# Appendix 3

Ardmore Park Quarry – Modification 3

# Pavement Remaining Life Report Ardmore Park Quarry Product Delivery Route

prepared by

**Pavement Management Services** 

(Total No. of pages including blank pages = 96)

September 2018

Ardmore Park Quarry Appendix 3 RESPONSE TO SUBMISSIONS
PA 07\_0155 MOD3
Report No. 625/25

# **Note to Readers**

It is noted that this report was prepared to assist in the negotiations for the Voluntary Planning Agreement (VPA). The contribution values in the VPA supersede those referred to on pages A3-1, A3-9, A3-13 and A3-14.

Appendix 3

# **MULTIQUIP QUARRIES**

# PAVEMENT REMAINING LIFE REPORT: ARDMORE PARK QUARRY PRODUCT DELIVERY ROUTE

# **REPORT NO. R2017152**

VER	REV	REVISION DESCRIPTION	VER. DATE	PREPARED BY	REVIEWED BY
1	0	Draft report for client review	3 <sup>rd</sup> Aug 18	J. Erskine	
1	1	Inclusion of additional truck types	11 <sup>th</sup> Sep 18	J. Erskine	
1	2	Revision of analysis to account for limit on annual tonnes hauled and combination of 4 Axle Dog & A Double truck scenario	24 <sup>th</sup> Sep 18	J. Erskine	
1	3	Issued as Final	25 <sup>th</sup> Sep 18	J. Erskine	

Winner

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Winner

Finalist

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# MULTIQUIP QUARRIES Ardmore Park Quarry Appendix 3

RESPONSE TO SUBMISSIONS
PA 07\_0155 MOD3
Report No. 625/25

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PA 07\_0155 MOD3 Report No. 625/25 MULTIQUIP QUARRIES

Ardmore Park Quarry

Appendix 3

#### **EXECUTIVE SUMMARY**

Pavement Management Services (PMS) was contracted by Multiquip to undertake a pavement structural evaluation and provide a remaining life assessment on the pavement of the Ardmore Park Quarry Transport Route from the South Marulan Road to the quarry entrance at Lumley Road. The route comprises Jerrara Road, Mountain Ash Road, Bungonia Bypass and Oallen Ford Road with the Bungonia Bypass not assessed between Mountain Ash Road and Oallen Ford Road.

To undertake the pavement investigation and prepare the remaining life report, Pavement Management Services undertook Falling Weight Deflectometer (FWD) testing on the existing pavement between 30<sup>th</sup> May and 20<sup>th</sup> June 2018. Based on the FWD testing, the values for deflection and curvature were determined and the remaining life for the various pavement sections assessed.

The findings of the structural and remaining life analysis found the three roads comprising the transport route exhibit a similar deflection response. Both Jerrara Road and Oallen Ford Road exhibit localised and for the most part isolated locations of remaining life less than 20 years, representing approximately 16% of the total transport route. The loaded lane of the transport route heading north owing to the higher design traffic volumes has the lower remaining life with an average of 17.1 to 17.5 years. This compares with to 19.3 to 19.4 for the unloaded lane considering the two quarry truck scenarios analysed.

The financial impact that the quarry trucks will have on the life of the pavement asset of the transport route when compared with the existing base load traffic was found to range from \$857,376 (3 Axle Dog) to \$1,143,168 (4 Axle Dog & A Double). This compares with Section 94 contributions based on material hauled over the same design period (20 years) which range from \$7,520,000 (3 Axle Dog) to \$10,646,064 (4 Axle Dog & A Double). The Section 94 contributions¹ range from 8.8 times (3 Axle Dog) to 9.3 times (4 Axle Dog & A Double) those determined from the increased consumption of the pavement asset.

This analysis is based on the pavement remaining in its current configuration of a spray sealed flexible unbound pavement that is subject to permanent deformation (rutting) being the primary mode in which these roads can be expected to fail. Should the road ever be surfaced with an asphalt wearing course the results indicate that asphalt fatigue would become the primary mode and with detrimental consequences.

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<sup>&</sup>lt;sup>1</sup> See Note on page A3-ii

RESPONSE TO SUBMISSIONS

Ardmore Park Quarry Appendix 3 PA 07\_0155 MOD3 Report No. 625/25

# **Table of Contents**

	PAGE
Executive Summary	1
1 Introduction	3
1.1 Introduction and Background	3
1.2 Objective	3
1.3 Scope of Work	3
1.4 Location Details	3
1.5 Referenced Documents	4
2 Method and Assumptions	5
2.1 Test Methods of Survey	5
2.1.1 Design Traffic Analysis	5
2.1.2 Remaining Life and Overlay Requirements based on Design Chart Method	7
3 Pavement Condition Results	8
3.1 Structural Assessment	8
3.1.1 Design Traffic	8
3.1.2 Deflection	9
3.1.3 Curvature	11
3.1.4 Empirical Remaining Life (ESA's)	12
4 Conclusions and Recommendations	14
Appendix A – Design Traffic Volumes	15
Appendix B – FWD Deflection Test Results	27
Appendix C – Design Chart Remaining Life Results	47



Ardmore Park Quarry Appendix 3

#### 1 INTRODUCTION

#### 1.1 Introduction and Background

Pavement Management Services (PMS) was contracted by Multiquip to undertake a pavement structural evaluation and provide a remaining life assessment on the pavement of the Ardmore Park Quarry Transport Route from the South Marulan Road to the quarry entrance at Lumley Road. The route comprises Jerrara Road, Mountain Ash Road, Bungonia Bypass and Oallen Ford Road with the Bungonia Bypass not assessed between Mountain Ash Road and Oallen Ford Road.

To undertake the pavement investigation and prepare the remaining life report, Pavement Management Services undertook Falling Weight Deflectometer (FWD) testing on the existing pavement between 30<sup>th</sup> May and 20<sup>th</sup> June 2018. Based on the FWD testing, the values for deflection and curvature were determined and the remaining life for the various pavement sections assessed.

### 1.2 Objective

The objective of this report was to determine the current structural capacity and remaining life of existing central pavement of the transport route.

#### 1.3 Scope of Work

The scope of work covered:

- FWD testing of Ardmore Park Quarry Transport Route excluding the Bungonia Bypass.
- Determine design traffic volumes for each road along the transport route comprising local traffic and additional quarry truck volumes considering both loaded and unloaded movements from the quarry.
- Assess the remaining life of the existing central pavement.

#### 1.4 Location Details

The Ardmore Park Quarry Transport route extends from the South Marulan Road in the north to the Ardmore Park Quarry in the south totalling 19.82km. Only those road segments maintained by council have been considered in this analysis. Figure 1-1 following shows "in red" the transport route tested with the blue line representing the Bungonia Bypass not tested.

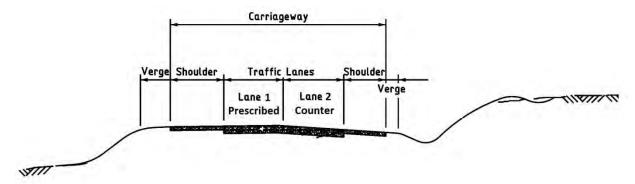


Figure 1-1 Ardmore Park Quarry Transport Route



Ardmore Park Quarry Appendix 3 PA 07\_0155 MOD3 Report No. 625/25

Testing was performed along the length of each road between the extents described in Table 1-1 following. Each road surveyed was considered as a two lane rural road with one lane in each direction and testing was undertaken in the existing central pavement. For the purposes of this report the following lane naming convention has been used as illustrated in Figure 1-2 following.



**Figure 1-2 Testing Lane Naming Convention** 

**Table 1-1: Section Locations** 

Road	Identifier	Start Location	End Location	Length (km)
James Dand	1A1	South Marulan Road	Mountain Ash Road	14.600
Jerrara Road	1A2	Mountain Ash Road	South Marulan Road	14.600
Mountain Ash	2A1	Jerrara Road	Bungonia Bypass	0.200
Road	2A2	Bungonia Bypass	Jerrara Road	0.200
Oallen Ford	3A1	Bungonia Bypass	Lumley Road (Quarry Entrance)	3.520
Road	3A2	Lumley Road (Quarry Entrance)	Bungonia Bypass	3.520

### 1.5 Referenced Documents

- 1. ASTM D4694 "Standard Test Method for Deflections with a Falling-Weight-Type Impulse Load Device" American Society for Testing Materials, Conshohocken, PA, 2002.
- 2. PMS-TP4-FWD "Falling Weight Deflectometer (FWD) Test Procedure" PMS, Sydney, 2000.
- 3. Austroads Pavement Design "Guide to Pavement Technology Part 5: Pavement Evaluation and Treatment Design", Austroads, 2008.
- 4. Ref No: PBS V110308 VA3988 Muscat Trailers / Multiquip Transport v1, NHVR 2017.
- 5. Austroads Pavement Design "Guide to Pavement Technology Part 2: Pavement Structural Design", Austroads, 2008.



PA 07\_0155 MOD3 Report No. 625/25

#### 2 METHOD AND ASSUMPTIONS

#### 2.1 Test Methods of Survey

The FWD testing was conducted in accordance with ASTM D4694 [1] and PMS-TP4-FWD [2] 30<sup>th</sup> May and 20<sup>th</sup> June 2018 and measured the pavement condition at 100m intervals. This testing was staggered in the adjacent lane as shown in Figure 2-1 following. The FWD measured at each test point the peak applied load and peak deflections from 9 geophones, with spacing ranging from under the centre of the load to a distance of 1.5m from the load. The target load of the testing was 40kN or approximately 566kPa based on a 300mm diameter loading plate. The deflection and curvature readings were determined from the FWD testing, based on the Austroads Guide to Pavement Technology - Part 5 [3].

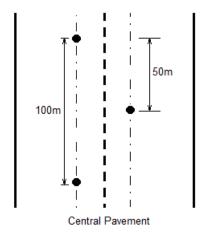


Figure 2-1 FWD Testing Pattern

#### 2.1.1 Design Traffic Analysis

Road traffic includes a mixture of vehicles ranging from light to heavy vehicles and all vehicles contribute to the structural deterioration of the pavement though light vehicle have a much lower impact when compared to heavy vehicles. To design a pavement structure within a defined period of time, the traffic is considered one of the most important factors.

The design traffic of Oallen Ford Road and Mountain Ash Road was determined from 12 bin vehicle classification data as supplied by representatives of Multiquip adjusted to 1st July 2018 based on a historical growth rate of 2.5%. In addition, a daily count of light and heavy vehicles travelling along Jerrara Road was performed in December 2017. The distribution of heavy vehicles from the Oallen Ford classified count was used to distribute the heavy vehicles observed on Jerrara Road. A total of 25,000 truck movements per annum, comprising 12,500 loaded from the quarry travelling north and unloaded travelling south are understood allowed to use the transport route. Three different quarry trucks are proposed to use the transport route, 3-axle dog plus 4-axle dog plus and A double in combination [4] with configurations as shown in Figure 2-2 to Figure 2-4 following. The design traffic volumes of the loaded and unloaded quarry trucks have been determined from weighbridge dockets provided by representatives of Multiquip for each type of truck. All design traffic calculations are based on The Guide to Pavement Technology Part 2: Pavement Structural Design published by Austroads in 2008 [5]. A design period of 20 years has been adopted along with a long term growth rate of 2.5% equal to the historical growth.



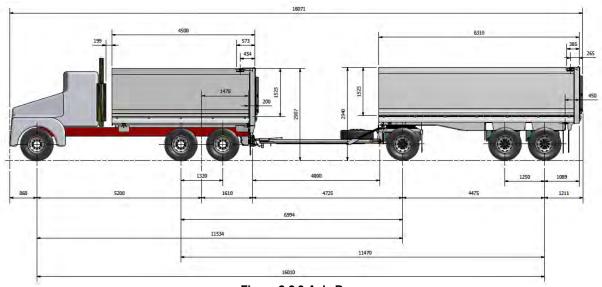


Figure 2-2 3-Axle Dog

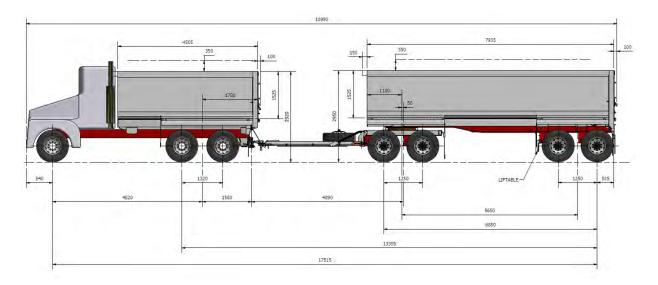


Figure 2-3 4-Axle Dog

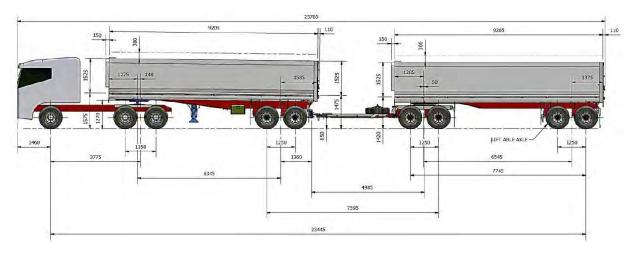


Figure 2-4 A Double



PA 07\_0155 MOD3 Report No. 625/25 MULTIQUIP QUARRIES

Ardmore Park Quarry

Appendix 3

# 2.1.2 Remaining Life and Overlay Requirements based on Design Chart Method

The empirical design chart based approach was used in the determination of the structural life of the pavement; the normalised deflection and curvature readings were related to the structural life in accordance with Part 5 of the Austroads Guide to Pavement Technology [3]. The following assumptions were made in undertaking this analysis:

- The remaining life and overlay requirements assume that the pavement is flexible and does not comprise cemented materials.
- The pavement surface comprises a single or double coat seal with a thickness of approximately 25mm.
- A seasonal moisture factor of 1.0 has been used on the basis that there is no defined wet/dry season at the site. This was determined utilising Bureau of Meteorology historical rainfall data from Goulburn which showed generally consistent rainfall patterns throughout the year.

Any assessment of pavement remaining life on the basis of the empirical design chart method is subject to the inherent limitations of empirical based methods. The more fundamentally based mechanistic-empirical approach, utilising material characteristics such as layer modulus and environmental conditions provides a higher level of confidence in the assessment of remaining life, subject to the constraints of having accurate pavement profiles.



Ardmore Park Quarry Appendix 3 PA 07\_0155 MOD3 Report No. 625/25

# **3 PAVEMENT CONDITION RESULTS**

# 3.1 Structural Assessment

### 3.1.1 Design Traffic

Twenty year design traffic volumes were determined using the traffic count and daily observed data plus the quarry trucks for each road. Table 3-1 summarises the design traffic calculations for each direction at the two locations.

**Table 3-1 Design Traffic** 

				3 A	xle Dog	4 Axle Do	g & A Double
Identifier	Road	Direction	Source	Design Traffic (ESA's) (1)	Reference	Design Traffic (ESA's) <sup>(1)</sup>	Reference
			Local	5.36x10 <sup>5</sup>	DT2017152-1	5.36x10 <sup>5</sup>	DT2017152-1
1A1	Jamana Daad		0	4.54.405	DT2047452 C	1.13x10 <sup>5</sup>	DT2017152-8
IAI	Jerrara Road	Unloaded	Quarry	1.54x10 <sup>5</sup>	DT2017152-6	1.79x10 <sup>5</sup>	DT2017152-10
			Total	6.90x10⁵	N/A	8.28x10 <sup>5</sup>	N/A
			Local	5.36x10 <sup>5</sup>	DT2017152-1	5.36x10 <sup>5</sup>	DT2017152-1
100	Jamana Daad	Landad	0	4 77,406	DT2047452 5	1.15x10 <sup>6</sup>	DT2017152-7
1A2	Jerrara Road	Loaded	Quarry	1.77x10 <sup>6</sup>	DT2017152-5	1.46x10 <sup>6</sup>	DT2017152-9
			Total	2.31x10 <sup>6</sup>	N/A	3.15x10 <sup>6</sup>	N/A
			Local	7.87x10 <sup>5</sup>	DT2017152-2	7.87x10 <sup>5</sup>	DT2017152-2
244	Mountain	haheold I	Quarry	1.54x10 <sup>5</sup>	DT2017152-6	1.13x10 <sup>5</sup>	DT2017152-8
2A1	Ash Road					1.79x10 <sup>5</sup>	DT2017152-10
			Total	9.41x10⁵	N/A	1.08x10 <sup>6</sup>	N/A
			Local	7.87x10 <sup>5</sup>	DT2017152-2	7.87x10 <sup>5</sup>	DT2017152-2
2A2	Mountain	Loaded	Querni	1 77,406	DT2017152-5	1.15x10 <sup>6</sup>	DT2017152-7
ZAZ	Ash Road		Quarry	urry   1.77x10 <sup>6</sup>	D12017152-5	1.46x10 <sup>6</sup>	DT2017152-9
			Total	2.56x10 <sup>6</sup>	N/A	3.40x10 <sup>6</sup>	N/A
			Local	3.26x10 <sup>5</sup>	DT2017152-3	3.26x10 <sup>5</sup>	DT2017152-3
3A1	Oallen Ford	Unloaded	Querni	1.54x10 <sup>5</sup>	DT2017152-6	1.13x10 <sup>5</sup>	DT2017152-8
SAT	Road	Unioaded	Quarry	1.5 <del>4</del> X10°	D12017152-0	1.79x10 <sup>5</sup>	DT2017152-10
			Total	4.80x10 <sup>5</sup>	N/A	6.18x10 <sup>5</sup>	N/A
			Local	3.16x10 <sup>5</sup>	DT2017152-4	3.16x10 <sup>5</sup>	DT2017152-4
3A2	Oallen Ford	Loaded	Quern:	1 77×106	DT2017152 5	1.15x10 <sup>6</sup>	DT2017152-7
SAZ	Road		Quarry	1.77x10 <sup>6</sup>	DT2017152-5	1.46x10 <sup>6</sup>	DT2017152-9
			Total	2.09x10 <sup>6</sup>	N/A	2.93x10 <sup>6</sup>	N/A

<sup>(1)</sup> Total Design Traffic is calculated as Local plus Quarry traffic



PA 07\_0155 MOD3 Report No. 625/25

Section 94 contributions<sup>2</sup> paid to council based on the payload of material transported from the quarry by each truck over the 20 year design period is summarised in Table 3-2.

**Table 3-2 Section 94 Contributions** 

Truck	Payload (tonnes)	Section 94 (cents/tonne)	Annual Loaded Trips	20 Year Section 94 Contributions	
3-Axle Dog	32	94	12,500	\$7,520,000	
4-Axle Dog <sup>1</sup>	39	94	6,292	\$4,613,294	
A Double <sup>1</sup>	51	94	6,292	\$6,032,770	

<sup>(1)</sup> Based on the 4-Axle Dog and A Double combination, total section 94 contributions equates to \$10,646,064.

# 3.1.2 Deflection

The aim of this analysis is to determine the current structural capacity of each road segment so that any impact from the quarry trucks can be assessed. The deflection values refer to the amount of vertical displacement that occurs in the pavement under a loaded truck. Table 3-3 and Figure 3-1 following, show the statistical summary and the distribution of measured deflection results across each road segment.

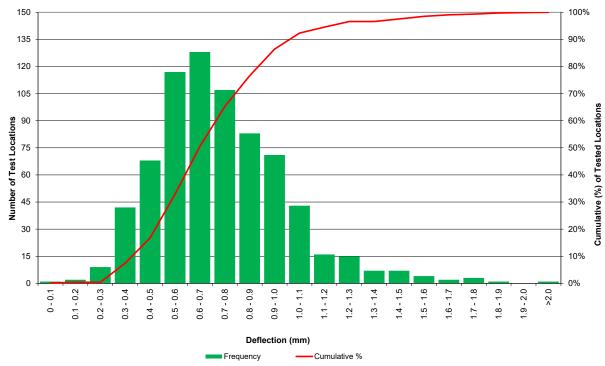
**Table 3-3 Deflection Results** 

Road	Identifier	Average	Standard Deviation	Upper 10 <sup>th</sup> Percentile	Lower 10 <sup>th</sup> Percentile	Minimum	Maximum
Jarrara Dood	1A1	0.76	0.22	1.02	0.51	0.29	1.58
Jerrara Road	1A2	0.76	0.29	1.09	0.42	0.09	2.09
Mountain Ash	2A1	0.66	0.21	0.77	0.54	0.51	0.80
Road	2A2	0.61	0.04	0.63	0.59	0.58	0.64
Oallen Ford	3A1	0.66	0.22	0.89	0.42	0.22	1.23
Road	3A2	0.68	0.25	0.98	0.37	0.12	1.20

These results show that in terms of average deflection, all roads generally exhibit a similar overall deflection response across the existing central pavement. What is also evident from the analysis is that there is a large range of deflection readings across each road as a whole with the deflections ranging from less than 0.5mm up to in excess of 1.5mm. The distribution of deflection values show approximately 15% of the tested locations have a deflection in excess of 1.0mm equivalent to a remaining life of less than 3 million axle repetitions. With the current loaded lane 20 year traffic volumes close to this volume, the results suggest that approximately 15% of the transport route is likely to have a remaining life of less than 20 years.



<sup>&</sup>lt;sup>2</sup> See Note on page A3-ii



**Figure 3-1 Distribution of Deflection** 

For comparison purposes, the following design deflections from Austroads [3] shown in Figure 3-2 are required to support the range of design traffic loadings.

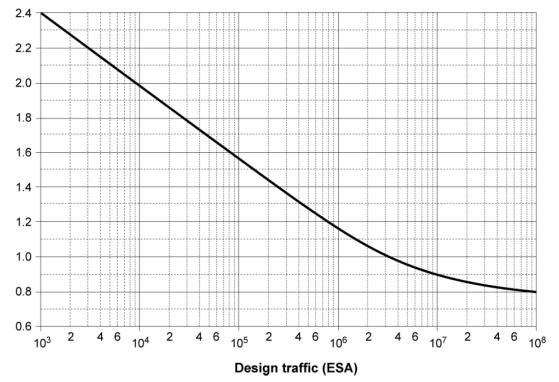


Figure 3-2 Design Deflections

Deflection results for each test location can be found in Appendix B.



#### 3.1.3 Curvature

The aim of this analysis is to determine the current structural capacity of each road segment so that any impact from the quarry trucks can be assessed. The curvature measures the shape of the deflection bowl. The higher the curvature the more likely the pavement is to crack under traffic load. High values for curvature indicate a tendency of the surface to suffer fatigue cracking. As the site tested is a spray seal surfaced pavement, fatigue cracking is not typically the primary cause of pavement failure. Table 3-4 and Figure 3-3 following, show the statistical summary and the distribution of measured curvature results across each road segment.

**Table 3-4 Curvature Results** 

Road	Identifier	Average	Standard Deviation	Upper 10 <sup>th</sup> Percentile	Lower 10 <sup>th</sup> Percentile	Minimum	Maximum
Jerrara Road	1A1	0.33	0.09	0.45	0.22	0.17	0.61
Jerrara Roau	1A2	0.30	0.11	0.45	0.19	0.03	0.62
Mountain Ash	2A1	0.26	0.04	0.28	0.24	0.23	0.29
Road	2A2	0.25	0.06	0.28	0.22	0.21	0.29
Oallen Ford	3A1	0.27	0.11	0.41	0.14	0.07	0.67
Road	3A2	0.24	0.10	0.37	0.15	0.05	0.52

These results show that in terms of curvature, all roads again have a similar overall response across the existing central pavement. It is important to note that as the transport route is a spray seal surfaced pavement fatigue which is assessed using curvature values is not applicable for this location. The distribution of curvature values show approximately 95% of the tested locations have a curvature in excess of 0.15mm equivalent to a remaining life of less than 3 million axle repetitions. This suggests that almost the entire length of the transport route is incapable of carrying significant traffic volumes should asphalt be used to surface the pavement in future due to the flexible nature of the pavement structure.

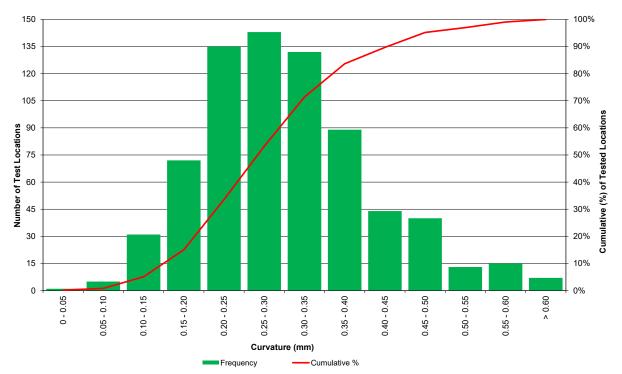


Figure 3-3 Distribution of Curvature

For comparison purposes the following values in Table 3-5 provides the design traffic life (in the fatigue mode) for various curvature functions.



Ardmore Park Quarry Appendix 3 PA 07\_0155 MOD3 Report No. 625/25

Table 3-5 Curvature/Design Traffic Loading Relationships

Curvature (mm)	Design Traffic Loading
< 0.11	More than 10 million ESA
0.11 – 0.18	1 million to 10 million ESA
0.18 – 0.32	100,000 to 1 million ESA
0.32 - 0.50	10,000 to 100,000 ESA
> 0.50	Less than 10,000 ESA

Curvature test results for each test location can be found in Appendix B.

# 3.1.4 Empirical Remaining Life (ESA's)

The remaining life of the pavement has been assessed using the Austroads empirically derived Design Chart Method using the peak deflection to assess the number of standard axle repetitions to failure in terms of permanent deformation. This in turn, based on the current and proposed quarry traffic volumes for each road has been used to determine the remaining life in terms of years.

**Table 3-6 Remaining Life Results (Years)** 

Road	Identifier	Existing (No Quarry)		3 Axle Dog		4 Axle Dog	Tested	
Noau	identinei	Average	< 10 yrs	Average	< 10 yrs	Average	< 10 yrs	Locations
Jerrara Road	1A1	19.5	4	19.3	5	19.3	5	145
Jeliala Noau	1A2	18.9	8	17.2	19	16.7	25	145
Mountain Ash	2A1	20.0	0	20.0	20	20.0	0	2
Road	2A2	20.0	0	20.0	20	20.0	0	2
Oallen Ford	3A1	20.0	0	19.8	0	19.6	0	35
Road	3A2	20.0	0	18.5	3	18.2	3	35
Total		19.4	12 (3.3%)	18.5	27 (7.4%)	18.2	33 (9.1%)	364

The average remaining life of the unloaded lane was found to range from be 19.3 to 19.4 years and for the unloaded lane from 17.1 to 17.5 years based on the two quarry truck scenarios analysed. Overall considering both the loaded and unloaded lanes, the average remaining life for the transport route was 18.5 years for the 3 Axle Dog, 18.2 years for the 4 Axle Dog and A Double combination. Despite the 4 Axle Dog and A Double combination carrying 40% more material than the 3 Axle Dog from the same number of design life movements, the remaining life is reduced by only 0.3 years.

By examining the reduction in remaining life for the three truck configurations it is possible to determine an economic cost reflecting the increased consumption of the pavement asset associated with the quarry trucks using the local roads. Utilising a reconstruction unit rate of  $130/m^2$  provided by representatives of Multiquip, a replacement cost for the 18.32km transport route, excluding the Bungonia Bypass, based on an 8m width is calculated as 19,052,800 (130 x 8 x 18320). Determining the delta of the average remaining life between the existing traffic volumes without the quarry trucks and those with the addition of the quarry trucks, a value for the increased consumption of the pavement asset can be determined as follows:

$$\textit{Consumption} = \frac{\textit{Remaining Life}_{\textit{current}} - \textit{Remaining Life}_{\textit{quarry}}}{20} \times \textit{Replacement Cost}$$



Ardmore Park Quarry Appendix 3

PA 07\_0155 MOD3 Report No. 625/25

The consumption of the pavement asset is summarised for the three truck configuration in Table 3-7 following and compared with the Section 94 contributions<sup>3</sup> paid.

**Table 3-7 Consumption vs Contributions** 

	Current	3 Axle Dog	4 Axle Dog & A Double
Remaining Life	19.4	18.5	18.2
Consumption	N/A	\$857,376	\$1,143,168
Section 94 Contributions	N/A	\$7,520,000	\$10,646,064

What can be seen from this economic analysis is that the section 94 contributions are considerably greater, being almost 10 times that determined from the increased consumption of the pavement asset. While the quarry trucks will also contribute to an increased deterioration of the wearing surface which has not been considered in this analysis, this increase is not deemed to be significant. Furthermore the replacement cost that has been calculated is inclusive of the wearing surface and the unit rate adopted is understood to be conservative. As such any increased consumption of the wearing course is believed to be taken into account within the economic analysis undertaken.

The remaining life results for each road at each test location can be found in Appendix C.



<sup>&</sup>lt;sup>3</sup> See Note on page A3-ii

# MULTIQUIP QUARRIES Ardmore Park Quarry

Appendix 3

**RESPONSE TO SUBMISSIONS** 

PA 07\_0155 MOD3 Report No. 625/25

### 4 CONCLUSIONS AND RECOMMENDATIONS

The findings of the structural and remaining life analysis found the three roads comprising the transport route exhibit a similar deflection response. Both Jerrara Road and Oallen Ford Road exhibit localised and for the most part isolated locations of remaining life less than 20 years, representing approximately 16% of the total transport route. The loaded lane of the transport route heading north owing to the higher design traffic volumes has the lower remaining life with an average of 17.1 to 17.5 years. This compares with to 19.3 to 19.4 for the unloaded lane considering the two guarry truck scenarios analysed.

The financial impact that the quarry trucks will have on the life of the pavement asset of the transport route when compared with the existing base load traffic was found to range from \$857,376 (3 Axle Dog) to \$1,143,168 (4 Axle Dog & A Double). This compares with Section 94 contributions based on material hauled over the same design period (20 years) which range from \$7,520,000 (3 Axle Dog) to \$10,646,064 (4 Axle Dog & A Double). The Section 94 contributions<sup>4</sup> range from 8.8 times (3 Axle Dog) to 9.3 times (4 Axle Dog & A Double) those determined from the increased consumption of the pavement asset.

This analysis is based on the pavement remaining in its current configuration of a spray sealed flexible unbound pavement that is subject to permanent deformation (rutting) being the primary mode in which these roads can be expected to fail. Should the road ever be surfaced with an asphalt wearing course the results indicate that asphalt fatigue would become the primary mode and with detrimental consequences.

<sup>&</sup>lt;sup>4</sup> See Note on page A3-ii



A3-14

PA 07\_0155 MOD3 Report No. 625/25 MULTIQUIP QUARRIES Ardmore Park Quarry Appendix 3

# APPENDIX A - DESIGN TRAFFIC VOLUMES



Ardmore Park Quarry Appendix 3 PA 07\_0155 MOD3 Report No. 625/25

Report Date: 2-Aug-18	Management Services to F	roads Guid Pavement chnology <sup>1</sup>
Project No.: 2017/152	Unit 7b, 26 Powers Road Seven Hills, NSW 2147	
Vehicle   Class   Lane/Day   SAST   SADT   TAST	Prepared By: James Erskine Report No.: DT2017152-1 Direction: N/A Carriageway: Single Design Lane: Left Lane Design Period: 20 years Projected Growth Rate: 2.5% Historical Growth Rate: 2.5%	
Vehicle   Class   Lane/Day   SAST   SADT   TAST		
Class	i i	
2   311   0   0   0   0   0   3   34   34   34	TRDT QADT N <sub>HVAG</sub>	
3	0 0 0	
4   5   5   0   0   0	0 0 0 68	
S	0 0 10	
Total HV/Day 51   Total HV/Day 115   Calculated N <sub>HVAG</sub> 2.25	0 0 6	
Section   Sect	0 0 15	
10	0 0 3	
10	0 0 6	
11	1 0 3	
13 (Other)	0 0 0	
Total   362   53   45   0	0 0 0	
Total HV/Day 51	0 0 0	
Total HV/Day 51	2 0 115	
Total HV/Day 51 otal HV Axle Groups/Day 115 Calculated N <sub>HVAG</sub> 2.25  raffic Design Figures  Current AADT: 367 DF: 0.5 %HV: 14.1 LDF: 1 CGF: 25.5 Presumptive N <sub>HVAG</sub> : N/A  raffic Load Distribution Calculations  Standard Axle Repetitions per Heavy Vehicle Axle Group SAST 0.510 1.149 0.592 0.933 10 SADT 0.360 0.811 0.422 0.650 2. TAST 0.000 0.000 0.000 0.000 0.000 0.000 TADT 0.106 0.239 0.117 0.158 0. TADT 0.106 0.239 0.117 0.158 0. TRDT 0.010 0.023 0.011 0.018 0. QADT 0.000 0.000 0.000 0.000 0.000 0.000 Total 0.986 2.223 1.142 1.753 14  esign Traffic Loading Calculations  Design Traffic (ESA)  Patigue of asphalt DSAR5 5.36E+05  Rutting and shape loss DSAR7 9.53E+05	0.017 0.000	
Axle Group   ESA/HVAG   ESA/HV   SAR5/HVAG   SAR7/HVAG   SAR7/HV	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6	
Axle Group   ESA/HVAG   ESA/HV   SAR5/HVAG   SAR7/HVAG   SAR7/HV	7.6.2	
SAST   0.510	Standard Axle Repetitions per ESA <sup>2</sup>	
SADT	G SAR5/ESA SAR7/ESA SAR12/ESA	
TAST	0.601 0.946 11.080	
TADT	0.428 0.660 3.038	
TRDT	0.000 0.000 0.000 0.119 0.160 0.591	
QADT   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000	0.011 0.013 0.036	
Design Traffic (ESA)  Design Traffic (ESA)  N <sub>DT</sub> 5.44E+05  Overall Damage DESA  Design Standard Axle Repetitions (DSAR)  Fatigue of asphalt SAR5  Rutting and shape loss DSAR7 9.53E+05	0.000 0.000 0.000	
Design Traffic (ESA)	1,158 1.779 14.746 Table	7.8
Design Traffic (ESA)	7.6.3	
N <sub>DT</sub>   5.44E+05     Overall Damage   DESA   5.36E+05     Design Standard Axle Repetitions (DSAR)     Fatigue of asphalt   DSAR5   6.21E+05     Rutting and shape loss   DSAR7   9.53E+05		
Overall Damage DESA 5.36E+05  Design Standard Axle Repetitions (DSAR)  Fatigue of asphalt DSAR5  Rutting and shape loss DSAR7 9.53E+05	Equa	tion 7.1
Fatigue of asphalt DSAR5 6.21E+05 Rutting and shape loss DSAR7 9.53E+05	Equal	tion 7.4
Rutting and shape loss DSAR7 9.53E+05		
		tion 7.5
		tion 7.5 tion 7.5
. These design traffic calculations follow the methodology of the Austroads Guide to Pavern . Method of traffic collection determines whether results are calculated or presumptive value		
The state of the s	200	



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PA 07\_0155 MOD3 Report No. 625/25

Intended Date of Opening:

Ardmore Park Quarry Appendix 3



Austroads Guide to Pavement Technology<sup>1</sup>

#### **Design Traffic Calculation Sheet**

Report Date: 2-Aug-18 Project No.: 2017152

Location: Mountain Ash Road (100m east of Jerrara Road)

Client: Multiquip

Road Type: Rural Method: Vehicle Classification Count

Traffic Load: Moderate to Heavy

Date Collected:

from 3-Aug-17

to 24-Aug-17 1-Jul-18

0.85 years to start of work

Unit 7b, 26 Powers Roa Seven Hills, NSW 2147

Prepared By: James Erskine Report No.: DT2017152-2 Direction: N/A

Carriageway: Single Design Lane: Left Lane Design Period: 20

years Projected Growth Rate: 2.5%

Historical Growth Rate: 2.5%

7.4.2 7.4.5

7.4.4

7.4.4

7.4.3

Average Daily Traffic Figures (Vehicles/Lane/Day)

Vehicle Class	Vehicles/ Lane/Day	SAST	SADT	TAST	TADT	TRDT	QADT	N <sub>HVAG</sub>
1	484	0	0	0	0	0	0	0
2	46	0	0	0	0	0	0	0
3	58	58	58	0	0	0	0	116
4	4	4	0	0	4	0	0	8
5	2	4	0	0	2	0	0	6
6	4	4	8	0	0	0	0	12
7	4	4	4	0	4	0	0	12
8	(4)	1.	0	0	2	0	0	3
9	2	2	0	0	2	2	0	6
10	1	1	0	0	2	10	0	4
-11	0	0	0	0	0	0	0	.0
12	0	0	0	0	0	0	0	0
13 (Other)	0	0	0	0	0	0	0	0
Total	606	78	70	0	16	3	0	167
ion of Each Axle	4 000	0.407		0.000	0.000	0.040	2.000	

Prop 1.000 0.467 0.419 0.000 0.096 0.018 0.000 Group

Total HV/Day 76 Total HV Axle Groups/Day 167 Calculated N<sub>HVAG</sub> 2.20

#### **Traffic Design Figures**

Current AADT: 619 DF: 0.5 %HV: 12.5 LDF: 1 CGF: 25.5 Presumptive N<sub>HVAG</sub>: N/A

**Traffic Load Distribution Calculations** 

7.4.5
7.4.6
1 2 2

	Standard	Axle Repeti	itions per Heav	y Vehicle Axl	Group <sup>2</sup>	Standard A	xle Repetition	ons per ESA <sup>2</sup>
Axle Group	ESA/HVAG	ESA/HV	SAR5/HVAG	SAR7/HVAG	SAR12/HVAG	SAR5/ESA	SAR7/ESA	SAR12/ESA
SAST	0.517	1.135	0.600	0.945	11.069	0.606	0.954	11.177
SADT	0.385	0.847	0.452	0.697	3.208	0.457	0.704	3.239
TAST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TADT	0.078	0.171	0.086	0.116	0.428	0.087	0.117	0.432
TRDT	0.010	0.023	0.011	0.013	0.037	0.011	0.013	0.037
QADT	0.000	0.000	0.000	0,000	0.000	0.000	0.000	0.000
Total	0.000	2 176	1 1/40	1 771	14 741	1 160	1 788	14 885

**Design Traffic Loading Calculations** 

Design Traffic (ESA)		7.055.00
Stramous and a	N <sub>DT</sub>	7.95E+05
Overall Damage	DESA	7.87E+05
Design Standard Axle Repetitions (	DSAR)	
Design Standard Axle Repetitions (I	DSAR) DSAR5	9.14E+05
		9.14E+08

1. These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G 2. Method of traffic collection determines whether results are calculated or presumptive values are used

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Equation 7.1 Equation 7.4

Table 7.8

7.6.3

Equation 7.5 Equation 7.5 Equation 7.5

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Page 1 of 1



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Ardmore Park Quarry Appendix 3 PA 07\_0155 MOD3 Report No. 625/25

Report Date: 2-Aug-18 Client: Multiquip Project No.: 2017152 Location: Oallen Ford Fload (2km south of King Street/Lookdown Road) Direction: South Road Type: Rural Carriageway: Single Method: Vehicle Classification Count Traffic Load: Moderate to Heavy Projected Growth Rate: 2.5%  Date Collected: from 10-May-13 to 17-May-13							1		avement agement Services	Austroads Gu to Pavemer Technology
Report Date   2.4   2.5   2.5   Client: Multipup   Project Not : 2017152   Project Not	esign Traffic Calculati	ion Sheet								
Vehicles	Project No.: Location: Road Type: Method: Traffic Load: Date Collected: ntended Date of Opening:	2017152 Oallen Ford Ro Rural Vehicle Classif Moderate to Ho from to	oad (2km sou fication Coun eavy 10-May-13 17-May-13 1-Jul-18	uth of King Street t			( I De Projected (	Report No.: Direction: Carriageway: Design Lane: esign Period: Growth Rate:	James Erskine DT2017152-3 South Single Left Lane 20 years 2.5%	
Class   Lane   Day   SASI   SAU   IASI   IAU   IAU   OAU   North   N		11 8 10 1 W 8 17					H1000	77.75	ľu o	
15			SAST	SADT	TAST	TADT	TRDT	QADT	N <sub>HVAG</sub>	
3										
4										
Section   1										
Section   Company   Comp										
The content of the										
9	7			0	0	0	0	0	0	
10										
11										
12	3.6~									
13 (Other)   0										
Total   184	VC 2004 1964									
Total HV/Jub   Tota										13
Total HV/Jub   Tota	Proportion of Each Axle	1 000	0.404	0.055	0.000	0.404	0.000	0.000		
Presumptive N <sub>HVAG</sub> ; N/A	caffic Design Figures  Current AADT:  DF:  %HV:	209 1 7.6								7.4.4 7.4.4
Standard Axle Repetitions per Heavy Vehicle Axle Group										
Axle Group   ESAHVAG	CGF:	25.5								7.4.5
SAST   0.535   1.185   0.622   0.979   11.467   0.626   0.986   11.552	CGF: Presumptive N <sub>HVAG</sub> :	25.5 N/A	ons							7.4.5 7.4.6
SADT   0.326   0.722   0.383   0.590   2.716   0.386   0.594   2.736     TAST   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000     TADT   0.131   0.291   0.144   0.195   0.720   0.146   0.196   0.726     TRDT   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000     QADT   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000     Total   0.993   2.198   1.149   1.764   14.903   1.158   1.777   15.014     Pasign Traffic Loading Calculations   Table 7.8     Pasign Traffic (ESA)   Equation 7.1     Overall Damage   DESA   3.28E+05   Equation 7.4     Design Standard Axle Repetitions (DSAR)   Equation 7.5     Rutting and shape loss   DSAR7   5.79E+05   Equation 7.5     Fatigue of cemented materials   DSAR12   4.89E+06   Equation 7.5     These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G	CGF: Presumptive N <sub>HVAG</sub> :	25.5 N/A on Calculatio	1.00	tions per Heav	y Vehicle Axlo	e Group <sup>2</sup>		Standard A	xle Repetitions per ESA <sup>2</sup>	7.4.5 7.4.6
TAST	CGF: Presumptive N <sub>HVAG</sub> : raffic Load Distributio	25.5 N/A on Calculation Standard	Axle Repeti ESA/HV	SAR5/HVAG	SAR7/HVAG	SAR12/HVA	G	SAR5/ESA	SAR7/ESA SAR12/ESA	7.4.5 7.4.6
TADT   0.131   0.291   0.144   0.195   0.720   0.146   0.196   0.726     TRDT   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000     TRDT   0.000   0.000   0.000   0.000   0.000   0.000   0.000     Total   0.993   2.198   1.149   1.764   14.903   1.158   1.777   15.014     Table 7.8	CGF: Presumptive N <sub>HVAG</sub> : raffic Load Distributio  Axle Group SAST	25.5 N/A on Calculation Standard ESA/HVAG 0.535	Axle Repeti ESA/HV 1.185	SAR5/HVAG 0.622	SAR7/HVAG 0.979	SAR12/HVA 11.467	G	SAR5/ESA 0.626	SAR7/ESA SAR12/ESA 0.986 11.552	7.4.5 7.4.6
TRDT	CGF: Presumptive N <sub>HVAG</sub> :  **affic Load Distributio*  **Example Axle Group  SAST SAST SADT	25.5 N/A on Calculation Standard ESA/HVAG 0.535 0.326	Axle Repeti ESA/HV 1.185 0.722	SAR5/HVAG 0.622 0.383	SAR7/HVAG 0.979 0.590	SAR12/HVA 11.467 2.716	G	SAR5/ESA 0.626 0.386	SAR7/ESA SAR12/ESA 0.986 11.552 0.594 2,736	7.4.5 7.4.6
Company   Comp	CGF: Presumptive N <sub>HVAG</sub> :  affic Load Distributio  Axle Group  SAST SADT TAST	25.5 N/A on Calculation Standard ESA/HVAG 0.535 0.326 0.000	ESA/HV 1.185 0.722 0.000	SAR5/HVAG 0.622 0.383 0.000	SAR7/HVAG 0.979 0.590 0.000	SAR12/HVA 11.467 2.716 0.000	G	SAR5/ESA 0.626 0.386 0.000	SAR7/ESA SAR12/ESA 0.986 11.552 0.594 2.736 0.000 0.000	7.4.5 7.4.6
Pesign Traffic Loading Calculations  Design Traffic (ESA)  NDT 3.28E+05 Overall Damage DESA 3.26E+05  Equation 7.1 Equation 7.4  Design Standard Axle Repetitions (DSAR)  Fatigue of asphalt DSARS 3.77E+05 Rutting and shape loss DSAR7 5.79E+05 Fatigue of cemented materials DSAR12 4.89E+06  These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G	CGF: Presumptive N <sub>HVAG</sub> :  affic Load Distributio  Axle Group SAST SADT TAST TADT	25.5 N/A on Calculation Standard ESA/HVAG 0.535 0.326 0.000 0.131	ESA/HV 1.185 0.722 0.000 0.291	SAR5/HVAG 0.622 0.383 0.000 0.144	SAR7/HVAG 0.979 0.590 0.000 0.195	SAR12/HVA 11.467 2.716 0.000 0.720	G	SAR5/ESA 0.626 0.386 0.000 0.146	SAR7/ESA SAR12/ESA 0.986 11.552 0.594 2.736 0.000 0.000 0.196 0.726	7.4.5 7.4.6
Design Traffic (ESA)  NDT 3.28E+05 3.26E+05  Design Standard Axle Repetitions (DSAR)  Fatigue of asphalt DSARS DSAR7 Fatigue of cemented materials DSAR12  DSAR12  These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G	CGF: Presumptive N <sub>HVAG</sub> :  affic Load Distributio  Axle Group SAST SAST SADT TAST TADT TRDT QADT	25.5 N/A  Calculation  Standard  ESA/HVAG  0.535 0.326 0.000 0.131 0.000 0.000	ESA/HV 1.185 0.722 0.000 0.291 0.000 0.000	SAR5/HVAG 0.622 0.383 0.000 0.144 0.000 0.000	SAR7/HVAG 0.979 0.590 0.000 0.195 0.000 0.000	11.467 2.716 0.000 0.720 0.000 0.000	G	SAR5/ESA 0.626 0.386 0.000 0.146 0.000 0.000	SAR7/ESA SAR12/ESA 0.986 11.552 0.594 2.736 0.000 0.000 0.196 0.726 0.000 0.000 0.000 0.000	7.4.5 7.4.6 7.6.2
Design Traffic (ESA)  NDT 3.28E+05 3.26E+05  Design Standard Axle Repetitions (DSAR)  Fatigue of asphalt DSARS DSAR7 Fatigue of cemented materials DSAR12  DSAR12  These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G	CGF: Presumptive N <sub>HVAG</sub> :  affic Load Distributio  Axle Group SAST SAST SADT TAST TADT TRDT QADT	25.5 N/A  Calculation  Standard  ESA/HVAG  0.535 0.326 0.000 0.131 0.000 0.000	ESA/HV 1.185 0.722 0.000 0.291 0.000 0.000	SAR5/HVAG 0.622 0.383 0.000 0.144 0.000 0.000	SAR7/HVAG 0.979 0.590 0.000 0.195 0.000 0.000	11.467 2.716 0.000 0.720 0.000 0.000	G	SAR5/ESA 0.626 0.386 0.000 0.146 0.000 0.000	SAR7/ESA SAR12/ESA 0.986 11.552 0.594 2.736 0.000 0.000 0.196 0.726 0.000 0.000 0.000 0.000	7.4.5 7.4.6 7.6.2
Overall Damage DESA 3.28E+05 3.26E+05 Equation 7.1  Design Standard Axle Repetitions (DSAR)  Fatigue of asphalt Rutting and shape loss Fatigue of cemented materials DSAR1 DSAR1 DSAR12 4.89E+06 Equation 7.5  These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G	CGF: Presumptive N <sub>HVAG</sub> :  raffic Load Distributio  Axle Group SAST SADT TAST TADT TRDT QADT Total	25.5 N/A  Calculation  Standard  ESA/HVAG  0.535 0.326 0.000 0.131 0.000 0.000 0.993	ESA/HV 1.185 0.722 0.000 0.291 0.000 0.000 2.198	SAR5/HVAG 0.622 0.383 0.000 0.144 0.000 0.000	SAR7/HVAG 0.979 0.590 0.000 0.195 0.000 0.000	11.467 2.716 0.000 0.720 0.000 0.000	G	SAR5/ESA 0.626 0.386 0.000 0.146 0.000 0.000	SAR7/ESA SAR12/ESA 0.986 11.552 0.594 2.736 0.000 0.000 0.196 0.726 0.000 0.000 0.000 0.000	7.4.5 7.4.6 7.6.2 Table 7.8
Overall Damage DESA 3.26E+05 Equation 7.4  Design Standard Axle Repetitions (DSAR)  Fatigue of asphalt DSAR5 3.77E+05 Rutting and shape loss DSAR7 5.79E+05 Fatigue of cemented materials DSAR12 4.89E+06 Equation 7.5  These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G	CGF: Presumptive N <sub>HVAG</sub> :  raffic Load Distributio  Axle Group SAST SADT TAST TADT TADT TADT TADT TADT	25.5 N/A  Calculation  Standard  ESA/HVAG  0.535 0.326 0.000 0.131 0.000 0.000 0.993  Calculation	ESA/HV 1.185 0.722 0.000 0.291 0.000 0.000 2.198	SAR5/HVAG 0.622 0.383 0.000 0.144 0.000 0.000	SAR7/HVAG 0.979 0.590 0.000 0.195 0.000 0.000	11.467 2.716 0.000 0.720 0.000 0.000	G	SAR5/ESA 0.626 0.386 0.000 0.146 0.000 0.000	SAR7/ESA SAR12/ESA 0.986 11.552 0.594 2.736 0.000 0.000 0.196 0.726 0.000 0.000 0.000 0.000	7.4.5 7.4.6 7.6.2 Table 7.8
Fatigue of asphalt DSARS 3.77E+05 Equation 7.5 Rutting and shape loss DSAR7 DSAR1	CGF: Presumptive N <sub>HVAG</sub> :  affic Load Distributio  Axle Group SAST SADT TAST TADT TRDT QADT Total  esign Traffic Loading	25.5 N/A  Calculation  Standard  ESA/HVAG  0.535 0.326 0.000 0.131 0.000 0.000 0.993  Calculation	ESA/HV 1.185 0.722 0.000 0.291 0.000 0.000 2.198	SAR5/HVAG 0.622 0.383 0.000 0.144 0.000 0.000 1.149	SAR7/HVAG 0.979 0.590 0.000 0.195 0.000 0.000	11.467 2.716 0.000 0.720 0.000 0.000	G	SAR5/ESA 0.626 0.386 0.000 0.146 0.000 0.000	SAR7/ESA SAR12/ESA 0.986 11.552 0.594 2.736 0.000 0.000 0.196 0.726 0.000 0.000 0.000 0.000	7.4.5 7.4.6 7.6.2 Table 7.8 7.6.3
Rutting and shape loss DSAR7 5.79E+05 Equation 7.5 Fatigue of cemented materials DSAR12 4.89E+06 Equation 7.5  These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G	CGF: Presumptive N <sub>HVAG</sub> :  *affic Load Distributio  Axle Group SAST SADT TAST TADT TRDT QADT Total  esign Traffic Loading  Design Tra  Ov	25.5 N/A  Calculation  Standard  ESA/HVAG  0.535 0.326 0.000 0.131 0.000 0.000 0.993  Calculation  offic (ESA)	ESA/HV 1.185 0.722 0.000 0.291 0.000 2.198	SAR5/HVAG 0.622 0.383 0.000 0.144 0.000 0.000 1.149	SAR7/HVAG 0.979 0.590 0.000 0.195 0.000 0.000	11.467 2.716 0.000 0.720 0.000 0.000	G	SAR5/ESA 0.626 0.386 0.000 0.146 0.000 0.000	SAR7/ESA SAR12/ESA 0.986 11.552 0.594 2.736 0.000 0.000 0.196 0.726 0.000 0.000 0.000 0.000	7.4.5 7.4.6 7.6.2 Table 7.8 7.6.3
Fatigue of cemented materials DSAR12 4.89E+06 Equation 7.5  These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G	CGF: Presumptive N <sub>HVAG</sub> :  *affic Load Distributio  Axle Group SAST SADT TAST TADT TRDT TRDT TRDT TRDT TRDT TRDT TRD	25.5 N/A  Calculation  Standard  ESA/HVAG  0.535 0.326 0.000 0.131 0.000 0.000 0.993  Calculation  offic (ESA)  rerall Damage	ESA/HV 1.185 0.722 0.000 0.291 0.000 2.198  IS  Note the content of the content o	SAR5/HVAG 0.622 0.383 0.000 0.144 0.000 1.149 3.28E+05 3.26E+05	SAR7/HVAG 0.979 0.590 0.000 0.195 0.000 0.000	11.467 2.716 0.000 0.720 0.000 0.000	G	SAR5/ESA 0.626 0.386 0.000 0.146 0.000 0.000	SAR7/ESA SAR12/ESA 0.986 11.552 0.594 2.736 0.000 0.000 0.196 0.726 0.000 0.000 0.000 0.000	7.4.5 7.4.6 7.6.2 Table 7.8 7.6.3 Equation 7.1 Equation 7.4
	CGF: Presumptive N <sub>HVAG</sub> :  affic Load Distributio  Axle Group SAST SADT TAST TADT TRDT QADT Total  esign Traffic Loading  Design Tra  Ov  Design Standard Axle Fatig	25.5 N/A  Calculatic  Standard  ESA/HVAG  0.535 0.326 0.000 0.131 0.000 0.000 0.993  Calculation  offic (ESA)  rerall Damage Repetitions ( gue of asphalt	ESA/HV 1.185 0.722 0.000 0.291 0.000 2.198  NpT DESA  DSAR) DSARS	SAR5/HVAG 0.622 0.383 0.000 0.144 0.000 0.000 1.149 3.28E+05 3.26E+05	SAR7/HVAG 0.979 0.590 0.000 0.195 0.000 0.000	11.467 2.716 0.000 0.720 0.000 0.000	G	SAR5/ESA 0.626 0.386 0.000 0.146 0.000 0.000	SAR7/ESA SAR12/ESA 0.986 11.552 0.594 2.736 0.000 0.000 0.196 0.726 0.000 0.000 0.000 0.000	7.4.5 7.4.6 7.6.2 Table 7.8 7.6.3 Equation 7.1 Equation 7.4
	Presumptive N <sub>HVAG</sub> :  Presumptive N <sub>HVAG</sub> :  Presumptive N <sub>HVAG</sub> :  Presumptive N <sub>HVAG</sub> :  Axle Group SAST SADT TAST TADT TAST TADT TRDT QADT Total  Presign Traffic Loading  Design Tra  Ov  Design Standard Axle Fatig Rutting ar	25.5 N/A  Calculation  Standard  ESA/HVAG  0.535 0.326 0.000 0.131 0.000 0.000 0.993  Calculation  offic (ESA)  rerall Damage Repetitions (gue of asphalt and shape loss	ESA/HV 1.185 0.722 0.000 0.291 0.000 2.198  Not DESA  DSAR) DSAR5 DSAR5 DSAR5	SAR5/HVAG 0.622 0.383 0.000 0.144 0.000 0.000 1.149  3.28E+05 3.26E+05 3.77E+05 5.79E+05	SAR7/HVAG 0.979 0.590 0.000 0.195 0.000 0.000	11.467 2.716 0.000 0.720 0.000 0.000	G	SAR5/ESA 0.626 0.386 0.000 0.146 0.000 0.000	SAR7/ESA SAR12/ESA 0.986 11.552 0.594 2.736 0.000 0.000 0.196 0.726 0.000 0.000 0.000 0.000	7.4.5 7.6.2  Table 7.8  7.6.3  Equation 7.1 Equation 7.4  Equation 7.5 Equation 7.5

ver:2 rev:0 Page 1 of 1 PMS-QF4-007



PA 07\_0155 MOD3 Report No. 625/25 Ardmore Park Quarry Appendix 3



Austroads Guide to Pavement Technology<sup>1</sup>

#### **Design Traffic Calculation Sheet**

Date Collected:

Intended Date of Opening:

Report Date: 2-Aug-18 Project No.: 2017152

Client: Multiquip

Location: Oallen Ford Road (2km south of King Street/Lookdown Road)

Road Type: Rural

Method: Vehicle Classification Count

Traffic Load: Moderate to Heavy

from 10-May-13

to 17-May-13 1-Jul-18

5.13 years to start of work

Unit 7b, 26 Powers Road Seven Hills, NSW 2147

Prepared By: James Erskine Report No.: DT2017152-4 Direction: North Carriageway: Single

Design Lane: Left Lane
Design Period: 20 years

Projected Growth Rate: 2.5%
Historical Growth Rate: 2.5%

7.4.2 7.4.5

7.4.4

7.4.4

7.4.4 7.4.3 7.4.5

7.4.6

.6.2

Table 7.8

Equation 7.1

Equation 7.4

Equation 7.5

Equation 7.5

Equation 7.5

7.6.3

Average Daily Traffic Figures (Vehicles/Lane/Day)

Vehicle Class	Vehicles/ Lane/Day	SAST	SADT	TAST	TADT	TRDT	QADT	N <sub>HVAG</sub>
1	158	0	0	0	0	0	0	0
2	13	0	0	0	0	0	0	0
3	11	41	11	0	0	0	0	22
4	1.	1	0	0	1	0	0	2
5	0	0	0	0	0	0	0	0
6	-1	1	2	0	0	0	0	3
7	0	0	0	0	O	0	0	0
8	10	1.	0	0	2	0	0	3
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13 (Other)	0	0	0	0	0	0	0	0
Tota	I 185	14	13	0	3	- 0	0	30
oportion of Each Axle	1,000	0.467	0.433	0.000	0.100	0.000	0.000	

Group

Total HV/Day 14

Total HV Axle Groups/Day 30

## Traffic Design Figures

Current AADT: 210 DF: 1 %HV: 7.6 LDF: 1 CGF: 25.5

Calculated N<sub>HVAG</sub> 2.14

Presumptive N<sub>HVAG</sub>: N/A

Traffic Load Distribution Calculations

Standard Axle Repetitions per ESA<sup>2</sup>

Axle Group	ESA/HVAG	ESA/HV	SAR5/HVAG	SART/HVAG	SAR12/HVAG	SAR5/ESA	SAR7/ESA	SAR12/ESA
SAST	0.516	1.106	0.600	0.944	11.059	0.602	0.948	11.105
SADT	0.398	0.854	0.468	0.720	3.316	0.470	0.723	3.330
TAST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TADT	0.081	0.174	0.090	0.121	0.447	0.090	0.121	0.448
TRDT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
QADT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.996	2.134	1.157	1.785	14.822	1,162	1.793	14,883

**Design Traffic Loading Calculations** 

1. These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G 2. Method of traffic collection determines whether results are calculated or presumptive values are used

Standard Axle Repetitions per Heavy Vehicle Axle Group<sup>2</sup>

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

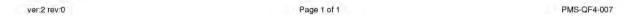
Page 1 of 1 PMS-QF4-007



ver:2 rev:0

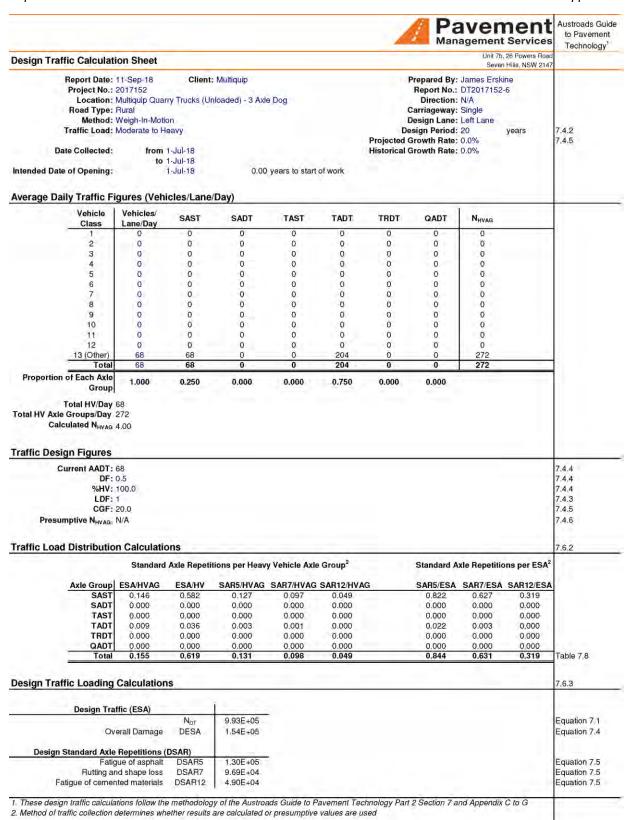
Ardmore Park Quarry Appendix 3

	All Meralia							Unit 7b, 26 Powers Roa	d
esign Traffic Calculati	on Sheet							Seven Hills, NSW 214	
Road Type:	2017152 Multiquip Quar Rural Weigh-In-Motic	ry Trucks (Lo	Multiquip aded) - 3 Axle D	og .		C C De	Report No.: Direction: Carriageway: Design Lane: sign Period:	Single Left Lane 20 years	7.4.2
Date Collected:	from	1-Jul-18					Growth Rate: Growth Rate:		7.4.5
	to	1-Jul-18	4.73		4.3				
ntended Date of Opening:		1-Jul-18	0.00	years to start	of work				
verage Daily Traffic Fi	gures (Vehi	cles/Lane/	Day)						
Vehicle	Vehicles/	SAST	SADT	TAST	TADT	TRDT	QADT	N <sub>HVAG</sub>	
Class	Lane/Day 0	0	0	Ö	0	0	0	0	-
2	0	0	0	0	0	0	0	0	
3	0	0	o	o	0	0	o	0	
4	0	0	0	0	0	0	0	0	
5	0	0	0	0	0	0	0	0	
6	0	0	0	0	0	0	0	0	
7	0	0	0	0	0	0	0	0	
8	0	0	0	0	0	0	0	0	
9	0	0	0	0	0	0	0	0	
10	0	0	0	0	0	0	0	0	
- 11	0	0	0	0	0	0	0	0	
12	0	0	0	0	0	0	0	0	
13 (Other)	68 68	68	68 68	0	136 136	0	0	272 272	44
Proportion of Each Axle								212	-
Group	1.000	0.250	0.250	0.000	0.500	0.000	0.000		
Total HV/Day otal HV Axie Groups/Day Calculated N <sub>HVAG</sub>	272								
affic Design Figures  Current AADT:  DF:  %HV:  LDF:  CGF:  Presumptive N <sub>HVAG</sub> :	272 4.00 68 0.5 100.0 1 20.0 N/A								7.4.4 7.4.4 7.4.4 7.4.3 7.4.5 7.4.6
otal HV Axle Groups/Day Calculated N <sub>HVAG</sub> raffic Design Figures Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :	272 4.00 68 0.5 100.0 1 20.0 N/A		ions per Heavy	v Vehicle Axl	a Group <sup>2</sup>		Standard A	xle Repetitions per ESA	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6
otal HV Axle Groups/Day Calculated N <sub>HVAG</sub> raffic Design Figures Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :	272 4.00 68 0.5 100.0 1 20.0 N/A n Calculatio		ions per Heavy SAR5/HVAG			G		xle Repetitions per ESA: SAR7/ESA SAR12/ES/	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6
otal HV Axle Groups/Day Calculated N <sub>HVAG</sub> raffic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :	272 4.00 68 0.5 100.0 1 20.0 N/A n Calculatio	Axle Repetit				G			7.4.4 7.4.4 7.4.3 7.4.5 7.4.6
call HV Axle Groups/Day Calculated N <sub>HVAG</sub> Caffic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :  Caffic Load Distributio  Axle Group SAST SADT	272 4.00 68 0.5 100.0 1 20.0 N/A T Calculatio Standard ESA/HVAG 0.381 0.371	ESA/HV 1.525 1.484	SAR5/HVAG 0.424 0.410	SAR7/HVAG 0.523 0.499	SAR12/HVA 0.887 0.817	G	SAR5/ESA 0.237 0.229	SAR7/ESA SAR12/ESA 0.293 0.497 0.279 0.457	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6
call HV Axle Groups/Day Calculated N <sub>HWAG</sub> Caffic Design Figures Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> : Caffic Load Distributio  Axle Group SAST SADT TAST	272 4.00 68 0.5 100.0 1 20.0 N/A Calculatio Standard ESA/HVAG 0.381 0.371 0.000	ESA/HV 1.525 1.484 0,000	SAR5/HVAG 0.424 0.410 0.000	SAR7/HVAG 0.523 0.499 0.000	0.887 0.817 0.000	G	0.237 0.229 0.000	SAR7/ESA SAR12/ESA 0.293 0.497 0.279 0.457 0.000 0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6
raffic Design Figures  Current AADT: DF: %HY: LDF: CGF: Presumptive N <sub>HVAG</sub> :  affic Load Distributio  Axle Group SAST SADT TAST TADT	272 4.00 68 0.5 100.0 1 20.0 N/A n Calculation Standard ESA/HVAG 0.381 0.371 0.000 1.034	ESA/HV 1.525 1.484 0,000 4.137	SAR5/HVAG 0.424 0.410 0.000 1,240	SAR7/HVAG 0.523 0.499 0.000 1.784	0.887 0.817 0.000 4.425	G	0.237 0.229 0.000 0.694	SAR7/ESA SAR12/ESA 0.293 0.497 0.279 0.457 0.000 0.000 0.998 2.477	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6
Calculated N <sub>HWAG</sub> Caffic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HWAG</sub> :  Caffic Load Distributio  Axle Group SAST SADT TAST TADT TRDT	272 4.00 68 0.5 100.0 1 20.0 N/A The Calculation Standard ESA/HVAG 0.381 0.371 0.000 1.034 0.000	ESA/HV 1.525 1.484 0.000 4.137 0.000	SAR5/HVAG 0.424 0.410 0.000 1.240 0.000	SAR7/HVAG 0.523 0.499 0.000 1.784 0.000	0.887 0.817 0.000 4.425 0.000	G	SAR5/ESA 0.237 0.229 0.000 0.694 0.000	SAR7/ESA         SAR12/ESA           0.293         0.497           0.279         0.457           0.000         0.000           0.998         2.477           0.000         0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6
raffic Design Figures  Current AADT: DF: %HY: LDF: CGF: Presumptive N <sub>HVAG</sub> :  affic Load Distributio  Axle Group SAST SADT TAST TADT	272 4.00  68 0.5 100.0 1 20.0 N/A   Calculatio  Standard  ESA/HVAG  0.381 0.371 0.000 1.034 0.000 0.000	ESA/HV 1.525 1.484 0.000 4.137 0.000 0.000	SAR5/HVAG 0.424 0.410 0.000 1.240 0.000 0.000	SAR7/HVAG 0.523 0.499 0.000 1.784 0.000 0.000	SAR12/HVA 0.887 0.817 0.000 4.425 0.000 0.000	G	SAR5/ESA 0.237 0.229 0.000 0.694 0.000 0.000	SAR7/ESA         SAR12/ESA           0.293         0.497           0.279         0.457           0.000         0.000           0.998         2.477           0.000         0.000           0.000         0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6
otal HV Axle Groups/Day Calculated N <sub>HWAG</sub> raffic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HWAG</sub> :  raffic Load Distributio  Axle Group SAST SAST TAST TAST TADT TRDT QADT	272 4.00 68 0.5 100.0 1 20.0 N/A The Calculation Standard ESA/HVAG 0.381 0.371 0.000 1.034 0.000	ESA/HV 1.525 1.484 0.000 4.137 0.000	SAR5/HVAG 0.424 0.410 0.000 1.240 0.000	SAR7/HVAG 0.523 0.499 0.000 1.784 0.000	0.887 0.817 0.000 4.425 0.000	G	SAR5/ESA 0.237 0.229 0.000 0.694 0.000	SAR7/ESA         SAR12/ESA           0.293         0.497           0.279         0.457           0.000         0.000           0.998         2.477           0.000         0.000	7.4.4 7.4.4 7.4.5 7.4.5 7.4.6 7.6.2
calculated N <sub>HVAG</sub> raffic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :  raffic Load Distributio  Axle Group SAST SADT TAST TADT TRDT QADT Total	272 4.00  68 0.5 100.0 1 20.0 N/A   Calculatio  Standard  ESA/HVAG  0.381 0.371 0.000 1.034 0.000 0.000 1.787	ESA/HV 1.525 1.484 0.000 4.137 0.000 0.000 7.146	SAR5/HVAG 0.424 0.410 0.000 1.240 0.000 0.000	SAR7/HVAG 0.523 0.499 0.000 1.784 0.000 0.000	SAR12/HVA 0.887 0.817 0.000 4.425 0.000 0.000	G	SAR5/ESA 0.237 0.229 0.000 0.694 0.000 0.000	SAR7/ESA         SAR12/ESA           0.293         0.497           0.279         0.457           0.000         0.000           0.998         2.477           0.000         0.000           0.000         0.000	7.4.4 7.4.4 7.4.5 7.4.5 7.4.6 7.6.2
calculated N <sub>HVAG</sub> raffic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :  raffic Load Distributio  Axle Group SAST SADT TAST TADT TRDT QADT Total	272 4.00  68 0.5 100.0 1 20.0 N/A   Calculation  ESA/HVAG  0.381 0.371 0.000 1.034 0.000 1.787  Calculation	ESA/HV 1.525 1.484 0.000 4.137 0.000 0.000 7.146	SAR5/HVAG 0.424 0.410 0.000 1.240 0.000 0.000 2.074	SAR7/HVAG 0.523 0.499 0.000 1.784 0.000 0.000	SAR12/HVA 0.887 0.817 0.000 4.425 0.000 0.000	G	SAR5/ESA 0.237 0.229 0.000 0.694 0.000 0.000	SAR7/ESA         SAR12/ESA           0.293         0.497           0.279         0.457           0.000         0.000           0.998         2.477           0.000         0.000           0.000         0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2 2 4 Table 7.8
otal HV Axle Groups/Day Calculated N <sub>HWAG</sub> raffic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HWAG</sub> :  raffic Load Distributio  Axle Group SAST SADT TAST TADT TADT TRDT QADT Total  esign Traffic Loading Design Tra	272 4.00  68 0.5 100.0 1 20.0 N/A   Calculation  ESA/HVAG  0.381 0.371 0.000 1.034 0.000 1.787  Calculation	ESA/HV 1.525 1.484 0.000 4.137 0.000 0.000 7.146	SAR5/HVAG 0.424 0.410 0.000 1.240 0.000 0.000	SAR7/HVAG 0.523 0.499 0.000 1.784 0.000 0.000	SAR12/HVA 0.887 0.817 0.000 4.425 0.000 0.000	G	SAR5/ESA 0.237 0.229 0.000 0.694 0.000 0.000	SAR7/ESA         SAR12/ESA           0.293         0.497           0.279         0.457           0.000         0.000           0.998         2.477           0.000         0.000           0.000         0.000	7.4.4 7.4.4 7.4.5 7.4.5 7.4.6 7.6.2
otal HV Axle Groups/Day Calculated N <sub>HWAG</sub> raffic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HWAG</sub> :  raffic Load Distributio  Axle Group SAST SADT TAST TADT TADT TADT TADT TADT	272 4.00 68 0.5 100.0 1 20.0 N/A  n Calculatic Standard  ESA/HVAG 0.381 0.371 0.000 1.034 0.000 1.787  Calculation  tfic (ESA) erall Damage	ESA/HV 1.525 1.484 0.000 4.137 0.000 0.000 7.146 S	SAR5/HVAG 0.424 0.410 0.000 1.240 0.000 0.000 2.074	SAR7/HVAG 0.523 0.499 0.000 1.784 0.000 0.000	SAR12/HVA 0.887 0.817 0.000 4.425 0.000 0.000	G	SAR5/ESA 0.237 0.229 0.000 0.694 0.000 0.000	SAR7/ESA         SAR12/ESA           0.293         0.497           0.279         0.457           0.000         0.000           0.998         2.477           0.000         0.000           0.000         0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2 Table 7.8 7.6.3
raffic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :  raffic Load Distributio  Axle Group SAST SADT TAST TADT TRDT TRDT QADT Total  esign Traffic Loading  Design Tra  Ov  Design Standard Axle	272 4.00 68 0.5 100.0 1 20.0 N/A  n Calculatic Standard  ESA/HVAG 0.381 0.371 0.000 1.034 0.000 1.787  Calculation  tfic (ESA) erall Damage	ESA/HV 1.525 1.484 0.000 4.137 0.000 0.000 7.146 S	SAR5/HVAG 0.424 0.410 0.000 1.240 0.000 0.000 2.074	SAR7/HVAG 0.523 0.499 0.000 1.784 0.000 0.000	SAR12/HVA 0.887 0.817 0.000 4.425 0.000 0.000	G	SAR5/ESA 0.237 0.229 0.000 0.694 0.000 0.000	SAR7/ESA         SAR12/ESA           0.293         0.497           0.279         0.457           0.000         0.000           0.998         2.477           0.000         0.000           0.000         0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2 Table 7.8 7.6.3
raffic Design Figures Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> : raffic Load Distributio  Axle Group SAST SADT TAST TADT TRDT QADT Total  Design Traffic Loading  Design Standard Axle Fatig	272 4.00 68 0.5 100.0 1 20.0 N/A  n Calculatic Standard ESA/HVAG 0.381 0.371 0.000 1.034 0.000 0.000 1.787  Calculation  ffic (ESA) erall Damage  Repetitions ( pue of asphalit d shape loss	ESA/HV 1.525 1.484 0.000 4.137 0.000 0.000 7.146 S  N <sub>DT</sub> DESA DSAR)	SAR5/HVAG 0.424 0.410 0.000 1.240 0.000 0.000 2.074  9.93E+05 1.77E+06	SAR7/HVAG 0.523 0.499 0.000 1.784 0.000 0.000	SAR12/HVA 0.887 0.817 0.000 4.425 0.000 0.000	G	SAR5/ESA 0.237 0.229 0.000 0.694 0.000 0.000	SAR7/ESA         SAR12/ESA           0.293         0.497           0.279         0.457           0.000         0.000           0.998         2.477           0.000         0.000           0.000         0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2  Table 7.8  7.6.3  Equation 7.1 Equation 7.4
Calculated N <sub>HVAG</sub> Calculated N <sub></sub>	272 4.00 68 0.5 100.0 1 20.0 N/A  n Calculation Standard ESA/HVAG 0.381 0.371 0.000 1.034 0.000 1.787  Calculation ffic (ESA) erall Damage Repetitions (pue of asphalt ad shape loss ted materials	ESA/HV 1.525 1.484 0.000 4.137 0.000 0.000 7.146  S  N <sub>DT</sub> DESA DSAR) DSAR5 DSAR7 DSAR12	9.93E+05 1.77E+06 2.06E+06 6.09E+06	SAR7/HVAG 0.523 0.499 0.000 1.784 0.000 0.000 2.806	SAR12/HVA 0.887 0.817 0.000 4.425 0.000 0.000 6.130		SAR5/ESA 0.237 0.229 0.000 0.694 0.000 1.161	SAR7/ESA         SAR12/ESA           0.293         0.497           0.279         0.457           0.000         0.000           0.998         2.477           0.000         0.000           0.000         0.000           1.571         3.431	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2  Table 7.8 7.6.3  Equation 7.1 Equation 7.4  Equation 7.5 Equation 7.5
raffic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> : raffic Load Distributio  Axle Group SAST SADT TAST TADT TRDT TADT TRDT TADT TRDT TOtal  Design Traffic Loading  Design Traffic Loading  Pesign Standard Axle Fatigue of cemer	272 4.00 68 0.5 100.0 11 20.0 N/A  n Calculation Standard ESA/HVAG 0.381 0.371 0.000 1.034 0.000 0.000 1.787  Calculation  ffic (ESA) erall Damage  Repetitions ( pue of asphalt and shape loss atted materials  utions follow the	ESA/HV 1.525 1.484 0.000 4.137 0.000 0.000 7.146  S  Nor DESA DSAR) DSAR5 DSAR7 DSAR12 e methodologe	9.93E+05 1.77E+06 2.06E+06 2.79E+06 40 0.090 2.074	SAR7/HVAG 0.523 0.499 0.000 1.784 0.000 0.000 2.806	SAR12/HVA  0.887  0.817  0.000  4.425  0.000  0.000  6.130	hnology Part	SAR5/ESA 0.237 0.229 0.000 0.694 0.000 1.161	SAR7/ESA         SAR12/ESA           0.293         0.497           0.279         0.457           0.000         0.000           0.998         2.477           0.000         0.000           0.000         0.000           1.571         3.431	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2  Table 7.8 7.6.3  Equation 7.1 Equation 7.4  Equation 7.5 Equation 7.5





PA 07\_0155 MOD3 Report No. 625/25 Ardmore Park Quarry
Appendix 3



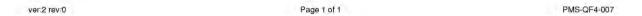
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Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Ardmore Park Quarry Appendix 3

esign Traffic Calculat	ion Sheet								26 Powers Road	
		20.00					nanca Zás		Hills, NSW 2147	
Report Date: Project No.:		Client	: Multiquip			-	Prepared By:	James Erski DT2017152-		
		ry Trucks (Le	oaded) - Current	Approval			Direction:			
Road Type:		.,	adday callon	, Mariana			Carriageway:			
	Weigh-In-Moti	on					Design Lane:			10.0
Traffic Load:	Moderate to H	eavy					sign Period:		years	7.4.2
4	41.0	v 2452					Frowth Rate:			7.4.5
Date Collected:		1-Jul-18 1-Jul-18				Historical C	Frowth Rate:	0.0%		
tended Date of Opening:		1-Jul-18	0.00	years to start	of work					
				Service and control						
verage Daily Traffic Fi Vehicle	gures (Vehi				1 9	E 1012	- T 72 1	lino a		
Class	Lane/Day	SAST	SADT	TAST	TADT	TRDT	QADT	N <sub>HVAG</sub>		U
1	0	0	0	0	0	0	0 -	0		1
2	0	0	0	0	0	0	0	0		
3	0	0	0	0	0	0	0	.0		
4	0	0	0	0	0	0	0	0		
5	0	0	0	0	0	0	0	0		
7	0	0	0	0	0	0	0	0		
8	o	0	0	0	o	0	0	0		
9	0	0	o	0	O	o	0	ō		
10	0	0	0	0	0	0	0	0		
11	0	0	0	0	0	0	0	0		
12	0	0	0	0	0	0	0	0		
13 (Other)	35	35	0	0	105	0	0	140		
Total	35	35	0	0	105	- 0	0	140		
Proportion of Each Axle Group	1.000	0.250	0.000	0.000	0.750	0.000	0.000			
Group										
Calculated N <sub>HVAG</sub>	140 4.00									744
otal HV Axle Groups/Day Calculated N <sub>HVAG</sub>	35 0,5 100.0 1 20.0									7.4.4 7.4.4 7.4.4 7.4.3 7.4.5 7.4.6
otal HV Axle Groups/Day Calculated N <sub>HVAG</sub> Caffic Design Figures Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :	35 0.5 100.0 1 20.0 N/A	ons								7.4.4 7.4.4 7.4.3 7.4.5
otal HV Axle Groups/Day Calculated N <sub>HVAG</sub> raffic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :	140 4.00 35 0.5 100.0 1 20.0 N/A		itions per Heavy	/ Vehicle Axl	e Group <sup>2</sup>		Standard A	xle Repetitio	ons per ESA <sup>2</sup>	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6
otal HV Axle Groups/Day Calculated N <sub>HVAG</sub> raffic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :	140 4.00 35 0.5 100.0 1 20.0 N/A		itions per Heavy SAR5/HVAG			G			ons per ESA <sup>2</sup> SAR12/ESÁ	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6
otal HV Axle Groups/Day Calculated N <sub>HVAG</sub> raffic Design Figures Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :	35 0.5 100.0 1 20.0 N/A n Calculatio Standard ESA/HVAG 0.499	Axle Repeti ESA/HV 1.996				G				7.4.4 7.4.4 7.4.3 7.4.5 7.4.6
raffic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :  raffic Load Distribution  Axle Group SAST SADT	35 0.5 100.0 1 20.0 N/A Calculatio Standard ESA/HVAG 0.499 0.000	ESA/HV 1.996 0.000	SAR5/HVAG 0.593 0.000	0.838 0.000	SAR12/HVA0 1.989 0.000	G	SAR5/ESA 0.264 0.000	SAR7/ESA 0.373 0.000	SAR12/ESA 0.885 0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6
otal HV Axle Groups/Day Calculated N <sub>HWAG</sub> raffic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HWAG</sub> :  raffic Load Distribution  Axle Group SAST SADT TAST	35 0.5 100.0 1 20.0 N/A T Calculatio Standard ESA/HVAG 0.499 0.000 0.000	ESA/HV 1.996 0.000 0,000	SAR5/HVAG 0.593 0.000 0.000	0.838 0.000 0.000	1.989 0.000 0.000	G	0.264 0.000 0.000	0.373 0.000 0.000	SAR12/ESA 0.885 0.000 0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6
raffic Design Figures  Current AADT: DF: %HY: LDF: CGF: Presumptive N <sub>HYAG</sub> : raffic Load Distribution  Axle Group SAST SADT TADT	35 0.5 100.0 1 20.0 N/A n Calculation Standard ESA/HVAG 0.499 0.000 0.000 1.748	ESA/HV 1.996 0.000 0.000 6.992	SAR5/HVAG 0.593 0.000 0.000 2.160	0.838 0.000 0.000 3.297	1.989 0.000 0.000 9.493	G	0.264 0.000 0.000 0.961	SAR7/ESA 0.373 0.000 0.000 1.467	SAR12/ESA 0.885 0.000 0.000 4.225	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6
call HV Axle Groups/Day Calculated N <sub>HVAG</sub> Caffic Design Figures Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> : Caffic Load Distribution  Axle Group SAST SADT TAST	35 0.5 100.0 1 20.0 N/A T Calculation Standard ESA/HVAG 0.499 0.000 0.000 1.748 0.000	ESA/HV 1.996 0.000 0.000 6.992 0.000	SAR5/HVAG 0.593 0.000 0.000 2.160 0.000	SAR7/HVAG 0.838 0.000 0.000 3.297 0.000	1.989 0.000 0.000	G	0.264 0.000 0.000	SAR7/ESA 0.373 0.000 0.000 1.467 0.000	SAR12/ESA 0.885 0.000 0.000 4,225 0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6
Taffic Design Figures  Current AADT: DF: %HY: LDF: CGF: Presumptive N <sub>HYAG</sub> :  Taffic Load Distribution  Axle Group SAST SADT TAST TADT TRDT	35 0.5 100.0 1 20.0 N/A n Calculation Standard ESA/HVAG 0.499 0.000 0.000 1.748	ESA/HV 1.996 0.000 0.000 6.992	SAR5/HVAG 0.593 0.000 0.000 2.160	0.838 0.000 0.000 3.297	1.989 0.000 0.000 9.493 0.000	G	SAR5/ESA 0.264 0.000 0.000 0.961 0.000	SAR7/ESA 0.373 0.000 0.000 1.467	SAR12/ESA 0.885 0.000 0.000 4.225	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6
otal HV Axle Groups/Day Calculated N <sub>HWAG</sub> raffic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HWAG</sub> :  raffic Load Distribution  Axle Group SAST SADT TAST TADT TRDT TRDT QADT Total	35 0.5 100.0 1 20.0 N/A Calculation Standard ESA/HVAG 0.499 0.000 0.000 1.748 0.000 0.000 2.247	ESA/HV 1.996 0.000 0.000 6.992 0.000 0.000 8.988	SAR5/HVAG 0.593 0.000 0.000 2.160 0.000 0.000	SAR7/HVAG 0.838 0.000 0.000 3.297 0.000 0.000	1.989 0.000 0.000 9.493 0.000 0.000	G	SAR5/ESA 0.264 0.000 0.000 0.961 0.000 0.000	SAR7/ESA 0.373 0.000 0.000 1.467 0.000 0.000	SAR12/ESA 0.885 0.000 0.000 4.225 0.000 0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2
otal HV Axle Groups/Day Calculated N <sub>HWAG</sub> raffic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HWAG</sub> : raffic Load Distribution  Axle Group SAST SADT TAST TADT TADT TADT QADT Total	35 0.5 100.0 1 20.0 N/A Calculation Standard ESA/HVAG 0.499 0.000 0.000 1.748 0.000 0.000 2.247	ESA/HV 1.996 0.000 0.000 6.992 0.000 0.000 8.988	SAR5/HVAG 0.593 0.000 0.000 2.160 0.000 0.000	SAR7/HVAG 0.838 0.000 0.000 3.297 0.000 0.000	1.989 0.000 0.000 9.493 0.000 0.000	G.	SAR5/ESA 0.264 0.000 0.000 0.961 0.000 0.000	SAR7/ESA 0.373 0.000 0.000 1.467 0.000 0.000	SAR12/ESA 0.885 0.000 0.000 4.225 0.000 0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2
raffic Design Figures Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> : raffic Load Distribution  Axle Group SAST SADT TAST TADT TADT TADT TADT TADT	140 4.00 35 0.5 100.0 1 20.0 N/A Calculation ESA/HVAG 0.499 0.000 0.000 1.748 0.000 0.000 2.247	ESA/HV 1.996 0.000 0.000 6.992 0.000 0.000 8.988	SAR5/HVAG 0.593 0.000 0.000 2.160 0.000 0.000 2,753	SAR7/HVAG 0.838 0.000 0.000 3.297 0.000 0.000	1.989 0.000 0.000 9.493 0.000 0.000	G	SAR5/ESA 0.264 0.000 0.000 0.961 0.000 0.000	SAR7/ESA 0.373 0.000 0.000 1.467 0.000 0.000	SAR12/ESA 0.885 0.000 0.000 4.225 0.000 0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2
esign Traffic Loading  Design Traffic Loading	140 4.00 35 0.5 100.0 1 20.0 N/A Calculation ESA/HVAG 0.499 0.000 0.000 1.748 0.000 0.000 2.247	ESA/HV 1.996 0.000 0.000 6.992 0.000 0.000 8.988	SAR5/HVAG 0.593 0.000 0.000 2.160 0.000 0.000	SAR7/HVAG 0.838 0.000 0.000 3.297 0.000 0.000	1.989 0.000 0.000 9.493 0.000 0.000	G	SAR5/ESA 0.264 0.000 0.000 0.961 0.000 0.000	SAR7/ESA 0.373 0.000 0.000 1.467 0.000 0.000	SAR12/ESA 0.885 0.000 0.000 4.225 0.000 0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2 Table 7.8 7.6.3
raffic Design Figures Current AADT: DF: %HY: LDF: CGF: Presumptive N <sub>HYAG</sub> : raffic Load Distribution  Axle Group SAST SADT TADT TADT TRDT QADT Total  esign Traffic Loading	140 4.00 35 0.5 100.0 1 20.0 N/A   **Calculation**  **ESA/HVAG** 0.499 0.000 0.000 1.748 0.000 0.000 2.247   **Calculation**  **Calculation**  **Calculation**  **Time Calculation**  **Calculation**  **Time Calculation**  **Time Calculation**	ESA/HV 1.996 0.000 0.000 6.992 0.000 0.000 8.988	SAR5/HVAG 0.593 0.000 0.000 2.160 0.000 0.000 2.753	SAR7/HVAG 0.838 0.000 0.000 3.297 0.000 0.000	1.989 0.000 0.000 9.493 0.000 0.000	G	SAR5/ESA 0.264 0.000 0.000 0.961 0.000 0.000	SAR7/ESA 0.373 0.000 0.000 1.467 0.000 0.000	SAR12/ESA 0.885 0.000 0.000 4.225 0.000 0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2
otal HV Axle Groups/Day Calculated N <sub>HVAG</sub> raffic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :  raffic Load Distribution  Axle Group SAST SADT TAST TADT TADT TRDT QADT Total  esign Traffic Loading  Design Standard Axle	140 4.00 35 0.5 100.0 1 20.0 N/A   **Calculation**  **ESA/HVAG** 0.499 0.000 0.000 1.748 0.000 0.000 2.247   **Calculation**  **Calculation**  **Calculation**  **Time Calculation**  **Calculation**  **Time Calculation**  **Time Calculation**	ESA/HV 1.996 0.000 0.000 6.992 0.000 0.000 8.988	SAR5/HVAG 0.593 0.000 0.000 2.160 0.000 0.000 2.753	SAR7/HVAG 0.838 0.000 0.000 3.297 0.000 0.000	1.989 0.000 0.000 9.493 0.000 0.000	G	SAR5/ESA 0.264 0.000 0.000 0.961 0.000 0.000	SAR7/ESA 0.373 0.000 0.000 1.467 0.000 0.000	SAR12/ESA 0.885 0.000 0.000 4.225 0.000 0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2  Table 7.8 7.6.3  Equation 7.4
otal HV Axle Groups/Day Calculated N <sub>HWAG</sub> raffic Design Figures  Current AADT: DF: %HW: LDF: CGF: Presumptive N <sub>HWAG</sub> : raffic Load Distribution  Axle Group SAST SADT TAST TADT TADT TADT TADT TADT	140 4.00 35 0.5 100.0 1 20.0 N/A   Calculatic  Standard  ESA/HVAG 0.499 0.000 0.000 1.748 0.000 0.000 2.247  Calculatior  ffic (ESA) erall Damage Repetitions ( pue of asphalt d shape loss	ESA/HV  1.996 0.000 0.000 6.992 0.000 0.000 8.988	SAR5/HVAG 0.593 0.000 0.000 2.160 0.000 0.000 2.753 5.11E+05 1.15E+06	SAR7/HVAG 0.838 0.000 0.000 3.297 0.000 0.000	1.989 0.000 0.000 9.493 0.000 0.000	G	SAR5/ESA 0.264 0.000 0.000 0.961 0.000 0.000	SAR7/ESA 0.373 0.000 0.000 1.467 0.000 0.000	SAR12/ESA 0.885 0.000 0.000 4.225 0.000 0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2  Table 7.8  7.6.3  Equation 7.4  Equation 7.5  Equation 7.5
otal HV Axle Groups/Day Calculated N <sub>HVAG</sub> raffic Design Figures  Current AADT: PF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :  raffic Load Distribution  Axle Group SAST SADT TAST TADT TADT TADT TADT TADT	140 4.00 35 0.5 100.0 1 20.0 N/A   Calculatic  Standard  ESA/HVAG 0.499 0.000 0.000 1.748 0.000 0.000 2.247  Calculatior  ffic (ESA) erall Damage Repetitions ( pue of asphalt d shape loss	ESA/HV 1.996 0.000 0.000 6.992 0.000 0.000 8.988	SAR5/HVAG  0.593 0.000 0.000 2.160 0.000 0.000 2.753  5.11E+05 1.15E+06	SAR7/HVAG 0.838 0.000 0.000 3.297 0.000 0.000	1.989 0.000 0.000 9.493 0.000 0.000	G	SAR5/ESA 0.264 0.000 0.000 0.961 0.000 0.000	SAR7/ESA 0.373 0.000 0.000 1.467 0.000 0.000	SAR12/ESA 0.885 0.000 0.000 4.225 0.000 0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2 Table 7.8 7.6.3 Equation 7.4 Equation 7.4
otal HV Axle Groups/Day Calculated N <sub>HVAG</sub> raffic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :  raffic Load Distribution  Axle Group SAST SADT TAST TADT TRDT QADT Total  esign Traffic Loading  Design Tra  Ov  Design Standard Axle Fatigue of cemei	140 4.00 35 0.5 100.0 1 20.0 N/A  n Calculation Standard ESA/HVAG 0.499 0.000 0.000 1.748 0.000 0.000 2.247  Calculation  ffic (ESA) erall Damage Repetitions (gue of asphalt d shape loss the d materials	ESA/HV  1.996 0.000 0.000 6.992 0.000 0.000 8.988  IS  N <sub>DT</sub> DESA DSAR) DSAR5 DSAR7 DSAR12	\$AR5/HVAG  0.593 0.000 0.000 2.160 0.000 2.753  5.11E+05 1.15E+06  1.41E+06 2.11E+06 5.87E+06	SAR7/HVAG 0.838 0.000 0.000 3.297 0.000 0.000 4.135	SAR12/HVA( 1.989 0.000 0.000 9.493 0.000 0.000 11.462		SAR5/ESA 0.264 0.000 0.000 0.961 0.000 1.225	SAR7/ESA 0.373 0.000 0.000 1.467 0.000 0.000 1.840	SAR12/ESA 0.885 0.000 0.000 4.225 0.000 0.000 5.110	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2  Table 7.8  7.6.3  Equation 7.4  Equation 7.5  Equation 7.5
otal HV Axle Groups/Day Calculated N <sub>HWAG</sub> raffic Design Figures  Current AADT: DF: %HW: LDF: CGF: Presumptive N <sub>HWAG</sub> : raffic Load Distribution  Axle Group SAST SADT TAST TADT TADT TADT QADT Total  esign Traffic Loading  Design Tra  Ov  Design Standard Axle Fatig Rutting ai	140 4.00 35 0.5 100.0 1 20.0 N/A  n Calculation Standard ESA/HVAG 0.499 0.000 0.000 1.748 0.000 0.000 2.247  Calculation  ffic (ESA) erall Damage Repetitions ( pue of asphalt and shape loss ted materials  utions follow the	ESA/HV  1.996 0.000 0.000 6.992 0.000 0.000 8.998  NDT DESA  DSAR)  DSARS DSAR7 DSAR12  methodologe	SAR5/HVAG  0.593 0.000 0.000 2.160 0.000 0.000 2.753  5.11E+05 1.15E+06  1.41E+06 2.11E+06 5.87E+06	SAR7/HVAG 0.838 0.000 0.000 3.297 0.000 0.000 4.135	SAR12/HVA( 1.989 0.000 0.000 9.493 0.000 0.000 11.482	hnology Part	SAR5/ESA 0.264 0.000 0.000 0.961 0.000 1.225	SAR7/ESA 0.373 0.000 0.000 1.467 0.000 0.000 1.840	SAR12/ESA 0.885 0.000 0.000 4.225 0.000 0.000 5.110	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2  Table 7.8  7.6.3  Equation 7.4  Equation 7.5  Equation 7.5





**Design Traffic Calculation Sheet** 

Report Date: 2-Aug-18

#### **MULTIQUIP QUARRIES**

PA 07\_0155 MOD3 Report No. 625/25 Ardmore Park Quarry Appendix 3

7.4.2

7.4.5

7.6.2

7.6.3



years

Road Type: Rural Carriageway: Single
Method: Weigh-In-Motion Design Lane: Left Lane
Traffic Load: Moderate to Heavy Projected Growth Rate: 0.0%
Date Collected: from 1-Jul-18 Historical Growth Rate: 0.0%

Date Collected: from 1-Jul-18 Historical Growth
to 1-Jul-18
Intended Date of Opening: 1-Jul-18 0.00 years to start of work

Client: Multiquip

Project No.: 2017152 Location: Multiquip Quarry Trucks (Unloaded) - 4 Axle Dog

Average Daily Traffic Figures (Vehicles/Lane/Day)

	ehicle class	Vehicles/ Lane/Day	SAST	SADT	TAST	TADT	TRDT	QADT	N <sub>HVAG</sub>
	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0
	5	O	0	0	0	O	0	0	0
	6	O.	0	0	0	0	0	0	0
	7	0	0	0	0	O	0	0	0
	8	0	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0
	11	0	0	0	0	0	0	0	0
	12	0	0	0	0	0	0	0	0
13	(Other)	35	35	0	0	105	0	0	140
	Total	35	35	0	0	105	0	0	140
oportion of Ea	ch Axle	1 000	0.250	0.000	0.000	0.750	0.000	0.000	

Proportion of Each Axle Group 1.000 0.250 0.000 0.000 0.750 0.000 0.000

Total HV/Day 35 Total HV Axle Groups/Day 140 Calculated N<sub>HVAG</sub> 4.00

#### **Traffic Design Figures**

Current AADT: 35
DF: 0.5
7.4.4
%HV: 100.0
7.4.4
LDF: 1
CGF: 20.0
7.4.5
Presumptive N<sub>HVAG</sub>: N/A
7.4.6

#### **Traffic Load Distribution Calculations**

	Standard	Axle Repet	itions per Heav	y Vehicle Axle	e Group*	Standard A	xle Repetition	ons per ESA	
Axle Group	ESA/HVAG	ESA/HV	SAR5/HVAG	SAR7/HVAG	SAR12/HVAG	SAR5/ESA	SAR7/ESA	SAR12/ESA	
SAST	0.211	0.844	0.202	0.186	0.150	0.915	0.841	0.680	1
SADT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
TAST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
TADT	0.010	0.040	0.004	0.001	0.000	0.017	0.003	0,000	
TRDT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
QADT	0.000	0.000	0,000	0,000	0.000	0.000	0.000	0,000	51,50
Total	0.221	0.884	0.206	0.186	0.150	0.932	0.843	0,680	Table 7

#### **Design Traffic Loading Calculations**

Design Traffic (ESA)		- Control of the Cont	- Annual - A
	N <sub>DT</sub>	5.11E+05	Equation 7.
Overall Damage	DESA	1.13E+05	Equation 7.
Design Standard Axle Repetitions (	DSAR)		
Design Standard Axle Repetitions ( Fatigue of asphalt		1.05E+05	Equation 7.
		1.05E+05 9.52E+04	Equation 7.6 Equation 7.6

1. These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G 2. Method of traffic collection determines whether results are calculated or presumptive values are used

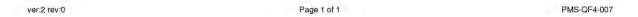
Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

ver:2 rev:0 Page 1 of 1 PMS-QF4-007



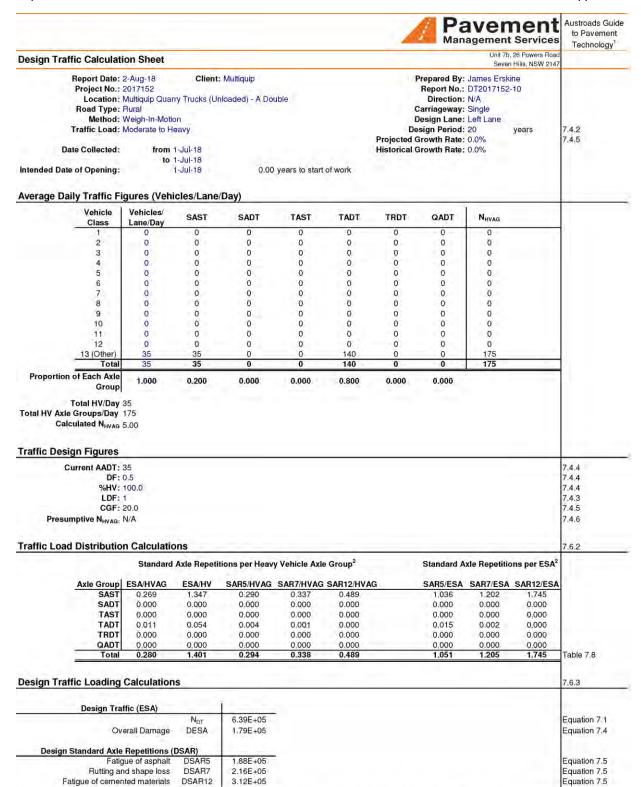
Ardmore Park Quarry Appendix 3

Report Date: 2-Aug-16	esign Traffic Calculat	ion Shoot							Unit 7b, 26 Powers	
Project No. 2017/18/2   Location: Midnight Clarry Trucks (Location: A A Double Road Type: Rard   Mother of the Plant   Mother of t	esign manic calculat	ion sheet	77.5							2147
Date Collected:   From 1-Juli-18   T-Juli-18   T-Ju	Project No.: Location: Road Type: Method:	2017152 Multiquip Quar Rural Weigh-In-Motic	ry Trucks (Lo		е		C C De	Report No.: Direction: Carriageway: Design Lane: esign Period:	DT2017152-9 N/A Single Left Lane 20 years	
Vehicle   Vehicles	Date Collected:	from	1-Jul-18							7.4.5
Vehicle   Class   Vehicles   Class   SAST   SADT   TAST   TADT   TRDT   QADT   Minvac	tended Date of Opening:			0.00	years to start	t of work				
Class   Lane Day   SAS   S	verage Daily Traffic Fi	igures (Vehi	icles/Lane	/Day)						
2			SAST	SADT	TAST	TADT	TRDT	QADT	N <sub>HVAG</sub>	
3										
4										
Section   Company   Comp										
Section   Sect										
Total   35   35   0   0   0   0   0   0   0   0   0									1.00	
8									1,21	
10	8		0		0	0	0	0	190	
11									1.72	
12	2.5								150	
13 (Other)   35   35   0   0   140   0   0   175						7	12.		98	
Total   35   35   0   0   140   0   0   175										4
Total HV/Day 35										
Total HVD/Bay 35	A CONTRACT OF THE PARTY OF THE	- 11-12								
AxI B Groups   175   7.4.4   7.4.4   7.4.4   7.4.4   7.4.4   7.4.4   7.4.4   7.4.4   7.4.4   7.4.4   7.4.4   7.4.5   7.4.4   7.4.5   7.4.4   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7.4.5   7		1.000	0.200	0.000	0.000	0.800	0.000	0.000		
Standard Axle Repetitions per Heavy Vehicle Axle Group	affic Design Figures  Current AADT:	35								
Standard Axle Repetitions per Heavy Vehicle Axle Group	affic Design Figures  Current AADT:  DF:  %HV:  LDF:  CGF:	35 0,5 100.0 1 20.0								7.4.4 7.4.4 7.4.3 7.4.5
SAST   0.420   2.100   0.506   0.733   1.852   0.221   0.321   0.811	Caffic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :	35 0,5 100,0 1 20,0 N/A	ons							7.4.4 7.4.4 7.4.3 7.4.5 7.4.6
SADT   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000	affic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :	35 0.5 100.0 1 20.0 N/A	7.797	itions per Heavy	Vehicle Axl	e Group <sup>2</sup>		Standard A	xle Repetitions per E	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6
TAST	affic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :  affic Load Distribution	35 0.5 100.0 1 20.0 N/A The Calculation Standard	Axle Repeti ESA/HV	SAR5/HVAG	SAR7/HVAG	SAR12/HVA	G	SAR5/ESA	SAR7/ESA SAR12/E	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2
TADT	affic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :  affic Load Distribution  Axle Group SAST	35 0.5 100.0 1 20.0 N/A on Calculation Standard ESA/HVAG 0.420	Axle Repeti ESA/HV 2.100	SAR5/HVAG 0.506	SAR7/HVAG	1.852	G	SAR5/ESA 0.221	SAR7/ESA SAR12/E 0.321 0.811	7.4.4 7.4.3 7.4.5 7.4.6 7.6.2 SA <sup>2</sup> ESA
TRDT	affic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :  affic Load Distribution  Axle Group SAST SADT	35 0.5 100.0 1 20.0 N/A or Calculation Standard ESA/HVAG 0.420 0.000	ESA/HV 2.100 0.000	SAR5/HVAG 0.506 0.000	SAR7/HVAG 0.733 0.000	1.852 0.000	G	SAR5/ESA 0.221 0.000	SAR7/ESA SAR12/E 0.321 0.811 0.000 0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2 SA <sup>2</sup>
QADT   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000   0,000	affic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> : affic Load Distribution  Axle Group SAST SADT TAST	35 0.5 100.0 1 20.0 N/A The Calculation Standard ESA/HVAG 0.420 0.000 0.000	ESA/HV 2.100 0.000 0.000	SAR5/HVAG 0.506 0.000 0.000	SAR7/HVAG 0.733 0.000 0.000	1.852 0.000 0.000	G.	SAR5/ESA 0.221 0.000 0.000	SAR7/ESA SAR12/E 0.321 0.811 0.000 0.000 0.000 0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2 SA <sup>2</sup>
Design Traffic Loading Calculations  Design Traffic (ESA)  NDT 6.39E+05 Overall Damage DESA 1.46E+06  Design Standard Axle Repetitions (DSAR)  Fatigue of asphalt DSAR5 1.79E+06 Rutting and shape loss DSAR7 2.71E+06  Fatigue of Saphalt DSAR5 1.79E+06 Equation	affic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :  affic Load Distribution  Axle Group SAST SADT TAST	35 0.5 100.0 1 20.0 N/A The Calculation Standard ESA/HVAG 0.420 0.000 0.000 1.864	ESA/HV 2.100 0.000 0.000 9.322	SAR5/HVAG 0.506 0.000 0.000 2,304	SAR7/HVAG 0.733 0.000 0.000 3.517	1.852 0.000 0.000 10.126	G	SAR5/ESA 0.221 0.000 0.000 1.008	SAR7/ESA SAR12/E 0.321 0.811 0.000 0.000 0.000 0.000 1.539 4.433	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2 SA <sup>2</sup>
Design Traffic (ESA)           NDT         6.39E+05         Equation           Overall Damage         DESA         1.46E+06         Equation           Design Standard Axle Repetitions (DSAR)         Equation         Equation           Fatigue of asphalt         DSAR5         1.79E+06         Equation           Rutting and shape loss         DSAR7         2.71E+06         Equation	affic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :  affic Load Distribution  Axle Group SAST SADT TAST TADT TRDT QADT	35 0.5 100.0 1 20.0 N/A The Calculation Standard ESA/HVAG 0.420 0.000 0.000 1.864 0.000 0.000 0.000	ESA/HV 2.100 0.000 0.000 0.000 9.322 0.000 0.000	SAR5/HVAG 0.506 0.000 0.000 2,304 0.000 0.000	SAR7/HVAG 0.733 0.000 0.000 3.517 0.000 0.000	1.852 0.000 0.000 10.126 0.000 0.000	G	SAR5/ESA 0.221 0.000 0.000 1.008 0.000 0.000	SAR7/ESA SAR12/E 0.321 0.811 0.000 0.000 0.000 0.000 1.539 4.433 0.000 0.000 0.000 0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2 SA <sup>2</sup>
Design Standard Axle Repetitions (DSAR)  Fatigue of asphalt DSAR5 Rutting and shape loss DSAR7  DSAR5  DSAR7  1.46E+06  Equation  Equation  Equation  Equation  Equation  Equation	affic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :  affic Load Distribution  Axle Group SAST SADT TAST TADT TRDT CADT	35 0.5 100.0 1 20.0 N/A The Calculation Standard ESA/HVAG 0.420 0.000 0.000 1.864 0.000 0.000 0.000	ESA/HV 2.100 0.000 0.000 0.000 9.322 0.000 0.000	SAR5/HVAG 0.506 0.000 0.000 2,304 0.000 0.000	SAR7/HVAG 0.733 0.000 0.000 3.517 0.000 0.000	1.852 0.000 0.000 10.126 0.000 0.000	G	SAR5/ESA 0.221 0.000 0.000 1.008 0.000 0.000	SAR7/ESA SAR12/E 0.321 0.811 0.000 0.000 0.000 0.000 1.539 4.433 0.000 0.000 0.000 0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2 SA <sup>2</sup>
Design Standard Axle Repetitions (DSAR)  Fatigue of asphalt DSAR5 Rutting and shape loss DSAR7  DSAR5  DSAR7  Equation  Equation  Equation  Equation  Equation  Equation  Equation	caffic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> : raffic Load Distribution  Axle Group SAST SADT TAST TADT TRDT TRDT QADT Total	35 0.5 100.0 1 20.0 N/A The Calculation Standard ESA/HVAG 0.420 0.000 0.000 1.864 0.000 0.000 2.284	ESA/HV 2.100 0.000 0.000 9.322 0.000 0.000 11.422	SAR5/HVAG 0.506 0.000 0.000 2,304 0.000 0.000	SAR7/HVAG 0.733 0.000 0.000 3.517 0.000 0.000	1.852 0.000 0.000 10.126 0.000 0.000	G	SAR5/ESA 0.221 0.000 0.000 1.008 0.000 0.000	SAR7/ESA SAR12/E 0.321 0.811 0.000 0.000 0.000 0.000 1.539 4.433 0.000 0.000 0.000 0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2 SA <sup>2</sup> ESA
Design Standard Axle Repetitions (DSAR)  Fatigue of asphalt DSAR5 1.79E+06 Equation Rutting and shape loss DSAR7 2.71E+06 Equation	affic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> : affic Load Distribution  Axle Group SAST SADT TAST TADT TRDT TRDT QADT Total	35 0.5 100.0 1 20.0 N/A The Calculation Standard ESA/HVAG 0.000 0.000 1.864 0.000 0.000 2.284	ESA/HV 2.100 0.000 0.000 9.322 0.000 0.000 11.422	SAR5/HVAG 0.506 0.000 0.000 2,304 0.000 0.000	SAR7/HVAG 0.733 0.000 0.000 3.517 0.000 0.000	1.852 0.000 0.000 10.126 0.000 0.000	G.	SAR5/ESA 0.221 0.000 0.000 1.008 0.000 0.000	SAR7/ESA SAR12/E 0.321 0.811 0.000 0.000 0.000 0.000 1.539 4.433 0.000 0.000 0.000 0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2 SA <sup>2</sup> ESA
Fatigue of asphalt DSAR5 1.79E+06 Equation Rutting and shape loss DSAR7 2.71E+06 Equation	Affic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :  Axle Group SAST SADT TAST TADT TRDT QADT Total  esign Traffic Loading	35 0.5 100.0 1 20.0 N/A The Calculation Standard ESA/HVAG 0.420 0.000 0.000 1.864 0.000 0.000 2.284 Calculation of the Calculation of	ESA/HV 2.100 0.000 0.000 9.322 0.000 0.000 11.422	SAR5/HVAG 0.506 0.000 0.000 2.304 0.000 0.000 2.809	SAR7/HVAG 0.733 0.000 0.000 3.517 0.000 0.000	1.852 0.000 0.000 10.126 0.000 0.000	G	SAR5/ESA 0.221 0.000 0.000 1.008 0.000 0.000	SAR7/ESA SAR12/E 0.321 0.811 0.000 0.000 0.000 0.000 1.539 4.433 0.000 0.000 0.000 0.000	7.4.4 7.4.3 7.4.5 7.4.6 7.6.2  SA <sup>2</sup> SA  Table 7.8  7.6.3
Rutting and shape loss DSAR7 2.71E+06 Equation	affic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> :  affic Load Distribution  Axle Group SAST SADT TAST TADT TRDT TRDT TRDT QADT Total  esign Traffic Loading Design Tra	35 0.5 100.0 1 20.0 N/A  The Calculation  Standard  ESA/HVAG 0.420 0.000 0.000 1.864 0.000 0.000 2.284  Calculation  tfic (ESA)	ESA/HV 2.100 0.000 0.000 9.322 0.000 11.422	SAR5/HVAG 0.506 0.000 0.000 2.304 0.000 0.000 2.809	SAR7/HVAG 0.733 0.000 0.000 3.517 0.000 0.000	1.852 0.000 0.000 10.126 0.000 0.000	G	SAR5/ESA 0.221 0.000 0.000 1.008 0.000 0.000	SAR7/ESA SAR12/E 0.321 0.811 0.000 0.000 0.000 0.000 1.539 4.433 0.000 0.000 0.000 0.000	7.4.4 7.4.4 7.4.3 7.4.5 7.4.6 7.6.2 SA <sup>2</sup> ESA
	Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> : raffic Load Distribution  Axle Group SAST SADT TAST TADT TRDT TRDT TRDT TRDT TOtal  esign Traffic Loading  Design Tra Ov	35 0.5 100.0 1 20.0 N/A  The Calculation Standard ESA/HVAG 0.000 0.000 1.864 0.000 2.284  Calculation  ffic (ESA)  rerall Damage Repetitions (	ESA/HV 2:100 0:000 0:000 9:322 0:000 11.422 IS  Note the content of the content o	SAR5/HVAG 0.506 0.000 0.000 2.304 0.000 0.000 2.809 6.39E+05 1.46E+06	SAR7/HVAG 0.733 0.000 0.000 3.517 0.000 0.000	1.852 0.000 0.000 10.126 0.000 0.000	G	SAR5/ESA 0.221 0.000 0.000 1.008 0.000 0.000	SAR7/ESA SAR12/E 0.321 0.811 0.000 0.000 0.000 0.000 1.539 4.433 0.000 0.000 0.000 0.000	7.4.4 7.4.3 7.4.5 7.4.6 7.6.2  SA <sup>2</sup> ESA  7.6.3  Table 7.8  7.6.3  Equation 7.1 Equation 7.4
Those design traffic collections follow the methodology of the Australia Oxida to December 7 why 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	raffic Design Figures  Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> : raffic Load Distribution  Axle Group SAST SADT TAST TADT TADT TADT QADT Total  esign Traffic Loading  Design Tra  Ov  Design Standard Axle Fatig Rutting ai	35 0.5 100.0 1 20.0 N/A  In Calculation  Standard  ESA/HVAG 0.000 0.000 1.864 0.000 0.000 2.284  Calculation  Iffic (ESA)  erall Damage Repetitions ( gue of asphalt d shape loss	ESA/HV 2.100 0.000 0.000 9.322 0.000 0.000 11.422 IS  Not DESA DSAR) DSAR5 DSAR5 DSAR5	SAR5/HVAG 0.506 0.000 0.000 2.304 0.000 0.000 2.809 6.39E+05 1.46E+06	SAR7/HVAG 0.733 0.000 0.000 3.517 0.000 0.000	1.852 0.000 0.000 10.126 0.000 0.000	G	SAR5/ESA 0.221 0.000 0.000 1.008 0.000 0.000	SAR7/ESA SAR12/E 0.321 0.811 0.000 0.000 0.000 0.000 1.539 4.433 0.000 0.000 0.000 0.000	7.4.4 7.4.3 7.4.5 7.4.6 7.6.2  SA <sup>2</sup> SA  Table 7.8  7.6.3
These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G  Method of traffic collection determines whether results are calculated or presumptive values are used	Current AADT: DF: %HV: LDF: CGF: Presumptive N <sub>HVAG</sub> : raffic Load Distribution  Axle Group SAST SADT TAST TADT TRDT TRDT TRDT TRDT Total  esign Traffic Loading  Design Tra Ov  Design Standard Axle Fatig Rutting at Fatigue of cemei	35 0.5 100.0 1 20.0 N/A  The Calculation Standard  ESA/HVAG 0.000 0.000 1.864 0.000 2.284  Calculation  ffic (ESA)  rerall Damage Repetitions (gue of asphalt and shape loss atted materials	ESA/HV 2:100 0:000 0:000 9:322 0:000 11.422 IS  NDT DESA  DSAR)  DSAR5 DSAR7 DSAR12	SAR5/HVAG  0.506 0.000 0.000 2.304 0.000 0.000 2.809  6.39E+05 1.46E+06  1.79E+06 2.71E+06 7.65E+06	SAR7/HVAG 0.733 0.000 0.000 3.517 0.000 0.000 4.249	8 SAR12/HVA( 1.852 0.000 0.000 10.126 0.000 0.000 11.978		SAR5/ESA 0.221 0.000 0.000 1.008 0.000 0.000 1.230	SAR7/ESA SAR12// 0.321 0.811 0.000 0.000 0.000 0.000 1.539 4.433 0.000 0.000 0.000 5.243	7.4.4 7.4.3 7.4.5 7.4.6 7.6.2  SA <sup>2</sup> ESA  10 10 11 12 13 14 15 16 17 16 17 17 18 18 18 18 18 18 18 18 18 18 18 18 18





PA 07\_0155 MOD3 Report No. 625/25 Ardmore Park Quarry Appendix 3



ver:2 rev:0 Page 1 of 1 PMS-QF4-007

1. These design traffic calculations follow the methodology of the Austroads Guide to Pavement Technology Part 2 Section 7 and Appendix C to G

2. Method of traffic collection determines whether results are calculated or presumptive values are used

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia



# MULTIQUIP QUARRIES Ardmore Park Quarry Appendix 3

RESPONSE TO SUBMISSIONS
PA 07\_0155 MOD3

Report No. 625/25

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PA 07\_0155 MOD3 Report No. 625/25 MULTIQUIP QUARRIES Ardmore Park Quarry Appendix 3

# APPENDIX B – FWD DEFLECTION TEST RESULTS



Ardmore Park Quarry Appendix 3

#### **RESPONSE TO SUBMISSIONS**

PA 07\_0155 MOD3 Report No. 625/25

-34,7476100 149,9763533 New Pavement

Form No. TP5-R-001



Unit 7b, 26 Powers Road

Seven Hills, NSW 2147

Client: Multiquip Quarries Job No: 2017152

Report No: DR2017152-3

Client Section ID: 1A1\_IWP

Smoothing: No Farget Load (kN): 40

Road Id:

V Lane: Block:

Defl. Temperature (°C) Surface 10.0 Air Normalised Deflection Results (μm)

Local Comment

Latitude Longitude -34.7319766 149.9803367 -34.7327550 149.9798367

Curv. 0.31

FWD

-34.7335400 149.9793483

0.22 0.26

> 0.54 0.64

0.83

-34.7343733 149.9788850

0.33 0.27 0.43 0.23 0.26 0.36 0.25 0.22 0.33 0.38 0.49

14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3

-34.7351866 149.9784083

0.52

0.91 0.54 0.64 0.97 0.51 0.39 0.84

-34.7369050 149,9776917 -34.7377733 149.9773617 -34.7386467 149.9770250 -34,7395217 149,9767033

-34.7360617 149.9780217

10.0 10.0 10.0 0.01 10.0 0'01 Distance from Load (mm) 

0.150 0.250

IWP

0.350

0.450 0.550 0.650 0.750 0.850 0.950 1,050 1,150 1.250 1.350 1.450 1.550

Measured Deflection Results (μm)

rom South Marulan Road to Mountain Ash Road

Jerrara Road

Distance from Load (mm)

Peak Load (kPa) 

Wheel IWP

Lane

S

23 23 49 

0.01 0.01 10.0 0.01 10.0

0.0 10.0

WP IWP

WP

-34.7403933 149.9764483

-34.7412867 149.9762783 -34.7421483 149.9762334 -34.7430533 149.9762484

90.

1.03

-34.7439950 149.9762650

0.35 0.46 0.35

97.0 1.05

10.0

10.0

0.01 10.0 10.0

-34,7448850 149,9762917

-34.7458033 149.9763184

-34.7467167 149.9763383

0.35

0.93

K 

1.650

.850

IWP WP WP IWP

Page 1 of 18

Ver:2 Rev:0

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia



FWD/HWD Structural Test Report - Deflection Results

**Testing Date: 31/05/2018** 

Fest Method: QT211

Test Equipment: FWD-016 Operator: John Muir

# MULTIQUIP QUARRIES Ardmore Park Quarry Appendix 3

	tude Local Comment	31883 New Pavement	56933	19783	12350	35117	71765	23817 ND	17733	12400	37417 New Pavement	33350	39367	35867	32450	30250	38600	37167	35567	33283	30267	76783	72916	39250	55433	31550	58983	58017	26000	51634 ND	17217	12833	39150	(
DA	Latitude Longitude	-34.7485000 149.9761883	-34.7492817 149.9756933	34,7499566 149,9749783	34.7506467 149.9742350	34.7513433 149.9735117	-34,7519833 149,9729717	-34.7527517 149.9723817	34.7535334 149.9717733	34.7542517 149.9712400	34.7550700 149.9707417	-34.7559233 149.9703350	-34.7567733 149.9699367	-34.7576133 149.9695867	34,7585250 149,9692450	34.7593800 149.9690250	34.7602250 149.9688600	34.7611167 149.9687167	-34.7620417 149.9685567	34,7629066 149.9683283	34.7637683 149.9680267	34.7646317 149.9676783	34,7654783 149,9672916	34.7663217 149.9669250	-34.7671567 149.9665433	-34.7680300 149.9661550	-34.7688484 149.9658983	-34.7697617 149.9658017	34.7706400 149.9656000	-34,7714650 149,9651634	-34.7722383 149.9647217	-34.7731517 149.9642833	-34,7739383 149.9639150	
			-34.74	-34.74	-34.75	-34.75	-34.75	-34.75	-34.75	-34.75	-34.75	-34.75	-34.75	-34.75	-34.75	-34.75	-34.76	-34.76	-34.76	-34.76	-34.76	-34.76	-34.76	-34.76	-34.76	-34.76	-34.76	-34.76	-34.77	-34.77	-34.77	-34.77	-34.77	
FWD	Curv.	0.43	0.25	0.30	0.26	0.34	0.34	0.32	0.25	0.45	0.25	0.37	0.46	0.33	0.33	0.25	0.54	0.38	0.42	0.21	0.29	0.37	0.19	0.45	0.33	0.42	0.26	0.20	0.17	0.27	0.48	0.47	0.50	
ū.	Defl.	0.87	0.67	0.67	0.98	0.76	0.59	0.80	0.74	0.98	0.70	0.82	1.11	0.79	0.65	0.68	0.95	0.85	0.88	0.37	0.57	0.84	0.36	0.93	0.74	1.04	0.64	0.42	0.41	0.66	96.0	1.21	0.95	
Temperature (°C)	Surface	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	
Tempera (°C)	Air S	10.0	10.0	10.0	10.0	10.0	10,0	10.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11:0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11,0	11.0	11.0	11.0	11.0	11.0	11.0	
	1500	56	56	7	37	23	2	61	35	36	25	13	53	45	28	41	35	6	9	9	25	17	17	8	56	34	9	9	ω	17	37	65	34	
Ê	1200 1500	35	37	o	20	27	1	18	49	51	36	5	41	54	33	54	45	25	10	80	35	58	19	23	33	22	Ξ	12	14	32	52	90	47	
ults (µ	900	54	26	F	72	37	00	47	25	29	52	45	22	9/	41	84	25	28	55	=	39	20	2	45	46	98	52	24	9	32	78	146	29	
n Resi	750	6/	11	48	86	50	o	64	99	72	19	5	72	26	52	103	89	85	53	15	15	9	30	64	62	106	39	45	25	30	100	189	87	
ection	009	118	111	30	156	99	5	98	26	26	25	92	103	132	22	141	16	125	24	22	89	16	49	86	85	139	99	89	4	63	130	252	116	
alised Deflection Results Distance from Load (mm)	450	184	173	9	263	107	52	144	149	188	123	110	179	191	122	198	134	191	126	40	98	168	74	149	123	198	119	92	69	123	180	360	170	
Normalised Deflection Results (μm) Distance from Load (mm)	300	331	286	196	471	229	32	285	290	382	566	273	360	292	218	320	231	318	274	11	158	303	132	246	219	370	222	150	154	235	345	562	285	
Nora	200	441	420	375	718	413	248	482	485	533	446	452	644	457	324	432	407	469	457	157	285	470	178	476	418	623	379	222	242	393	472	744	456	
	0	898	672	1/29	826	757	283	803	737	984	969	824	1106	786	920	229	950	846	881	370	572	838	365	927	743	1044	644	417	412	663	955	1209	952	
	1500	56	56	1	37	23	9	6	35	35	24	19	58	45	58	14	34	19	9	7	24	11	17	\$	56	34	9	9	œ	17	37	99	34	
Ê	1200 1500	35	36	o	20	28	1	80	48	20	35	30	4	24	33	54	4	25	10	œ	35	53	19	23	32	99	9	4	4	32	52	90	47	
Measured Deflection Results (μm) Distance from Load (mm)	900	54	55	÷	72	37	œ	47	55	99	25	42	22	9/	4	84	54	28	5	4	39	49	72	46	45	82	52	24	00	32	4	146	99	
n Res	750	62	9/	8	86	20	6	64	99	7	09	20	72	26	25	103	29	85	58	12	20	64	30	64	09	106	38	45	25	30	101	189	98	
ectio	009	119	110	29	156	99	5	85	96	95	80	64	103	131	22	141	90	126	53	22	29	91	49	86	83	139	64	29	42	63	130	252	114	
Isured Deflection Distance from Log	450	185	172	64	263	107	56	144	148	184	122	109	180	191	122	198	131	192	125	4	98	167	74	149	120	198	116	95	70	122	180	361	168	
asure Dista	300	333	284	193	471	229	86	284	289	375	263	270	361	291	218	320	227	319	271	79	156	300	132	246	213	369	217	149	155	234	345	564	282	
Me	200	443	417	370	718	414	255	481	483	523	440	447	645	456	324	432	400	472	452	161	282	466	178	476	408	621	371	221	243	392	472	745	451	
	0	873	999	099	626	759	909	800	735	965	289	815	1108	785	649	829	933	851	872	379	999	831	363	927	725	1040	630	416	414	199	955	1211	941	
Peak	(kPa)	569	561	257	999	299	583	564	564	555	559	260	295	565	565	999	556	569	260	629	260	561	563	999	552	564	554	564	569	564	999	299	559	
Lane Wheel		WP	W	IWP	IWP	WP	IWP	IWP	WP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	WP	WP	WP	W	IWP	IWP	IWP	IWP	IWP	IWP	
ane		+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	÷	F	F	-	+	-	-	÷	-	-	-	-	
Station	(km)	2.050	2.150	2.250	2.350	2.450	2.550	2.650	2.750	2.850	2.950	3.050	3.150	3.250	3.350	3.450	3.550	3.650	3.750	3.850	3.950	4.050	4.150	4.250	4.350	4.450	4.550	4.650	4.750	4.850	4.950	5.050	5,150	



Ardmore Park Quarry Appendix 3

	ide Local Comment	1867	884	933	983	950	000	1833	283	1233	1467	033	1550	300	950	516	633	1200	133	450	250	1584 ND	1466	784	1967	317	1117	1650	784	100	1500	1450 ND	210	CONSULT AUSTRALIA
GDA94	Longitude	7 149.9635867	-34.7756417 149.9631884	34,7764267 149,9626933	34.7772400 149.9621983	-34.7780583 149.9616950	34,7788467 149,9612000	0 149,9608833	4 149.9612283	34.7813517 149.9616233	-34.7822517 149.9616467	-34.7831266 149.9614033	34.7839767 149.9610550	34.7848033 149.9606300	34,7856033 149,9601950	-34,7864433 149,9597516	6 149,9593633	4 149.9590200	4 149.9587133	-34,7898617 149,9584450	34.7907183 149.9582250	34.7915817 149.9580584	34,7925067 149,9578466	34.7933817 149.9577784	-34.7942883 149.9577967	-34.7951267 149.9574317	34,7959183 149,9570117	0 149.9565650	34.7976334 149.9562784	-34.7985450 149.9561100	-34.7994167 149.9559500	-34.8003200 149.9559450	7 149.9562	
ਲ	Latitude	-34.7748067	-34.775641	-34,776426	-34.777240	-34.778058	-34.778846	-34.7796750	-34.7805784	-34.781351	-34.782251	-34.783126	-34.783976	-34.784803	-34,785603	-34.786443	-34.7872616	-34.7880884	-34.7889584	-34,789861	-34.790718	-34.791581	-34.792506	-34.793381	-34.794288	-34.795126	-34.795918	-34,7967650	-34.797633	-34.798545	-34.799416	-34.800320	-34,8011717 149,9562017	
FWD	Curv.	0.39	0.27	0.32	0.42	0.45	0.29	0.39	0.35	0.61	0.35	0.42	0.41	0.33	0.25	0.20	0.45	0.32	0.41	0.22	0.25	0.22	0.23	0.18	0.33	0.28	0.28	0.43	0.30	0.30	0.30	0.32	0.24	
Œ	Deff.	79.0	0.97	0.86	0.88	1.00	0.83	0.82	0.73	1.18	0.84	1.06	0.99	08'0	0.58	0.36	0.89	0.68	0.95	0.45	0.73	0.49	0.54	0.29	0.67	0.44	0.64	1.04	0.63	92.0	0.87	0.56	0.51	
rature	Surface	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	
Temperature (°C)	Air S	11.0	11.0	11.0	11.0	11:0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11:0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11,0	11.0	11.0	11.0	11.0	11.0	11,0	
	1	12	6	5	59	44	21	5	Ţ.	52	22	35	38	36	2	Į	2	8	38	12	41	17	9	4	24	Ξ	19	28	Ξ	59	35	o	22	
Ê	1200 1500	50	34	24	48	65	33	20	15	29	59	49	51	20	53	9	12	24	41	12	19	16	20	15	5	8	28	32	18	40	52	2	59	
ults (µ	900	35	78	15	7	90	19	5	49	26	55	99	69	74	41	56	56	33	6/	2	59	32	53	21	44	28	43	52	30	62	6/	17	83	
n Resi	750	49	118	62	86	116	62	45	24	123	79	80	93	26	55	33	42	44	116	59	46	40	40	23	29	38	09	79	44	6/	108	24	40	
Normalised Deflection Results (μm) Distance from Load (mm)	900	20	179	124	135	151	104	71	38	165	116	86	142	132	83	46	72	09	163	36	90	54	22	30	9/	47	87	114	63	106	155	36	52	
d Def	450	101	270	208	194	204	151	124	22	235	169	197	241	190	123	72	130	16	242	24	169	9	82	44	115	71	135	178	107	146	233	92	8	
Dist	300	178	459	348	317	338	297	275	192	401	265	407	407	321	225	115	249	231	475	124	291	166	180	9/	252	118	236	347	186	255	400	172	174	
Nor	200	278	969	535	459	547	544	430	377	570	490	638	577	471	334	160	442	365	538	228	474	265	304	108	342	159	360	614	327	456	569	242	273	
	0	672	996	859	883	986	832	816	728	1176	844	1055	985	804	583	359	894	684	952	448	725	489	538	292	899	439	637	1040	631	756	871	561	512	
	1500	12	19	5	58	44	21	5	÷	52	22	35	38	36	21	F	2	18	38	12	4	17	16	4	24	F	6	27	11	58	35	6	22	
(mm)	1200	20	34	24	48	9	33	20	15	19	59	48	5	20	29	16	12	24	41	15	19	16	20	16	31	200	28	3	48	40	5	21	53	
esults d (mm)	900	35	78	20	71	88	19	25	19	96	55	65	69	74	40	26	27	33	79	2	29	32	29	2	44	28	43	51	30	62	78	17	34	
on Re Load	750	48	118	79	98	115	29	45	25	122	179	79	93	97	22	33	43	44	115	28	46	40	40	23	59	38	09	. 78	43	62 .	108	24	4	
from	009	69	179	124	134	149	103	. 71	38	164	116	96	142	132	82	46	73	59	163	36	96	54	22	30	9/ 1	47	87	112	62	106	155	37	52	
sured Deflection R Distance from Load	450	100	3 270	207	193	1 202	149	124	2 75	234	168	193	5 240	190	3 123	5 72	131	16 (	1 241	54	169	90	8	45	115	3 71	3 135	2 175	901 9	3 146	3 233	9 65	81	10
Measured Deflection Results (μm) Distance from Load (mm)	300	5 177	3 459	3 347	316	334	3 294	3 274	3 192	399	7 264	399	1 405	320	223	115	3 252	3 230	474	3 123	2 290	165	179	11 (	3 250	9 118	236	345	3 185	3 255	399	2 172	5 176	
2	200	5 275	969 9	533	457	541	3 538	8 428	378	0 567	487	5 626	574	3 471	335	160	446	363	537	1 226	472	3 264	302	5 110	333	159	361	4 604	326	3 456	3 567	242	275	
	0	999	996	857	879	987	823	813	730	1170	839	1035	980	803	579	359	902	680	949	444	722	486	535	295	664	439	637	1024	627	756	898	561	517	
Peak	(kPa)	260	566	564	563	260	560	564	295	563	563	555	563	565	562	565	571	563	564	559	564	563	563	573	562	999	999	257	563	999	564	566	571	
ane Wheel	Path	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	20 mg/s - 100 mg 1 mg/s 20 mg/s - 10 mg/s 20 mg/s - 10 mg/s 20
		+				(#8	( <del>+</del>	-	9	-		-	-	-	-	-		-	100	-	-	el S	-		# J	+	<del>-</del>	-	-	-	0		-	
Station	(km)	5.250	5.350	5.450	5.550	5.650	5.750	5.850	5.950	6.050	6.150	6.250	6.350	6.450	6.550	6.650	6.750	6.850	6.950	7.050	7.150	7.250	7.350	7.450	7.550	7.650	7.750	7.850	7.950	8.050	8.150	8.250	8,350	



MULTIQUIP QUARRIES Ardmore Park Quarry Appendix 3

	Local Comment																													ND	ND			COMSULT AUSTRALIA	)
194	Longitude	149.9562916	149,9560816	149,9558167	149.9554733	149,9550700	149,9546750	149.9541383	149.9535567	149.9530300	149.9525700	149.9521317	149.9517700	149.9515667	149.9513767	149.9511717	149.9510033	149.9508917	149.9508600	149.9507300	149,9505750	149.9505650	149,9505417	149.9502633	149.9499300	149.9496700	149,9496533	149.9500317	149.9504283	149,9505100	149.9503066	149.9501567	149.9502800		
GDA94	Latitude	-34.8020650 149.9562916	-34.8029550 149.9560816	-34.8038100 149.9558167	-34.8046817 149.9554733	-34.8055367 149.9550700	-34,8063500 149,9546750	-34.8071466 149.9541383	-34.8078933 149.9535567	-34.8086550 149.9530300	-34.8094884 149.9525700	-34.8103200 149.9521317	-34.8112100 149.9517700	-34.8120633 149.9515667	-34.8129283 149.9513767	-34.8138083 149.9511717	-34,8147033 149,9510033	-34.8156067 149.9508917	-34.8165550 149.9508600	-34,8174067 149,9507300	-34.8182983 149.9505750	-34.8191883 149.9505650	-34,8200700 149,9505417	-34.8209467 149.9502633	-34.8217800 149.9499300	-34.8226034 149.9496700	-34.8235650 149.9496533	-34.8244600 149.9500317	-34.8252883 149.9504283	-34.8261383 149.9505100	-34.8271267 149.9503066	-34.8279233 149.9501567	-34,8288583 149,9502800		
FWD	Curv.	0.34	0.24	0.24	0.28	0.32	0.41	0.30	0.28	0.27	0.24	0.34	0.33	0.39	0.46	0.21	0.33	0.30	0.31	0.25	0.26	0.22	0.36	0.26	0.24	0.45	0.23	0.32	0.24	0.32	0.22	0.28	0.37		
Œ	Defl.	0.61	0.70	99.0	69.0	0.74	1.34	0.77	0.81	0.71	0.62	0.78	0.64	1.27	1.17	0.45	0.77	0.63	0.70	0,54	0.48	0.45	0.92	0.72	0.52	0.84	0.53	0.81	0.50	0.64	0.53	0.72	0.79		
Temperature (°C)	Surface	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1		
Temp (°	Air	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11:0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0		
	1500	5	36	36	58	30	64	56	39	31	52	28	4	52	38	26	3	50	38	4	24	4	52	27	15	12	22	20	24	45	35	32	2		
(E)	1200	22	20	46	38	39	87	38	51	31	28	3	2	73	57	36	43	30	20	6	59	22	32	36	2	20	30	33	25	33	39	45	28		
mm)	900	56	72	19	44	20	140	44	70	15	14	43	28	119	79	48	64	45	69	27	44	53	52	5	30	27	45	46	27	4	15	58	43		
n Hes	750	30	88	22	25	9	204	62	93	89	99	28	37	169	124	55	83	29	16	35	22	37	2	9	42	34	52	64	43	98	99	79	55		
Normalised Deflection Results (μm) Distance from Load (mm)	9	47	118	66	83	82	295	94	132	95	75	11	53	246	175	72	116	84	130	24	99	20	106	93	59	49	89	95	43	101	98	106	78		
d Def	450	84	178	152	127	152	454	156	199	152	113	126	91	385	304	94	173	130	188	93	82	22	184	165	26	83	104	157	69	119	127	153	126		
Dist	300	171	314	295	251	268	699	343	338	282	224	259	170	099	553	169	300	235	290	184	136	145	345	324	177	207	189	298	209	312	456	287	289		
Nor	200	276	455	424	416	424	931	461	531	439	381	441	315	885	710	242	440	333	383	289	219	229	557	466	276	387	301	489	269	319	305	431	422		
	0	614	200	663	692	741	1336	765	810	711	622	781	641	1273	1172	455	773	633	269	545	481	453	915	723	519	838	533	814	504	639	526	716	790		
	1500	13	36	36	59	59	64	56	38	31	25	28	4	52	38	26	31	50	38	4	23	4	52	27	5	72	22	20	24	45	35	32	20		
Ê	1200	22	20	46	39	33	87	38	51	31	27	3	21	73	22	37	4	58	20	19	29	22	32	36	2	50	59	32	52	33	39	45	88	<u></u>	
mm)	900	25	72	19	45	48	140	4	70	20	4	42	28	119	79	48	65	45	69	27	43	29	5	20	30	27	42	45	27	4	52	28	45	Australia	
Load (	750	53	88	9/	22	59	204	62	93	89	99	28	37	169	124	55	84	29	91	35	25	37	69	64	42	34	25	63	43	98	29	78	24	329	
isured Deflection Results Distance from Load (mm)	900	46	118	100	83	18	296	94	132	95	74	76	53	246	175	72	117	84	131	54	65	20	105	92	29	20	89	93	43	100	86	106	11	12 245	111
ance	450	84	178	153	127	151	454	156	198	151	112	125	90	382	304	94	175	129	189	92	82	22	182	164	86	88	103	155	70	119	127	152	125	64 00	
Measured Deflection Results (μm) Distance from Load (mm)	300	169	314	297	251	267	699	343	337	280	221	257	169	099	554	170	304	233	291	183	135	144	338	323	177	208	188	294	209	311	456	286	286	ABN	
Σ	200	273	456	427	416	422	931	461	529	436	375	436	313	886	1 711	244	446	330	384	287	218	228	552	464	277	387	299	483	269	318	305	429	418	of L to	100
	0	209	701	899	693	738	1336	765	807	206	614	773	638	1273	1174	457	784	628	669	539	478	451	906	720	519	839	529	803	504	637	527	712	781	Vices	
Peak		260	267	220	566	563	999	566	564	562	558	260	563	999	292	569	574	561	299	562	562	564	260	563	999	295	562	558	566	564	566	563	260	ent Sen	
Lane Wheel	Path	IWP	IWP	IWP	WP	IWP	IWP	WP	IWP	(WP	IWP	IWP	W	IWP	Pavement Management Sarvices Ptv. 1td. ARN 64 002 245 329	-0																			
Lane		+	*	-	÷	-	-	-	+	-	-	-	-	+	-	-	+	e	e	-	-	P	F	-	=	-	-	-	•	-	e	-	-	M	
Station	(km)	8.450	8.550	8.650	8.750	8.850	8,950	9.050	9,150	9.250	9.350	9.450	9.550	9.650	9.750	9.850	9.950	10.050	10.150	10,250	10.350	10.450	10,550	10.650	10.750	10.850	10.950	11.050	11.150	11.250	11,350	11.450	11,550	Pavem	



PA 07\_0155 MOD3 Report No. 625/25

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Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia Ver.2 Rev.0

#### **RESPONSE TO SUBMISSIONS**

PA 07\_0155 MOD3 Report No. 625/25 MULTIQUIP QUARRIES

Ardmore Park Quarry

Appendix 3



0.33	0.09		0.45
0.76	0.22	0.51	1.02
14.2	0.1		
10.8	4.0		

1 Acronyms: IWP - Inner Wheel Path of the tested lane, ND - Non Decreasing deflection bowl, RT - Retested owing to poor deflection bowl. Survey Notes

2 Lane 1 is in the prescribed direction whilst lane 2 is in the counter direction and all station values presented are increasing in the direction of lane 1 (prescribed lane).

3 Where negative curvature values occur as a result of Non-Decreasing deflection bowl data, they have been set to 0.00mm

4 IWP results were measured within the existing central pavement of the lane tested.

Reviewed By:

James Erskine Senior Pavement Engineer

25-Sep-18

Prepared By:

James Erskine Senior Pavement Engineer

25-Sep-18

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Page 6 of 18

Pavement Management Services Ver:2 Rev:0



Average

Standard Deviation 10th Percentile 90th Percentile

Ardmore Park Quarry Appendix 3

## **RESPONSE TO SUBMISSIONS**

-34.7467634 149.9763150

-34,7476450 149,9763267

-34.7441350 149.9762400

0.30 0.22

39 39

55

Ξ

334 336

545

849

120 142

176

507

5

2 85 45

142

27 27 21

160

147

IWP

205 162

9

75

104

167 171

-34.7432117 149.9762267

-34,7449583 149,9762733

-34.7458883 149.9762884

0.29

0.86 0.78 0.57

58 2 2

8.0

45

66

147

PA 07\_0155 MOD3 Report No. 625/25

Form No. TP5-R-001

Page 7 of 18



Seven Hills, NSW 2147

Unit 7b, 26 Powers Road

Client: Multiquip Quarries

Job No: 2017152

Report No: DR2017152-3 Client Section ID: 1A2 IWP

N Lane: Road Id:

V Block:

Smoothing: No

Farget Load (kN): 40

Air Normalised Deflection Results (μm) 900 Distance from Load (mm) 900 551 1500 1200 Measured Deflection Results (μm)

FWD Defl. 98.0 0.64 Temperature (°C) Surface 8.0 8.0

Local Comment

ND

-34.7321166 149.9802134

Latitude Longitude

Curv. 0.31 0.26 -34.7337517 149.9792133

0.21

0.57 60.1 0.59 0.84

0.3 0.3 10.3 10.3 10.3 10.3 10.3 10.3 10.3 10.3 10.3 10.3 10.3 10.3 10.3 10.3 10,3

8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0

-34.7345317 149.9787667

0.36 0.28 0.24 0.19

-34.7329217 149.9797084

-34.7353816 149.9782900 -34.7361350 149.9779566

N 28 27 4 3 9 48 5 7 22 48 16 137 24 204 127 160 333 400 172 109

359

726

1089

04

138

206

1097

570 563 562 562

586

N

834 454 671

561

561

0.375 0.475 0.575 0.675 0.775 0.875

0.275

107

383

900

333

552 383 356 732 310 601 231 406

864

0.175

223 248 403 171

300

Peak Load (kPa) 999 999

> Wheel Path IWP WP WP WP WP WP WP WP

Lane

Distance from Load (mm)

from Mountain Ash Road to South Marulan Road

28 78 26 34 52 33 72 47 110 116 181 229

22

44

26

16 34

108 227

53

115

561

311

-34,7370733 149,9775950

0.43 99.0 -34.7404883 149.9764067 -34.7413800 149.9762450 -34.7422583 149.9762117

0.34

0.78

0.36 0.46 0.32

1.00

1.09 0.88 0.85 0.73

-34.7387634 149.9769567 -34,7396500 149,9766367

0.33 0.25

0.83 0.64

8

4 37 40 28 35 26 38 40 17

> 5 48 59

89 89 36

-34.7379300 149.9772517

0.27

133 46 197 17 107 98 118 295 157 178 217 262 455 410 386 605 443 635 233 501 589 840 219 833 638 779 266 427

397 335 559 628 085 882 N 18 14 39 27 35 3 19 28 56 5

48 46 39 52 88 36 55 34 69 09 72 47 98 5 45 77 77 89 194 110 109 108 103 1 85 119 180 157 291 176 991

334 376 205 569 726 569 568 558 999 562 260 564

499 WP WP IWP WP WP WP IWP

830 564 IWP 0.975

1,075 1,175 1.675 1.275 375 475 .575

473 999 560 IWP WP 1.875 775

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Ver:2 Rev:0

FWD/HWD Structural Test Report - Deflection Results

**Testing Date: 1/06/2018** 

Fest Method: QT211

Test Equipment: FWD-016 Operator: John Muir

Jerrara Road

Lane Wheel	-3.5		ž	Dist	ance	Distance from Load (mm)	oad (I	(Fig.				Norm	2 0	Defle	ction om Lo	Resul	ts (µn	- 15		50		3		DAS	
Path	(kPa)	0	200	300	450	009	120	900	1200 1500	1500	0	200	300 4	450	009	750	900	1200 1	1500 Air	r Surface		Defl. C	Curv.	Latitude Longitude	Local Comment
WP	999	493	297	189	116	7	48	31	50	#	493	297	189	116	20	48	31	50	11	8.0 10	10.3 0.	0.49 0	0.20	-34.7485817 149.9761333	
WP	257	784	493	269	141	87	19	5	39	30	161	200	273 1	144	88	62	51	39	30 8	8.0 10	10.3 0.	0.80 0	0.30 -34	-34.7493284 149.9756184	
IWP	999	383	153	89	35	8	7	00	9	4	381	152	89	35	8	12	1	9	4	8.0 10	10.3 0.	0.38 0	0.23 -34	34,7500183 149,9748866	
WP	569	651	436	273	175	119	79	29	36	52	647	434	272	174	611	78	58	36	25 8	8.0 10	10.3 0.	0.65 0	0.21 -34	34.7506800 149.9741433	
WP	295	661	318	163	79	22	43	30	19	16	999	320	164	80	22	43	30	50	16 8	8.0 10	10.3 0.	0.66 0	0.35 -34	34.7513600 149.9734716	
IWP	563	1083	512	262	108	99	45	33	22	9	880	515	263 1	80	29	46	33	22	13	8.0 10	10.3	1.09 0	0.57 -34	-34,7521734 149,9727967	
WP	292	630	356	204	91	48	36	30	25	2	659	355	204	91	48	36	30	25	21	8.0 10	10.3 0.	0.63 0	0.27 -3	34.7529450 149.9722317	
WP	999	741	441	291	162	102	92	59	4	33	740	441	290 1	62	05	92	269	41	33	8.0 10	0.3 0.	0.74 0	0.30 -34	34.7536883 149.9716433	
WP	562	715	367	205	73	34	27	23	16	12	720	370	207	73	34	27	23	. 91	12	8.0 10	10.3 0.	0.72 0	0.35 -34	34,7544733 149,9710667	
WP	563	756	435	242	105	23	35	30	52	20	260	437	243 1	901	53	35	30	26	20 8	8.0 10	10.3 0.	0.76 0	0.32 -34	-34.7552633 149.9706167	
WP	562	869	403	248	118	62	38	53	28	50	203	406	249 1	119	62	38	59	28	20 8	8.0 10	0.3 0.	0.70	0.30 -34	-34.7561167 149.9702117	
WP	566	988	521	298	160	88	20	55	43	36	286	520	298	160	86	70	55	43	36 8	8.0 10	10.3 0.	0.99 0	0.47 -34	34.7569167 149.9698584	
IWP	125	627	287	162	95	59	46	37	30	24	622	284	191	92	09	45	37	30	24 8	8.0 10	10.3 0.	0.62 0	0.34 -3	34.7577800 149.9694883	
IWP	571	527	287	177	66	02	26	46	34	56	523	284	9/1	86	69	99	45	34	26 8	8.0 10	10.3 0.	0.52 0	0.24 -3	-34.7586217 149.9691733	New Pavement
IWP	175	1053	629	477	309	203	137	96	22	42	043	673	472 3	307	201	135	95	26	42 8	8.0 10	10.3 1.	1.04 0	0.37 -34	-34.7595200 149.9689583	New Pavement
WP	561	941	551	293	172	124	26	78	19	48	949	999	1 962	174	125	26	78 6	62	48 8	8.0 10	10.3 0.	0.95 0	0.39 -34	34,7604266 149,9688084	
WP	562	653	416	271	148	90	94	20	36	27	859	419	273 1	149	91	64	20 3	36	27 8	8.0 10	10.3 0.	0.66 0	0.24 -34	34.7613250 149.9686500	
IWP	559	544	237	105	43	50	16	15	10	00	920	239	106	44	50	16	15	10	8	8.0 10	10.3 0.	0.55 0	0.31 -34	34.7622017 149.9685033	
IWP	292	491	275	159	18	46	27	48	13	10	490	274	158	81	46	27	18		0	8.0 10	10.3 0.	0.49 0	0.22 -3	34,7630833 149,9682517	
WP	260	402	222	160	26	99	20	38	30	25	406	225	161	86	99	20	38	30	25 8	8.0 10	10.3 0.	0.41 0	0.18 -34	34,7639016 149,9679500	
IWP	562	681	450	264	142	98	62	52	38	23	989	453	266 1	143	98	63	52	38	23	8.0 9	9.2 0.	0.69 0	0.23 -34	34.7647584 149.9675884	
IWP	124	242	146	74	42	30	52	20	9	12	240	145	74	41	30	24	19	91	2	8.0 9.	0	.24 0	0.10	34,7656000 149,9672300	
WP	563	594	322	185	101	62	41	32	54	20	282	323	186 1	102	62	45	32	24	20 8	8.0 9.	Q	0.60 0	0.27 -34	34.7664283 149.9668450	
WP	999	397	186	106	29	5	45	35	27	8	397	186	901	29	50	45	35	27	81	8.0 9.	N	0.40 0	0.21 -34	-34.7672784 149.9664600	
WP	260	1017	653	396	250	164	117	87	49	32	1028	099	400	252	991	118	88	49	32 8	8.0 9.	2	1.03 0	0.37 -3	34,7681267 149,9660933	
WP	563	784	528	345	191	123	62	22	48	6	288	531	347 1	192	123	80	29	8	6	8.0 9.	2	0.79 0	0.26 -34	-34.7690150 149.9658450	
WP	999	424	264	166	92	25	22	6	1	LO.	454	264	991	92	55	22	80	9	φ	8.0 9.	N	0.42 0	0.16 -34	34,7698833 149,9657617	
IWP	257	958	610	409	228	148	101	65	32	14	823	620	416	231	51	103	99	32	8	8.0 9.	N	0.97 0	0.35 -34	-34.7708150 149.9654966	
IWP	551	934	386	233	150	Ξ	84	64	39	25	696	397	240 1	154	114	98	99	40	26 8	8.0 9.	N	0.96.0	0.56 -34	-34,7716084 149,9650533	
WP	569	699	261	156	85	23	36	56	16	F	999	528	155	84	53	36	56	91	Ξ.	8.0	9.2 0.	0.67 0	0.41 -3	-34.7724500 149.9645933	
IWP	570	767	459	291	165	110	84	99	45	35	761	455	288	164	601	83	64	45	35 8	8.0 9.	N	0.76 0	0.31 -34	-34.7732867 149.9641950	
IWP	292	269	389	272	168	11	83	63	5	30	969	389	272 1	168	E	83	63	43	30 8	8.0 9	c,	0.69.0	0.31 -34	-34,7741383 149,9638083	
																									COMSULT AUSTRALIA
	1000	0000	74 140	VOV .	20 60	SICO		Auctoria	.5																



PA 07\_0155 MOD3 Report No. 625/25

Ardmore Park Quarry Appendix 3

363         147         93         59         36         9         5         80         92         0.66           330         213         99         47         32         22         14         80         92         0.05           257         146         93         60         42         14         13         80         92         0.05           345         17         36         25         14         80         92         0.05           350         178         36         26         41         25         24         80         92         0.05           365         178         36         26         46         35         22         14         80         92         0.05           374         116         67         46         35         22         14         80         92         0.08           374         126         16         35         22         14         80         92         0.08           374         26         16         35         26         16         80         92         0.08           370         18         17         41 <td< th=""><th>  Peak   Distance from Load                                      </th><th>  Peak   Distance from Load (mm)   Load (kPa)   0 200 300 450 600 750 900  </th><th>Measured Deflection Results ( Distance from Load (mm) 0 200 300 450 600 750 900</th><th>Measured Deflection Results ( Distance from Load (mm) 200 300 450 600 750 900</th><th>Distance from Load (mm)</th><th>(mm) 900</th><th>(mm) 900</th><th>(mm) 900</th><th>(mm) 900</th><th><b>3</b> - 1   2  </th><th>0 15</th><th>  8</th><th></th><th>141</th><th>Dista 300</th><th>ance 1</th><th>Normalised Deflection Results (μm) Distance from Load (mm) 200 300 450 600 750 900 120</th><th>alised Deflection Results Distance from Load (mm) 300 450 600 750 900</th><th>mm)</th><th>(m) 1200 1500</th><th>1200</th><th>Tempera (°C) Air Su</th><th></th><th>Deff.</th><th>FWD I. Curv.</th><th>GDA94 Latitude Lo</th><th>94 Longitude</th><th>Local Comment</th></td<>	Peak   Distance from Load	Peak   Distance from Load (mm)   Load (kPa)   0 200 300 450 600 750 900	Measured Deflection Results ( Distance from Load (mm) 0 200 300 450 600 750 900	Measured Deflection Results ( Distance from Load (mm) 200 300 450 600 750 900	Distance from Load (mm)	(mm) 900	(mm) 900	(mm) 900	(mm) 900	<b>3</b> - 1   2	0 15	8		141	Dista 300	ance 1	Normalised Deflection Results (μm) Distance from Load (mm) 200 300 450 600 750 900 120	alised Deflection Results Distance from Load (mm) 300 450 600 750 900	mm)	(m) 1200 1500	1200	Tempera (°C) Air Su		Deff.	FWD I. Curv.	GDA94 Latitude Lo	94 Longitude	Local Comment
330         213         94         47         32         22         14         80         92         103         347758266         1499630433           257         146         83         60         42         14         13         80         92         0.57         0.15         3477768271         149.9625884           345         148         84         24         14         13         80         92         0.47         0.15         3477788474         149.9615333           251         173         80         92         0.86         0.32         3477798467         149.9615333           251         105         80         92         0.86         0.31         347798467         149.9615333           254         105         80         92         0.86         0.31         347789407         149.9615283           264         105         80         92         0.86         0.31         0.347789407         149.9615283           264         105         80         92         0.88         0.32         0.347789407         149.961313           270         105         80         92         0.88         0.31         0.34778940967	567 660 413 363 147 94 60 36 9 5 658	567 660 413 363 147 94 60 36 9 5 658	413 363 147 94 60 36 9 5 658	413 363 147 94 60 36 9 5 658	363 147 94 60 36 9 5 658	147 94 60 36 9 5 658	94 60 36 9 5 658	60 36 9 5 658	36 9 5 658	9 5 658	658	100	100	412	363	147	93	59	36	თ	10	8.0	9.5	99.0	0.25	-34.7749850 14	49.9635050	
257         145         88         92         0.57         0.15         34,7768271 149,9825584           417         83         48         34         14         13         80         92         0.47         0.15         34,7768271 149,9825584           318         48         34         25         18         10         80         92         0.78         0.22         34,7778384 149,9621733           251         105         26         40         92         0.78         0.22         34,7778440 149,9621733           251         105         26         16         80         92         0.78         0.32         34,7778440 149,9621733           264         105         26         16         80         92         0.78         0.36         24,7778440 149,962173           264         106         92         0.88         0.92         0.89         0.37         0.41         0.41         0.41         0.41         0.41         0.41         0.41         0.41         0.41         0.41         0.41         0.41         0.41         0.41         0.41         0.41         0.41         0.41         0.41         0.41         0.41         0.41         0.42	561 1018 650 327 211 98 47 31 22 14 1027	561 1018 650 327 211 98 47 31 22 14 1027	650 327 211 98 47 31 22 14 1027	650 327 211 98 47 31 22 14 1027	327 211 98 47 31 22 14 1027	211 98 47 31 22 14 1027	98 47 31 22 14 1027	47 31 22 14 1027	31 22 14 1027	22 14 1027	14 1027			655	330	213	66	47	32	22	4	8.0	9.2	1.03	0.37	-34.7758266 14	49.9630433	
41         53         44         56         44         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         60         92         93         93         93         93         93         93         93         93         93         93         93         93         93         93         93         93         93         93         93         93         93         93         93         93         93         93         93         93         93         93         93         93         93<	146 94 61 43 14	568 569 418 258 146 94 61 43 14 13	418 258 146 94 61 43 14 13	418 258 146 94 61 43 14 13	258 146 94 61 43 14 13	146 94 61 43 14 13	94 61 43 14 13	61 43 14 13	43 14 13	14 13	<u>ب</u>	299		417	257	146	8	09 7	4 7	4 6	<u> </u>	0.0	מ מ	0.57	0.15	-34,7766217 14	49.9625584	
309         115         80         50         40         92         0.78         0.32         34.7789467         49.9611150           251         103         65         46         35         22         14         80         92         0.86         0.41         34.7789460         149.9616283           264         116         67         49         36         26         16         80         92         0.38         0.36         34.7896900         149.9616283           344         286         16         80         92         0.36         0.31         34.7896900         149.9616289           396         126         16         80         92         0.37         0.34         24.789660         149.9616289           391         145         87         26         80         92         0.77         0.28         34.789680         149.9616289           391         145         87         80         92         0.74         0.27         0.37         0.34.784667         149.9616289           392         145         80         80         92         0.34         0.37         0.34.786667         149.9616289         149.9616283           <	565 863 548 344 179 98 57 41 25 24	565 863 548 344 179 98 57 41 25 24	548 344 179 98 57 41 25 24	548 344 179 98 57 41 25 24	344 179 98 57 41 25 24	179 98 57 41 25 24	98 57 41 25 24	57 41 25 24	41 25 24	25 24	5 4	864			345	3 5	0 6	5 2	G 1	25 -0	5 2	0 0		0.86	0.32	-34 7781783 14	49.9615733	
251         103         65         46         35         22         14         80         9.2         0.86         0.41         -34.7798400         149.9608833           264         116         67         49         36         26         16         80         9.2         0.88         0.36         -34.7806900         149.96162834           374         258         168         16         80         9.2         1.34         0.55         -34.7806900         149.96162834           391         145         87         62         43         80         9.2         0.36         -34.7806900         149.9616283           391         145         87         62         43         80         9.2         0.36         -34.7806900         149.9616283           391         145         87         80         9.2         0.77         0.28         34.7849667         149.9606150           392         145         80         9.2         0.74         0.22         34.7849667         149.9605133           391         149         80         9.2         0.74         0.22         34.7849667         149.9605143           392         149         80	565 776 453 309 185 80	565 776 453 309 185 80 50 40 28 19	453 309 185 80 50 40 28 19	453 309 185 80 50 40 28 19	309 185 80 50 40 28 19	185 80 50 40 28 19	80 50 40 28 19	50 40 28 19	40 28 19	28 19	9	777		454	309	185	80	20	40	28	6	8.0		0.78	0.32	-34,7789467 14	49,9611150	
264         116         67         48         36         26         16         80         9.2         1.34         0.36         -34.7806900 149.9612684           374         258         163         104         77         48         33         80         9.2         1.34         0.55         -34.7815267 149.9616283           416         206         126         85         62         43         80         9.2         0.36         -34.7815267 149.9616281           206         126         87         43         80         9.2         0.77         0.28         -34.7816207 149.9616133           301         189         108         10         9.2         0.77         0.28         -34.7816207 149.9605150           31         198         108         9.2         0.77         0.28         -34.7849667 149.9605150           31         101         80         9.2         0.77         0.28         -34.7849667 149.9605150           310         102         3.2         2.4         1.1         80         9.2         0.74         0.25         -34.7849667 149.9605160           32         10         8.0         9.2         0.24         0.22         34.7868117	WP 557 844 437 247 102 64 46 34 21 13 857	557 844 437 247 102 64 46 34 21 13	437 247 102 64 46 34 21 13	437 247 102 64 46 34 21 13	247 102 64 46 34 21 13	102 64 46 34 21 13	64 46 34 21 13	46 34 21 13	34 21 13	21 13	5	85	~	444	251	103	99	46	35	22	4	8.0	9.2	0.86	0.41	-34.7798400 14	49.9608833	
374         258         163         148         33         8.0         9.2         1.34         0.55         34.7815267         149.9616283           416         206         126         43         8.0         9.2         0.36         0.31         34.7824050         149.9615133           209         145         87         52         43         80         9.2         0.77         0.28         34.7884050         149.9615133           301         189         106         71         50         34         21         80         9.2         0.74         0.27         34.7849667         149.9605150           189         108         11         80         9.2         0.74         0.22         34.7849667         149.9605150           189         101         80         9.2         0.74         0.22         34.78449667         149.9606150           280         101         80         9.2         0.74         0.72         34.7849667         149.9606150           280         101         80         9.2         0.74         0.72         34.7849667         149.9606150           280         101         80         9.2         0.81         8.0 <td>WP 558 820 462 260 115 66 48 36 26 16 8</td> <td>558 820 462 260 115 66 48 36 26 16</td> <td>462 260 115 66 48 36 26 16</td> <td>462 260 115 66 48 36 26 16</td> <td>260 115 66 48 36 26 16</td> <td>115 66 48 36 26 16</td> <td>66 48 36 26 16</td> <td>48 36 26 16</td> <td>36 26 16</td> <td>26 16</td> <td>16</td> <td></td> <td>831</td> <td>469</td> <td>264</td> <td>116</td> <td>29</td> <td>49</td> <td>36</td> <td>56</td> <td>9</td> <td>8.0</td> <td></td> <td>0.83</td> <td>0.36</td> <td>-34.7806900 14</td> <td>49.9612684</td> <td></td>	WP 558 820 462 260 115 66 48 36 26 16 8	558 820 462 260 115 66 48 36 26 16	462 260 115 66 48 36 26 16	462 260 115 66 48 36 26 16	260 115 66 48 36 26 16	115 66 48 36 26 16	66 48 36 26 16	48 36 26 16	36 26 16	26 16	16		831	469	264	116	29	49	36	56	9	8.0		0.83	0.36	-34.7806900 14	49.9612684	
416         206         126         87         43         80         92         0.31         34.7824050 149.9613133           299         145         87         52         43         80         92         0.77         0.28         34.7833017 149.9613133           301         189         108         10         92         0.74         0.27         34.7841216 149.9605150           189         108         10         20         0.74         0.22         34.7841216 149.9605150           189         10         60         4         3         1         80         92         0.33         34.7849667 149.9605150           189         10         6         4         3         1         80         92         0.33         34.7849667 149.9605160           289         10         6         6         4         3         1         80         92         0.33         34.7849667 149.9605160           280         10         6         6         4         3         1         80         92         0.34         0.38         0.49         0.23         34.7868171 149.9606150           280         10         6         6         4         3	IWP 563 1337 790 372 257 162 104 76 48 33 1	563 1337 790 372 257 162 104 76 48 33	790 372 257 162 104 76 48 33	790 372 257 162 104 76 48 33	372 257 162 104 76 48 33	257 162 104 76 48 33	162 104 76 48 33	104 76 48 33	76 48 33	48 33	33	_	343	3 794	374	258	163	104	11	48	33	8.0		1.34	0.55		49.9616283	
299         145         87         67         52         38         30         9.2         0.77         0.28         3.47833017 149.9613133           301         189         108         71         50         34         21         80         9.2         0.74         0.27         3.47841216 149.9605150           370         203         135         102         71         43         35         80         9.2         0.81         0.22         3.47849667 149.9605150           380         101         53         35         24         17         11         80         9.2         0.83         3.47849667 149.9600550           280         102         0.30         0.32         0.44         0.23         3.47849667 149.9600550           280         106         6         4         3         1         80         9.2         0.93         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44 <t< td=""><td>IWP 569 968 656 418 207 126 86 63 53 43 8</td><td>569 968 656 418 207 126 86 63 53 43</td><td>656 418 207 126 86 63 53 43</td><td>656 418 207 126 86 63 53 43</td><td>418 207 126 86 63 53 43</td><td>207 126 86 63 53 43</td><td>126 86 63 53 43</td><td>86 63 53 43</td><td>63 53 43</td><td>53 43</td><td>43</td><td>0,1</td><td>963</td><td>8 652</td><td>416</td><td>206</td><td></td><td>88</td><td>62</td><td>52</td><td>43</td><td>8.0</td><td></td><td>96.0</td><td>0.31</td><td>-34.7824050 14</td><td>49.9615917</td><td></td></t<>	IWP 569 968 656 418 207 126 86 63 53 43 8	569 968 656 418 207 126 86 63 53 43	656 418 207 126 86 63 53 43	656 418 207 126 86 63 53 43	418 207 126 86 63 53 43	207 126 86 63 53 43	126 86 63 53 43	86 63 53 43	63 53 43	53 43	43	0,1	963	8 652	416	206		88	62	52	43	8.0		96.0	0.31	-34.7824050 14	49.9615917	
301         189         108         71         60         34         21         8.0         9.2         0.74         0.27         -34-7841216 149.9609584           370         203         135         102         71         43         35         8.0         9.2         0.81         0.22         -34-7849667 149.9605150           183         101         53         35         24         17         11         8.0         9.2         0.33         -34.786617 149.9605150           289         136         6         4         3         1         8.0         9.2         0.33         -34.7866017 149.9605150           289         136         16         8         9         9         0.9         0.23         -34.7866217 149.9605150           281         16         8         9         9         0.9         0.23         -34.784600         149.9505060           211         129         8         8         9         9         0.9         0.23         -34.784600         149.9505060           211         129         8         9         9         0.9         0.23         -34.786601         149.9506060           211         123         1	IWP 560 764 491 296 143 86 66 52 38 30 7	560 764 491 296 143 86 66 52 38 30	491 296 143 86 66 52 38 30	491 296 143 86 66 52 38 30	296 143 86 66 52 38 30	143 86 66 52 38 30	86 66 52 38 30	66 52 38 30	52 38 30	38 30	30	7	772	496	299	145	87	29	25	38	30	8.0		0.77	0.28	-34.7833017 14	49.9613133	
370         203         135         102         71         43         35         8.0         9.2         0.81         0.22         -34,7849667         149,9605150           183         101         53         35         24         17         11         8.0         9.2         0.49         0.23         -34,7868117         149,960550           289         136         6         4         3         1         8.0         9.2         0.49         0.23         -34,7866217         149,95600550           289         136         78         3         23         18         8.0         9.2         0.31         0.45         -34,7847400         149,95600550           281         8         0         9.2         0.33         0.23         -34,7883400         149,9562433           211         143         38         25         8.0         8.0         9.2         0.45         -34,7806601         149,9562433           211         129         6         8.0         8.4         0.58         0.45         0.45         0.45         0.45         0.47         0.45         0.45         0.45         0.45         0.45         0.45         0.45         0.45	IWP 568 742 471 302 189 109 72 50 34 21 7	568 742 471 302 189 109 72 50 34 21	471 302 189 109 72 50 34 21	471 302 189 109 72 50 34 21	302 189 109 72 50 34 21	189 109 72 50 34 21	109 72 50 34 21	72 50 34 21	50 34 21	34 21	21	7	740	469	301	189		71	20	34	23	8.0		0.74	0.27	-34.7841216 14	49.9609584	
183         101         53         35         24         17         11         8.0         9.2         0.49         0.23         34.7868117         149.9600550           289         136         6         6         4         3         1         8.0         9.2         0.33         34.7866217         149.9560400           289         136         78         50         33         23         18         8.0         9.2         0.91         0.45         -34.7864700         149.9586400           211         128         50         33         23         18         8.0         8.4         1.09         0.45         -34.786400         149.9586400           211         129         81         52         8.0         8.4         1.09         0.45         -34.7896601         149.9586430           211         129         81         57         48         8.0         8.4         1.08         0.45         -34.7896650         149.9586430           210         81         81         80         8.4         1.08         0.46         34.7996650         149.9586813           210         82         14         80         8.4         0.69         <	IWP 564 806 589 369 202 135 102 71 43 35 8	564 806 589 369 202 135 102 71 43 35	589 369 202 135 102 71 43 35	589 369 202 135 102 71 43 35	369 202 135 102 71 43 35	202 135 102 71 43 35	135 102 71 43 35	102 71 43 35	71 43 35	43 35	35	w	809	591	370	203	135	102	7.1	43	35	8.0		0.81	0.22	-34.7849667 14	49.9605150	
35         10         6         6         4         3         1         80         9.2         0.33         0.23         3.4.7866217         149.9589400           289         136         78         50         33         23         18         80         9.2         0.91         0.45         34.78674700         149.9589400           211         129         81         50         33         25         80         8.4         1.09         0.45         -34.7883400         149.9588030           211         129         81         50         80         8.4         0.58         0.28         -34.7883400         149.9588030           211         129         81         50         80         8.4         0.58         0.26         -34.7883400         149.958800           303         207         142         30         20         80         8.4         0.69         0.24         -34.7990260         149.958800           304         22         20         80         8.4         0.69         0.24         -34.7990860         149.958800           40         32         14         80         8.4         0.09         0.02         -34.7990860	IWP 565 492 268 183 100 53 35 24 17 11 4	565 492 268 183 100 53 35 24 17 11	268 183 100 53 35 24 17 11	268 183 100 53 35 24 17 11	183 100 53 35 24 17 11	100 53 35 24 17 11	53 35 24 17 11	35 24 17 11	24 17 11	17 11	11	4	493	3 268		101	23	35	54	11	Ξ	8.0		0.49	0.23	-34.7858117 14	49.9600550	
289         136         78         50         33         23         18         80         9.2         0.91         0.45         34.7874700         149.95892433           397         233         144         98         64         38         25         80         8.4         1.09         0.45         34.7883400         149.9589000           211         129         81         25         80         8.4         1.08         0.45         34.7881334         149.9589133           261         319         171         98         58         34         24         80         8.4         0.58         0.28         34.7991834         149.95891367           362         220         80         8.4         0.58         0.28         -34.7991834         149.95891367           367         220         147         80         8.4         0.69         0.24         -37.909267         149.9581767           40         32         27         24         80         8.4         0.69         0.24         -34.7990867         149.958787           41         31         31         31         80         8.4         0.69         0.24         -34.7994833         149	IWP 563 330 102 35 10 6 6 4 3 1	563 330 102 35 10 6 6 4 3 1	102 35 10 6 6 4 3 1	102 35 10 6 6 4 3 1	35 10 6 6 4 3 1	10 6 6 4 3 1	6 4 3	6 4 3	φ 6	3	+		332	102	35	10	9	9	4	m	+	8.0	9.2	0.33	0.23	-34.7866217 14	49.9596400	
397         233         144         93         64         38         25         8.0         8.4         1.09         0.45         34.7883400         149.9588000           211         129         81         57         45         30         20         8.0         8.4         0.58         0.28         34.7891834         149.9588367           303         207         153         174         84         36         15         8.0         8.4         0.58         0.45         -34.7900650         149.9583677           303         207         153         114         84         36         15         8.0         8.4         0.69         0.24         -34.7900650         149.958367           40         220         148         8.0         8.4         0.69         0.24         -34.7900267         149.958767           41         91         60         4.8         8.0         8.4         0.69         0.24         -34.7900267         149.958767           40         32         24         8.0         8.4         0.09         0.03         -34.794833         149.957776           283         152         41         31         8.0         8.4	IWP 565 914 462 289 135 77 50 33 23 18 18	565 914 462 289 135 77 50 33 23 18	462 289 135 77 50 33 23 18	462 289 135 77 50 33 23 18	289 135 77 50 33 23 18	135 77 50 33 23 18	77 50 33 23 18	50 33 23 18	33 23 18	23 18	48		915	463	289	136	78	20	33	23	8	8.0	9.2	0.91	0.45	-34.7874700 14	49.9592433	
211         129         81         57         45         30         20         8.4         0.58         3.4,7891834 149.9586133           621         319         171         98         58         34         24         8.0         8.4         1.38         0.45         34,7890867 149.9586136           367         207         153         114         84         36         15         8.0         8.4         0.69         0.24         34,7990867 149.9581767           367         220         147         103         8.0         8.4         0.69         0.24         34,7990867 149.9587967           44         91         60         43         30         22         14         8.0         8.4         0.69         0.34         34,7998676         149.957967           44         91         60         43         30         22         14         8.0         8.4         0.69         0.32         34,7998676         149.957796           283         15         41         8.0         8.4         0.69         0.22         34,7998680         149.957894         149.957894           15         44         30         11         4         8.0	IWP 563 1088 642 395 232 144 93 63 38 24 1	563 1088 642 395 232 144 93 63 38 24	642 395 232 144 93 63 38 24	642 395 232 144 93 63 38 24	395 232 144 93 63 38 24	232 144 93 63 38 24	144 93 63 38 24	93 63 38 24	63 38 24	38 24	24	_	1094	4 645	397	233	144	93	64	38	25	8.0	8.4	1.09	0.45	-34.7883400 14	49.9589000	
621         319         171         98         58         34         24         80         84         1.38         0.45         34,7900650         149,9583667           303         207         153         114         84         36         15         80         84         0.69         0.24         34,7900650         149,9587967           144         91         60         43         30         22         14         80         84         0.69         0.26         34,79926716         149,9577916           40         32         27         24         22         14         80         84         0.09         0.03         34,79926716         149,9577916           283         152         24         22         16         80         84         0.09         0.03         34,79926716         149,9577916           283         152         24         25         20         6         80         84         0.09         0.03         34,7944833         149,9577916           101         25         41         31         80         84         0.65         0.21         -34,7944833         149,9572916           11         7         80	IWP 565 576 301 210 129 81 57 45 30 20 5	565 576 301 210 129 81 57 45 30 20	301 210 129 81 57 45 30 20	301 210 129 81 57 45 30 20	210 129 81 57 45 30 20	129 81 57 45 30 20	81 57 45 30 20	57 45 30 20	45 30 20	30 20	50	πò	211	301	211	129	8	22	45	30	20	8.0	8.4	0.58	0.28	-34.7891834 14	49.9586133	
302 207 153 114 84 36 15 80 8.4 0.69 0.24 34,7909267 149,9581767 367 220 147 103 81 63 48 80, 8.4 0.93 0.36 34,7909267 149,9581767 149 81 60 43 30 22 14 80, 8.4 0.41 0.19 34,7909267 149,9577766 283 152 94 75 57 41 31 80 8.4 0.65 0.22 34,7935534 149,9577766 283 152 94 75 57 41 31 80 8.4 0.65 0.23 34,7935534 149,9577766 293 152 94 75 57 41 31 80 8.4 0.65 0.23 34,7935534 149,9577866 211 105 89 71 48 30 80 8.4 0.65 0.21 34,7935647 149,9568800 204 95 44 32 27 23 20 80 8.4 0.89 0.28 34,793647 149,9568800 204 95 44 32 27 23 20 80 8.4 0.65 0.3 34,798650 149,9560450 205 171 121 91 74 50 36 80 8.4 0.55 0.14 34,7987250 149,9560450 205 125 80 65 49 37 28 80 8.4 0.50 0.21 34,7987250 149,9560450 205 125 80 65 49 37 28 80 8.4 0.50 0.21 34,7987250 149,9560450 205 125 80 82 4 32 27 28 80 8.4 0.50 0.21 34,7987250 149,9560450 205 125 80 82 4 32 27 28 80 8.4 0.50 0.21 34,7987250 149,9560450 205 125 80 82 4 138 70 82 84 0.50 0.21 34,7987250 149,9560450 205 125 80 82 4 138 70 82 84 0.50 0.21 34,7987250 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 149,9560450 205 205 205 205 205 205 205 205 205 2	IWP 566 1375 927 622 319 171 98 58 34 24 1	566 1375 927 622 319 171 98 58 34 24	927 622 319 171 98 58 34 24	927 622 319 171 98 58 34 24	622 319 171 98 58 34 24	319 171 98 58 34 24	171 98 58 34 24	98 58 34 24	58 34 24	34 24	24	_	375	5 927	621	319	171	86	28	34	24	8.0	8,4	1.38	0.45	-34,7900650 14	49.9583567	
367         220         147         103         81         63         48         80         84         0.93         0.36         -34,7918083         149,9579767           144         91         60         43         30         22         14         80         8.4         0.41         0.19         34,7926716         149,9577766           283         152         27         24         22         20         6         8.0         8.4         0.09         0.03         34,7936534         149,9577866           283         152         24         75         57         41         31         8.0         8.4         0.09         0.03         34,7936534         149,9577866           283         152         81         31         18         8.0         8.4         0.65         0.22         34,7944833         149,9577866           1141         7         80         8.4         0.65         0.22         34,796467         149,9568800           386         211         105         89         71         48         30         8.4         0.85         0.21         34,796467         149,9568800           386         21         12	WP 564 686 449 302 206 153 113 84 35 15	564 686 449 302 206 153 113 84 35 15	449 302 206 153 113 84 35 15	449 302 206 153 113 84 35 15	302 206 153 113 84 35 15	206 153 113 84 35 15	153 113 84 35 15	113 84 35 15	84 35 15	35 15	15	-	689	450	303	207	153	114	84	36	5	8.0	8.4	69.0	0.24	-34.7909267 14	49.9581767	
144         91         60         43         30         22         14         80         84         0.41         0.19         34.7926716 149.9577916           283         152         27         24         22         20         6         8.0         8.4         0.09         0.03         34.7936534 149.957796           283         152         94         75         57         41         31         8.0         8.4         0.65         0.22         34.7944833 149.9572846           121         67         44         30         19         11         7         8.0         8.4         0.65         0.22         34.7944833 149.9572846           198         109         65         47         38         31         19         8.0         8.4         0.65         0.21         34.7954401 149.9572884           198         109         65         47         38         31         19         8.0         8.4         0.55         0.11         34.7961217 149.9568800           204         21         48         30         8.0         8.4         0.52         0.21         34.7961217 149.956820           204         32         27         23         20	IWP 562 925 563 364 218 146 103 80 62 47	562 925 563 364 218 146 103 80 62	563 364 218 146 103 80 62	563 364 218 146 103 80 62	364 218 146 103 80 62	218 146 103 80 62	146 103 80 62	103 80 62	80 62	62			932	295	367	220	147	103	8	63	48	8.0	8.4	0.93	98.0	-34.7918083 14	49.9579767	
40         32         27         24         22         20         6         80         84         0.09         0.03         -34,7935534         149,9577766           283         152         94         75         57         41         31         80         84         0.65         0.22         34,7935340         149,957786           121         67         44         30         19         11         7         80         84         0.65         0.13         -34,7953400         149,9572894           198         109         65         47         38         31         19         80         84         0.62         0.21         -34,7963400         149,9572894           386         21         19         80         84         0.82         0.21         -34,7963407         149,9568800           204         95         44         32         27         23         20         80         84         0.68         0.30         -34,7969407         149,95682167           205         171         121         91         48         80         84         0.58         0.34         -34,7986407         149,9568040           205         125	(WP 563 410 226 143 91 60 43 30 22 14	563 410 226 143 91 60 43 30 22	226 143 91 60 43 30 22	226 143 91 60 43 30 22	143 91 60 43 30 22	91 60 43 30 22	60 43 30 22	43 30 22	30 22	22			412	227	144	91	09	43	30	22	4	8.0	4.8	0.41	0.19	-34.7926716 14	49,9577916	
283         152         94         75         57         41         31         80         8.4         0.65         0.22         -34,7944833 149,9576916           121         67         44         30         19         11         7         80         8.4         0.62         0.19         -34,796340 149,957894           198         109         65         47         38         31         19         80         8.4         0.52         0.21         -34,7963407 149,9568800           386         211         105         89         71         48         30         8.0         8.4         0.89         0.28         -34,7963467 149,9568800           204         95         44         32         27         23         80         8.4         0.89         0.28         -34,7963467 149,9569450           204         95         44         32         27         23         80         8.4         0.58         0.30         -34,7963467 149,9569450           205         171         121         91         49         37         28         80         8.4         0.50         0.14         -34,79878500 149,9569480           205         125         80	577 89 53 41	577 89 53 41 33 28 24 22 21	53 41 33 28 24 22 21	53 41 33 28 24 22 21	41 33 28 24 22 21	33 28 24 22 21	28 24 22 21	24 22 21	22 21	2			87	52	40	32	27	24	22	20	9	8.0	8.4	0.09	0.03	-34.7935534 14	49.9577766	
121 67 44 30 19 11 7 8.0 8.4 0.42 0.19 -34,7953400 149,9572884 198 109 65 47 38 31 19 8.0 8.4 0.52 0.21 -34,7961217 149,9568800 204 95 44 32 27 23 20 8.0 8.4 0.89 0.28 -34,7968467 149,9562450 205 171 121 91 74 50 36 8.0 8.4 0.55 0.14 -34,7978500 149,9562167 205 125 80 65 49 37 28 8.0 8.4 0.55 0.14 -34,798750 149,9560450 205 125 80 65 49 37 28 8.0 8.4 0.50 0.21 -34,7996650 149,9559083 232 127 83 60 47 33 24 8.0 8.4 0.67 0.29 -34,8013900 149,9552133	IWP 564 651 437 282 152 94 75 56 40 31	564 651 437 282 152 94 75 56 40	437 282 152 94 75 56 40	437 282 152 94 75 56 40	282 152 94 75 56 40	152 94 75 56 40	94 75 56 40	75 56 40	56 40	40			654	439	283	152	94	75	25	41	55	8.0	8.4	0.65	0.22	-34.7944833 14	49.9576916	
198 109 65 47 38 31 19 8.0 8.4 0.52 0.21 -34,7961217 149,9568800 386 211 105 89 71 48 30 8.0 8.4 0.89 0.28 -34,7969467 149,9568450 204 95 44 32 27 23 20 8.0 8.4 0.68 0.30 -34,7969467 149,956450 205 171 121 91 74 50 36 8.0 8.4 0.55 0.14 -34,7987250 149,9560450 205 125 80 65 49 37 28 8.0 8.4 0.50 0.21 -34,7987250 149,9560450 205 127 83 60 47 33 24 8.0 8.4 0.50 0.21 -34,7987250 149,956983 32 127 83 60 47 33 24 8.0 8.4 0.57 0.39 -34,8013900 149,9562133	IWP 566 423 234 122 67 44 30 19 11 7	566 423 234 122 67 44 30 19	234 122 67 44 30 19	234 122 67 44 30 19	122 67 44 30 19	67 44 30 19	44 30 19	30 19	19	3	1		453	234	121	29	4	30	6	7	7	8.0	8,4	0.45	0.19	-34.7953400 14	49.9572884	
386 211 105 89 71 48 30 8.0 8.4 0.89 0.28 -34,7969467 149,9564550 204 95 44 32 27 23 20 8.0 8.4 0.68 0.30 -34,7969467 149,95624567 269 171 121 91 74 50 36 8.0 8.4 0.55 0.14 34,7996650 149,9560450 205 125 80 65 49 37 28 8.0 8.4 0.50 0.21 34,7996650 149,9560450 225 127 83 60 47 33 24 8.0 8.4 0.67 0.29 -34,8005533 149,9559083 321 569 394 286 229 138 70 8.0 8.4 1.57 0.39 -34,8013900 149,9562133	IWP 567 519 309 198 110 65 47 38 31 20	567 519 309 198 110 65 47 38 31	309 198 110 65 47 38 31	309 198 110 65 47 38 31	198 110 65 47 38 31	110 65 47 38 31	65 47 38 31	47 38 31	38 31	31			518	309	198	109	92	47	38	31	9	8.0	8.4	0.52	0.21	-34.7961217 14	49.9568800	
204         95         44         32         27         23         20         8.0         8.4         0.68         0.30         -34,7978500         149,9562167           269         171         121         91         74         50         36         8.0         8.4         0.55         0.14         -34,798660         149,9560460           205         125         80         65         49         37         28         8.0         8.4         0.50         0.21         -34,7996660         149,9559083           232         127         83         60         47         33         24         8.0         8.4         0.67         0.29         -34,8005533         149,9559083           921         569         394         286         229         138         70         8.0         8.4         1,57         0.39         -34,8013900         149,9562133	IWP 567 892 610 387 212 106 90 71 48 30	567 892 610 387 212 106 90 71 48	610 387 212 106 90 71 48	610 387 212 106 90 71 48	387 212 106 90 71 48	212 106 90 71 48	106 90 71 48	90 71 48	71 48	48			891	609	386	211	105	88	71	48	30	8.0	8.4	0.89	0.28	-34.7969467 14	49.9564550	
269 171 121 91 74 50 36 8.0 8.4 0.55 0.14 34.7987250 149.9560450 205 125 80 65 49 37 28 8.0 8.4 0.50 0.21 34.7986650 149.9559083 232 127 83 60 47 33 24 8.0 8.4 0.67 0.29 34.8005533 149.9559683 921 569 394 286 229 138 70 8.0 8.4 1.57 0.39 34.8013900 149.9562133	IWP 560 668 369 202 94 43 31 27 23 20	560 668 369 202 94 43 31 27 23	369 202 94 43 31 27 23	369 202 94 43 31 27 23	202 94 43 31 27 23	94 43 31 27 23	43 31 27 23	31 27 23	27 23	23			675	373	204	98	44	32	27	23	28	8.0	8.4	0.68	0.30	-34.7978500 14	49.9562167	
205 125 80 65 49 37 28 8.0 8.4 0.50 0.21 34.7996650 149.9559083 232 127 83 60 47 33 24 8.0 8.4 0.67 0.29 -34.8005533 149.9559683 921 569 394 286 229 138 70 8.0 8.4 1.57 0.39 -34.8013900 149.9562133	IWP 567 550 408 269 171 121 91 75 51 36	567 550 408 269 171 121 91 75 51 36	408 269 171 121 91 75 51 36	408 269 171 121 91 75 51 36	269 171 121 91 75 51 36	171 121 91 75 51 36	121 91 75 51 36	91 75 51 36	75 51 36	51 36	36		549	407	269	171	121	91	74	20	36	8.0	8.4	0.55	0.14	-34.7987250 14	49.9560450	
232 127 83 60 47 33 24 8.0 8.4 0.67 0.29 34.8005533 149.9559683 921 569 394 286 229 138 70 8.0 8.4 1.57 0.39 34.8013900 149.9562133	IWP 565 502 296 205 124 80 65 49 37 28	565 502 296 205 124 80 65 49 37 28	296 205 124 80 65 49 37 28	296 205 124 80 65 49 37 28	205 124 80 65 49 37 28	124 80 65 49 37 28	80 65 49 37 28	65 49 37 28	49 37 28	37 28	58		503	3 296	205	125	80	99	49	37	28	8.0	8.4	0.50	0.21	-34.7996650 14	49.9559083	
921 569 394 286 229 138 70 8.0 8.4 1.57 0.39 -34.8013900 149.9562133	IWP 568 675 379 233 127 83 61 48 34 24	568 675 379 233 127 83 61 48 34	379 233 127 83 61 48 34	379 233 127 83 61 48 34	233 127 83 61 48 34	127 83 61 48 34	83 61 48 34	61 48 34	48 34	34			672	377	232	127	83	09	47	33	24	8.0	8.4	0.67	0.29	-34.8005533 14	49.9559683	
MESTY ITEMOS	IWP 563 1561 1173 917 566 392 284 228 138 70 1	563 1561 1173 917 566 392 284 228 138 70	1173 917 566 392 284 228 138 70	1173 917 566 392 284 228 138 70	917 566 392 284 228 138 70	566 392 284 228 138 70	392 284 228 138 70	284 228 138 70	228 138 70	138 70	20		1569	9 1179		569	394	286	229	138	20	8.0	8.4	1.57	0.39	-34,8013900 14	49.9562133	
																												COMSULT AUSTRAL



13	Lane Wheel	- 2.2	713		Dist	ance	Distance from Load	Load	(mm)					Dista	Distance from Load (mm)	m Lo	ad (m	î î			Temperature (°C)	<u>.</u>	FWD	GDA94		
	Path		0	200	300	450	009	750	900	900 1200 1500	1500	0	200	300	450 6	009	750 9	900 1200 1500	00 15	00 Air	Surface	ice Deff.	II. Curv.	v. Latitude	Longitude L	Local Comment
100	2 IWP	555	292	356	3 225	127	84	99	54	45	31	8/9	363	529	129	98	29	55 4	43 31		8.0 8	8.4 0.58	8 0.22	2 -34.8023033 149.9562433	149.9562433	
199	2 IWP	564	780	099 (	360	187	116	86	86	99	20	783	299	361	187 1	116	86	87 6	99		8.0.8	8.4 0.78	8 0.22		-34.8031800 149.9559883	
*50	2 IWP	299	521	328	3 240	134	29	23	21	17	15	522	329	240	134	58	23	21 1	17 1	15 8	8.0 8.	4 0.52	2 0.19		-34.8040117 149.9557133	
14	2 IWP	564	1230	0 919	712	465	318	209	149	88	63	1234	922	714	467	319	210 1	149 8	89 63		8.0 7	7.9 1.24	4 0.31	1 -34.8048700	149.9553717	
100	2 IWP	299	807	522	353	204	129	92	59	14	31	908	521	352	203	128	92	59 4	41 31	-	8.0 7	7.9 0.81	1 0.28		34.8057250 149.9549517	
1	2 IWP	999	1191	1 612	382	226	146	Ē	95	29	20	1191	611	385	225	145 1	111	95 6	67 50		8.0 7	9 1.19	9 0.58		-34,8065566 149,9545400	
30	2 IWP	564	1011	1 590	353	188	114	75	54	40	32	1014	269	354	188	14	12	54 4	40 32	- 1 1	8.0 7	7.9 1.01	1 0.42	-	-34.8072967 149.9539950	
100	2 IWP	563	908	3 625	418	244	153	95	61	3	17	912	628	420	245	53	95 6	62 3	31 17	- 0	8.0 7	7.9 0.91	1 0.28		-34.8080667 149.9533983	
	2 IWP	299	757	7 453	305	186	127	16	75	49	37	758	453	303	187 1	127	16	75 4	49 37	7	8.0 7	7.9 0.76	6 0.30		-34.8088483 149.9528967	
- 11	2 IWP	299	650	0 415	5 265	158	107	71	48	31	2	649	414	564	158 1	107	71 1	48 3	31 21	-	8.0 7	9 0.65	5 0.23	-	34.8096733 149.9524483	
1	2 IWP	699	517	7 311	203	124	88	99	49	27	19	515	309	202	123	88	99	48 2	27 1	19	8.0 7	5 0.52	2 0.21	-	-34.8105400 149.9520267	
	2 IWP	699	669	319	194	120	76	25	43	33	27	695	317	193	120	9/	55 .4	43 3	33 26		8.0 7.	7.5 0.69	9 0.38	-34.8113850	149.9516816	
210	2 IWP	595	694	699 †	402	225	129	83	61	45	32	695	220	403	226 1	129	84 (	61 4	42 32		8.0 7	7.5 0.70	0 0.13		-34.8122700 149.9515100	
	2 IWP	572	352	2 195	128	11	53	42	34	52	8	348	193	126	92	52	42	33 2	24 1	18 7	7.5 6	6.0 0.35	5 0.15	-34.8132117	149.9512733	
169	2 IWP	574	425	5 231	151	88	58	84	32	2	16	418	227	149	98	22	42	32 2	21	16 7	7.5 6	6.0 0.42	2 0.19	-34.8140650	149,9511066	
7	2 IWP	257	643	3 388	305	136	94	70	55	38	58	653	394	307	138	95	77	56 3	39 29		7.5 6	6.0 0.65	5 0.26		-34,8149650 149,9509333	
-77	2 IWP	299	499	321	218	123	85	63	51	36	58	498	321	218	123	85	63	51 3	36 29		7.5 6	6.0 0.50	0 0.18		-34.8158717 149.9508517	
1	2 IWP	564	530	317	219	116	74	49	32	4	o	532	318	220	116	74	49	32 1	14	9 7	5	6.0 0.53	3 0.21	-	-34.8167650 149.9508317	
100	2 IWP	029 0	269	428	284	147	78	49	36	56	8	692	425	282	146	. 11	49	35 2	26 1	7 71	7.5 6	69.0 0.69	9 0.27		-34,8176383 149,9506367	
-01	2 IWP	260	535	5 278	155	20	47	38	32	25	6	541	281	157	20	48	38	32 2	25 1	7 61	7.5 6	6.0 0.54	4 0.26		34.8185550 149.9505367	
100	2 IWP	999	745	5 448	3 282	137	80	26	46	37	19	742	446	281	137	80	2 99	46 3	37 1	6 2	7.5 6	6.0 0.74	4 0.30		-34.8194400 149.9505367	
133	2 IWP	562	1021	1 645	405	192	90	48	34	22	15	1028	099	408	193	91	49	34 2	22 1	15 7	7.5 6	6.0 1.03	3 0.38	-	34,8203350 149,9504500	
25	2 IWP	258	574	343	215	113	72	54	42	34	56	582	348	218	114	73	54	43 3	35 2	26 7.	7.5 6	6.0 0.58	8 0.23	-34.8212016	149,9501350	
99	2 IWP	260	795	5 493	333	156	97	29	48	2	5	803	498	336	157	86	7 29	48 3	32 21		7.5 6	6.0 0.80	0 0.30		-34.8220633 149.9498083	
42	2 IWP	595	741	479	340	166	104	75	54	38	28	742	480	341	166 1	104	12	54 3	38 28	7	5.5	6.0 0.74	4 0.26	-	-34,8229517 149,9495867	
	2 IWP	280	327	7 273	3 206	69	42	34	30	24	16	319	267	200	89	41	33	29 2	23 1	7 91	7.5 6	6.0 0.32	2 0.05	-	-34.8238600 149.9497017	
	2 IWP	929	372	2 187	1119	73	45	27	17	Ŧ	œ	365	184	117	71	45	27	1 2	- 8	_	7.5 6	6.0 0.36	6 0.18		-34.8246533 149.9501083	
1	Z IWP	299.	955	5 614	450	293	198	150	110	11	29	926	615	451	293	198	50 1	10 7	7 5	59 7.	7.5 6.	0.96	6 0.34		-34.8254533 149.9504383	
79	2 IWP	581	411	1 227	16	42	29	22	17	5	10	400	221	94	41	28	22	17 1	13 1	7 01	7.5 6	6.0 0.40	0 0.18		-34.8263700 149.9504583	
7	2 IWP	578	329	3 223	144	83	62	53	49	45	58	322	219	141	18	61	52	48 4	41 28		7.5 6	6.0 0.32	2 0.10	-34.8272767	149.9502450	
	2 IWP	260	616	3 411	292	181	123	83	22	36	25	623	415	295	183 1	124	84	58 3	36 2	25 7	7.5 6	6.0 0.62	2 0.21	1 -34.8282084 149.9501217	149.9501217	
	2 IWP	260	782	514	351	193	121	85	99	52	34	791	519	354	195 1	122	83	67 5	52 35	-	7.5 6	0 0.79	9 0.27	7 -34.8290517 149.9503317	149.9503317	
		COOL ATO COOL TO HADE FILL TO CO.		ć	0		200			4																COMBULT AUSTRALIA
Ď	Manage	meni dei	Ses	71	G. ADI	040	72 24		Australia	U																



Ardmore Park Quarry Appendix 3

# **RESPONSE TO SUBMISSIONS**

PA 07\_0155 MOD3 Report No. 625/25

	Local Comment																					RT						QN.	RT	RT	TO
494	Longitude	149,9509050	149.9516534	-34,8310383 149,9524967	34.8317666 149.9530984	-34.8326084 149.9533583	-34,8335750 149,9534616	34.8344433 149.9535483	-34.8353566 149.9536283	-34.8362350 149.9536533	-34.8371234 149.9536517	-34.8379383 149.9532283	-34.8386167 149.9525283	-34.8393000 149.9517717	-34.8400550 149.9512733	-34.8409334 149.9509333	-34,8416867 149,9503717	-34.8423700 149.9496750	-34.8430400 149.9489383	-34,8437750 149,9481450	-34.8444516 149.9474250	-34.8451384 149.9466900	149,9461067	-34.8466583 149.9457317	-34.8475167 149.9452883	-34,8483650 149,9448150	-34,8491633 149,9443433	-34.8498884 149.9437317	-34.8503733 149.9428350	-34.8510183 149.9421100	24 0610000 140 0410000
GDA94	Latitude	-34.8298466 149.9509050	-34.8304450 149.9516534	-34.8310383	-34.8317666	-34.8326084	-34,8335750	-34.8344433	-34.8353566	-34.8362350	-34.8371234	-34.8379383	-34.8386167	-34.8393000	-34.8400550	-34.8409334	-34.8416867	-34.8423700	-34.8430400	-34.8437750	-34.8444516	-34.8451384	-34,8458600 149,9461067	-34.8466583	-34.8475167	-34.8483650	-34,8491633	-34.8498884	-34.8503733	-34.8510183	00000110
٥	Curv.	0.23	0.19	0.37	0.29	0.43	0.25	0.23	0.45	0.22	0.28	0.30	0.46	0.48	0.58	0.41	0.45	0.25	0.23	0.62	0.48	0.14	0.45	0.58	0.37	0.39	0.30	0.46	0.21	0.27	
FWD	Defl.	0.64	0.48	92.0	1.05	1.25	0.72	0.75	1.33	0.62	0.70	0.75	1.42	1.12	1.10	06.0	98.0	0.58	09.0	1,68	1.61	0.51	0.95	5.09	90.1	96.0	09'0	96.0	0.57	0.84	0000
ature	Surface	0.9	0.9	0.9	6.0	6.0	0'9	6.0	0.9	6.0	0.9	0.9	0.9	0.9	0.9	0.9	2.0	5.0	5.0	5.0	5.0	5.0	2.0	5.0	5.0	5.0	2.0	5.0	5.0	5.0	10
Temperature (°C)	100	7.5	7.5	2.5	i,	9.	5	2.5	2.5	2.5	2.5	7.5	7.5	5.7	2.5	7.5	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	
ř	500 Air	26 7	20	34	73 7	39	35 7	44	46 7	91	21	51	83 7	40 7	22	57 73	34 6	33 6	32 6	75 6	55	9 61	36 6	57 6	40.	43	8	31 6	6.1	27 6	
(t	1200 1500	38	30 2	41 3	001	51 3	47	61 4	70 4	18 1	27	67	117 8	48 4	27 2	65	45 3	38	45 3	96	82	29	48	85	57 4	53 4	26 1	31	28	38	
IIS (III	1 006	48	41	63	152	82	89	83	106	35	49	06	170	62	36	94	99	51	28	126	126	43	28	148	87	73	34	51	47	64	
Distance from Load (mm)	750	63	51	83	189	113	88	110	140	43	99	110	219	9/	51	118	74	62	64	163	155	62	74	215	113	35	45	20	99	92	
om L	009	92	02	96	251	171	123	148	207	26	87	134	291	108	82	153	94	11	71	241	279	92	103	328	162	125	89	75	88	124	
ince fr	450	141	102	129	352	286	182	218	352	94	128	164	414	183	143	219	149	116	120	392	486	140	161	604	245	186	109	125	128	199	
Normalised Deflection Results (μm) Distance from Load (mm)	300	248	185	245	547	515	308	355	989	227	242	264	646	386	304	351	282	254	238	714	823	253	309	1001	427	351	191	289	213	377	
Nor	200	409	287	392	763	815	470	514	206	402	411	450	996	634	515	488	439	328	371	1061	1137	365	496	1507	069	553	302	485	363	268	
	0	635	478	758	1048	1249	723	746	1328	623	695	748	1421	1118	1098	901	864	576	602	1681	1615	510	947	2089	1059	945	603	947	569	841	ŀ
	1200 1500	56	20	34	73	39	35	44	46	16	21	51	83	40	22	57	35	34	33	75	54	20	37	22	40	43	19	31	20	28	
E I		37	30	4	100	51	48	19	202	18	27	68	116	48	27	99	46	39	47	96	82	30	49	84	56	53	27	31	30	40	
Hesults (µm) ad (mm)	006	48	4	62	152	85	89	84	106	36	20	16	170	62	36	9 94	57	53	90	3 126	126	46	90	5 148	98	74	36	52	49	99	
	0 220	63	,	82	190	3 114	3 89	111	7 140	44	65	5 111	219	3 76	5	3 119	75	9	99	163	3 154	99	2 76	7 215	0 112	3 93	47	20	69	96 (	
Measured Deflection I	009 0	1 92	2 70	8 95	3 251	8 173	3 123	8 149	3 207	3 57	9 87	5 135	3 290	2 108	3 82	0 153	0 95	0 80	4 73	1 240	5 278	96 6	4 105	4 327	3 160	8 126	3 71	6 75	5 94	8 130	
stance	0 450	7 141	5 102	3 128	8 353	9 288	9 183	6 218	6 353	2 96	3 129	5 165	4 413	6 182	3 143	3 220	6 150	2 120	6 124	2 391	0 485	9 149	6 164	39 604	4 243	4 188	8 113	0 126	5 135	4 208	
Measu	300	8 247	185	0 243	548	1 519	3 309	5 356	17 686	1 232	2 243	2 265	3 644	3 386	3 303	0 353	5 286	8 262	14 246	58 712	33 820	7 269	7 316	1505 1089	424	8 354	4 198	7 290	225	3 394	
	0 200	633 408	476 287	753 390	1050 764	1258 821	727 473	747 515	1328 907	636 411	698 412	752 452	1417 963	1116 633	1094 513	904 490	875 445	595 338	624 384	1675 1058	1610 1133	541 387	205 796	2086 150	1050 684	953 558	626 314	951 487	600 382	878 593	
Peak		564 63	564 47	562 75	267 10	570 12	569 72	267 74	566 13	578 63	39 899	569 75	564 14	565 11	564 10	268 90	573 87	584 55	586 62	564 16	564 16		578 96	565 20			29 889	568 95	969		
		5					-			-			÷		-				+		-	P 601			P 561	P 571		_		P 591	
Lane Wheel	Path	2 IWP	2 IWP	2 IWP	2 IWP	2 IWP	2 IWP	2 IWP	2 IWP	2 IWP	2 IWP	2 IWP	2 IWP	2 IWP	2 IWP	2 IWP	2 IWP	2 IWP	2 IWP	2 IWP	2 (WP	2 (WP	2 IWP	100							
Station La		11.675	11.775	11.875	11.975	12.075	12.175	2.275	12.375	12.475	12.575	12.675	12.775	12,875	12.975	13.075	13.175	13.275	13.375	13,475	13.575	13.675	13,775	13.875	13.975	14,075	14.175	14.275	14.375	14,475	



Page 11 of 18

#### **RESPONSE TO SUBMISSIONS**

PA 07\_0155 MOD3 Report No. 625/25 MULTIQUIP QUARRIES

Ardmore Park Quarry

Appendix 3

CONSULT AUSTRALIA
Form No. TP5-R-001

0.30	Ξ	91.0	.45
0	0	0	0.0
92.0	0.29	0.45	1.09
8.1	6.1		
1.7	9.0		

1 Acronyms: IWP - Inner Wheel Path of the tested lane, ND - Non Decreasing deflection bowl, RT - Retested owing to poor deflection bowl.

2 Lane 1 is in the prescribed direction whilst lane 2 is in the counter direction and all station values presented are increasing in the direction of lane 1 (prescribed lane).

3 Where negative curvature values occur as a result of Non-Decreasing deflection bowl data, they have been set to 0.00mm

4 IWP results were measured within the existing central pavement of the lane tested.

Reviewed By:

James Erskine Senior Pavement Engineer 25-Sep-18

Prepared By:

James Erskine

Senior Pavement Engineer 25-Sep-18

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Page 12 of 18

Pavernent management services
Ver:2 Rev:0



Average

Standard Deviation 10th Percentile 90th Percentile

Survey Notes

Ardmore Park Quarry Appendix 3

#### RESPONSE TO SUBMISSIONS

Senior Pavement Engineer

25-Sep-18

James Erskine

Reviewed By:

PA 07\_0155 MOD3 Report No. 625/25

Form No. TP5-R-001

Management Services Pavement

Unit 7b, 26 Powers Road Seven Hills, NSW 2147

Client: Multiquip Quarries Job No: 2017152

Report No: DR2017152-3

Client Section ID: 2A1\_IWP

Smoothing: No Target Load (kN): 40

Road Id: 2 Lane: 1

Block:

Distance from Los Normalised Deflection 300 450 600

	_						
194	750 900 1200 1500 Air Surface Defl. Curv., Latitude Longitude L	149.9411900	149.9404133				
GDA94	Latitude	0.29 -34.8520683 149.9411900	0.23 -34.8515116 149.9404133				
FWD	Curv.	0.29	0.23	0.26	0.04	0.24	0.28
Ę	Defl.	0.80	0.51	99.0	0.21	0.54	0.77
Temperature (°C)	Surface	13.0 14.8 0.80	13.0 14.8	13.0 14.8 0.66	0.0		
Temp	Air	13.0	13.0	13.0	0.0		
	1500	34 27	16				
Ê	1200	34	21				
Results (µm)	900	75 54	47 34				
Results (	750	75	47				

112

182 106

329 189

205 284

797

34 2

54 750 900

IWP

14.650 14.750

34 75 48

> 20 107

190

285

218

IWP

Average

200

Measured Deflection Results (μm)

from Jerrara Road to Bungonia Bypass

Mountain Ash Road

Distance from Load (mm)

300 450 600

200

0

Peak Load (kPa) 268 699

Station Lane Wheel (km) Path

20

ude Local Comment

# Survey Notes

90th Percentile

10th Percentile

Standard Deviation

1 Acronyms: IWP - Inner Wheel Path of the tested lane, ND - Non Decreasing deflection bowl, RT - Retested owing to poor deflection bowl.

2 Lane 1 is in the prescribed direction whilst lane 2 is in the counter direction and all station values presented are increasing in the direction of lane 1 (prescribed lane).

3 Where negative curvature values occur as a result of Non-Decreasing deflection bowl data, they have been set to 0.00mm

4 IWP results were measured within the existing central pavement of the lane tested.

Prepared By:

James Erskine

Senior Pavement Engineer 25-Sep-18

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Ver:2 Rev:0

Page 13 of 18

FWD/HWD Structural Test Report - Deflection Results

Testing Date: 30/05/2018

Test Method: QT211

Test Equipment: FWD-016 Operator: John Muir

Senior Pavement Engineer

25-Sep-18

James Erskine

Reviewed By:

PA 07\_0155 MOD3 Report No. 625/25

> Management Services Pavemen

Unit 7b, 26 Powers Road

Seven Hills, NSW 2147

Client: Multiquip Quarries

Job No: 2017152

Client Section ID: 2A2\_IWP

Report No: DR2017152-3

Smoothing: No Target Load (kN): 40

from Bungonia Bypass to Jerrara Road

Peak Load (kPa) 561 577

Station Lane Wheel (km) Path

IWP

Ø

14.675 14.775

IWP

Mountain Ash Road

FWD/HWD Structural Test Report - Deflection Results

Test Method: QT211 Testing Date: 30/05/2018

Test Equipment: FWD-016 Operator: John Muir

N Road Id: 2 Lane:

Normalised Deflection Results (μm) Temperature
Normalised Deflection Results (μm)  Temperature
Normalised Deflection Results (μm)  Temperature
Normalised Deflection Results (μm)

		'50 900 1200 1500 0 200 300 450 600 750 900 1200 1500 Air Surface Defl. Curv. Latitude Longitude Local Comment						
	494	Longitude	67 49 35 23 639 425 316 166 100 68 49 35 24 13.0 14.8 0.64 0.21 -34.8519167 149.9410150	33 25 19 580 285 169 85 55 41 33 24 18 13.0 14.8 0.58 0.29 -34.8513483 149.9402000				
	GDA94	Latitude	-34.8519167	-34.8513483				
	_	Curv.	0.21	0.29	0.25	90.0	0.22	0.28
	FWD	Defl.	0.64	0.58	0.61	0.04	0.59	0.63
Temperature	(00)	urface	14.8	14.8	13.0 14.8 0.61			
Tempe	<u>.</u>	Air S	13.0	13.0	13.0	0.0 0.0		
		1500	24	18				
(m.		1200	35	54				
Normalised Deflection Results (μm)	(mu	006	49	33				
Resi	oad (r	750	89	4				
ection	Distance from Load (mm)	900	100	22				
d Defi	ince f	450	166	85				
nalise	Dist	300	316	169				
Norn		200	425	285				
		0	639	580				
		1500	23	6				
(m)		1200	35	52				
Results (µm)	mu)	006	49	33				
1 Res	oad (I	750	29	4				
ection	Distance from Load (mm)	909		99				
d Def	ince f	450	165					
Measured Deflection	Dista	300	313	173				
Me		0 200 300 450 600	633 422 313 165 100	592 291 173 87				
		0	633	592				

Survey Notes

10th Percentile 90th Percentile

Standard Deviation

Average

1 Acronyms: IWP - Inner Wheel Path of the tested Iane, ND - Non Decreasing deflection bowl, RT - Retested owing to poor deflection bowl.

2 Lane 1 is in the prescribed direction whilst lane 2 is in the counter direction and all station values presented are increasing in the direction of lane 1 (prescribed lane).

3 Where negative curvature values occur as a result of Non-Decreasing deflection bowl data, they have been set to 0.00mm

4 IWP results were measured within the existing central pavement of the lane tested.

Prepared By:

Senior Pavement Engineer

James Erskine

25-Sep-18

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Ver:2 Rev:0

Page 14 of 18

Form No. TP5-R-001

Pavement 4 4 1 **Management Services** 

Ardmore Park Quarry Appendix 3

## RESPONSE TO SUBMISSIONS

New Pavement

ND, RT

PA 07\_0155 MOD3 Report No. 625/25

-34,8788927 149,9386758

0.37

14.6

13.0

8 33

Form No. TP5-R-001

Page 15 of 18



Unit 7b, 26 Powers Road

Seven Hills, NSW 2147

Client: Multiquip Quarries Job No: 2017152

Report No: DR2017152-3

Client Section ID: 3A1\_IWP

Smoothing: No Target Load (kN): 40

from Bungonia Bypass to Lumley Road (Quarry Entrance)

Lane: Road Id:

V Block:

FWD Temperature (°C) Local Comment

ND, RT

Peak Load (kPa) 

Lane Wheel

IWP

16,350

16,450 16.550

 WP

16,650 16.750 16.850 16,950

IWP

Measured Deflection Results (µm)

Distance from Load (mm)

-34.8744377 149.9380967 D, New Pavemen -34.8726402 149.9379466 -34.8699100 149.9377242 -34.8673319 149.9385136 -34.8717165 149.9378709 -34.8753222 149.9381615 -34.8770898 149.9383112 -34.8647619 149.9395532 -34.8656365 149.9392035 -34.8708303 149.9377957 -34.8735227 149.9380184 -34,8762079 149,9382355 -34.8780256 149.9384525 Latitude Longitude -34.8664957 149.9388688 -34,8681738 149,9381584 -34.8630577 149.9402662 -34.8639081 149.9398992 -34.8690074 149.9378081 Curv. 0.25 0.14 0.43 0.28 0.26 0.28 0.12 0.22 0.23 0.30 0.17 0.19 0.07 0.27 0.27 0.21 Defl. 0.54 0.58 0.43 0.70 0.22 0.63 09'0 0.63 0.81 0.86 0.61 0.37 0.44 09.0 0.61 0.60 0.47 0.59 Surface 14.6 14.6 14.6 14.6 14.6 14.6 4.6 14.6 14.6 14.6 14.6 14.6 14.6 14.6 14.6 14.6 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 Air 22 23 23 19 16 Normalised Deflection Results (μm) Distance from Load (mm) Ξ 

> 3 22 2 8 8 N

17.050

17.150

WP WP WP

17.250

17.350

17.450

17.550

17,650

17.750

WP WP IWP

17,850

17.950

18.050

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Ver:2 Rev:0

FWD/HWD Structural Test Report - Deflection Results

Testing Date: 20/06/2018

Fest Method: QT211

Test Equipment: FWD-016 Operator: John Muir

Oallen Ford Road

# **MULTIQUIP QUARRIES** Ardmore Park Quarry Appendix 3

Senior Pavement Engineer

25-Sep-18

James Erskine

PA 07\_0155 MOD3 Report No. 625/25

tation	Station Lane Wheel	Peak	100	ž	Dist	Measured Deflection Distance from Lo	from		Hesults (µm) ad (mm)	Ē			Norm	alised	Normalised Deflection Results (μm) Distance from Load (mm)	ction I	Resul ad (mi	ts (µп m)	2	Ē	Temperature (°C)	ture	FWD	0	GD,	GDA94	
(km)	Path		0	200	300	450	900	750	900	1200 1500	1500	0	200	300 4	450 6	2 009	750 9	900 12	1200 1500	DO Air	Surface	$\sim$	Defl.	Curv.	Latitude	Longitude	Local Comment
18,250	1 IWP	573	427	222	136	92	9/	64	5	52	2	422	219	134	91	75 6	63	50 2	24 21	13.0		14,6	0,42	0.20	-34,8797309	-34,8797309 149,9389122	
18,350	1 IWP	564	1155	5 711	412	189	118	85	69	49	38	1159	713	414	189 1	118 8	85	70 4	49 38	8 13.0		14.6	1.16	0.45	-34,8806122	-34,8806122 149,9391574	
18.450	1 IWP	585	603	303	180	120	65	5	37	59	21	583	293	174	116	62 4	49	36 2	28 20	0.81 0		14.6	95.0	0.29	-34.8814672	-34.8814672 149.9394215	
18.550	1 IWP	261	840	531	360	197	117	9/	55	36	28	847	535	363	199 1	118	11	55 3	36 29	13.0		14.8	0.85	0.31	-34.8823593	-34.8823593 149.9397002	
18,650	1 IWP	570	999	391	250	143	96	73	5	8	30	099	389	248	142	95 7	72	51	18 30		13.0	14.8	99'0	0,27	-34,8832442	-34,8832442 149,9398822	ND
18.750	1 IWP	298	781	442	304	186	128	101	77	5	42	778	440	303	185 1	128 1	100	77 5	51 42	2 13.0		14.8	0.78	0.34	-34.8841313	-34.8841313 149.9398646	
18.850	1 IWP	260	1070	716	531	324	213	151	Ε	Z	54	1082	724	536	328 2	215 1	153 1	112 7	72 54	13.0		14.8	1.08	0.36	-34.8850419	-34.8850419 149.9398202	
18.950	1 IWP	564	662	430	288	154	95	89	14	27	37	664	432	289	155	95 6	68	41 2	27 37	7 13.0		14.8	99.0	0.23	-34.8859488	-34,8859488 149,9397890	ND, RT
19.050	1 IWP	569	808	362	223	124	86	69	22	38	35	803	360	221	124	9 98	89	57 3	38 31		13.0 1.	14.8	0.80	0.44	-34.8868455	-34.8868455 149.9397615	
19.150	1 IWP	565	1224	1 555	317	171	123	97	92	54	37	1226	555	318	172 1	123 8	1 26	76 5	54 37	7 13.0		14.8	1.23	29.0	-34.8877480	-34.8877480 149.9397086	
19.250	1 IWP	575	535	293	208	127	85	19	48	37	32	526	288	205 1	125 8	81 6	7 09	47 3	37 32	13.0		14.8	0.53	0.24	-34.8886396	-34.8886396 149.9396664	
19.350	1 IWP	569	675	437	341	246	192	146	111	72	23	671	435	339 2	244 1	191 1	145 1	7 01	72 53	3 13.0		14.8	79.0	0.24	-34.8895388	-34.8895388 149.9396286	
19,450	1 IWP	572	736	424	239	141	96	9/	57	41	37	728	419	236 1	140	95 7	75	57 4	40 36	5 13.0		14.8	0.73	0.31	-34.8904278	-34.8904278 149.9395902	
19,550	1 IWP	592	673	359	254	154	95	99	20	33	54	674	360	254 1	154	95 6	99	50 3	33 24		13.0 1	14.8	79.0	0.31	-34.8913419	-34.8913419 149.9395550	
19.650	1 IWP	559	905	517	340	203	147	109	98	54	38	913	523	344	205 1	148 1	110	87 5	55 38	3 13.0		14.8	0.91	0.39	-34.8922274	-34.8922274 149.9395195	
19.750	1 IWP	929	556	413	306	21	161	121	94	99	48	546	406	301	207 1	158 1	119	95 6	65 47	7 13.0		14.8	0.55	0.14	-34.8931404	-34.8931404 149.9394860	
	Average	9																		13	13.0 1	14.7	0.66	0.27			
tandarc	Standard Deviation	č																		0.0		0.1	0.22	0.11			
10th	10th Percentile	<u>a</u>																					0.42	0.14			
90th	90th Percentile	9																				7	0.89	0.41			

3 Where negative curvature values occur as a result of Non-Decreasing deflection bowl data, they have been set to 0.00mm Reviewed By:

4 IWP results were measured within the existing central pavement of the lane tested.

Prepared By:

2 Lane 1 is in the prescribed direction whilst lane 2 is in the counter direction and all station values presented are increasing in the direction of lane 1 (prescribed lane).

1 Acronyms: IWP - Inner Wheel Path of the tested Iane, ND - Non Decreasing deflection bowl, RT - Retested owing to poor deflection bowl.

Senior Pavement Engineer James Erskine

25-Sep-18

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Ver:2 Rev:0

Page 16 of 18

Form No. TP5-R-001

Pavement 4 4 1 **Management Services** 

Ardmore Park Quarry Appendix 3

## RESPONSE TO SUBMISSIONS

-34.8934510 149.9394398 -34.8934510 149.9394398 -34,8934510 149,9394398

0.17 0.26

0.59 0.63 97.0 0.36

13.0

17

35

40

20 63

96 94 13.0

13.0 13.0

30

146

228

09

37

IWP

127

184

146

629

ND, RT ND, RT

ON

-34,8934510 149,9394398

-34.8934510 149.9394398

0.15

-34.8934510 149.9394398 -34,8934510 149,9394398 -34.8934510 149.9394398 -34,8934510 149,9394398

0.21

0.64

16

40 83

00

72

24

27 22 8 19 34 43

48

123

0.14

0.30

0.30 0.30

0.71

13.0

15

PA 07\_0155 MOD3 Report No. 625/25

Form No. TP5-R-001

Page 17 of 18



Unit 7b, 26 Powers Road

Seven Hills, NSW 2147

Client: Multiquip Quarries Job No: 2017152

Report No: DR2017152-3

Client Section ID: 3A2 IWP

Smoothing: No Target Load (kN): 40

from Lumley Road (Quarry Entrance) to Bungonia Bypass

Measured Deflection Results (µm)

Distance from Load (mm)

Peak Load (kPa) 570 573 999 579 568 564 565 565 564 576

Wheel Path IWP WP IWP WP WP WP IWP

Lane

N V Lane: Road Id: Block:

Curv. FWD Defl. Temperature (°C) Surface Air Normalised Deflection Results (μm)

Local Comment

Latitude Longitude -34.8934510 149.9394398 -34.8934510 149.9394398

0.29

97.0

330

462 590 707

757

54

80

152

209

333 300

> 466 597 707 265 809 533 525 261

762

16,375 16.475 16.575

122

165

428 521 156 395

422

1163

54 5

106

348 252

4 58 59

85 240 165

524

16,675

698 729

51

43

92

146

872

726 902 423 791 236

16.875 16.975 17.075 17.175 17.275 17.375

16.775

26 19

20

144

358 171 308

33

104

470 130

IWP WP

16

29 40

40 64

86 173

ND, RT

-34.8934510 149.9394398

0.46

1.16

14.8

0.51 0.87 0.73 0.71

0.22

0.81

-34,8934510 149,9394398 -34.8934510 149.9394398 -34.8934510 149,9394398

QN

-34,8934510 149,9394398

0.19 0.18 0.16

0.26 0.25

> 14.8 14.8 14.8 14.8 4.8 14.8 14.8 14.8 14.8 14.8 14.8 14.8 14.8 14.8 14.8

-34.8934510 149.9394398 -34.8934510 149.9394398 -34.8934510 149.9394398

0.42 0.79 0.23 0.12 0.88

0.32 0.10 0.05

13.0 13.0 13.0 13.0 13.0 13.0

8 4

23

19 10

219 00 23 53 308 58 96 20 514 47 231 98 262 128 525 725 433 471 163 69 454 793 707

34 5 56 48 40 85 34 26 6 122 31 40 74 35 40 218 52 102 8 24 20 26 307 30 95 5

146 228 513 229 88 229 168 275 723 428 167 411 287 456

48 505 634 564 559 578 565 563 567

7 577 WP WP WP WP WP IWP WP N N

IWP 17.475 17.675 17,875 17.575 17.775 17.975 18.075 Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Ver:2 Rev:0



FWD/HWD Structural Test Report - Deflection Results

Testing Date: 20/06/2018

Fest Method: QT211

Test Equipment: FWD-016 Operator: John Muir

Oallen Ford Road

# **MULTIQUIP QUARRIES** Ardmore Park Quarry Appendix 3

PA 07\_0155 MOD3 Report No. 625/25

a a	Station Lane Wheel	Peak		Ź	easure Dista	ance f	Measured Deflection Results Distance from Load (mm)		Results (µm) ad (mm)	î		ž	rmalis	sed De	from	Normalised Deflection Results (μm) Distance from Load (mm)	mm)	Ê		Tempera (°C)	Temperature (°C)	ш	FWD	15	GDA94	
Path	The I	(kPa)	0	200	300	450	009	750	900 1	1200 1500	0 00	200	300	450	009 (	150	900	1200 1500	1	Air S	Surface	Defl.	Curv.	Latitude	Longitude	Local Comment
IWP	1	566	649	389	208	108	9/	25	45	30 16	5 649	688 6	9 208	3 107	9/ /	57	45	30	16	13.0	14,8	0,65	0,26	-34.893451	-34.8934510 149,9394398	
IWP	3.7	575	569	404	238	106	26	33	22	14 9	560	398	8 234	105	55	32	22	4	o	13.0	14.8	0,56	0,16		-34,8934510 149,9394398	
IWP		565	1053	534	369	204	126	85	57	38 31	-	1055 534	4 370	204	126	82	22	38	3	13.0	14.8	1.06	0.52		-34.8934510 149.9394398	
IWP	0	222	477	319	215	132	88	72	23	44 29	9 467	37 312	2 210	129	88	71	52	43	53	13.0	14.8	0.47	0.15		-34.8934510 149.9394398	
IWP	0	562	953	497	298	152	96	73	27	40 30	0 959	9 501	1 300	153	3 97	73	28	40	30	13.0	14.8	96.0	0,46		-34.8934510 149.9394398	
WP	n.	569	1208	8 819	521	276	185	142	108	72 47		1202 814	4 518	3 274	184	141	107	72	47	13.0	14.8	1.20	0.39		-34.8934510 149.9394398	
IWP	0	878	462	223	161	115	88	73	61	45 37	7 452	2 218	3 158	3 113	3 87	71	59	4	37	13.0	14.8	0.45	0.23		-34.8934510 149.9394398	
IWP	0	572	824	496	328	192	137	102	83	61 51	1 815	5 491	324	190	135	101	82	9	5	13.0	14.8	0.82	0.32		-34.8934510 149.9394398	
IWP	Δ.	570	795	642	364	219	153	122	98	71 57		789 637	7 361	218	3 152	121	46	71	22	13.0	14.8	0.79	0.15		-34.8934510 149.9394398	
IWP	n.	292	779	578	394	231	148	66	79	34 29		777 577	7 393	3 230	147	86	79	34	53	13.0	14.8	0.78	0.20		-34.8934510 149.9394398	
IWP	Δ.	268	1001	648	453	284	193	141	106	72 54	4 997	97 646	3 451	283	3 192	140	106	11	54	13.0	14.8	1.00	0.35		-34.8934510 149.9394398	
3	IWP	569	577	341	221	152	119	88	70	46 36		573 339	9 220	151	119	1 87	69	46	36	13.0	14.8	0.57	0.23		-34.8934510 149.9394398	
≥	IWP	999	009	320	202	116	75	54	39	28 20		600 320	202	2 116	3 75	54	39	28	50	13.0	14.8	0.60	0.28	-	-34.8934510 149.9394398	
2	WP	571	389	240	150	91	29	46	32	22 17		385 237	7 149	06 6	99	46	32	22	17	13.0	14.8	0.39	0.15	-34.893451	-34.8934510 149.9394398	
≥	IWP	999	786	554	392	220	141	26	70 ,	44 32	2 786	16 554	4 392	220	141	26	70	44	32	13.0	14.8	0.79	0.23	-34.893451	-34.8934510 149.9394398	
2	IWP	563	591	362	234	133	83	7	55	34 24	4 594	364	4 235	5 133	3 93	K	25	34	25	13.0	14.8	0.59	0.23	-34.893451	-34,8934510 149,9394398	
Average	ige																		Ī	13.0	14.8	0.68	0.24			
Standard Deviation	uo																			0.0	0.0	0.25	0.10			
10th Percentile	ile																		3			0.37	0.15			
90th Percentile	tile																					0.98	0.37			

Reviewed By:

2 Lane 1 is in the prescribed direction whilst lane 2 is in the counter direction and all station values presented are increasing in the direction of lane 1 (prescribed lane).

3 Where negative curvature values occur as a result of Non-Decreasing deflection bowl data, they have been set to 0.00mm

4. IWP results were measured within the existing central pavement of the lane tested.

Prepared By:

1 Acronyms: IWP - Inner Wheel Path of the tested lane, ND - Non Decreasing deflection bowl, RT - Retested owing to poor deflection bowl.

Senior Pavement Engineer James Erskine

25-Sep-18

Page 18 of 18

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Ver:2 Rev:0

Senior Pavement Engineer

25-Sep-18

James Erskine

Pavement 4 4 1 **Management Services** 

Form No. TP5-R-001

# MULTIQUIP QUARRIES Ardmore Park Quarry Appendix 3

RESPONSE TO SUBMISSIONS
PA 07\_0155 MOD3
Report No. 625/25

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# **RESPONSE TO SUBMISSIONS**

PA 07\_0155 MOD3 Report No. 625/25 MULTIQUIP QUARRIES Ardmore Park Quarry Appendix 3

# APPENDIX C - DESIGN CHART REMAINING LIFE RESULTS



Ardmore Park Quarry Appendix 3

#### **RESPONSE TO SUBMISSIONS**

PA 07\_0155 MOD3 Report No. 625/25

Pavement Management Services

Unit 7b, 26 Powers Road Seven Hills, NSW 2147

Prepared By: James Erskine Growth Rate: 2.5% Design Period: 20

Client: Multiquip Quarries

Remaining Life and Overlay Requirements - Design Charts Method 2,3

Location: 1A1\_IWP - Jerrara Road from South Marulan Road to Mountain Ash Road

Analysis Method: FPMS-QP4-002 Testing Date: 31-May-18

Test Method: QT211

Tested By: John Muir

Test Equipment: FWD-016

Station (km) 0.150 0.350 0.450 0.550 0.650 0.750 0.850 0.950 1.050 1.150 1.250 1.350 1.450 1.550 1.650

0.250

Existing Pavement: Flexible without Cemented Materials Design Traffic Intensity: 6.90E+05

Overlay Type: Asphalt

Design Deflection: 1.20

Overlay Adjustment Factor: 0.94 WMAPT: 22

Seasonal Moisture Variation: 1.0

Form No. TP5-R-001

	Su	Surface	Ī	FWD Measured	asured			Temperature	ature	Adjusted	sted	Permanent Deformation	t Deforma	tion		Fatigue	ne	
	Type Thi	Thickness Temp (mm) (°C)		Deflection Curvature (mm) (mm)	-	DSF	CSF	Adjustment Factor Deflection Curvature		Deflection (mm)	Deflection Curvature (mm) (mm)	Remaining Life ESA's Yrs	Ġ	Overlay (mm) anular Asphalt <sup>4</sup>		g Life Yrs <sup>8</sup>	Remaining Life Overlay (mm) ESA's Yrs <sup>8</sup> Asphalt <sup>8,9</sup>	Comment
	Seal	25	14.3	0.78	0.31	1.10	1.00	1.00	1.00	0.86	0.31	1.83E+07 20	0	0	N/A	A/A	N/A	
4	Seal	25	14.3	0.83	0.26	1,10	1.00	1.00	1.00	0.91	0.26	7.92E+06 20	0	0	A/A	N/A	N/A	
03	Seal	25	14.3	0.54	0.22	1,10	1.00	1.00	1.00	0.59	0.22	1.00E+08 20	0	0	N/A	N/A	N/A	
S	Seal	25	14.3	0.64	0.33	1.10	1.00	1.00	1.00	0.70	0.33	1.00E+08 20	0	0	N/A	N/A	N/A	
CO	Seal	25	14.3	0.52	0.27	1.10	1.00	1,00	1,00	0.57	0.27	1.00E+08 20	0	0	A/A	N/A	N/A	
S	Seal	25	14.3	0.91	0.43	1.10	1.00	1.00	1.00	1.00	0.43	2.81E+06 20	0	0	N/A	A/A	N/A	
S	Seal	25	14.3	0,54	0.23	1.10	1.00	1.00	1.00	0.59	0.23	1,00E+08 20	0	0	N/A	N/A	N/A	
S	Seal	25	14.3	0.64	0.26	1.10	1.00	1.00	1.00	0.70	0.26	1.00E+08 20	a	0	N/A	N/A	A/N	
S	Seal	25	14.3	0.97	0.36	1.10	1.00	1.00	1.00	1.07	98.0	1.56E+06 20	0	0	N/A	N/A	N/A	
S	Seal	25	14.3	0.51	0.25	1.10	1.00	1.00	1.00	0.56	0.25	1.00E+08 20	0	0	N/A	N/A	A/A	
S	Seal	25	14.3	0.39	0.22	1.10	1.00	1.00	1.00	0.43	0.22	1.00E+08 20	0	0	N/A	N/A	N/A	
S	Seal	25	14.3	0.84	0.33	1,10	1.00	1.00	1.00	0.92	0.33	6.90E+06 20	0	0	N/A	N/A	N/A	
S	Seal	25	14.3	1.05	0.38	1,10	1.00	1,00	1.00	1.16	0.38	8.68E+05 20	0	0	N/A	N/A	A/A	
S	Seal	25	14.3	1.03	0,49	1.10	1.00	1.00	1.00	1,13	0.49	1.03E+06 20	D	0	N/A	A/A	N/A	
Š	Seal	52	14.3	92'0	0.35	1.10	1.00	1.00	1.00	0.84	0.35	2.81E+07 20	0	0	N/A	N/A	N/A	
S	Seal	25	14.3	1.05	0.46	1.10	1.00	1.00	1.00	1.16	0.46	8.68E+05 20	0	0	N/A	N/A	N/A	
S	Seal	25	14.3	0.79	0.35	1.10	1.00	1.00	1.00	0.87	0.35	1.51E+07 20	0	0	A/A	N/A	N/A	
S	Seal	25	14.3	0.93	0,35	1,10	1.00	1,00	1,00	1.02	0.35	2,34E+06 20	0	0	A/A	N/A	N/A	



Page 1 of 22

Ver:2 Rev:0

**Pavement Management Services** 

Report Date: 24-Sep-18 Report No.: R2017152

Project No.: 2017152

	Comment																															
9	Remaining Life Overlay (mm) ESA's Yrs <sup>8</sup> Asphalt <sup>8,9</sup>	N/A	NA	N/A	N/A	N/A	N/A	NA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A																
Fatigue	Life O	N/A	N/A	N/A	A/A	N/A	A/A	N/A	N/A	N/A	A/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	A/A	N/A											
	Remaining ESA's 8	N/A	A/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A																					
tion	# 44	0	0	0	0	0	0	0	Q	0	0	O	0	24	0	0	0	0	0	0	0	0	0	o	0	0	0	0	0	0	0	0
Permanent Deformation	Overlay (mm) Granular Aspha	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	О	0	0	0	o	0	0	0	0	0
anent		20	20	20	20	20	50	20	50	20	20	20	20	8	20	20	20	20	20	20	20	20	20	50	20	20	20	20	50	20	20	20
Perm	Remaining Life ESA's Yrs	1.00E+08	4.23E+06	1.00E+08	1.00E+08	1.45E+06	2.81E+07	1.00E+08	1.26E+07	6.37E+07	1.45E+06	1.00E+08	9.17E+06	6.25E+05	1.51E+07	1.00E+08	1.00E+08	1.97E+06	5.34E+06	3.79E+06	1.00E+08	1.00E+08	6.90E+06	1,00E+08	2.34E+06	6.37E+07	9.68E+05	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1 68F+06
ted	Curvature (mm)	0.37	0,43	0.25	0.30	0.26	0.34	0.34	0.32	0.25	0,45	0.25	0.37	0.46	0.33	0,33	0.25	0.54	0.38	0.42	0.21	0,29	0.37	0,19	0.45	0.33	0.42	0,26	0.20	0.17	0.27	0.48
Adjusted	Deflection Curvature (mm) (mm)	0.79	96.0	0.74	0.74	1.08	0.84	0.65	0,88	0.81	1,08	0.77	0.90	1,22	0.87	0.72	0.75	1.04	0.94	0.97	0.41	0.63	0.92	0.40	1.02	0.81	1,14	0.70	0.46	0.45	0.73	1.06
ture	d)	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1,00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1 00
lemperature	Adjustment Factor Deflection Curvature	1.00	1.00	1.00	1,00	1.00	1,00	1.00	1,00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	CSF Pe	1.00	00.1	1.00	00.1	1.00	1.00	1,00	1,00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1,00	1,00	1.00	1.00	1.00	1,00	1.00	00.1	1.00
	DSF C	1.10 1	1,10 1	1.10 1	1.10 1	1.10 1	1.10 1	1,10 1	1,10 1	1.10 1	1.10 1	1.10 1	1.10 1	1.10 1	1.10 1	1.10 1	1.10 1	1.10 1	1.10 1	1.10 1	1.10 1	1.10 1	1,10 1	1,10 1	1.10 1	1.10 1	1.10 1	1.10 1	1,10 1	1.10 1	1.10 1	1.10.1
asured	are (	0.37	0.43	0.25	0.30	0.26	0.34	0,34	0,32	0.25	0.45	0.25	0.37	0.46	0.33	0.33	0.25	0.54	0.38	0.42	0.21	0.29	0.37	0,19	0.45	0.33	0.42	0.26	0.20	0.17	0.27	0.48
FWD Measured	Deflection Curvati	0.72	0.87	0.67	0.67	0.98	92.0	0.59	0.80	0.74	0.98	0.70	0.82	1.11	0.79	0.65	0.68	0.95	0.85	0.88	0.37	0.57	0.84	0.36	0.93	0.74	1.04	0.64	0.45	0.41	99.0	96.0
		14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3
Surface	Thickness Temp (mm) (°C)	25	25	25	52	52	25	25	25	52	52	52	52	52	25	52	25	52	52	52	52	52	52	25	52	52	52	52	52	25	52	52
<b>U</b> )	Type T	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal																							
		IWP (9	IWP 8	IWP 8	WP	IWP 8	WP 8	IWP	WP 8	WP 8	IWP 8	IWP	WP	IWP 8	IWP	IWP 8	IWP	IWP	IWP 8	IWP	IWP 8	IWP 8	WP	IWP	IWP	IWP	WP 8	WP	IWP 8	IWP	IWP 8	WP
	Lane Wheel	N	×	N	M	<u>×</u>	×	2	N.	>	5	×	2	×	N	N.	N	M I	<u>×</u>	<u>×</u>	<u>×</u>	<u>×</u>	2	×	<u>&gt;</u>	5	2	5	<u>&gt;</u>	M	N	≥
		50	20	20	20	20	20	20	20	20	20	20	20	20	20	. 02	20	. 05	20	20	20	20	20	20	20	20	20	20	20	20	20	20
	Station (km)	1.950	2.050	2.150	2.250	2.350	2.450	2.550	2,650	2.750	2.850	2.950	3.050	3.150	3.250	3.350	3,450	3.550	3.650	3.750	3.850	3.950	4,050	4.150	4.250	4.350	4.450	4.550	4.650	4.750	4.850	4 950

Pavement Management Services Pty Ltd., ABN 64 002 245 329, Australia Ver:2 Rev;0

Page 2 of 22





PA 07\_0155 MOD3 Report No. 625/25

Ardmore Park Quarry
Appendix 3

			Suriace		LAND	200000000000000000000000000000000000000			- marine division		Talance a	Commence Coloniano	-			andan	
Station L (km)	Lane Wheel	eel Type	Thickness (mm)	ss Temp		Deflection Curvature (mm) (mm)	DSF C	CSF A	Adjustment Factor Deflection Curvature		Deflection Curvature (mm)	Remaining Life ESA's Yrs	Overlay (mm) Granular Aspha	/ (mm) Asphalt <sup>4</sup>	Remaining ESA's 8	Remaining Life Overlay (mm) ESA's Yrs <sup>8</sup> Asphalt <sup>8,9</sup>	m) Comment
5.050	1 IWP	P Seal	25	14.3	1.21	0.47	1,10 1	1.00	1.00 1.00	1.33	3 0.47	3.43E+05 11	42	24	N/A	N/A N/A	
5.150	1 IWP	P Seal	25	14.3	0.95	0.50	1,10	00'	1.00 1.00	1.04	t 0.50	1.97E+06 20	0	0	N/A	A/A	_
5.250	1 IWP	P Seal	25	14.3	0.67	0.39	1.10 1	1.00	1.00	0.74	t 0.39	1.00E+08 20	0	0	N/A	N/A N/A	
5.350	1 IWP	P Seal	52	14.3	0.97	0.27	1.10 1	8	1.00 1.00	1.07	7 0.27	1.56E+06 20	0	0	N/A	N/A N/A	_
5.450	1 IWP	P Seal	25	14.3	0.86	0.32	1.10	1.00	1.00	0.95	5 0.32	4.74E+06 20	0	0	N/A	N/A N/A	_
5,550	1 IWP	P Seal	25	14.3	0.88	0.45	1.10 1	1.00	1.00 1.00	0.97	7 0.42	3.79E+06 20	0	0	N/A	N/A N/A	
5.650	1 IWP	P Seal	25	14.3	1,00	0.45	1.10 1	00'1	1.00	1,10	0.45	1.25E+06 20	0	0	N/A	N/A N/A	
5,750	1 IWP	P Seal	25	14.3	0.83	0.29	1.10 1	1,00	1.00	0,91	0,29	7.92E+06 20	0	Q	N/A	N/A N/A	
5.850	1 (WP	P Seal	52	14.3	0.82	0.39	1.10 1.	1.00	1.00	06.0	0.39	9.17E+06 20	0	0	N/A	N/A N/A	
5.950	1 IWP	P Seal	25	14.3	0.73	0.35	1.10 1	1.00	1.00	0.80	0.35	1.00E+08 20	0	0	N/A	N/A N/A	
6.050	1 IWP	P Seal	25	14.3	1.18	0.61	1.10	1.00	1.00	1.30	0.61	4.04E+05 13	32	24	N/A	N/A N/A	_
6.150	1 IWP	P Seal	25	14.3	0.84	0.35	1.10 1.	1.00	1.00	0.92	2 0.35	6.90E+06 20	0	a	N/A	N/A N/A	
6.250	1 IWP	P Seal	25	14.3	1.06	0.42	1.10 1	00.	1.00	1,17	7 0.42	8.22E+05 20	0	0	N/A	N/A N/A	
6.350	1 IWP	P Seal	25	14.3	0.99	0.41	1.10 1	00.1	1.00	1.09	9 0.41	1.34E+06 20	0	0	N/A	N/A N/A	
6.450	1 IWP	P Seal	25	14.3	08'0	0.33	1.10	1.00	1.00 1.00	0.88	3 0,33	1.26E+07 20	0	0	N/A	N/A N/A	
6.550	1 IWP	P Seal	25	14.3	0.58	0.25	1.10 1	1.00	1.00 1.00	0.64	4 0.25	1.00E+08 20	0	0	N/A	N/A N/A	
6,650	1 IWP	P Seal	25	14.3	0.36	0.20	1.10 1	00.1	1.00 1.00	0.40	0.20	1.00E+08 20	0	0	N/A	N/A N/A	
6.750	1 IWP	P Seal	52	14.3	0.89	0.45	1.10 1.	1.00	1.00 1.00	0.98	3 0.45	3.42E+06 20	0	0	N/A	N/A N/A	
6.850	1 IWP	P Seal	25	14.3	0.68	0.32	1.10	8	1.00 1.00	0.75	5 0.32	1.00E+08 20	0	0	N/A	N/A N/A	
6.950	1 IWP	P Seal	25	14.3	0.95	0.41	1.10 1	00	1.00 1.00	1.04	1 0.41	1.97E+06 20	0	0	N/A	N/A N/A	
7.050	1 IWP	P Seal	25	14.3	0.45	0.22	1.10 1.	1.00	1.00 1.00	0.50	0,22	1.00E+08 20	0	0	N/A	N/A N/A	_
7.150	1 IWP	P Seal	25	14.3	0.73	0.25	1,10 1,	1,00	1.00 1.00	08'0	0.25	1.00E+08 20	О	0	N/A	N/A N/A	_
7.250	1 IWP	P Seal	25	14.3	0.49	0,22	1,10 1,	1,00	1.00 1.00	0,54	4 0,22	1.00E+08 20	0	Q	N/A	N/A N/A	_
7.350	1 IWP	P Seal	52	14.3	0.54	0.23	1.10 1	1,00	1.00 1.00	0.59	9 0.23	1.00E+08 20	0	0	N/A	N/A N/A	
7.450	1 IWP	P Seal	25	14.3	0.29	0.18	1.10 1	1.00	1.00	0.32	2 0.18	1.00E+08 20	0	0	N/A	N/A N/A	
7.550	1 IWP	P Seal	25	14.3	0.67	0.33	1.10 1	00.	1.00 1.00	0.74	1 0.33	1.00E+08 20	0	0	N/A	N/A N/A	
7.650	1 IWP	P Seal	25	14.3	0.44	0.28	1.10 1	1.00	1.00 1.00	0.48	3 0,28	1.00E+08 20	0	0	N/A	N/A N/A	
7.750	1 IWP	P Seal	52	14.3	0.64	0.28	1.10 1	00.1	1.00 1.00	0.70	0.28	1.00E+08 20	0	0	N/A	N/A N/A	
7.850	1 IWP	P Seal	25	14.3	1.04	0.43	1.10 1.	1.00	1.00 1.00	1.14	t 0.43	9.68E+05 20	0	0	N/A	N/A N/A	_
7.950	1 IWP	P Seal	52	14.3	0.63	0.30	1.10 1.	00.	1.00 1.00	0.69	9 0.30	1.00E+08 20	0	0	N/A	N/A N/A	_
8.050	1 IMP	Spal	100	CV	0		100		200			1000	8	8		- C - C - C - C - C - C - C - C - C - C	_



Page 3 of 22

Park Qu Append	
CONSULT AUSTRALIA	Form No. TP5-R-001

		on lace					1	lemperature		Adju	Adjusted		0	ation		Fatigue	9	
Type		Thickness (mm)	(°C)	Deflection Curvatur (mm) (mm)	0	DSF	CSF	Adjustment Factor Deflection Curvatur	a	Deflection (mm)	Deflection Curvature (mm) (mm)	Remaining Life ESA's Yrs	ত	Overlay (mm) anular Asphalt <sup>4</sup>		ng Life C	Remaining Life Overlay (mm) ESA's Yrs8 Asphalt <sup>8,9</sup>	Comment
Seal	<u></u>	52	14.3	0.87	0.30	1.10	1.00	1.00	1.00	96.0	0.30	4.23E+06 20	0	0		N/A	N/A	
Seal	ਬ	25	14.3	95.0	0.32	1,10	1,00	1.00	1.00	0.62	0.32	1.00E+08 20	0	0	N/A	N/A	N/A	
S	Seal	25	14.3	0.51	0.24	1.10	1.00	1.00	1.00	0.56	0.24	1.00E+08 20	0	0	N/A	N/A	N/A	
S	Seal	25	14.3	0.61	0.34	1.10	1.00	1.00	1.00	29.0	0.34	1.00E+08 20	0	0	N/A	A/A	N/A	
S	Seal	52	14.3	0.70	0.24	1.10	1.00	1.00	1.00	0.77	0.24	1.00E+08 20	0	0	N/A	N/A	N/A	
S	Seal	25	14.3	99.0	0.24	1.10	1.00	1,00	1.00	0.73	0.24	1.00E+08 20	0	0	N/A	N/A	N/A	
S	Seal	25	14.3	69.0	0.28	1.10	1,00	1.00	1.00	0.76	0.28	1.00E+08 20	0	0	N/A	N/A	A/N	
CIT	Seal	25	14.3	0.74	0.32	1,10	1,00	1,00	1,00	0.81	0.32	6,37E+07 20	0	0	A/A	A/A	N/A	
(/)	Seal	52	14.3	1.34	0.41	1.10	1.00	1,00	1.00	1.47	0.41	1.60E+05 6	82	28	N/A	N/A	N/A	
0.1	Seal	52	14.3	0.77	0:30	1.10	1.00	1.00	1.00	0.85	0.30	2.24E+07 20	0	0	N/A	N/A	A/A	
	Seal	25	14.3	0.81	0.28	1.10	1.00	1.00	1.00	0.89	0.28	1.07E+07 20	0	0	N/A	N/A	N/A	
	Seal	25	14.3	0.71	0.27	1.10	1.00	1.00	1.00	0.78	0.27	1.00E+08 20	0	0	N/A	A/N	N/A	
	Seal	25	14.3	0.62	0.24	1,10	1.00	1.00	1.00	0.68	0.24	1.00E+08 20	0	0	N/A	N/A	N/A	
	Seal	25	14.3	0.78	0.34	1.10	1.00	1.00	1.00	98.0	0.34	1.83E+07 20	0	0	N/A	A/A	N/A	
	Seal	25	14.3	0.64	0.33	1,10	1.00	1.00	1.00	0.70	0,33	1.00E+08 20	0	0	N/A	N/A	N/A	
	Seal	25	14.3	1.27	0.39	1.10	1.00	1.00	1.00	1.40	0.39	2.34E+05 8	62	24	N/A	A/A	N/A	
	Seal	52	14.3	1.17	0.46	1.10	1.00	1,00	1,00	1.29	0.46	4.27E+05 13	29	24	N/A	A/A	N/A	
	Seal	52	14.3	0.45	0.21	1.10	1.00	1.00	1,00	0.50	0.21	1.00E+08 20	0	0	N/A	N/A	N/A	
	Seal	25	14.3	0.77	0.33	1.10	00.1	1.00	1.00	0.85	0.33	2.24E+07 20	0	0	N/A	N/A	N/A	
	Seal	52	14.3	0.63	0:30	1.10	1.00	1.00	1,00	0.69	0.30	1.00E+08 20	0	0	N/A	N/A	N/A	
	Seal	25	14.3	0.70	0.31	1.10	1.00	1.00	1,00	22.0	0.31	1.00E+08 20	0	0	N/A	N/A	N/A	
	Seal	52	14.3	0,54	0.25	1,10	1,00	1,00	1.00	0.59	0.25	1.00E+08 20	О	0	N/A	A/N	N/A	
	Seal	25	14.3	0.48	0,26	1,10	1,00	1.00	1.00	0,53	0,26	1.00E+08 20	0	0	N/A	A/A	N/A	
	Seal	52	14.3	0.45	0.22	1,10	1,00	1.00	1.00	0.50	0.22	1.00E+08 20	0	0	N/A	N/A	N/A	
	Seal	52	14.3	0.92	0.36	1.10	1.00	1.00	1.00	1.01	0.36	2.56E+06 20	0	0	N/A	A/N	N/A	
	Seal	52	14.3	0.72	0.26	1.10	1.00	1.00	1.00	0.79	0.26	1.00E+08 20	0	0	N/A	A/A	N/A	
	Seal	52	14.1	0.52	0.24	1.10	1.00	1.00	1.00	0.57	0,24	1.00E+08 20	0	0	NA	N/A	N/A	
	Seal	52	14.1	0.84	0.45	1,10	00,1	1.00	1.00	0.92	0.45	6.90E+06 20	0	0	N/A	A/A	N/A	
(J)	Seal	25	14.1	0.53	0.23	1.10	1.00	1.00	1.00	0.58	0.23	1.00E+08 20	0	0	N/A	N/A	N/A	
	Seal	52	14.1	0.81	0.32	1.10	1.00	1.00	1.00	0.89	0.32	1.07E+07 20	0	Q	N/A	A/N	N/A	
(1)	Seal	52	14.1	0.50	0.24	1.10	1.00	1.00	1.00	0.55	0.24	1.00E+08 20	0	0	N/A	A/A	N/A	

Pavement Management Services Pty Ltd., ABN 64 002 245 329, Australia Ver:2 Rev;0

Page 4 of 22



PA 07\_0155 MOD3 Report No. 625/25

Ardmore Park Quarry Appendix 3

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Wheel	Туре	Thickness (mm)	(°C)	Deflection Curvatu (mm) (mm)	Curvature (mm)	DSF	SF	Adjustment Factor Deflection Curvatur	nt Factor Curvature	Deflection (mm)	Deflection Curvature (mm) (mm)	Remaining Life ESA's Yrs	উ	Overlay (mm) anular Asphalt <sup>4</sup>		Remaining Life Overlay (mm) ESA's Yrs8 Asphalt <sup>8,9</sup>	erlay (mm) Comment Asphalt <sup>8,9</sup>
WP	Seal	25	14.1	0.64	0.32	1.10	1.00	1.00	1.00	0.70	0.32	1.00E+08 20	0	0	N/A		N/A
IWP	Seal	25	14.1	0.53	0.22	1,10	1,00	1.00	1.00	0.58	0.22	1.00E+08 20	0	0	N/A	N/A	N/A
WP	Seal	25	14.1	0.72	0.28	1.10	1.00	1.00	1.00	0.79	0.28	1.00E+08 20	0	0	N/A	N/A	N/A
IWP	Seal	52	14.1	0.79	0.37	1.10	1.00	1.00	1.00	0.87	0.37	1.51E+07 20	0	0	N/A	N/A	N/A
IWP	Seal	52	14.1	0.73	0.27	1.10	1.00	1.00	1.00	0.80	0.27	1.00E+08 20	0	0	N/A	N/A N/A	N/A
IWP	Seal	25	14.1	0.58	0.28	1,10	1.00	1.00	1.00	0.64	0.28	1.00E+08 20	0	0	A/A	N/A	N/A
WP	Seal	25	14.1	0.67	0.26	1.10	1.00	1.00	1.00	0.74	0.26	1.00E+08 20	0	0	N/A	N/A	N/A
IWP	Seal	25	14.1	0.77	0.24	1.10	1.00	1,00	1,00	0,85	0,24	2.24E+07 20	0	Q	A/N	N/A	N/A
	IWP Seal	25	14.1	0.95	0.42	1.10	1.00	1,00	1.00	1.04	0.42	1.97E+06 20	0	0	A/N	N/A	N/A
	IWP Seal	25	14.1	0.81	0.27	1.10	1.00	1.00	1.00	0.89	0.27	1.07E+07 20	0	0	N/A	N/A	N/A
	IWP Seal	25	14.1	08.0	0.37	1.10	1.00	1.00	1.00	0.88	0.37	1.26E+07 20	0	0	N/A	N/A	N/A
IWP	Seal	52	14.1	0.95	98.0	1.10	1.00	1.00	1.00	1.04	0.36	1.97E+06 20	0	a	N/A	N/A	N/A
IWP	Seal	52	14.1	96.0	0.32	1.10	1.00	1.00	1.00	1.06	0,32	1.68E+06 20	0	0	N/A	N/A N/	N/A
IWP	Seal	25	14.1	0.64	0.26	1.10	1.00	1.00	1.00	0.70	0.26	1.00E+08 20	0	0	N/A	N/A	N/A
IWP	Seal	25	14.1	0.57	0.30	1.10	1.00	1.00	1.00	0.63	0.30	1.00E+08 20	0	0	N/A	N/A	N/A
IWP	Seal	25	14.1	1.33	0.55	1.10	1.00	1.00	1.00	1.46	0.55	1.69E+05 6	79	24	N/A	N/A	N/A
	IWP Seal	52	14.1	0.74	0.35	1.10	1.00	1,00	1,00	0.81	0,35	6.37E+07 20	0	0	N/A	N/A	N/A
	IWP Seal	25	14.1	0.63	0.26	1.10	1.00	1.00	1,00	69.0	0.26	1.00E+08 20	0	0	N/A	N/A N/A	N/A
IWP	Seal	52	14.1	0.62	0.26	1.10	1.00	1.00	1.00	0.68	0.26	1.00E+08 20	0	0	N/A	N/A N	N/A
IWP	Seal	25	14.1	0.61	0.29	1.10	1.00	1.00	1,00	0.67	0.29	1.00E+08 20	0	0	N/A	N/A N	N/A
	IWP Seal	25	14.1	0.68	0.33	1.10	1.00	1,00	1,00	0.75	0.33	1.00E+08 20	0	0	N/A	N/A N	N/A
	IWP Seal	25	14.1	96'0	0.30	1,10	1.00	1,00	1.00	1.06	0.30	1.68E+06 20	D	0	N/A	N/A	N/A
	IWP Seal	25	14.1	1.28	0,58	1,10	1,00	1.00	1,00	1.41	0,58	2.22E+05 8	92	24	A/N	N/A	N/A
	IWP Seal	52	14.1	0.65	0.24	1.10	1,00	1.00	1.00	0.72	0.24	1.00E+08 20	0	0	N/A	N/A	N/A
	IWP Seal	25	14.1	0.82	0.21	1.10	1.00	1.00	1.00	0.90	0.21	9.17E+06 20	0	0	N/A	N/A N	N/A
	IWP Seal	52	14.1	0.80	0.37	1.10	1.00	1.00	1.00	0.88	0,37	1.26E+07 20	0	0	N/A	N/A	N/A
	IWP Seal	25	14.1	96.0	0.47	1.10	1.00	1.00	1.00	1.06	0.47	1.68E+06 20	0	0	N/A	N/A N/A	N/A
	IWP Seal	52	14.1	1.58	0.58	1,10	1,00	1.00	1.00	1.74	0,58	3.66E+04 1	150	47	N/A	N/A N	N/A
	IWP Seal	25	14.1	0.86	0.26	1.10	1.00	1.00	1.00	0.95	0.26	4.74E+06 20	0	0	N/A	N/A N/A	N/A
	IWP Seal	52	14.1	0.67	0.28	1.10	1.00	1.00	1.00	0.74	0.28	1.00E+08 20	0	0	N/A	N/A N/	N/A
IWP	Seal	25	4.4.4	0 50	10.0	4.40	0	,		000	0	ממ במי במי		c			



Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia Ver.2 Rev;0

Page 5 of 22

Form No. TP5-R-00

PA 07\_0155 MOD3 Report No. 625/25

				Surface		FWD Measured	asured			Temperature	e e	Adjusted	sted	Permanent Deformation	int Defo	rmation		Fatigue	en	
Station (km)	Lane	Wheel Path	Туре	Thickness (mm)	(CC)	Thickness Temp Deflection Curvatur (mm) (°C) (mm) (mm)	Curvature (mm)	DSF	CSF	re DSF CSF Adjustment Factor Deflection Curvature Remaining Life Overlay (mm) Remaining Life Overlay (mm) Comment Deflection Curvature (mm) (mm) ESA's Yrs Granular Asphalt <sup>4</sup> ESA's <sup>8</sup> Yrs <sup>8</sup> Asphalt <sup>8,9</sup>	actor I	Deflection (mm)	Curvature (mm)	Remaining Life Overlay (mm) Remaining Life ESA's Yrs Granular Asphalt <sup>4</sup> ESA's <sup>8</sup> Yrs <sup>8</sup>	e O	rerlay (mm) ular Asphalt	Remair t <sup>4</sup> ESA's	ing Life 8 Yrs <sup>8</sup>	Overlay (mm) Asphalt <sup>8,9</sup>	Comment
14.350	-	IWP	Seal	25	14.1	0.82	0.35	1,10 1,00	1.00	1,00	1.00	06'0	0.35	9.17E+06 20	0	0	N/A	N/A	N/A	
14.450	-	IWP	Seal	25	14.1	0.82	0.38	1.10	1.00	1.00	00'	0.90	0.38	9.17E+06 20	0	0	N/A	N/A	N/A	
14.550	-	IWP	Seal	25	14.1	09.0	0.19	1.10	1.00	1.00	00.	99.0	0.19	1.00E+08 20	0	0	N/A	N/A	N/A	
	A	Average		52	14.2	92.0	0.33					0.84	0.33	5.34E+07 19	4	2	N/A	N/A	N/A	
Stand	ard De	Standard Deviation		0	0.1	0.22	60.0					0.24	60.0	4.64E+07 3	7	1 7	N/A	N/A	N/A	
7	th Per	10th Percentile				0.51	0.22					0.56	0.22	1.12E+06 20	0	0	N/A	N/A	N/A	
96	th Per	90th Percentile				1,02	0.45					1.12	0,45	1,00E+08 20	0	0	N/A	N/A	N/A	

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1 These remaining life and overlay calculations follow the methodology of the Austroads Guide to Pavement Technology Part 5 Appendix E

The remaining life and overlay requirements assume that the asphalt surfaced pavement has not been progressively strengthened in stages or has significant remaining asphalt fatigue life

3. The remaining life and overlay requirements assume that the pavement is flexible and does not include any cemented materials, where this is not the case a mechanistic analysis should be undertaken

4 The asphalt overlay thickness to overcome permanent deformation is based on using asphalt with G320 binder, the use of other binders may result in a different thickness required

5 it is possible that a thinner asphalt overlay thickness may overcome fatigue however there would be a higher risk of premature distress in this case and as such it has not been considered

6 The overlay requirements indicate the thickness of additional material required to overcome any structural deficiencies of the pavement based on the pavement consisting of an asphalt wearing course and being subject to both permanent deformation and fatigue

7 The granular overlay requirements for design traffic volumes up to 1x10/8 ESA's can be derived using the Design Chart Method, while asphalt overlays are limited to a maximum design traffic volume of 1x10/7 ESA'

The asphalt fatigue remaining life is calculated considering a minimum 40mm of asphalt overlay

The thickness of the asphalt overlay considering fatigue is the minimum required considering the design traffic

Reviewed By:

Senior Pavement Engineer James Erskine

24-Sep-18

Senior Pavement Engineer

24-Sep-18

James Erskine

Prepared By:

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia







Ardmore Park Quarry Appendix 3

#### RESPONSE TO SUBMISSIONS

PA 07\_0155 MOD3 Report No. 625/25

Form No. TP5-R-001

Management Services Pavemen

Unit 7b, 26 Powers Road

Seven Hills, NSW 2147

Prepared By: James Erskine Growth Rate: 2.5%

Design Period: 20

Client: Multiquip Quarries

Remaining Life and Overlay Requirements - Design Charts Method 2,3

Location: 1A2 IWP - Jerrara Road from Mountain Ash Road to South Marulan Road

Analysis Method: FPMS-QP4-002

Test Method: QT211

Testing Date: 01-Jun-18 Tested By: John Muir

Test Equipment: FWD-016

Existing Pavement: Flexible without Cemented Materials Design Traffic Intensity: 2.31E+06

Overlay Type: Asphalt

Design Deflection: 1.02

Overlay Adjustment Factor: 0.94 WMAPT: 22

Seasonal Moisture Variation: 1.0

Comment Remaining Life Overlay (mm) Asphalt<sup>8,9</sup> N/A N/A N/A N/A N/A Fatigue N/A N/A N/A N/A N/A N/A AN NA N/A N/A N/A N/A ESA's 8 N/A Granular Asphalt<sup>4</sup> Overlay (mm) 24 Permanent Deformation Remaining Life Yrs 20 2 20 20 20 20 20 20 20 20 20 20 20 20 20 20 4.74E+06 1.00E+08 1.00E+08 6.98E+05 1.00E+08 6.90E+06 1.00E+08 1.00E+08 7.92E+06 1.00E+08 1.83E+07 6.98E+05 3.79E+06 4.74E+06 1.25E+06 5.34E+06 1.00E+08 1.83E+07 ESA's Adjustment Factor Deflection Curvature (EE) 0.33 0.25 0.34 0.36 0.32 0.21 0.24 0.27 Adjusted 0.63 0.65 1.10 0.70 1.20 0.92 0.47 0.91 0.70 0.86 1.20 0.80 0.97 0.94 Deflection Curvature 1.00 1.00 1.00 1.00 1.00 1.00 1,00 1.00 1.00 1.00 1,00 1.00 1.00 00. 00 1.00 Temperature 1.00 00. 00. 00 00 00 1.00 00. 00 00 00 SSF 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 00. 1.00 1.00 1.00 1.10 1.10 1.10 1.10 1.10 1.10 1.10 1.10 1.10 1.10 1.10 1.10 1.10 1.10 1.10 1,10 DSF Deflection Curvature FWD Measured 0.33 0.36 0.46 0.31 0.21 0.24 0.27 0.25 0.34

0.59

0.84

0.57 1.09

25 25 25 25 25 25 25 25 25 25 25

IWP

WP IWP IWP IWP IWP

0.575

0.675

0.775 0.875 0.975

0.64

10.3 10.3 10.3 10.3 10.3 10.3 0.3 10.3 10.3 10.3 0.3 10.3 10.3 0.3 10.3 10.3 10.3

Seal Seal Seal Seal Seal Seal Seal

IWP

Seal

IWP

0.175 0.275 0.375 0.475

到

Thickness (mm)

Wheel

Station

0.43 0.68 0.83 0.78

0.64

Seal Seal Seal Seal Seal

IWP

IWP IWP IWP

1.075

1.175

1.275

1.00 60. 0.88

Seal

IWP IWP WP

1.375

1.475

575

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

98.0

Seal

Seal

IWP IWP IWP

1.675 1.775 1.875 Page 7 of 22

Ver:2 Rev:0



Report Date: 24-Sep-18 Report No.: R2017152

Project No.: 2017152

CONSULT AUSTRALIA	TP5-R-001
	Form No.

	Comment																															
Je Je	Remaining Life Overlay (mm) ESA's 8 Yrs8 Asphalt <sup>8,9</sup>	N/A																														
Fatigue	Yrs <sup>8</sup>	N/A	N/A	N/A	A/A	N/A	N/A	N/A	A/A	N/A	A/A	A/A	N/A	N/A	N/A	A/A	A/A	A/A	N/A	N/A	N/A	N/A	N/A	N/A	A/A	N/A						
	Remaining ESA's 8	N/A																														
ion	4	0	0	0	0	0	0	24	0	0	0	0	0	24	0	0	24	24	0	0	0	0	0	0	0	0	24	0	0	24	24	0
Permanent Deformation	Overlay (mm) Granular Aspha	0	0	0	0	0	0	99	0	0	0	0	0	27	0	0	45	80	0	0	0	0	О	0	0	0	41	0	0	19	16	0
anent	J Life Yrs	20	20	20	20	20	20	7	20	20	20	20	20	5	20	20	10	48	20	20	20	20	20	20	20	20	10	20	20	4	15	20
Perm	Remaining Life ESA's Yrs	1.00E+08	1.00E+08	1.26E+07	1.00E+08	1.00E+08	1.00E+08	6.98E+05	1,00E+08	6.37E+07	1.00E+08	2.81E+07	1.00E+08	1.34E+06	1.00E+08	1.00E+08	9.68E+05	1.97E+06	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1,00E+08	1.00E+08	1.00E+08	1.03E+06	1.51E+07	1.00E+08	1.56E+06	1.68E+06	1.00E+08
ted	Curvature (mm)	0.30	0.20	0.30	0.23	0.21	0.35	0.57	0.27	0.30	0.35	0,32	0.30	0.47	0.34	0.24	0.37	0.39	0.24	0.31	0.22	0.18	0.23	0.10	0.27	0.21	0,37	0,26	0,16	0.35	95.0	0.41
Adjusted	Deflection Curvature (mm) (mm)	0.63	0.54	0.88	0.42	0.72	0.73	1.20	0.69	0.81	0.79	0.84	0.77	1.09	0.68	0.57	1.14	1.04	0.73	0.60	0.54	0.45	92.0	0,26	0.66	0.44	1,13	0.87	0.46	1.07	1.06	0.74
ıture	d)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Temperature	Adjustment Factor Deflection Curvature	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1,00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	CSF	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	00.1	1.00	1.00	1.00	1,00	1,00	1.00	1.00	1.00	1,00	1.00	1.00	1.00
	DSF C	1.10 1	1.10	1.10 1	1.10	1.10	1,10	1,10 1	1,10 1	1.10 1	1.10 1	1.10	1.10	1.10 1	1.10 1	1.10 1	1.10	1.10 1	1.10 1	1.10	1,10 1	1.10	1,10 1	1,10 1	1.10 1	1.10 1	1.10 1	1.10 1	1,10 1	1.10 1	1.10 1	1.10 1
sured	ure (	0.30	0.20	0.30	0.23	0.21	0.35	0.57	0.27	0.30	0.35	0.32	0:30	0.47	0.34	0.24	0.37	0.39	0.24	0.31	0.22	0.18	0.23	0,10	0.27	0.21	0.37	0.26	0.16	0.35	0.56	0.41
FWD Measured	Deflection Curvat (mm) (mm	0.57	0.49	08.0	0.38	0.65	99.0	1,09	0,63	0.74	0.72	0.76	0.70	0.99	0.62	0.52	1.04	0.95	99.0	0.55	0.49	0.41	69'0	0.24	09.0	0.40	1.03	0.79	0.42	0.97	96.0	0.67
Ĭ	Temp (°C)	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	9.2	9.2	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
Surface	Thickness T (mm)	25	52	52	52	52	52	. 52	52	52	52	52	52	52	. 52	52	52	52	52	52	. 52	52	52	25	52	52	25	52	52	25	25	52
S	Type T	Seal																														
	- 1			_	-	-	-	_			-				-	_	-				-				-		7.7	-	77	- 194		
	e Wheel	IWP																														
	n Lane	2	2	2	2	2	2	2	2	2	2	2	2	N	2	2	2	N	23	2	2	N	2	23	2	2	2	2	2	2	2	2
	Station (km)	1.975	2.075	2.175	2.275	2.375	2.475	2.575	2.675	2.775	2.875	2.975	3.075	3.175	3.275	3.375	3.475	3.575	3.675	3.775	3.875	3.975	4.075	4.175	4.275	4.375	4.475	4.575	4.675	4.775	4.875	4.975

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia Ver:2 Rev;0

Page 8 of 22



PA 07\_0155 MOD3 Report No. 625/25

Ardmore Park Quarry
Appendix 3

	Remaining Life Overlay (mm) Comment ESA's 8 Yrs Asphalt <sup>8,9</sup>	N/A																														
Fatigue	e Overla												1																			
Fal	ing Life	N/A	N/A	N/A	A/A	N/A																										
		N/A																														
ion	/ (mm) Asphalt <sup>4</sup>	0	0	0	24	0	0	0	o	0	0	52	24	0	0	0	0	0	0	24	0	52	0	24	0	0	0	0	0	0	0	
Permanent Deformation	Overlay (mm) Granular Aspha	0	0	0	4	0	0	0	0	0	0	148	16	0	0	0	0	0	0	99	0	161	0	0	0	0	0	0	0	0	0	
nent [		20	20	20	9	20	20	20	20	20	20	CA.	15	20	20	20	20	20	20	7	20	+	20	20	20	20	20	20	20	20	20	
Perma	Remaining Life ESA's Yrs	2.81E+07	1.00E+08	1.00E+08	1.03E+06	1.00E+08	1.00E+08	4.74E+06	1.83E+07	4.74E+06	7.92E+06	1.60E+05	1.68E+06	2.24E+07	6.37E+07	1.07E+07	1.00E+08	1.00E+08	2.81E+06	6.98E+05	1.00E+08	1.22E+05	1.00E+08	2.34E+06	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	3.42E+06	1.00E+08	
ted		0.31	0.31	0.25	0.37	0.15	0.22	0.32	0.32	0.41	0.36	0.55	0.31	0.28	0.27	0.22	0.23	0.23	0.45	0.45	0.28	0.45	0.24	96,0	0.19	0.03	0.22	0.19	0.21	0.28	0.30	
Adjusted	Deflection Curvature (mm)	0.84	92.0	0.73	1,13	0.63	0.52	0.95	98'0	0.95	0.91	1.47	1.06	0.85	0.81	0.89	0.54	0.36	1.00	1.20	0.64	1.52	0.76	1.02	0.45	0.10	0.72	0.46	0.57	0.98	0,75	
ature		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Temperature	Adjustment Factor Deflection Curvature	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
	CSF	1.00	1,00	1.00	1.00	1.00	1.00	1,00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1,00	1,00	1.00	1.00	1.00	1,00	1.00	1.00	
	DSF	1.10	1,10	1.10	1.10	1.10	1,10	1.10	1.10	1.10	1.10	1.10	1.10	1,10	1.10	1,10	1.10	1.10	1.10	1.10	1.10	1.10	1,10	1,10	1.10	1.10	1.10	1.10	1,10	1.10	1.10	
easured	Curvature (mm)	0.31	0.31	0.25	0.37	0.15	0.22	0.32	0.32	0.41	96.0	0.55	0.31	0.28	0.27	0.22	0.23	0.23	0.45	0.45	0.28	0.45	0.24	96,0	0.19	0.03	0.22	0.19	0.21	0.28	0.30	1000
FWD Measured	Deflection Curvatu (mm) (mm)	0.76	69.0	99.0	1.03	0.57	0.47	0.86	0.78	0.86	0.83	1.34	96.0	0.77	0.74	0.81	0.49	0.33	16.0	1.09	0.58	1.38	69'0	0.93	0.41	0.09	0.65	0.42	0.52	0.89	0.68	
	Temp (°C)	9.5	9.5	9.5	9.5	9.5	9.2	9.5	9.5	9.5	9.5	9.2	9.5	9.2	9.5	9.5	9.2	9.5	9.5	8.4	8.4	8,4	8.4	8,4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	
Surface	Thickness Temp (mm) (°C)	25	25	25	52	25	25	25	25	52	25	25	52	52	25	25	25	52	52	25	25	52	52	25	52	52	52	25	52	25	25	
57	Type T	Seal																														
	Wheel	IWP	WP	IWP	WP	IWP																										
	Lane W	2	2	2	2	2	N	2	EV.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	CA	2	2	2	2	2	2	2	
1	Station L (km)	5.075	5.175	5.275	5.375	5.475	5.575	5.675	5.775	5.875	5.975	6.075	6.175	6.275	6.375	6.475	6.575	6.675	6.775	6.875	6.975	7.075	7,175	7.275	7.375	7.475	7.575	7.675	7.775	7.875	7.975	



A3-56

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia Ver:2 Rev:0

Page 9 of 22

PROULT AUSTRALIA	P5-R-001
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Á		on inc			I W D IMERSALEA			o in included		naleninu	-	Communication and the	1	descen		and a	D	
Wheel	Type	Thickness (mm)	s Temp	Deflection Curvatu (mm) (mm)	Curvature (mm)	DSF C	CSF	Adjustment Factor Deflection Curvatur	0	Deflection (mm)	Deflection Curvature (mm) (mm)	Remaining Life ESA's Yrs	Ē	Overlay (mm) anular Asphalt <sup>4</sup>		g Life C	Remaining Life Overlay (mm) ESA's Yrs Asphalt <sup>8,9</sup>	Comment
WP	Seal	25	8.4	0.50	0.21	1.10	1.00		1.00	0.55	0.21	1.00E+08 20	0	1		N/A	N/A	
IWP	Seal	25	8.4	0.67	0.29	1,10	00,1	1.00	1.00	0.74	0.29	1.00E+08 20	0	0	N/A	N/A	N/A	
IWP	Seal	25	8.4	1.57	0.39	1.10	1.00	1.00	1.00	1.73	0.39	3.87E+04 0	213	20	N/A	A/N	N/A	
IWP	Seal	25	8.4	0.58	0.22	1.10	1.00	1.00	1.00	0.64	0.22	1.00E+08 20	0	0	N/A	A/A	N/A	
IWP	Seal	52	8.4	0.78	0.22	1.10	1.00	1.00	1.00	98.0	0.22	1.83E+07 20	0	0	N/A	N/A	N/A	
IWP	Seal	25	4.8	0.52	0.19	1,10	1.00	1.00	1.00	0.57	0.19	1.00E+08 20	0	0	N/A	N/A	N/A	
IWP	Seal	25	7.9	1.24	0.31	1.10	1,00	1.00	1.00	1,36	0.31	2.91E+05 3	116	38	N/A	N/A	N/A	
IWP	Seal	25	7.9	0.81	0.28	1.10	1,00	1,00	1,00	0,89	0.28	1,07E+07 20	0	0	N/A	A/A	NA	
WP	Seal	52	7.9	1.19	0.58	1.10 1	1.00	1,00	1.00	1.31	0,58	3.83E+05 4	101	33	N/A	N/A	N/A	
IWP	Seal	25	7.9	1.01	0.42	1.10	1.00	1.00	1.00	1,11	0.42	1.17E+06 11	34	24	N/A	N/A	N/A	
IWP	Seal	25	7.9	0.91	0.28	1.10	1.00	1.00	1.00	1.00	0.28	2.81E+06 20	0	0	N/A	N/A	N/A	
IWP	Seal	25	7.9	0.76	0.30	1.10	1.00	1.00	1.00	0.84	0.30	2.81E+07 20	0	0	N/A	N/A	N/A	
IWP	Seal	52	7.9	0.65	0.23	1.10 1	1.00	1.00	1.00	0.72	0.23	1.00E+08 20	0	0	N/A	N/A	N/A	
IWP	Seal	25	7.5	0.52	0.21	1.10	1.00	1.00	1.00	0.57	0.21	1.00E+08 20	0	0	N/A	N/A	N/A	
IWP	Seal	25	7.5	69'0	0.38	1.10	1.00	1.00	1.00	92.0	0.38	1.00E+08 20	0	0	N/A	N/A	N/A	
IWP	Seal	25	7.5	0.70	0.13	1.10	1.00	1.00	1.00	0.77	0.13	1.00E+08 20	0	0	N/A	N/A	N/A	
IWP	Seal	52	0.9	0.35	0.15	1.10	1.00	1.00	1,00	0.38	0.15	1.00E+08 20	0	0	N/A	N/A	N/A	
IWP	Seal	52	6.0	0.42	0.19	1.10	1.00	1.00	1.00	0.46	0.19	1.00E+08 20	0	0	N/A	N/A	N/A	
IWP	Seal	25	0.9	99.0	0.26	1.10	00.1	1.00	1.00	0.72	0.26	1.00E+08 20	0	0	N/A	N/A	N/A	
IWP	Seal	25	6.0	0.50	0.18	1,10 1	1.00	1.00	1.00	0.55	0.18	1.00E+08 20	0	0	N/A	N/A	N/A	
WP	Seal	25	0.9	0.53	0.21	1.10	1.00	1,00	1,00	0.58	0.21	1.00E+08 20	0	0	N/A	N/A	N/A	
WP	Seal	25	0'9	69'0	0.27	1,10 1	1,00	1,00	1.00	92'0	0.27	1.00E+08 20	O	0	N/A	A/A	N/A	
WP	Seal	25	6.0	0.54	0,26	1,10	1,00	1.00	1.00	0,59	0,26	1.00E+08 20	0	0	N/A	N/A	N/A	
IWP	Seal	52	6.0	0.74	0.30	1.10 1	1,00	1.00	1.00	0.81	0.30	6.37E+07 20	0	0	N/A	N/A	N/A	
IWP	Seal	25	6.0	1.03	0.38	1.10 1	1.00	1.00	1.00	1.13	0.38	1.03E+06 10	14	24	N/A	N/A	N/A	
IWP	Seal	52	6.0	0.58	0.23	1.10 1	1.00	1.00	1.00	0.64	0.23	1.00E+08 20	0	0	N/A	N/A	N/A	
WP	Seal	52	6.0	0.80	0:30	1.10 1	1.00	1.00	1.00	0.88	0.30	1.26E+07 20	0	0	N/A	N/A	N/A	
IWP	Seal	25	6,0	0.74	0.26	1.10	1,00	1.00	1.00	0.81	0.26	6.37E+07 20	0	0	N/A	N/A	N/A	
WP	Seal	25	6.0	0.32	0.05	1.10	1.00	1.00	1.00	0.35	0.05	1.00E+08 20	0	0	N/A	N/A	NA	
IWP	Seal	25	0.9	0.36	0.18	1.10 1	1.00	1.00	1.00	0.40	0.18	1.00E+08 20	0	0	N/A	N/A	N/A	
IWP	Seal	36	0	0		,		37.5	200	100		1	200	7	1000		2.75	

Pavement Management Services Pty Ltd., ABN 64 002 245 329, Australia Ver:2 Rev;0

Page 10 of 22



PA 07\_0155 MOD3 Report No. 625/25

Ardmore Park Quarry
Appendix 3

Station L (km)			Sullace	0		FWD Measured			Temperature	re	Adjusted	sted	Permanent Deformation	t Deform	ation		Fatigue	Je.	
	Lane	Wheel Type	Thickness (mm)	ess Temp ) (°C)		Deflection Curvature (mm)	DSF	SF	Adjustment Factor Deflection Curvature		Deflection Curvature (mm)	Curvature (mm)	Remaining Life ESA's Yrs	G	Overlay (mm) anular Asphalt <sup>4</sup>		g Life (	Remaining Life Overlay (mm) ESA's Yrs <sup>8</sup> Asphalt <sup>8,9</sup>	Comment
11.275	2	IWP Seal	al 25	6.0		0.40 0.18	1.10	1.00	1.00	1.00	0.44	0.18	1.00E+08 20	0	0	N/A	N/A	N/A	
11.375	2	IWP Seal	31 25	6.0		0.32 0.10	1,10	00.1	1.00	00.1	0.35	0.10	1.00E+08 20	0	0	N/A	N/A	N/A	
11.475	2	IWP Seal	al 25	6.0		0.62 0.21	1.10	1.00	1.00	00.1	0.68	0.21	1.00E+08 20	0	0	N/A	N/A	NA	
11.575	2	IWP Seal	al 25	6.0		0.79 0.27	1.10	00.1	1.00	1.00	0.87	0.27	1.51E+07 20	0	0	N/A	A/A	N/A	
11,675	2	IWP Seal	al 25	6.0		0.64 0.23	1.10	1.00	1.00	00.1	0.70	0.23	1.00E+08 20	0	0	N/A	A/A	N/A	
11.775	2	IWP Seal	al 25	6.0		0.48 0.19	1,10	1.00	1.00	00.1	0.53	0.19	1.00E+08 20	0	0	N/A	N/A	N/A	
11.875	2	IWP Seal	31 25	6.0	_	0.76 0.37	1,10	1,00	1.00	00.1	0.84	0.37	2.81E+07 20	0	0	N/A	N/A	N/A	
11,975	2	IWP Seal	al 25	0'9	_	1,05 0,29	1,10	1,00	1,00	00"	1,16	0,29	8.68E+05 9	52	24	N/A	N/A	NA	
12.075	2	IWP Seal	31 25	6.0	_	1.25 0.43	1,10	1.00	1,00	00.1	1.38	0.43	2.61E+05 3	122	42	N/A	N/A	N/A	
12.175	2	IWP Seal	1 25	6.0		0.72 0.25	1.10	1.00	1.00	00.1	0.79	0.25	1.00E+08 20	0	0	N/A	A/A	N/A	
12.275	2	IWP Seal	al 25	6.0		0.75 0.23	1.10	1.00	1.00	1.00	0.82	0.23	4.70E+07 20	0	0	N/A	N/A	N/A	
12.375	2	IWP Seal	al 25	6.0	_	1.33 0.42	1.10	00.1	1.00	1.00	1.46	0.45	1.69E+05 2	145	47	N/A	A/A	N/A	
12.475	2	IWP Seal	al 25	6.0		0.62 0.22	1,10	1.00	1.00	1.00	0.68	0.22	1.00E+08 20	0	0	N/A	N/A	NA	
2.575	2	IWP Seal	al 25	6.0		0.70 0.28	1.10	1.00	1.00	1.00	0.77	0.28	1.00E+08 20	0	0	N/A	A/A	N/A	
2.675	2	IWP Seal	1 25	6.0	-	0.75 0.30	1,10	1.00	1.00	1.00	0.82	0.30	4.70E+07 20	0	0	N/A	N/A	N/A	
12.775	2	IWP Seal	al 25	6.0		1.42 0.46	1.10	1.00	1.00	1.00	1.56	0.46	9.78E+04 1	172	99	N/A	N/A	N/A	
2.875	2	IWP Seal	al 25	0.9		1,12 0.48	1.10	1.00	1,00	00	1.23	0.48	5.92E+05 6	92	28	N/A	A/N	N/A	
12.975	73	IWP Seal	al 25	6.0		1,10 0.58	1.10	00.1	1.00	00.1	1.21	0.58	6.61E+05 7	69	24	N/A	A/A	N/A	
13.075	2	IWP Seal	al 25	0.9		0.90 0.41	1.10	00.1	1.00	1.00	0.99	0.41	3.09E+06 20	0	0	N/A	A/N	N/A	
13.175	2	IWP Seal	al 25	5.0		0.86 0.42	1.10	1.00	1.00	1.00	0.95	0.42	4.74E+06 20	0	0	N/A	N/A	N/A	
13.275	2	IWP Seal	al 25	5,0		0.58 0.25	1.10	1.00	1,00	1,00	0.64	0,25	1.00E+08 20	0	0	N/A	ĕ,	N/A	
13,375	2	IWP Seal	al 25	5,0		0,60 0,23	1,10	1.00	1.00	1.00	99'0	0.23	1.00E+08 20	О	0	N/A	A/A	N/A	
13,475	27	IWP Seal	al 25	5,0		1,68 0,62	1,10	00'1	1,00	00"	1.85	0,62	2.01E+04 0	241	75	N/A	A/A	N/A	
13.575	2	IWP Seal	a) 25	5.0		1.61 0.48	1.10	1,00	1.00	00.1	1.77	0.48	3.11E+04 0	223	75	N/A	N/A	N/A	
13.675	2	IWP Seal	al 25	5.0	٩	0.51 0.14	1.10	1.00	1.00	00.1	0.56	0.14	1.00E+08 20	0	0	N/A	A/A	N/A	
13.775	2	IWP Seal	al 25	5.0		0.95 0.45	1.10	00.1	1.00	00.1	1,04	0.45	1.97E+06 18	80	24	N/A	A/A	N/A	
13.875	2	IWP Seal	al 25	5.0		2.09 0.58	1.10	1.00	1,00	1.00	2.30	0.58	1.73E+03 0	329	108	N/A	N/A	N/A	
13.975	2	IWP Seal	al 25	5.0	H	1.06 0.37	1,10	00.1	1.00	00.1	1,17	0.37	8.22E+05 8	55	24	N/A	A/A	N/A	
14.075	2	IWP Seal	al 25	5.0		0.95 0.39	1.10	1.00	1.00	00.1	1.04	0.39	1.97E+06 18	00	24	N/A	N/A	N/A	
14.175	2	IWP Seal	al 25	5.0		0.60 0.30	1.10	1.00	1.00	00.1	99.0	0.30	1.00E+08 20	0	0	N/A	A/A	N/A	
14.275	2	IWP   Seal	al 25	5.0	_	0.95 0.46	1.10	1.00	1.00	1.00	1.04	0.46	1.97E+06 18	ω	24	N/A	N/A	N/A	



Page 11 of 22

HULTIQUIP QUARRIES
Ardmore Park Quarry
Appendix 3

Form No. TP5-R-001

			Su	Surface		FWD Measured	painse		1	Temperature	Adjı	Adjusted	Permanent Deformation	nt Defoi	rmation		Fatigue	ne	
Station Lane Wheel (km) Path	ane WI	Wheel Typ	De Th	ickness T (mm)	lemp (oc)	Thickness Temp Deflection Curvatu (mm) (°C) (mm) (mm)	Curvature (mm)	DSF	CSF	re DSF CSF Adjustment Factor Deflection Curvature Remaining Life Overlay (mm) Deflection Curvature (mm) ESA's Yrs Granular Asphalt <sup>4</sup>	Deflection e (mm)	Curvature (mm)	Remaining Life Overlay (mm) Remaining Life ESA's Yrs Granular Asphalt <sup>4</sup> ESA's Yrs <sup>8</sup>	Grant	erlay (mm) ılar Asphalt	Remain	ing Life 7 Yrs <sup>8</sup>	Remaining Life Overlay (mm) Comment ESA's Yrs8 Asphalt <sup>8,9</sup>	Comment
14,375	2 1	WP Seal	a	25	5.0	0.57	0.21	1,10 1,00	1,00	1,00 1,00	0.63	0.21	1,00E+08 20	0	0	A/A	N/A	N/A	
14.475	2	IWP Seal	a	25	5.0	0.84	0.27	1.10 1.00	1.00	1.00 1,00	0.92	0.27	6,90E+06 20	0	o	N/A	N/A	N/A	
14.575	2	IWP Seal	la la	25	2.0	0.58	0.29	1,10 1.00	1.00	1.00 1.00	0.64	0.29	1.00E+08 20	0	0	N/A	N/A	N/A	
	Average	age		25	1.8	92.0	0.30				0.84	0.30	5.61E+07 17	20	8	N/A	N/A	N/A	
Standard Deviation	1 Devian	tion		0	6.1	0.29	0.11				0.32	0.11	4.64E+07 6	52	18	N/A	N/A	N/A	
10th	10th Percentile	ntile				0.42	0.19				0.46	0.19	6.98E+05 7	0	0	A/N	N/A	N/A	
90th	90th Percentile	ıtile				1,09	0.45				1.20	0,45	1.00E+08 20	99	24	N/A	N/A	N/A	

Survey Notes

1 These remaining life and overlay calculations follow the methodology of the Austroads Guide to Pavement Technology Part 5 Appendix E

2 The remaining life and overlay requirements assume that the asphalt surfaced pavement has not been progressively strengthened in stages or has significant remaining asphalt fatigue life

3. The remaining life and overlay requirements assume that the pavement is flexible and does not include any cemented materials, where this is not the case a mechanistic analysis should be undertaken

4 The asphalt overlay thickness to overcome permanent deformation is based on using asphalt with G320 binder, the use of other binders may result in a different thickness required

5 it is possible that a thinner asphalt overlay thickness may overcome fatigue however there would be a higher risk of premature distress in this case and as such it has not been considered

6 The overlay requirements indicate the thickness of additional material required to overcome any structural deficiencies of the pavement based on the pavement consisting of an asphalt wearing course and being

subject to both permanent deformation and fatigue

7 The granular overlay requirements for design traffic volumes up to 1x10/8 ESA's can be derived using the Design Chart Method, while asphalt overlays are limited to a maximum design traffic volume of 1x10/7 ESA'

8 The asphalt fatigue remaining life is calculated considering a minimum 40mm of asphalt overlay

The thickness of the asphalt overlay considering fatigue is the minimum required considering the design traffic

Reviewed By:

Senior Pavement Engineer James Erskine

24-Sep-18

Senior Pavement Engineer

24-Sep-18

James Erskine

Prepared By:

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Page 12 of 22

Ver:2 Rev:0



Ardmore Park Quarry Appendix 3

## RESPONSE TO SUBMISSIONS

PA 07\_0155 MOD3 Report No. 625/25

Form No. TP5-R-00

Seven Hills, NSW 2147 Unit 7b, 26 Powers Road

Management Services

Pavement

Prepared By: James Erskine Growth Rate: 2.5% Design Period: 20

Client: Multiquip Quarries

Remaining Life and Overlay Requirements - Design Charts Method  $^{2,3}$ 

Location: 2A1 IWP - Mountain Ash Road from Jerrara Road to Bungonia Bypass

Analysis Method: FPMS-QP4-002 Testing Date: 30-May-18

Test Method: QT211

Tested By: John Muir

Test Equipment: FWD-016

Existing Pavement: Flexible without Cemented Materials Design Traffic Intensity: 9.41E+05

Overlay Type: Asphalt Design Deflection: 1.15

WMAPT: 22

Overlay Adjustment Factor: 0.94 Seasonal Moisture Variation: 1.0

				Surface		FWDM	FWD Measured			Temperature	Adjusted	Isted	Permanent Deformation	nt Defor	nation		Fatigue	en	
Station Lane Wheel (km) Path	Lane	Wheel	Type	Thickness (mm)	Temp (°C)	hickness     Temp     Deflection     Curvatur       (mm)     (°C)     (mm)     (mm)	Curvature (mm)	DSF	CSF	re DSF CSF Adjustment Factor Deflection Curvature Remaining Life Overlay (mm) Remaining Life Overlay (mm) Comment Deflection Curvature (mm) (mm) ESA's Yrs Granular Asphalt <sup>4</sup> ESA's Yrs Asphalt <sup>8,9</sup>	Deflection e (mm)	Curvature (mm)	Remaining Life Overlay (mm) Remaining Life ESA's Yrs Granular Asphalt <sup>4</sup> ESA's Yrs <sup>8</sup>	e Ove Granul	rlay (mm) ar Asphalt <sup>4</sup>	Remainin ESA's 8	g Life Yrs <sup>8</sup>	Overlay (mm) Asphalt <sup>8,9</sup>	Comment
14.650	-	IWP	Seal	25	14.8	0.80	0.29	1.10 1.00	1.00	1.00 1.00	0.88	0.29	1.26E+07 20	0	0	N/A	N/A	N/A	
14.750	-	IWP	Seal	52	14.8	0.51	0.23	1.10 1.00	1.00	1.00 1.00	0.56	0.23	1.00E+08 20	0	0	N/A	N/A	N/A	
	Á	Average		25	14.8	99'0	0.26				0.72	0.26	5.63E+07 20	0	0	N/A	A/A	N/A	
Standard Deviation	rd Dev	riation /		0	0.0	0.21	0.04				0.23	0.04	6.18E+07 0	0	0	N/A	N/A	N/A	
101	h Perc	10th Percentile				0.54	0.24				0.59	0.24	2.14E+07 20	0	0	N/A	V/N	N/A	
106	h Perc	90th Percentile				0.77	0.28				0.85	0.28	9.13E+07 20	0	0	A/Z	A/A	N/A	

# Survey Notes

1 These remaining life and overlay calculations follow the methodology of the Austroads Guide to Pavement Technology Part 5 Appendix E

The remaining life and overlay requirements assume that the asphalt surfaced pavement has not been progressively strengthened in stages or has significant remaining asphalt fatigue life

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6 The overlay requirements indicate the thickness of additional material required to overcome any structural deficiencies of the pavement based on the pavement consisting of an asphalt wearing course and being subject to both permanent deformation and fatigue 7 The granular overlay requirements for design traffic volumes up to 1x10^8 ESA's can be derived using the Design Chart Method, while asphalt overlay sare limited to a maximum design traffic volume of 1x10^7 ESA

The asphalt fatigue remaining life is calculated considering a minimum 40mm of asphalt overlay

The thickness of the asphalt overlay considering fatigue is the minimum required considering the design traffic

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Page 13 of 22

Ver:2 Rev:0

Report Date: 24-Sep-18 Report No.: R2017152

Project No.: 2017152

James Erskine Senior Pavement Engineer 24-Sep-18

PA 07\_0155 MOD3 Report No. 625/25

**MULTIQUIP QUARRIES** 

Ardmore Park Quarry Appendix 3



Form No. TP5-R-001

Reviewed By:

Page 14 of 22

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia Ver:2 Rev:0

James Erskine Senior Pavement Engineer 24-Sep-18



Ardmore Park Quarry Appendix 3

## RESPONSE TO SUBMISSIONS

PA 07\_0155 MOD3 Report No. 625/25

Form No. TP5-R-00

Seven Hills, NSW 2147 Unit 7b, 26 Powers Road

Management Services

Pavement

Prepared By: James Erskine Growth Rate: 2.5% Design Period: 20

Client: Multiquip Quarries

Remaining Life and Overlay Requirements - Design Charts Method  $^{2,3}$ 

Location: 2A2 IWP - Mountain Ash Road from Bungonia Bypass to Jerrara Road

Analysis Method: FPMS-QP4-002 Testing Date: 30-May-18

Test Method: QT211

Tested By: John Muir

Test Equipment: FWD-016

Existing Pavement: Flexible without Cemented Materials Design Traffic Intensity: 2.56E+06

Overlay Type: Asphalt

Design Deflection: 1.01 WMAPT: 22

Overlay Adjustment Factor: 0.94

Seasonal Moisture Variation: 1.0

1	1	Surface FWD Measured Temperature Adjusted	e FWD Measured Temperature Adjusted	FWD Measured Temperature Adjusted	Measured Temperature Adjusted	Temperature Adjusted	Temperature Adjusted	Temperature Adjusted	ature Adjusted	Adjusted	sted	_	Permanent Deformation	nt Deform	ation		Fatigue	ane	
Station Lane Wheel Type (mm) (°C) (mm) (mm) (mm) Deflection Curvature Deflection Curvature (mm) (mm) (mm) (mm) (mm) (mm) (mm) (mm	Type		less Temp Deflection Curvature DSF CSF Adjustment Factor Deflection Curvature (mm) (mm) (mm) (mm)	p Deflection Curvature DSF CSF Adjustment Factor Deflection Curvature (mm) (mm) (mm)	on Curvature DSF CSF Adjustment Factor Deflection Curvatu (mm) Deflection Curvature (mm) (mm)	DSF CSF Adjustment Factor Deflection Curvatu	CSF Adjustment Factor Deflection Curvatu Deflection Curvature (mm) (mm)	Adjustment Factor Deflection Curvatu Deflection Curvature (mm) (mm)	t Factor Deflection Curvatu	Deflection Curvatu (mm) (mm)	Curvata (mm)	a _	Remaining Life Overlay (mm) Remaining Life (ESA's Yrs Granular Asphalt <sup>4</sup> ESA's Yrs <sup>8</sup>	Granula	ay (mm) - Asphalt <sup>4</sup>	Remainir ESA's 8	ng Life Yrs <sup>8</sup>	Overlay (mm) Asphalt <sup>8,9</sup>	Comme
WP Seal 25 14.8 0.64 0.21 1.10 1.00 1.00 1.00 0.70 0.21	Seal 25 14.8 0.64 0.21 1.10 1.00 1.00 1.00 0.70	25 14.8 0.64 0.21 1.10 1.00 1.00 1.00 0.70	1.10 1.00 1.00 0.70	1.10 1.00 1.00 0.70	1.10 1.00 1.00 0.70	1.00 0.70	1.00 0.70	1.00 0.70	0.70		0.2	_	1.00E+08 20	0	0	N/A	N/A	N/A	
WP Seal 25 14.8 0.58 0.29 1.10 1.00 1.00 1.00 0.64 0	Seal 25 14.8 0.58 0.29 1.10 1.00 1.00 1.00 0.64	25 14.8 0.58 0.29 1.10 1.00 1.00 1.00 0.64	0.58 0.29 1.10 1.00 1.00 1.00 0.64	0.58 0.29 1.10 1.00 1.00 1.00 0.64	1.10 1.00 1.00 0.64	1.00 1.00 0.64	1.00 1.00 0.64	1.00 1.00 0.64			0	0.29	1.00E+08 20	0	0	N/A	N/A	N/A	
Average 25 14.8 0.61 0.25 0.67	25 14.8 0.61 0.25	0.61 0.25	0.61 0.25	0.61 0.25	0.67	ŀ.	ŀ.	ŀ.	ŀ.	ŀ.		0.25	1.00E+08 20	0	0	N/A	A/A	N/A	
Standard Deviation 0 0.0 0.04 0.06 0.04	0.0 0.04 0.06	0.0 0.04 0.06	0.0 0.04 0.06 0.04	0.04 0.06	0.06	0.04	0.04	0.04	0.04	0.04		90.0	0.00E+00 0	0	0	N/A	N/A	N/A	
10th Percentile 0.59 0.22 0.65	0,59 0,22	0.22	0.22	0.22		0,65	0,65	0,65	0,65	0,65		0,22	1,00E+08 20	0	0	N/A	N/A	N/A	
<b>90th Percentile</b> 0.63 0.28 0.69	0,63 0.28	0.28	0.28	0.28		69'0	69'0	69'0	69'0	69'0		0.28	1.00E+08 20	0	0	N/A	A/A	N/A	

# Survey Notes

1 These remaining life and overlay calculations follow the methodology of the Austroads Guide to Pavement Technology Part 5 Appendix E

The remaining life and overlay requirements assume that the asphalt surfaced pavement has not been progressively strengthened in stages or has significant remaining asphalt fatigue life

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The thickness of the asphalt overlay considering fatigue is the minimum required considering the design traffic

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Page 15 of 22

Ver:2 Rev:0

Pavement **Management Services** 

Report Date: 24-Sep-18 Report No.: R2017152

Project No.: 2017152

James Erskine Senior Pavement Engineer 24-Sep-18

James Erskine Senior Pavement Engineer 24-Sep-18

PA 07\_0155 MOD3 Report No. 625/25

**MULTIQUIP QUARRIES** 

Ardmore Park Quarry Appendix 3



Form No. TP5-R-001

Reviewed By:

Prepared By:

Page 16 of 22

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia Ver:2 Rev:0



Ardmore Park Quarry Appendix 3

#### RESPONSE TO SUBMISSIONS

PA 07\_0155 MOD3 Report No. 625/25

Form No. TP5-R-001

Management Services Pavemen

Seven Hills, NSW 2147

Unit 7b, 26 Powers Road

Prepared By: James Erskine Design Traffic Intensity: 4.80E+05 Growth Rate: 2.5% Design Period: 20

Existing Pavement: Flexible without Cemented Materials Overlay Type: Asphalt

Design Deflection: 1.27

WMAPT: 22

Overlay Adjustment Factor: 0.94 Seasonal Moisture Variation: 1.0

> 1.00 00. 00.

> > 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 00.1 1.00 1.00 1.00

1.10 1.10 1.10 1.10

0.43

14.6 14.6 14.6 14.6 14.6 14.6 14.6

25 25 25 25 25 25 25 25 25 25 25 25

IWP

16.550

Seal Seal

IWP

Seal Seal

IWP IWP

16.650

16.750

0.81

98.0

CSF

DSF

Deflection Curvature **FWD Measured** 

> Thickness (mm)

Wheel

Station

00. 00 00

> 1.10 1.10 1.10

> > 0.28 0.12 0.22

0.70

Seal

IWP IWP IWP IWP IWP IWP IWP

16.950 17.050 17.150 17.250 17.350 17.450 17.550 17.650

IWP

16.850

Seal Seal Seal Seal Seal Seal

0.61

Comment Remaining Life Overlay (mm) Asphalt<sup>8,9</sup> N/A N/A N/A N/A N/A Fatigue N/A N/A N/A N/A N/A N/A AN NA N/A N/A N/A N/A ESA's 8 N/A Granular Asphalt<sup>4</sup> Overlay (mm) Permanent Deformation Remaining Life Yrs 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 1.00E+08 1.00E+08 1.00E+08 4.74E+06 1.00E+08 1.07E+07 1.00E+08 1.00E+08 ESA's Adjustment Factor Deflection Curvature E E 0.28 0.22 0.23 0.07 0.30 0.27 0.27 Adjusted 0.47 0.95 0.69 0.89 0.41 99'0 0.67 99.0 99.0 0.67 0.24 Deflection Curvature 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1,00 1.00 1.00 1.00 1,00 1.00 1.00 00 1.00 Temperature

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Page 17 of 22

1.00

1.10

1,10

0.59

Seal

Seal

IWP IWP IWP

17.850

17.950

17.750

00.

00

0.27 0.27

0.60 0.60

Seal

IWP WP

0.61

00 00 00

1.10

1.10 1.10

0.23 0.07

09'0

14.6

0.44

0.22 0.63

14.6 4.6

1.10

0.30

1.10 1.10 1.10

Ver:2 Rev:0

Pavement **Management Services** 

Report Date: 24-Sep-18 Report No.: R2017152

Project No.: 2017152

Client: Multiquip Quarries

Remaining Life and Overlay Requirements - Design Charts Method 23

Location: 3A1\_IWP - Oallen Ford Road from Bungonia Bypass to Lumley Road (Quarry Entrance)

Analysis Method: FPMS-QP4-002

Test Method: QT211

Testing Date: 20-Jun-18 Tested By: John Muir

Test Equipment: FWD-016

Form No. TP5-R-00

				Surface		FWD Measured	asured			Temperature	Adju	Adjusted	Permaner	Permanent Deformation		L	Fatigue	
Station (km)	Lane	Wheel	Туре	Thickness Temp (mm) (°C)	(°C)	Deflection Curvatu (mm) (mm)	9	DSF	CSF	Adjustment Factor Deflection Curvature		Deflection Curvature (mm)	Remaining Life ESA's Yrs	Overlay Granular	±	Remaining L	Remaining Life Overlay (mm) ESA's Yrs8 Asphalt <sup>8,9</sup>	Comment
18.150	+	IWP	Seal	25	14.6	0.37	0.15	1.10	1.00	1.00 1.00	0.41	0.15	1.00E+08 20	0	0	N/A N/A		
18.250	-	IWP	Seal	25	14.6	0.42	0.20	1,10	1,00	1.00 1.00	0.46	0.20	1.00E+08 20	0	0	N/A N/A	A/N/A	
18.350	<b>~</b>	IWP	Seal	25	14.6	1.16	0.45	1.10	1.00	1.00 1.00	1.28	0.45	4.51E+05 19	ú	24	N/A N/A	A NA	
18.450	-	IWP	Seal	25	14.6	0.58	0.29	1.10	1.00	1.00 1.00	0.64	0.29	1.00E+08 20	0	0	N/A N/A	A N/A	
18.550	÷	IWP	Seal	52	14.8	0.85	0.31	1.10	1.00	1.00 1.00	0.94	0.31	5.34E+06 20	0	0	N/A N/A	A N/A	
18.650	-	IWP	Seal	25	14.8	99.0	0.27	1.10	1.00	1,00 1,00	0.73	0.27	1.00E+08 20	0	0	N/A N/A	A N/A	
18.750	-	IWP	Seal	25	14.8	0.78	0,34	1,10	1,00	1.00 1.00	0.86	0.34	1.83E+07 20	0	0	N/A N/A	A N/A	
18,850	-	IWP	Seal	52	14.8	1.08	98'0	1,10	1,00	1,00 1,00	1.19	0.36	7.37E+05 20	0	0	N/A N/A	A NA	
18.950	÷	WP	Seal	52	14.8	99'0	0.23	1.10	1.00	1.00 1.00	0.73	0.23	1.00E+08 20	0	0	N/A N/A	A N/A	
19.050	+	N N	Seal	25	14.8	0.80	0.44	1.10	1.00	1.00 1.00	0.88	0.44	1.26E+07 20	0	0	N/A N/A	A N/A	
19,150	-	IWP	Seal	25	14.8	1.23	0.67	1.10	1.00	1.00 1.00	1.35	0.67	3.08E+05 14	25	24	N/A N/A	A N/A	
19.250	-	WP	Seal	25	14.8	0.53	0.24	1.10	1.00	1.00 1.00	0.58	0.24	1.00E+08 20	0	0	N/A N/A	A NA	
19.350	+	IWP	Seal	25	14.8	0.67	0.24	1,10	1.00	1.00 1.00	0.74	0.24	1.00E+08 20	0	0	N/A N/A	A N/A	
19.450	÷	IWP	Seal	25	14.8	0.73	0.31	1.10	1.00	1.00 1.00	0.80	0.31	1.00E+08 20	0	0	N/A N/A	A N/A	
19.550	-	IWP	Seal	25	14.8	0.67	0.31	1,10	1.00	1.00 1.00	0.74	0.31	1.00E+08 20	0	0	N/A N/A	A/N/A	
19.650	-	IWP	Seal	25	14.8	0.91	0.39	1.10	1.00	1.00 1.00	1.00	0.39	2.81E+06 20	0	0	N/A N/A	A N/A	
19.750	-	IWP	Seal	25	14.8	0.55	0.14	1.10	1.00	1.00 1.00	09.0	0,14	1.00E+08 20	0	0	N/A N/A	A N/A	
	A	Average		25	14.7	0.66	0.27				0.72	0.27	7.59E+07 20	+	-	N/A N/A	A/N	
Standard Deviation	rd De	viation		0	0.1	0.22	0.11				0.24	0.11	4.17E+07 1	4	9	N/A N/A	A N/A	
10	th Per	10th Percentile				0.42	0.14				0,46	0.14	3.58E+06 20	0	0	N/A N/A	A N/A	
90	th Per	90th Percentile				0.89	0.41				0.98	0.41	1.00E+08 20	0	0	N/A N/A	A/N	

# Survey Notes

- 1 These remaining life and overlay calculations follow the methodology of the Austroads Guide to Pavement Technology Part 5 Appendix E
- 3 The remaining life and overlay requirements assume that the pavement is flexible and does not include any cemented materials, where this is not the case a mechanistic analysis should be undertaken The remaining life and overlay requirements assume that the asphalt surfaced pavement has not been progressively strengthened in stages or has significant remaining asphalt fatigue life
- 4 The asphalt overlay thickness to overcome permanent deformation is based on using asphalt with C320 binder, the use of other binders may result in a different thickness required
- 6. The overlay requirements indicate the thickness of additional material required to overcome any structural deficiencies of the pavement based on the pavement consisting of an asphalt wearing course and being 5. It is possible that a thinner asphalt overlay thickness may overcome fatigue however there would be a higher risk of premature distress in this case and as such it has not been considered
- The granular overlay requirements for design traffic volumes up to 1x10^8 ESA's can be derived using the Design Chart Method, while asphalt overlays are limited to a maximum design traffic volume of 1x10^7 ESA' subject to both permanent deformation and fatigue
- 8 The asphalt fatigue remaining life is calculated considering a minimum 40mm of asphalt overlay
  - The thickness of the asphalt overlay considering fatigue is the minimum required considering the design traffic

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Page 18 of 22







Ardmore Park Quarry Appendix 3 **RESPONSE TO SUBMISSIONS** 

PA 07\_0155 MOD3 Report No. 625/25



Form No. TP5-R-001

Reviewed By:

James Erskine Senior Pavement Engineer

24-Sep-18

Page 19 of 22

Pavement Management Services Pty Ltd., ABN 64 002 245 329, Australia Ver.2 Rev:0

Prepared By:



James Erskine Senior Pavement Engineer 24-Sep-18

Form No. TP5-R-001

PA 07\_0155 MOD3 Report No. 625/25

Management Services Pavemer

Unit 7b, 26 Powers Road

Seven Hills, NSW 2147

Existing Pavement: Flexible without Cemented Materials Prepared By: James Erskine Design Traffic Intensity: 2.09E+06 Growth Rate: 2.5% Design Period: 20

Client: Multiquip Quarries

Remaining Life and Overlay Requirements - Design Charts Method  $^{2,3}$ 

Report Date: 24-Sep-18

Report No.: R2017152

Project No.: 2017152

Location: 3A2 IWP - Oallen Ford Road from Lumley Road (Quarry Entrance) to Bungonia Bypass

Analysis Method: FPMS-QP4-002

Test Method: QT211

Tested By: John Muir

Testing Date: 20-Jun-18 Test Equipment: FWD-016

Overlay Type: Asphalt Design Deflection: 1.03

WMAPT: 22

Overlay Adjustment Factor: 0.94

Seasonal Moisture Variation: 1.0

Deflection Curvature

1.00 00.1 00. 00

1.00

1.10

Temperature

CSF

DSF

Deflection Curvature **FWD Measured** 

Temp

Thickness (mm)

Wheel Path

Station

(km)

(mm)

1.00

1.00

1.10

1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00

1.10

0.46

1.16

25 25 25 25 25 35 25 25 25 25 25

0.51 0.87

> WP IWP IWP

0.81

14.8 14.8 14.8 14.8 14.8 14.8 14.8 14.8 14.8

Seal Seal Seal Seal Seal Seal Seal

IWP IWP IWP IWP

16.375 16.475 16.575 16.675 16.775 16.875 16.975 17.075 17.175 17.275 17,375 17.475 17.575 7.675 17.775

1.10

1.00

1.00 1.00 1.00 1.00 1,00 1.00

8

1.10

0.19

0.73

00

1.10

0.18 0.16

00

1.10

00

1.10

0.42 0.79

00

1.10

0.32

Comment Remaining Life Overlay (mm) Asphalt<sup>8,9</sup> N/A N/A N/A N/A N/A N/A N/A N/A Yrs N/A N/A N/A N/A A/A N/A N/A N/A N/A XX N/A N/A XX N/A N/A ESA's 8 N/A Granular Asphalt<sup>4</sup> Overlay (mm) Permanent Deformation Remaining Life Yrs 20 20 20 20 20 20 20 S 20 20 20 20 20 20 20 20 20 20 2.81E+07 1.07E+07 4.51E+05 4.23E+06 1.00E+08 1.00E+08 1.00E+08 1.51E+07 1.00E+08 1.00E+08 3.79E+06 1.00E+08 1.00E+08 1.00E+08 1.00E+08 1.00E+08 2.81E+07 1.00E+08 ESA's Adjustment Factor Deflection Curvature (mm) 0.19 0.18 0.16 0.32 0.10 0.05 0.15 0.30 0.21 Adjusted (mm) 0.25 0.13 0.78 0.46 0,89 1.28 0.56 96.0 0.80 0.87 0.97 0.70 0.33 0.84

1,00

00

1.10

0.10

0.23 0.12

Seal Seal

Seal

IWP IWP IWP IWP IWP

1.00 1.00

00.

1.10 1.10 1.10 1.10

0.05

4.8

00 00. 00 00. 00. 90. 1.00

0.15

0.88 0.64 0.30

Seal Seal

> IWP IWP

0.21

1.00 00. 1.00 1.00

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Page 20 of 22

1.00

1.00

1.10

1,10

0.17

0.63

14.8

Seal

IWP

17.975 7.875

Seal

IWP

18.075

Seal

IWP WP

1.10

1.10

0.30

0.71

Seal Seal 1.00

Ver:2 Rev:0



Ardmore Park Quarry Appendix 3

#### **RESPONSE TO SUBMISSIONS**

PA 07\_0155 MOD3 Report No. 625/25

A			Surface		FWD Measured			R	Temperature		Adju	Adjusted	Permanent Deformation	Ď			Fatigue	
Wheel Type Thio		Ē.	ickness (mm)	Thickness Temp (mm) (°C)	Deflection Curvati (mm) (mm)	are .	DSF	SF	Adjustment Factor Deflection Curvature		Deflection (mm)	Deflection Curvature (mm) (mm)	Remaining Life ESA's Yrs	ত	y (mm) Asphalt <sup>4</sup>	Remaining Life ESA's 8 Yrs8	I Life Overlay (mm) Yrs <sup>8</sup> Asphalt <sup>8,9</sup>	nm) Comment
IWP Seal	Seal		25	14.8	0.36	0.18	1.10	1.00	1.00	1.00	0.40	0.18	1.00E+08 20	0	0	N/A	N/A N/A	
IWP Seal	Seal		52	14.8	0.65	0.26	1,10	1,00	1.00	1.00	0.72	0.26	1.00E+08 20	0	0	N/A	N/A N/A	
IWP Seal	Seal		52	14.8	0.56	0.16	1.10 1	1.00	1.00	1.00	0.62	0.16	1.00E+08 20	0	0	N/A	N/A N/A	
IWP Seal	Seal		52	14.8	1.06	0.52	1.10	1.00	1.00	1.00	1,17	0.52	8.22E+05 9	51	24	N/A	N/A N/A	
IWP Seal	Seal		52	14.8	0.47	0.15	1.10 1	1.00	1.00	1.00	0.52	0.15	1.00E+08 20	0	0	N/A	N/A N/A	
IWP Seal	Seal		52	14.8	96.0	0.46	1,10 1	1.00	1,00	1.00	1.06	0.46	1.68E+06 17	12	24	N/A	N/A N/A	
IWP Seal	Seal		25	14.8	1.20	0.39	1,10	1,00	1.00	1.00	1,32	0.39	3.62E+05 4	100	33	N/A	N/A N/A	
IWP Seal	Seal		52	14.8	0.45	0.23	1,10	1,00	1,00	1,00	0,50	0,23	1,00E+08 20	0	0	N/A	N/A N/A	
IWP Seal	Seal		52	14.8	0.82	0.32	1.10	1.00	1.00	1.00	06.0	0.32	9.17E+06 20	0	0	N/A	N/A N/A	
IWP Seal	Seal		25	14.8	0.79	0.15	1.10	1.00	1.00	1.00	0.87	0.15	1.51E+07 20	0	0	N/A	N/A N/A	
IWP Seal	Seal		25	14.8	0.78	0.20	1.10	1.00	1.00	1.00	0.86	0.20	1.83E+07 20	0	0	N/A	N/A N/A	
IWP Seal	Seal		25	14.8	1.00	0.35	1.10	1.00	1.00	1.00	1,10	0.35	1.25E+06 13	27	24	N/A	N/A N/A	
IWP Seal	Seal		25	14.8	0.57	0.23	1.10 1	1,00	1.00	1.00	0.63	0.23	1.00E+08 20	0	0	N/A	N/A N/A	
IWP Seal	Seal		52	14.8	09.0	0.28	1.10 1	1.00	1.00	1.00	99.0	0.28	1.00E+08 20	0	0	N/A	N/A N/A	
IWP Seal	Seal		52	14.8	0.39	0.15	1.10	1.00	1.00	1.00	0.43	0,15	1.00E+08 20	0	0	N/A	N/A N/A	
IWP Seal	Seal		25	14.8	0.79	0.23	1.10	1.00	1.00	1.00	0.87	0.23	1.51E+07 20	0	0	N/A	N/A N/A	
IWP Seal	Seal		52	14.8	0.59	0.23	1.10	1.00	1.00	1.00	0.65	0.23	1.00E+08 20	0	0	N/A N	N/A N/A	
Average			52	14.8	0.68	0.24					0.74	0.24	6.15E+07 19	80	4	N/A	N/A N/A	
Standard Deviation			0	0.0	0.25	0,10					0.27	0.10	4.55E+07 4	24	10	N/A	N/A N/A	
10th Percentile					0.37	0.15					0.41	0.15	1.42E+06 15	0	0	N/A	N/A N/A	1
90th Percentile					0.98	0.37					1.08	0.37	1.00E+08 20	12	24	N/A	N/A N/A	
						-												



Form No. TP5-R-00

Survey Notes

1 These remaining life and overlay calculations follow the methodology of the Austroads Guide to Pavement Technology Part 5 Appendix E

The remaining life and overlay requirements assume that the asphalt surfaced pavement has not been progressively strengthened in stages or has significant remaining asphalt fatigue, life

3 The remaining life and overlay requirements assume that the pavement is flexible and does not include any cemented materials, where this is not the case a mechanistic analysis should be undertaken

4. The asphalt overlay thickness to overcome permanent deformation is based on using asphalt with G320 binder, the use of other binders may result in a different thickness required

5. It is possible that a thinner asphalt overlay thickness may overcome fatigue however there would be a higher risk of premature distress in this case and as such it has not been considered

The overlay requirements indicate the thickness of additional material required to overcome any structural deficiencies of the pavement based on the pavement consisting of an asphalt wearing course and being subject to both permanent deformation and fatigue 9

The granular overlay requirements for design traffic volumes up to 1x10^8 ESA's can be derived using the Design Chart Method, while asphalt overlays are limited to a maximum design traffic volume of 1x10^7 ESA's The asphalt fatigue remaining life is calculated considering a minimum 40mm of asphalt overlay

The thickness of the asphalt overlay considering fatigue is the minimum required considering the design traffic

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Page 21 of 22

Ver:2 Rev:0

James Erskine Senior Pavement Engineer 24-Sep-18

James Erskine Senior Pavement Engineer 24-Sep-18

PA 07\_0155 MOD3 Report No. 625/25

**MULTIQUIP QUARRIES** 

Ardmore Park Quarry Appendix 3



Form No. TP5-R-001

Reviewed By:

Page 22 of 22

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia Ver:2 Rev:0

Prepared By:

Ardmore Park Quarry Appendix 3

### RESPONSE TO SUBMISSIONS

PA 07\_0155 MOD3 Report No. 625/25

Form No. TP5-R-001

Management Services Pavemen

Seven Hills, NSW 2147 Unit 7b, 26 Powers Road

Prepared By: James Erskine

Growth Rate: 2.5%

Client: Multiquip Quarries

Remaining Life and Overlay Requirements - Design Charts Method 2,3

Location: 1A1\_IWP - Jerrara Road from South Marulan Road to Mountain Ash Road

Analysis Method: FPMS-QP4-002 Testing Date: 31-May-18

Test Method: QT211

Tested By: John Muir

Test Equipment: FWD-016

Design Period: 20

Existing Pavement: Flexible without Cemented Materials Design Traffic Intensity: 8.28E+05

Overlay Type: Asphalt Design Deflection: 1.17

WMAPT: 22

Overlay Adjustment Factor: 0.94 Seasonal Moisture Variation: 1.0

> Deflection Curvature **FWD Measured**

> > Thickness (mm)

Wheel

Station

Surface

0.31

0.83

0.54 0.64

14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 14.3 4.3

25

Seal Seal Seal

IWP

0.350 0.450

IWP IWP

0.550

Seal

IWP

0.150

0.250

Comment Remaining Life Overlay (mm) Asphalt<sup>8,9</sup> N/A N/A N/A N/A N/A Fatigue N/A N/A N/A N/A N/A N/A AN NA N/A N/A N/A N/A ESA's 8 N/A Granular Asphalt<sup>4</sup> Overlay (mm) Permanent Deformation Remaining Life Yrs 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 1.83E+07 7.92E+06 1.00E+08 1.00E+08 1.00E+08 2.81E+06 1.00E+08 1.00E+08 1.56E+06 1.00E+08 1.00E+08 6.90E+06 8.68E+05 1.03E+06 2.81E+07 8.68E+05 1.51E+07 2.34E+06 ESA's Adjustment Factor Deflection Curvature (mm) 0.23 0.26 0.36 0.25 0.22 0.33 0.38 0.27 Adjusted 0.43 1,13 1.02 0.59 0.70 0.57 0.59 0.70 1.07 0,56 0.92 0.84 0.91 1.00 Deflection Curvature 1.00 1.00 1.00 1.00 1.00 1.00 1,00 1.00 1.00 1.00 1.00 1,00 1.00 00. 00 1.00 Temperature 1.00 00. 00. 00 1.00 00 00 00 00 00 SSF 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 00 1.00 1.00 1.00 1.10 1.10 1.10 1.10 1.10 1.10 1.10 1.10 1.10 1.10 1.10 1.10 1.10 1.10 1,10 1.10 DSF

> 0.23 0.26 0.36

0.54

Seal

IWP IWP

0.750 0.850 0.950 1.050 1.150 1.250

IWP

0.650

Seal Seal Seal Seal Seal Seal

IWP

IWP IWP IWP

0.27 0.43

0.52

25 25 25 25 25 25 25 25 25

0.22 0.33

0.39

.05 .03

Seal

1.450

.550

IWP IWP WP

350

0.84

0.25

0.51

0.97

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

0.79

Seal

Seal

IWP IWP IWP Page 1 of 22

Ver:2 Rev:0

Pavement **Management Services** 

Report Date: 24-Sep-18 Report No.: R2017152

Project No.: 2017152

Comment

Remaining Life Overlay (mm)

Fatigue

Asphalt<sup>8,9</sup> N/A N/A

Z Z

X X

0 0

0 0

2 8

96.0

1.00E+08 4.23E+06

(mm) 0.37

(mm) 0.79

Deflection Curvature

1.00

1.00

1,10 1,00

ESA's Yrs Granular Asphalt<sup>4</sup> ESA's<sup>8</sup> Yrs<sup>8</sup>

Overlay (mm)

Remaining Life

Adjustment Factor Deflection Curvature

CSF

FWD Measured Deflection Curvature DSF

Temp

Thickness (mm)
25

Type

Wheel Path IWP

Lane

Station

(km)

1.950 2.050 2.150 2.250

(mm) 0.37 0.43

(mm) 0.72 0.87

14.3

14.3

Seal

2.350 2.450 2.550

2.750 2.850 2.950 3.050

2,650

3.250

3.350

3.150

3.450

3.550

3.650 3.750 3.850 3.950 4.050 4.250

4.350 4.450 4.650 4.750 4.850

4.150

Adjusted

Temperature

Permanent Deformation

)	1.00E+08 20 0 0	0 N/A	0 N/A	1.00E+08 20 0 0 N/A	N/A	N/A	1,45E+06 20 0 N/A	0 N/A	0.37 9.17E+06 20 0 0 N/A N/A	24 N/A	0 N/A	0 0 N/A	0 N/A	N/A	O N/A	O N/A	O N/A	O N/A	O N/A	D N/A	0 N/A	0 N/A	0 N/A	0 N/A	0.20 1.00E+08 20 0 0 N/A N/A	0 N/A	N/A	0 0 0 N/A N/A N/A
1.0		1.08 0.1	0.84 0.3	0.65 0.3	0.88 0.3	0.81 0.3					0.87 0.3	0.72 0.3		1.04 0.5	0.94 0.3	0.97	0.41 0.2	0.63 0.2	0.92 0.3			0.81 0.3			0.46 0.2	0.45 0.1	0.73 0.3	1.06
0	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
00.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
30.	1.00	1.00	1.00	1,00	1,00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1,00	1,00	1.00	1.00	1.00	1,00	1.00	1.00	1.00
1.10	1.10	1.10	1,10	1,10	1,10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1,10	1,10	1.10	1.10	1.10	1.10	1,10	1.10	1.10	1.10
0.25	0.30	0.26	0.34	0,34	0,32	0.25	0.45	0.25	0.37	0.46	0.33	0.33	0.25	0.54	0.38	0.42	0.21	0.29	0.37	0,19	0.45	0.33	0.45	0.26	0.20	0.17	0.27	0.48
29.0	0.67	0.98	92.0	0.59	0.80	0.74	0.98	0.70	0.82	1.11	0.79	0.65	0.68	0.95	0.85	0.88	0.37	0.57	0.84	0.36	0.93	0.74	1.04	0.64	0.45	0.41	0.66	96.0
14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3
52	25	25	25	25	25	52	52	52	25	25	25	25	25	52	25	25	25	25	25	25	25	52	52	52	52	25	52	25
Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal	Seal
WP	IWP	IWP	IWP	WP	IWP	IWP	IWP	WP	IWP	WP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	IWP	WP	IWP	WP





Form No. TP5-R-001

PA 07\_0155 MOD3 Report No. 625/25

Ardmore Park Quarry Appendix 3

7	1		Surface							- mining in		home for	0.200.000.000		Comment Delonianon		and a	ב	
Station L (km)	Lane W	Wheel Type	e Thickness (mm)	less Temp		Deflection Curvature (mm) (mm)	e DSF	CSF	Adjustment Factor Deflection Curvature		Deflection (mm)	Deflection Curvature (mm)	Remaining Life ESA's Yrs	উ	Overlay (mm) anular Asphalt <sup>4</sup>		ng Life Yrs <sup>8</sup>	Remaining Life Overlay (mm) ESA's Yrs <sup>8</sup> Asphalt <sup>8,9</sup>	Comment
5.050	÷	IWP Seal	11 25	14.3		1.21 0.47	1.10	1.00	1.00	1.00	1.33	0.47	3.43E+05 10	52	24	N/A	N/A	N/A	
5.150	-	IWP Seal	11 25	14.3		0.95 0.50	1,10	1,00	1.00	1.00	1.04	0.50	1.97E+06 20	0	0	N/A	N/A	N/A	
5.250	-	IWP Seal	11 25	14.3		0.67 0.39	1.10	1.00	1.00	1.00	0.74	0.39	1.00E+08 20	0	0	N/A	A/A	N/A	
5.350	-	IWP Seal	1 25	14.3		0.97 0.27	1.10	1.00	1.00	1.00	1.07	0.27	1.56E+06 20	0	0	N/A	A/A	N/A	
5.450	+	IWP Seal	11 25	14.3	_	0.86 0.32	1.10	1.00	1.00	1.00	0.95	0.32	4.74E+06 20	0	0	N/A	N/A	N/A	
5,550	+	IWP Seal	11 25	14.3	_	0.88 0.42	1,10	1.00	1.00	1.00	0.97	0.42	3.79E+06 20	0	0	N/A	N/A	N/A	
5.650	÷	IWP Seal	11 25	14.3	_	1,00 0.45	1.10	1,00	1.00	1.00	1,10	0.45	1.25E+06 20	0	0	N/A	N/A	A/A	
5,750	-	IWP Seal	al 25	14.3		0.83 0.29	1.10	1,00	1,00	1,00	0.91	0,29	7.92E+06 20	0	Q	N/A	A/A	N/A	
5.850	-	IWP Seal	11 25	14.3		0.82 0.39	1.10	1.00	1.00	1.00	0.90	0,39	9.17E+06 20	0	0	N/A	N/A	N/A	
5.950	+	IWP Seal	11 25	14.3		0.73 0.35	1.10	1.00	1.00	1.00	0.80	0.35	1.00E+08 20	0	0	N/A	N/A	N/A	
6.050	-	IWP Seal	1 25	14.3		1.18 0.61	1.10	1.00	1.00	1.00	1.30	0.61	4.04E+05 11	43	24	N/A	N/A	N/A	
6.150	-	IWP Seal	11 25	14.3		0.84 0.35	1.10	1.00	1.00	1.00	0.92	0.35	6.90E+06 20	0	0	N/A	N/A	N/A	
6.250	+	IWP Seal	11 25	14.3	Н	1.06 0.42	1.10	1.00	1.00	1.00	1,17	0.42	8.22E+05 20	0	24	N/A	N/A	N/A	
6.350	-	IWP Seal	11 25	14.3		0.99 0.41	1.10	1.00	1.00	1.00	1.09	0.41	1.34E+06 20	0	0	N/A	N/A	N/A	
6.450	-	IWP Seal	11 25	14.3	-	0.80 0.33	1.10	1.00	1.00	1.00	0.88	0.33	1.26E+07 20	0	0	N/A	N/A	N/A	
6.550	-	IWP Seal	11 25	14.3		0.58 0.25	1.10	1.00	1.00	1.00	0.64	0.25	1.00E+08 20	0	0	N/A	N/A	N/A	
6.650	-	IWP Seal	11 25	14.3		0.36 0.20	1.10	1.00	1,00	1,00	0.40	0.20	1.00E+08 20	0	0	N/A	A/A	N/A	
6.750	-	IWP Seal	11 25	14.3		0.89 0.45	1,10	1.00	1.00	1,00	0.98	0.45	3.42E+06 20	0	0	N/A	N/A	N/A	
6.850	-	IWP Seal	11 25	14.3		0.68 0.32	1.10	1.00	1.00	1.00	0.75	0.32	1.00E+08 20	0	0	N/A	N/A	N/A	
6.950	-	IWP Seal	11 25	14.3		0.95 0.41	1,10	1.00	1.00	1.00	1.04	0.41	1.97E+06 20	0	0	N/A	N/A	N/A	
7.050	-	IWP Seal	11 25	14.3		0.45 0.22	1.10	1.00	1,00	1,00	0.50	0,22	1.00E+08 20	0	0	N/A	N/A	N/A	
7.150	+	IWP Seal	11 25	14.3		0,73 0,25	1,10	1,00	1.00	1.00	08'0	0.25	1.00E+08 20	О	0	N/A	A/Z	N/A	
7.250	+	IWP Seal	1 25	14.3		0.49 0.22	1,10	1,00	1,00	1,00	0,54	0,22	1,00E+08 20	0	0	N/A	A/A	N/A	
7.350	-	IWP Seal	11 25	14.3	-	0.54 0.23	1,10	1,00	1.00	1.00	0.59	0.23	1.00E+08 20	0	0	N/A	N/A	N/A	
7.450	-	IWP Seal	11 25	14.3		0.29 0.18	1.10	1.00	1.00	1.00	0.32	0.18	1.00E+08 20	0	0	N/A	A/A	N/A	
7.550	+	IWP Seal	1 25	14.3		0.67 0.33	1.10	1.00	1.00	1.00	0.74	0.33	1.00E+08 20	0	0	N/A	N/A	N/A	
7.650	+	IWP Seal	11 25	14.3		0.44 0.28	1.10	1.00	1.00	1.00	0.48	0,28	1.00E+08 20	0	0	N/A	N/A	N/A	
7.750	-	IWP Seal	11 25	14.3		0.64 0.28	1,10	1,00	1.00	1.00	0.70	0.28	1.00E+08 20	0	0	N/A	N/A	N/A	
7.850	į.	IWP Seal	11 25	14.3	_	1.04 0.43	1.10	1.00	1.00	1.00	1.14	0.43	9.68E+05 20	0	0	N/A	N/A	N/A	
7.950	-	IWP Seal	1 25	14.3	_	0.63 0.30	1,10	1.00	1.00	1.00	69.0	0.30	1.00E+08 20	0	0	N/A	N/A	N/A	
8 050		IMID COOL	-		_	ACCES TO SECOND				100000					8				



Page 3 of 22

avement Management Services Pty Ltd, ABN 64 002 245 329, Australia		IWF Sea		25 14.1 0.50	-		0.24   1.10 1.00	1.00	1.00	0.55	0.24	1.00E+08 20	0	0	N/A	N/A	N/A
	nent Managen	ment Serv	rices Pty Ltd,	ABN 64 0	02 245	329, Australia											CONSULTAUSTRALIA

	Comment																															
Te le	Remaining Life Overlay (mm) ESA's Yrs8 Asphalt <sup>8,9</sup>	N/A	NA	N/A	N/A	N/A	N/A	NA	N/A	N/A																						
rangne	Yrs <sup>8</sup>	N/A	N/A	N/A	A/A	N/A	A/A	N/A	A/A	N/A	N/A	A/A	A/A	A/A	N/A	A/A	A/A	A/A	N/A	A/A	N/A	N/A	N/A	N/A	A/A	NI/A						
	Remaining ESA's 8	N/A	N/A	N/A	N/A	A/A	N/A	N/A	A/N	N/A	A/N	N/A	A/N	N/A	N/A	N/A	N/A	A/A	N/A	A/A	N.I.A											
non	y (mm) Asphalt <sup>4</sup>	0	0	0	0	0	0	0	0	28	0	0	0	0	0	0	24	24	0	0	0	0	0	0	0	0	0	0	0	0	0	C
Permanent Deformation	Overlay (mm) Granular Aspha	0	0	0	0	0	0	0	0	92	0	0	0	0	0	0	73	38	0	0	0	0	О	0	0	0	0	0	0	0	0	c
anen	g Life Yrs	20	20	50	20	20	20	20	20	CJ.	20	50	20	20	20	20	7	12	20	20	20	50	20	20	20	50	20	20	20	20	20	00
Pern	Remaining Life ESA's Yrs	4.23E+06	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	6.37E+07	1.60E+05	2.24E+07	1.07E+07	1.00E+08	1.00E+08	1.83E+07	1.00E+08	2.34E+05	4.27E+05	1.00E+08	2.24E+07	1.00E+08	1.00E+08	1.00E+08	1,00E+08	1.00E+08	2.56E+06	1.00E+08	1.00E+08	6.90E+06	1.00E+08	1.07E+07	* DOC *
ted	Curvature (mm)	0.30	0.32	0.24	0,34	0.24	0.24	0.28	0.32	0.41	0.30	0.28	0.27	0.24	0.34	0.33	0.39	0.46	0.21	0.33	0.30	0.31	0.25	0,26	0.22	0.36	0.26	0,24	0.45	0.23	0.32	Č
Adjusted	Deflection Curvature (mm)	96.0	0.62	0.56	0.67	0.77	0.73	0.76	0.81	1.47	0.85	0.89	0.78	0.68	98.0	0.70	1.40	1.29	0.50	0.85	0.69	22.0	0.59	0,53	0.50	1.01	62.0	0.57	0.92	0.58	0.89	-
iure	a	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	000
Iemperature	Adjustment Factor Deflection Curvatur	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
	CSF Pe	1.00	1,00	1.00	1.00	1.00	1.00	1,00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1,00	1,00	1.00	1.00	1.00	1,00	1.00	1.00	0
	DSF C	1.10 1.	1,10 1,	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1,10 1,	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1,10 1,	1.10 1.	1,10 1.	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1,10 1,	1,10 1,	1.10 1,	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1.10 1.	7
sured	a .	0.30	0.32	0.24	0.34	0.24	0.24	0.28	0.32	0.41	0.30	0.28	0.27	0.24	0.34	0.33	0.39	0.46	12.0	0.33	0.30	16.0	0.25	0,26	0.22	0.36	0.26	0.24	0.45	0.23	0.32	1000
FWD Measured	Deflection Curvati (mm) (mm)	0.87	95.0	0.51	0.61	0.70	99.0	69.0	0.74	1.34	0.77	0.81	0.71	0.62	0.78	0.64	1.27	1.17	0.45	0.77	0.63	0.70	0.54	0.48	0.45	0.92	0.72	0.52	0.84	0.53	0.81	0 50
	Temp D	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.1	14.1	14.1	14.1	17.1
Surface	Thickness Te (mm) (	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	25 1	100
Sul				9							2				į	5						-	3							9		
	Туре	Seal	Sea	Seal	Sea	Seal	Seal	Seal	Seal	Sea	Seal	Seal	Sea	Sea	Seal	Seal	Seal	Sea	Seal	Sea	Seal	Seal	Sea	Sea	Sea	Sea	Sea	Seal	Sea	Seal	Sea	000
	Wheel	IWP	IMID																													
	Lane	-	-	نہ	-	7	+	-	-	÷	+	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	4	-	
1	Station (km)	8.150	8.250	8.350	8.450	8.550	8,650	8.750	8,850	8.950	9.050	9.150	9.250	9.350	9.450	9.550	9.650	9.750	9.850	9.950	10.050	10,150	10.250	10,350	10.450	10.550	10.650	10.750	10.850	10.950	11.050	7

PA 07\_0155 MOD3 Report No. 625/25

						FWD Measured		T.	dina	lemperature	Adju	Adjusted		_	Permanent Deformation		Fatigue	ne	
S .	Wheel	Type	Thickness (mm)	Temp (°C)	Deflection Curvatu (mm) (mm)	Curvature (mm)	DSF	CSF	Adjustment Factor Deflection Curvatur	Adjustment Factor Deflection Curvature		Deflection Curvature (mm) (mm)	Remaining Life ESA's Yrs	G	Overlay (mm) Granular Asphalt <sup>4</sup>		ng Life	Remaining Life Overlay (mm) ESA's Yrs Asphalt <sup>8,9</sup>	Comment
1	IWP	Seal	52	14.1	0.64	0.32	1.10	1.00	1.00	1.00	0.70	0.32	1.00E+08 20			N/A	N/A	N/A	
	IWP	Seal	52	14.1	0.53	0.22	1,10	1,00	1.00	1.00	0.58	0.22	1.00E+08 20		0	N/A	N/A	N/A	
	IWP	Seal	25	14.1	0.72	0.28	1.10	1.00	1.00	1.00	0.79	0.28	1.00E+08 20		0 0	N/A	N/A	N/A	
_	IWP	Seal	52	14.1	0.79	0.37	1.10	1.00	1.00	1.00	0.87	0.37	1,51E+07 20		0 0	N/A	N/A	N/A	
_	IWP	Seal	52	14.1	0.73	0.27	1.10	1.00	1.00	1.00	0.80	0.27	1.00E+08 20		0 0	N/A	N/A	N/A	
_	IWP	Seal	25	14.1	0.58	0.28	1,10	1.00	1.00	1.00	0.64	0.28	1.00E+08 20		0 0	N/A	N/A	N/A	
_	IWP	Seal	25	14.1	0.67	0.26	1.10	1.00	1.00	1.00	0.74	0.26	1.00E+08 20	1000	0 0	N/A	N/A	N/A	
_	WP	Seal	25	14.1	0.77	0.24	1.10	1.00	1,00	1,00	0,85	0.24	2.24E+07 20		0 0	N/A	N/A	NA	
_	WP	Seal	52	14.1	0.95	0.42	1,10	1.00	1.00	1.00	1.04	0,42	1.97E+06 20	-	0 0	N/A	N/A	N/A	
	WP	Seal	52	14.1	0.81	0.27	1.10	1.00	1.00	1.00	0.89	0.27	1.07E+07 20		0 0	N/A	N/A	A/A	
	IWP	Seal	52	14.1	0.80	0.37	1.10	1.00	1.00	1.00	0.88	0.37	1.26E+07 20	-	0 0	N/A	N/A	N/A	
	IWP	Seal	52	14.1	0.95	96.0	1.10	1.00	1.00	1.00	1.04	0.36	1.97E+06 20		0 0	N/A	N/A	N/A	
	IWP	Seal	52	14.1	96.0	0.32	1.10	1.00	1.00	1.00	1.06	0.32	1.68E+06 20	17	0 0	N/A	N/A	N/A	
	IWP	Seal	52	14.1	0.64	0.26	1.10	1.00	1.00	1.00	0.70	0.26	1.00E+08 20	100	0 0	N/A	A/N	N/A	
	IWP	Seal	25	14.1	0.57	0.30	1.10	1.00	1.00	1.00	0.63	0.30	1.00E+08 20	-	0 0	N/A	N/A	N/A	
	IWP	Seal	25	14.1	1.33	0.55	1.10	1.00	1.00	1.00	1.46	0.55	1.69E+05 5	ω	89 28	N/A	A/N	N/A	
	IWP	Seal	52	14.1	0.74	0,35	1.10	1.00	1,00	1,00	0.81	0.35	6.37E+07 20		0 0	N/A	N/A	N/A	
	IWP	Seal	52	14.1	0.63	0.26	1.10	1.00	1.00	1.00	69.0	0.26	1.00E+08 20	17	0 0	N/A	N/A	N/A	
	IWP	Seal	52	14.1	0.62	0.26	1.10	1.00	1.00	1.00	0.68	0.26	1.00E+08 20		0 0	N/A	N/A	N/A	
	IWP	Seal	52	14.1	0.61	0.29	1.10	1.00	1.00	1,00	0.67	0.29	1.00E+08 20		0 0	N/A	N/A	N/A	
	WP	Seal	52	14.1	0.68	0.33	1.10	1.00	1.00	1,00	0.75	0.33	1.00E+08 20		0 0	N/A	N/A	N/A	
	WP	Seal	52	14.1	96'0	0.30	1,10	1,00	1.00	1.00	1.06	0.30	1.68E+06 20		0	N/A	A/Z	N/A	
	IWP	Seal	25	14.1	1.28	0,58	1,10	1,00	1.00	1.00	14.1	0.58	2.22E+05 6	10	75 24	N/A	N/A	NA	
	IWP	Seal	52	14.1	0.65	0.24	1.10	1,00	1.00	1.00	0.72	0.24	1.00E+08 20		0 0	N/A	N/A	N/A	
	IWP	Seal	52	14.1	0.82	0.21	1.10	1.00	1.00	1.00	0.90	0.21	9.17E+06 20		0 0	N/A	N/A	N/A	
	IWP	Seal	52	14.1	0.80	0.37	1.10	1.00	1.00	1.00	0.88	0.37	1.26E+07 20	_	0 0	N/A	N/A	N/A	
	IWP	Seal	25	14.1	96.0	0.47	1.10	1.00	1.00	1.00	1.06	0.47	1.68E+06 20		0 0	N/A	N/A	N/A	
	IWP	Seal	52	14.1	1.58	0.58	1,10	1,00	1.00	1.00	1.74	0.58	3.66E+04 1	7	160 52	N/A	N/A	N/A	
	WP	Seal	25	14.1	98.0	0.26	1.10	1.00	1.00	1.00	0.95	0.26	4.74E+06 20	-	0 0	N/A	N/A	N/A	
_	IWP	Seal	25	14.1	0.67	0.28	1.10	1.00	1.00	1.00	0.74	0.28	1.00E+08 20	_	0 0	N/A	N/A	N/A	
_	IWP	Seal	25	14.1	0.56	0.31	1.10	1 00	.00	1 00	0.62	0.91	1 00F±08 20		0	N/A	NIA	N/A	

12.150 12.250 12.250 12.250 12.650 12.650 12.650 13.050 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13.250 13



Page 5 of 22



11,950 12.050

Form No. TP5-R-00

PA 07\_0155 MOD3 Report No. 625/25

Permanent Deformation Fatigue	Contract of the contract of th
	Thickness Temp Deflection Curvature DSF CSF Adjustment Factor Deflection Curvature Kemaining Life Overlay (mm) Hemaining Life Overlay (mm) Comment (mm) (mm) (mm) (mm) (mm) RSA's Yrs Granular Asphalt <sup>4</sup> ESA's Yrs Asphalt <sup>8,9</sup> Comment
m) Remaining Li ohalt <sup>4</sup> ESA's 8 Yrg	
Remaining Life Overlay (mm) ESA's Yrs Granular Aspha	c
e Remaining Life ESA's Yrs	
Curvature	(mm)
	Deflection (mm)
	nt Factor 1 Curvature
- inches de la constant de la consta	Adjustment Factor Deflection Curvature
	CSF
	DSF
	Curvature (mm)
rwb measured	Deflection (mm)
	Temp D
Surrace	Thickness (mm)
	Type
	. Wheel Path
	Lane
	Station (km)

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1 These remaining life and overlay calculations follow the methodology of the Austroads Guide to Pavement Technology Part 5 Appendix E

The remaining life and overlay requirements assume that the asphalt surfaced pavement has not been progressively strengthened in stages or has significant remaining asphalt fatigue life

3. The remaining life and overlay requirements assume that the pavement is flexible and does not include any cemented materials, where this is not the case a mechanistic analysis should be undertaken

4 The asphalt overlay thickness to overcome permanent deformation is based on using asphalt with G320 binder, the use of other binders may result in a different thickness required

5 it is possible that a thinner asphalt overlay thickness may overcome fatigue however there would be a higher risk of premature distress in this case and as such it has not been considered

6 The overlay requirements indicate the thickness of additional material required to overcome any structural deficiencies of the pavement based on the pavement consisting of an asphalt wearing course and being

7 The granular overlay requirements for design traffic volumes up to 1x10/8 ESA's can be derived using the Design Chart Method, while asphalt overlays are limited to a maximum design traffic volume of 1x10/7 ESA' subject to both permanent deformation and fatigue

The asphalt fatigue remaining life is calculated considering a minimum 40mm of asphalt overlay

The thickness of the asphalt overlay considering fatigue is the minimum required considering the design traffic

Reviewed By:

James Erskine

Senior Pavement Engineer 24-Sep-18

Senior Pavement Engineer

24-Sep-18

James Erskine

Prepared By:

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Ver:2 Rev:0



Page 6 of 22



Ardmore Park Quarry Appendix 3

### RESPONSE TO SUBMISSIONS

PA 07\_0155 MOD3 Report No. 625/25

Form No. TP5-R-001

Management Services Pavemen

Seven Hills, NSW 2147

Unit 7b, 26 Powers Road

Prepared By: James Erskine Growth Rate: 2.5% Design Period: 20

Existing Pavement: Flexible without Cemented Materials Design Traffic Intensity: 3.15E+06

Overlay Type: Asphalt Design Deflection: 0.99

WMAPT: 22

Overlay Adjustment Factor: 0.94 Seasonal Moisture Variation: 1.0 Comment

Asphalt<sup>8,9</sup>

1.00 00. 00.

0.31

1.00 1.00

1.10 1.10 1.10 1.10

0.21

0.57 1.09

25 25 25 25 25 25 25 25 25 25 25

IWP

IWP IWP IWP IWP IWP

0.575

0.675

0.775 0.875 0.975

0.64

0.3 10.3 10.3 10.3 10.3 10.3 0.3 10.3 10.3 10.3 0.3 10.3 10.3 0.3 10.3 10.3 10.3

Seal Seal Seal Seal Seal Seal Seal

IWP

Seal

IWP

0.175 0.275 0.375 0.475

SSF

DSF

Deflection Curvature FWD Measured

> Thickness (mm)

Wheel

Station

00. 00

1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 00.

1.10

0.43 0.68 0.83

1.10

0.27

1.10

0.24

0.84

0.59

1.10

0.33

Seal Seal Seal Seal Seal

IWP

IWP IWP IWP

1.075

1.175

1.275

1.10 1.10

0.25 0.34

0.64

0.78

Remaining Life Overlay (mm) Fatigue N/A N/A N/A N/A N/A N/A AN NA N/A N/A N/A NA ESA's 8 N/A Granular Asphalt<sup>4</sup> Overlay (mm) 24 28 Permanent Deformation Remaining Life Yrs 20 20 20 20 5 20 20 20 20 20 20 20 0 5 20 20 20 20 4.74E+06 1.00E+08 1.00E+08 6.98E+05 1.00E+08 6.90E+06 1.00E+08 1.00E+08 7.92E+06 1.00E+08 3.79E+06 4.74E+06 1.83E+07 1.25E+06 6.98E+05 5.34E+06 1.00E+08 1.83E+07 ESA's Adjustment Factor Deflection Curvature (EE) 0.33 0.25 0.34 0.36 0.32 0.21 0.24 0.27 Adjusted 0.63 0.65 1.10 0.70 1.20 0.92 0.47 0.91 0.70 0.86 1.20 0.80 0.97 0.94 Deflection Curvature 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1,00 1.00 1.00 1,00 1.00 1.00 00. 00 1.00 Temperature

00 00

1.10 1.10 1.10

00 00

1.10

0.36 0.46

1.00 60. 0.88

Seal

IWP IWP WP

1.375 1.475 00

1.00

1.00 1.00

1,10

98.0

Seal

Seal

IWP IWP IWP

1.675 1.775 1.875

575

1.00

1.10

N/A N/A N/A N/A N/A

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Page 7 of 22

Ver:2 Rev:0



Report Date: 24-Sep-18 Report No.: R2017152

Project No.: 2017152

Client: Multiquip Quarries

Remaining Life and Overlay Requirements - Design Charts Method 2,3

Location: 1A2 IWP - Jerrara Road from Mountain Ash Road to South Marulan Road

Analysis Method: FPMS-QP4-002

Test Method: QT211

Testing Date: 01-Jun-18 Tested By: John Muir

Test Equipment: FWD-016

CONSULT AUSTRALIA	TP5-R-001
	Form No.

	Comment																															
e	Remaining Life Overlay (mm) ESA's 8 Yrs8 Asphalt <sup>8,9</sup>	N/A	NA	N/A																												
Fatigue	Life C	N/A	N/A	N/A	A/A	N/A	A/A	N/A																								
	Remaining ESA's 8	N/A																														
tion	alt4	0	0	0	0	0	0	28	0	0	0	0	0	24	0	0	24	24	0	0	0	0	0	Q	0	0	24	0	0	24	24	0
Permanent Deformation	Overlay (mm) Granular Aspha	0	0	0	0	0	0	78	0	0	0	0	0	39	0	0	22	20	0	0	0	0	0	0	0	0	53	0	0	31	28	0
anent		20	20	20	20	20	20	ın	20	20	20	20	20	9	20	20	7	4	20	20	20	20	20	20	20	20	00	20	20	÷	57	20
Perm	Remaining Life ESA's Yrs	1.00E+08	1.00E+08	1.26E+07	1.00E+08	1.00E+08	1.00E+08	6.98E+05	1,00E+08	6.37E+07	1.00E+08	2.81E+07	1.00E+08	1.34E+06	1.00E+08	1.00E+08	9.68E+05	1.97E+06	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1,00E+08	1.00E+08	1.00E+08	1.03E+06	1.51E+07	1.00E+08	1.56E+06	1.68E+06	1.00E+08
ted	Curvature (mm)	0.30	0.20	0.30	0.23	0.21	0.35	0.57	0.27	0.30	0.35	0.32	0.30	0.47	0.34	0.24	0.37	0.39	0.24	0.31	0.22	0.18	0.23	0.10	0.27	0.21	0.37	0,26	0,16	0.35	0.56	0.41
Adjusted	Deflection Curvature (mm)	0.63	0.54	0.88	0.42	0.72	0.73	1.20	69.0	0.81	62.0	0.84	0.77	1.09	0.68	0.57	1.14	1.04	0.73	09.0	0.54	0.45	92.0	0,26	0.66	0.44	1,13	0.87	0.46	1.07	1.06	0.74
rture	d)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Iemperature	Adjustment Factor Deflection Curvature	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	CSF	1.00	00.	00.1	00.1	1.00	1.00	1,00	1,00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	00.1	1.00	1.00	1,00	1,00	1,00	1.00	1.00	1.00	1,00	1.00	00.1	1.00
	DSF C	1.10 1	1.10	1.10 1	1.10 1	1.10 1	1,10 1	1,10 1	1,10 1	1.10 1	1.10 1	1.10 1	1.10 1	1.10 1	1.10 1	1.10 1	1.10 1	1.10 1	1.10 1	1.10 1	1.10 1	1.10 1	1,10 1	1,10 1	1.10 1	1.10 1	1.10 1	1.10 1	1,10 1	1.10 1	1.10 1	1.10 1
	are (	0:30	0.20	0.30	0.23	0.21	0.35	0.57	0.27	0.30	0.35	0.32	0:30	0.47	0.34	0.24	0.37	0.39	0.24	0.31	0.22	0.18	0,23	0,10	0.27	0.21	0.37	0.26	0.16	0.35	0.56	0.41
<b>FWD Measured</b>	Deflection Curvati (mm) (mm)	0.57	0,49	0.80	0.38	0.65	99.0	1.09	0,63	0.74	0.72	0.76	0.70	0.99	0.62	0.52	1.04	0.95	99.0	0.55	0.49	0.41	69'0	0.24	09.0	0.40	1.03	0.79	0.42	0.97	96.0	0.67
		10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	2 6	9,2	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.2
Surface	Thickness Temp (mm) (°C)	25	52	52	52	52	52	25	52	52	52	52	52	25	25	25	25	25	52	52	25	52	52	25	52	52	52	52	52	25	52	52
**	Type	Seal																														
	Wheel Path	IWP	WP	IWP																												
	Lane Wh		2	2 1	2	2 1	2	2	2	2	2 ×	2	2	2	2	2 1	2	2	2 1	2	2	2	2	2	2	2	2	2	2	2 1	2	2 1V
I	Station La (km)	1.975	2.075	2.175	2.275	2.375	2.475	2.575	2,675	2.775	2.875	2.975	3.075	3,175	3.275	3.375	3.475	3.575	3.675	3.775	3.875	3.975	4.075	4.175	4.275	4.375	4.475	4.575	4.675	4.775	4.875	4.975

Pavement Management Services Pty Ltd., ABN 64 002 245 329, Australia Ver:2 Rev;0

Page 8 of 22



PA 07\_0155 MOD3 Report No. 625/25

Ardmore Park Quarry
Appendix 3

	nm) Comment				-																											
a e	Remaining Life Overlay (mm) ESA's Yrs8 Asphalt <sup>8,9</sup>	N/A	N/A	N/A	N/A	N/A	N/A	A/N	N/A		N/A	Z Z	X X X	X X X X	X X X X X	N N N N N N N N N N N N N N N N N N N	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	N N N N N N N N N N N N N N N N N N N	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X							
Fatigue	g Life Yrs <sup>8</sup>	N/A	Z/A	N/A	A/A	N/A	Z/A	N/A	N/A	N/A	N/A		Z Z	Z Z Z	ZZZZ	X X X X X X X X X X X X X X X X X X X	X			N N N N N N N N N N N N N N N N N N N	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X						
	Remainin ESA's 8	N/A		N/A	Z Z Z	Y Y Y	X X X X X X X X X X X X X X X X X X X	&	* * * * * * * * * * * * * * * * * * *	4 4 4 4 4 4 2 2 2 2 2 2	4 4 4 4 4 4 4 2 2 2 2 2 2 2 2	4 4 4 4 4 4 4 4 2 2 2 2 2 2 2 2 2 2 2 2	4 4 4 4 4 4 4 4 4 2 2 2 2 2 2 2 2 2 2 2	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N															
	4	0	0	0	24	0	0	0	Q	0	0	52	24	0	0	0	0		0	0 24	0 54 58	0 28 0	24 28 0 0 56	24 28 0 0 0	0 24 5 0 28 6 7 6 9 6 9 6 9 6 9 6 9 9 9 9 9 9 9 9 9	0 28 0 0 0 24 0	0 28 28 0 0 0 0 0	0 58 28 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 58 28 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 58 28 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 28 28 28 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 28 2 28 2 28 2 2 2 2 2 2 2 2 2 2 2 2 2
Permanent Derormation	Overlay (mm) Granular Aspha	0	0	0	23	0	0	0	0	0	0	160	28	0	0	0	0	D	0	0 4	0 4 8	0 4 8 0	0 78 0 173	0 87 0 0 0 0	0 0 0 0 0 0 173	0 4 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 4 4 4 6 78 8 7 1 2 1 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 4 4 7 8 7 1 4 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1	0 4 4 6 0 7 1 2 2 0 0 0 0 0 0 0	0 4 8 0 0 12 0 0 0 0 0 0	0 4 8 0 0 1 2 0 0 0 0 0 0
		20	20	20	00	20	20	20	20	20	20	-	2	20	20	20	20	00	2	8 4	2 4 5	18 20 20	1 2 2 2 4	20 - 20 - 20	20 + 20 + 20 + 20	20 + 20 + 30 + 30 + 30 + 30 + 30 + 30 +	20 T S S S S S S S S S S S S S S S S S S	20 - 20 + 20 - 20 20 5 8 8 20 5 20 5 20 5 20 5 20 5 20	2 2 2 2 3 4 2 3 4 3 4 3 4 3 4 3 4 3 4 3	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 2 2 2 2 2 2 2 2 2 3 2 3 3 3 3 3 3 3
Remaining Life ESA's Yrs		2.81E+07	1.00E+08	1.00E+08	1.03E+06	1.00E+08	1.00E+08	4.74E+06	1.83E+07	4.74E+06	7.92E+06	1.60E+05	1.68E+06	2.24E+07	6.37E+07	1.07E+07	1 OOF TOB	LOUT TOO.	1.00E+08	1.00E+08 2.81E+06	1.00E+08 2.81E+06 6.98E+05	1.00E+08 2.81E+06 6.98E+05 1.00E+08	1.00E+08 2.81E+06 6.98E+05 1.00E+08	1.00E+08 2.81E+06 6.98E+05 1.00E+08 1.22E+05 1.00E+08	1.00E+08 6.98E+05 1.00E+08 1.22E+05 1.00E+08 2.34E+06	1.00E+08 6.98E+05 1.00E+08 1.22E+05 1.00E+08 2.34E+06 1.00E+08	1.00E+08 6.98E+05 1.00E+08 1.22E+05 1.00E+08 1.00E+08 1.00E+08 1.00E+08	1.00E+08 2.81E+06 6.98E+05 1.00E+08 1.00E+08 1.00E+08 1.00E+08 1.00E+08 1.00E+08	2.81E+06 6.98E+05 1.00E+08 1.22E+05 1.00E+08 1.00E+08 1.00E+08 1.00E+08 1.00E+08	2.81E+06 6.98E+05 1.00E+08 1.22E+05 1.00E+08 1.00E+08 1.00E+08 1.00E+08 1.00E+08 1.00E+08	2.81E+06 6.98E+05 1.00E+08 1.22E+05 1.00E+08 1.00E+08 1.00E+08 1.00E+08 1.00E+08 1.00E+08 1.00E+08 1.00E+08	2.81E+06 6.98E+05 1.00E+08 1.22E+05 1.00E+08 1.00E+08 1.00E+08 1.00E+08 1.00E+08 3.42E+06
nais	Curvature (mm)	0.31	0.31	0.25	0.37	0.15	0.22	0.32	0.32	0.41	0.36	0.55	0.31	0.28	0.27	0.22	0.23		0.23	0.23	0.23	0.23 0.45 0.45	0.23 0.45 0.28 0.28	0.23 0.45 0.28 0.28 0.24	0.23 0.45 0.28 0.28 0.24 0.36	0.23 0.45 0.28 0.45 0.24 0.36	0.23 0.45 0.45 0.28 0.24 0.36 0.03	0.23 0.45 0.45 0.28 0.24 0.36 0.03	0.23 0.45 0.28 0.28 0.24 0.36 0.03 0.03	0.23 0.45 0.28 0.24 0.24 0.03 0.03 0.03	0.23 0.45 0.28 0.24 0.03 0.03 0.03 0.22 0.19	0.23 0.45 0.45 0.28 0.24 0.03 0.22 0.22 0.22 0.22
naisnine	Deflection Curvature (mm) (mm)	0.84	92.0	0.73	1,13	0.63	0.52	0.95	98'0	0,95	0.91	1.47	1.06	0.85	0.81	0.89	0.54	200	0.36	1.00	1.00	1.00 1.20 0.64	1.00 1.20 0.64 1.52	0.36 1.00 0.64 1.52 0.76	1,00 1,20 0,64 1,52 0,76	0.36 1.20 0.64 1.52 0.76 1.02	0.36 1.20 0.64 1.52 0.76 1.02 0.45	0.36 1.00 1.20 0.64 1.52 0.76 0.45 0.10	0.36 1.00 1.20 0.64 1.52 0.76 0.45 0.10	0.36 1.20 0.64 1.52 0.76 0.45 0.10	0.36 1.20 0.64 1.52 0.76 0.45 0.72 0.46 0.57	0.36 1.20 0.64 1.52 0.76 1.02 0.10 0.72 0.45 0.57 0.98
- curbonale	nt Factor Curvature	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	00	00.1	1.00	1.00	1.00	00.1	00.1	00.00.00.00.00.00.00.00.00.00.00.00.00.	00.1	00.1	00.000000000000000000000000000000000000	00.1	00.1	00.1	00.1 00.1 00.1 00.1 00.1 00.1 00.1 00.1
	Adjustment Factor Deflection Curvatur	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	00 +	20.1	0.00	00.1	1.00	9. 0. 0. 0. 0.	00.1.1.1.1.00.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.1.00.	00.1 1 00.1 00.1 00.1 00.1 00.1	000111000000000000000000000000000000000	000000000000000000000000000000000000000	00.11.00.00.00.00.00.00.00.00.00.00.00.0	0.0000000000000000000000000000000000000			0.1.00000000000000000000000000000000000
7	SF	1.00	1,00	1.00	1.00	1.00	1.00	1,00	1,00	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1 00	2	9.	1.00	8 6 6 6	8 9 9 9	8 9 9 9 9	00.1	00 00 00 00 00 00 00 00 00 00 00 00 00	00.11	00.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.10000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000.1.1000	00.11	00.11		
	e DSF	1.10	1,10	1.10	1.10	1.10	1,10	1.10	1.10	1,10	1.10	1.10	1.10	1,10	1.10	1,10	1.10	1	2	1.10	2 2 2	9 2 2 2	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	5 5 5 5 5	5 5 5 5 5 5	6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6						
The state of the s	Curvature (mm)	0.31	0.31	0.25	0.37	0.15	0.22	0.32	0.32	0.41	98'0	0.55	0.31	0.28	0.27	0.22	0.23	0.23		0.45	0.45	0.45	0.45 0.28 0.45	0.45 0.28 0.45 0.45	0.45 0.28 0.28 0.24 0.36	0.45 0.28 0.28 0.45 0.24 0.36 0.19	0.45 0.28 0.24 0.36 0.19 0.03	0.45 0.28 0.28 0.24 0.36 0.19 0.03	0.45 0.28 0.28 0.24 0.36 0.19 0.03	0.45 0.28 0.28 0.45 0.36 0.19 0.03 0.03	0.45 0.45 0.24 0.36 0.03 0.03 0.02 0.19 0.22 0.22	0.45 0.28 0.24 0.36 0.03 0.03 0.22 0.19 0.28 0.30
FWD Measured	Deflection Curvatu (mm) (mm)	92.0	0.69	99'0	1.03	0.57	0.47	0.86	0.78	0.86	0.83	1.34	96.0	0.77	0.74	0.81	0.49	0.33		0.91	1.09	1.09	0.91 1.09 0.58 1.38	0.91 1.09 0.58 1.38	1.09 1.09 0.58 0.69 0.69	1.09 1.38 0.69 0.93 0.41	0.91 0.58 1.38 0.69 0.93 0.93	0.91 0.58 1.38 0.69 0.93 0.09 0.09	0.91 1.09 1.38 0.69 0.93 0.09 0.09	0.91 0.58 0.58 0.69 0.93 0.04 0.09 0.09 0.05 0.05 0.05 0.05 0.05	0.91 0.58 0.69 0.93 0.09 0.09 0.65 0.05 0.69	0.91 0.58 0.69 0.69 0.09 0.09 0.65 0.68 0.68 0.68
	Temp (°C)	9.5	9.5	9.5	9.5	9.5	9.2	9.5	9.5	9.5	9.2	9.5	9.5	9.5	9.2	9.2	9.2	9.5		9.5	9.2	9.2 4.8 4.8	9.8 4.8 4.4 4.8	2 8 8 8 8	0 8 8 8 8 8	2 4 4 4 4 4 4 4	2 4 4 4 4 4 4 4 8	0 8 8 8 8 8 8 8 8 8 8 8 8 8 8	0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0	00 00 00 00 00 00 00 00 00 00 00 00 00	0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0	0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0
	Thickness (mm)	25	25	25	52	25	25	25	25	52	25	25	52	52	25	52	25	25		52	25	25 25 25	25 25 25 25	25 25 25 25 25 25 25 25 25 25 25 25 25 2	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	8 8 8 8 8 8 8	8 8 8 8 8 8 8 8	8 8 8 8 8 8 8 8 8 8	8 8 8 8 8 8 8 8 8 8	8 8 8 8 8 8 8 8 8 8 8 8	8 8 8 8 8 8 8 8 8 8 8 8 8 8
	Туре	Seal	Seal		Seal	Seal	Seal Seal	Seal Seal Seal	Seal Seal Seal	Seal Seal Seal	Seal Seal Seal Seal Seal Seal Seal Seal	Seal Seal Seal Seal Seal Seal Seal Seal	Seal Seal Seal Seal	S S S S S S S S S S S S S S S S S S S	S S S S S S S S S S S S S S S S S S S	S S S S S S S S S S S S S S S S S S S	S S S S S S S S S S S S S S S S S S S															
	Wheel	IWP	IWP	IWP	IWP	IWP	IWP	WP	IWP	IWP	IWP	IWP	WP	IWP	IWP	IWP	IWP	IWP		IWP	W W	W W W	W W W W	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	W W W W W W	W W W W W W W	X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X     X <td>WP WP W</td> <td>WP WP W</td> <td>WW WW WW</td> <td>WP WP W</td> <td>WW WW WW</td>	WP W	WP W	WW	WP W	WW
	Lane	2	2	2	2	2	cv.	2	N	N	2	2	0	N	2	2	7	2		64	N N	N N N										
	Station (km)	5.075	5.175	5.275	5.375	5.475	5,575	5.675	5.775	5.875	5.975	6.075	6.175	6.275	6.375	6.475	6.575	6.675		3.775	3,775	6.775 6.875 6.975	6.775 6.875 6.975 7.075	5.775 5.875 5.975 7.075	6.775 6.875 6.975 7.075 7.275	6.775 6.875 6.975 7.075 7.175 7.275	6.875 6.875 6.975 7.075 7.175 7.275 7.375	3,775 3,875 3,975 3,075 3,175 3,275 3,375 3,475	6.875 6.875 6.975 7.075 7.275 7.375 7.375 7.375 7.375	3,775 3,875 3,975 3,075 1,775 3,775 3,775 3,775 3,775 3,775	6.875 6.875 6.975 7.075 7.275 7.375 7.475 7.575 7.775	6.875 6.875 6.975 7.075 7.275 7.275 7.275 7.575 7.675 7.675 7.675



Page 9 of 22

CONSULT AUSTRALIA	TP5-R-001
	Form No.

	Comment																															
9	Remaining Life Overlay (mm) ESA's Yrs8 Asphalt <sup>8,9</sup>	N/A	N/A																													
Fatigue	y Life (	N/A	A/N	N/A	A/A	N/A	A/A	N/A	N/A	N/A	N/A	A/A	A/N	N/A	N/A	A/A	A/A	A/A	N/A	A/N	N/A	N/A	A/A	N/A	A/A	VIV						
	Remaining ESA's 8	N/A	N.V.A																													
lon	/ (mm) Asphalt <sup>4</sup>	0	0	75	0	0	0	45	0	38	24	24	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	
Permanent Deformation	Overlay (mm) Granular Aspha	0	0	226	0	0	0	128	0	113	46	4	0	0	0	0	0	0	0	0	0	0	О	0	0	53	0	0	0	0	0	0
anent		20	20	0	20	20	20	N	20	0	6	<u>∞</u>	20	20	20	20	20	20	20	20	20	20	20	20	50	80	20	20	20	20	20	ç
Perm	Remaining Life ESA's Yrs	1.00E+08	1.00E+08	3.87E+04	1.00E+08	1.83E+07	1.00E+08	2.91E+05	1.07E+07	3.83E+05	1.17E+06	2.81E+06	2.81E+07	1.00E+08	6.37E+07	1.03E+06	1.00E+08	1.26E+07	6.37E+07	1.00E+08	1.00E+08	17.7										
ted	Curvature (mm)	0.21	0.29	0.39	0.22	0.22	0.19	0.31	0.28	0,58	0,42	0.28	0:30	0.23	0.21	0.38	0.13	0.15	0.19	0.26	0.18	0,21	0.27	0,26	0.30	0.38	0.23	0.30	0.26	0.05	0.18	
Adjusted	Deflection Curvature (mm) (mm)	0.55	0.74	1.73	0.64	98.0	0.57	1.36	0.89	1.31	1,11	1.00	0.84	0.72	0.57	92.0	0.77	0.38	0.46	0.72	0.55	0.58	92'0	0,59	0.81	1.13	0.64	0.88	0.81	0.35	0.40	100
	a)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1,00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	125
emperature	Adjustment Factor Deflection Curvature	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	- 1
	CSF Pe	1.00	1,00	1.00	1.00	1.00	1.00	1,00	1,00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1,00	1,00	1,00	1.00	1.00	1.00	1,00	1.00	1.00	
	DSF C	1.10 1.	1,10 1,	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1.10 1	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1,10 1,	1,10 1,	1.10 1,	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1.10 1.	1.10 1.	7
	are (	0.21	0.29	0.39	0.22	0.22	0.19	0.31	0.28	0.58	0.42	0.28	0:30	0.23	0.21	0.38	0.13	0.15	0.19	0.26	0.18	0.21	0.27	0,26	0.30	0.38	0.23	0:30	0.26	0.05	0.18	
FWD Measured	Deflection Curvati (mm) (mm)	0.50	0.67	1.57	0.58	0.78	0.52	1.24	0.81	1.19	1.01	0.91	0.76	0.65	0.52	69'0	0.70	0.35	0.42	99.0	0.50	0.53	69'0	0.54	0.74	1.03	0.58	0.80	0.74	0.32	98.0	
	Temp D	8.4	8.4	8.4	8.4	8.4	8.4	7.9	7.9	6.7	7.9	7.9	5.9	7.9	7.5	7.5	7.5	0.9	0.9	0.9	6.0	0.9	0'9	0.9	0.9	0.9	6.0	0.9	0.9	0.9	0.9	0
Surrace	Thickness (mm)	25	52	52	52	52	52	25	52	52	52	52	52	52	25	25	25	25	52	52	25	52	52	25	52	52	52	52	52	25	52	L
	Type	Seal																														
	Wheel	IWP	WP	IWP	-																											
	Lane Wh		2	2	2	2	2	2	2	2	2	2	2	2	2	2 1	2	2	2	2	2	2	2	2	2	2	2	2 >	2	2	2	***
_	Station La (km)	8.175	8.275	8.375	8.475	8.575	8,675	8.775	8,875	8.975	9.075	9.175	9.275	9.375	9.475	9.575	9.675	9.775	9.875	9.975	10.075	10,175	10,275	10,375	10.475	10.575	10.675	10.775	10.875	10.975	11.075	

Pavement Management Services Pty Ltd., ABN 64 002 245 329, Australia Ver:2 Rev;0

Page 10 of 22



PA 07\_0155 MOD3 Report No. 625/25

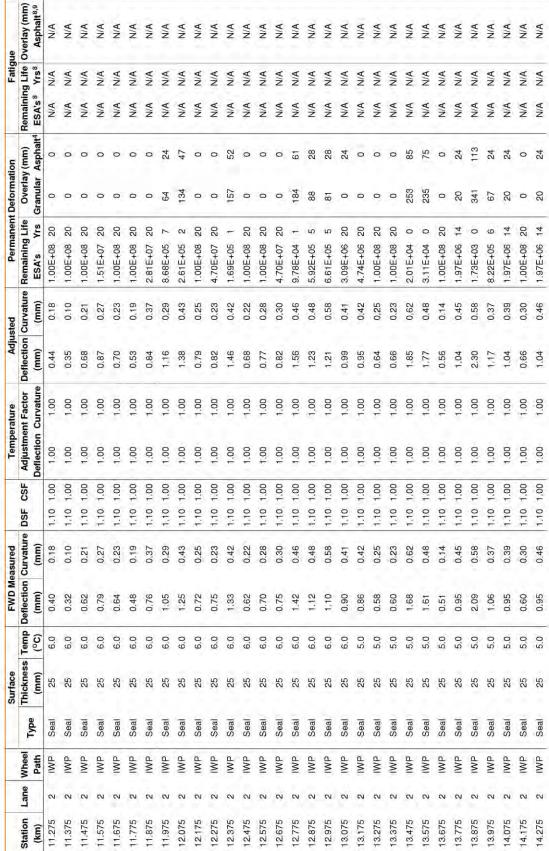
Ardmore Park Quarry Appendix 3

Comment

																														CONSULT AUSTRALIA	TP5-R-001
N/A		Form No.																													
×	A	4	×	×	×	×	4	A	K	A	A	×	A	A	4	4	4	×	4	4	A	×	K	K	4	K	4	A	<		



Page 11 of 22



Rev:0

Form No. TP5-R-00

PA 07\_0155 MOD3 Report No. 625/25

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Suriace	FWD	FWD Measured	Ì		Temperature	a	Adjusted	pa	Permanent Deformation	t Deformal	tion		Fatigue	eni	
Thickness Temp Deflection Curvature DSF CSF (mm) (mm) (°C)	on Curvature (mm)	d)	DSF	CSF	Adjustment Factor Deflection Curvature Remaining Life Overlay (mm) Remaining Life Overlay (mm) Comment Deflection Curvature (mm) (mm) ESA's Yrs Granular Asphalt <sup>4</sup> ESA's Yrs Asphalt <sup>8,9</sup>	ctor De	effection C (mm)	urvature (mm)	Remaining Life Overlay (mm) Remaining Life ESA's Yrs Granular Asphalt <sup>4</sup> ESA's Yrs <sup>8</sup>	Overla Granular	y (mm) Asphalt <sup>4</sup>	Remainin ESA's 8	g Life Yrs <sup>8</sup>	Overlay (mm) Asphalt <sup>8,9</sup>	Сотте
0.57 0.21	0.21		1,10 1,00	1.00	1,000 1.	1,00	0.63	0.21	1,00E+08 20	0	0	N/A	N/A	N/A	
0.84 0.27			1.10	1.00	1.00 1.	00'	0.92	0.27	6,90E+06 20	0	a	N/A	N/A	N/A	
0.58 0.29	Ì		1.10 1.00	1.00	1.00 1.	00.	0.64	0.29	1.00E+08 20	0	0	N/A	N/A	N/A	
0.76 0.30	0.30						0.84	0.30	5.61E+07 17	23	0	N/A	N/A	N/A	
1.9 0.29 0.11	0.11						0.32	0.11	4.64E+07 6	55	19	N/A	N/A	N/A	
0.42 0.19							0.46	0.19	6.98E+05 5	0	0	N/A	N/A	N/A	
1,09 0.45							1.20	0,45	1,00E+08 20	78	28	N/A	N/A	N/A	

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1 These remaining life and overlay calculations follow the methodology of the Austroads Guide to Pavement Technology Part 5 Appendix E

The remaining life and overlay requirements assume that the asphalt surfaced pavement has not been progressively strengthened in stages or has significant remaining asphalt fatigue life

3. The remaining life and overlay requirements assume that the pavement is flexible and does not include any cemented materials, where this is not the case a mechanistic analysis should be undertaken

4 The asphalt overlay thickness to overcome permanent deformation is based on using asphalt with G320 binder, the use of other binders may result in a different thickness required

5 it is possible that a thinner asphalt overlay thickness may overcome fatigue however there would be a higher risk of premature distress in this case and as such it has not been considered

6 The overlay requirements indicate the thickness of additional material required to overcome any structural deficiencies of the pavement based on the pavement consisting of an asphalt wearing course and being subject to both permanent deformation and fatigue

7 The granular overlay requirements for design traffic volumes up to 1x10/8 ESA's can be derived using the Design Chart Method, while asphalt overlays are limited to a maximum design traffic volume of 1x10/7 ESA'

The asphalt fatigue remaining life is calculated considering a minimum 40mm of asphalt overlay

The thickness of the asphalt overlay considering fatigue is the minimum required considering the design traffic

Senior Pavement Engineer James Erskine

24-Sep-18

Senior Pavement Engineer

24-Sep-18

James Erskine

Prepared By:

Reviewed By:

Page 12 of 22

avement **Management Services** 

Ardmore Park Quarry Appendix 3

Management Services

Pavemen

### RESPONSE TO SUBMISSIONS

PA 07\_0155 MOD3 Report No. 625/25

Form No. TP5-R-00

Seven Hills, NSW 2147 Unit 7b, 26 Powers Road

Prepared By: James Erskine Growth Rate: 2.5%

Client: Multiquip Quarries

Remaining Life and Overlay Requirements - Design Charts Method 2,3

Location: 2A1 IWP - Mountain Ash Road from Jerrara Road to Bungonia Bypass

Analysis Method: FPMS-QP4-002 Testing Date: 30-May-18

Test Method: QT211

Tested By: John Muir

Test Equipment: FWD-016

**Thicknes** (mm) 52 25 52

> Type Seal Seal

Path

WP

14.650 14.750

(km)

IWP Average

Wheel

Lane

Station

Design Traffic Intensity: 1.08E+06 Design Period: 20

Existing Pavement: Flexible without Cemented Materials

Overlay Type: Asphalt Design Deflection: 1.12

Overlay Adjustment Factor: 0.94 WMAPT: 22

Seasonal Moisture Variation: 1.0

Ţ		FWD Measured	easured			Temperature	ature	Adjusted	sted	Pern	nanen	Permanent Deformation	ion		Fatigue	ant	
SS	Temp (°C)	ss Temp Deflection Curvati		DSF	CSF	CSF Adjustment Factor Deflection Curvature	ourvature	Deflection (mm)	Curvature (mm)	Remainin ESA's	g Life Yrs	temaining Life Overlay (mm) Remaining Life ESA's Yrs Granular Asphalt <sup>4</sup> ESA's Yrs <sup>8</sup>	/ (mm) Asphalt <sup>4</sup>	Remainit ESA's 8	ng Life Yrs <sup>8</sup>	Ire DSF CSF Adjustment Factor Deflection Curvature Remaining Life Overlay (mm) Remaining Life Overlay (mm) Comment Deflection Curvature (mm) (mm) ESA's Yrs Granular Asphalt <sup>4</sup> ESA's Yrs <sup>8</sup> Asphalt <sup>8,9</sup>	Comment
	14.8	08.0	0.29	1.10	1.10 1.00	1.00	1.00	0.88	0.29	1.26E+07 20	20	0	0	N/A	N/A	N/A	
	14.8	0.51	0.23	1.10	1.10 1.00	1.00	1.00	0.56	0.23	1.00E+08 20	20	0	0	N/A	N/A	N/A	
	14.8	99.0	0.26					0.72	0.26	5.63E+07 20	20	o	0	N/A	A/A	N/A	
	0.0	0.21	0.04					0.23	0.04	6.18E+07	0	0	0	N/A	N/A	N/A	
		0.54	0.24					0.59	0.24	2.14E+07 20	50	0	0	N/A	A/A	N/A	
		0.77	0.28					0.85	0.28	9.13E+07 20	20	0	0	N/A	N/A	N/A	

### Survey Notes

1 These remaining life and overlay calculations follow the methodology of the Austroads Guide to Pavement Technology Part 5 Appendix E

The remaining life and overlay requirements assume that the asphalt surfaced pavement has not been progressively strengthened in stages or has significant remaining asphalt fatigue life

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The asphalt fatigue remaining life is calculated considering a minimum 40mm of asphalt overlay

The thickness of the asphalt overlay considering fatigue is the minimum required considering the design traffic

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Page 13 of 22

Ver:2 Rev:0

10th Percentile 90th Percentile

Standard Deviation



Report Date: 24-Sep-18 Report No.: R2017152

Project No.: 2017152

James Erskine Senior Pavement Engineer 24-Sep-18

James Erskine Senior Pavement Engineer 24-Sep-18

PA 07\_0155 MOD3 Report No. 625/25

**MULTIQUIP QUARRIES** 

Ardmore Park Quarry Appendix 3



Form No. TP5-R-001

Reviewed By:

Page 14 of 22

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia Ver:2 Rev:0

Ardmore Park Quarry Appendix 3

Management Services

Pavement

### RESPONSE TO SUBMISSIONS

PA 07\_0155 MOD3 Report No. 625/25

Form No. TP5-R-00

Unit 7b, 26 Powers Road Seven Hills, NSW 2147

> Prepared By: James Erskine Growth Rate: 2.5%

Client: Multiquip Quarries

Remaining Life and Overlay Requirements - Design Charts Method  $^{2,3}$ 

Location: 2A2 IWP - Mountain Ash Road from Bungonia Bypass to Jerrara Road

Analysis Method: FPMS-QP4-002 Testing Date: 30-May-18

Test Method: QT211

Tested By: John Muir

Test Equipment: FWD-016

Design Traffic Intensity: 3.40E+06 Design Period: 20

Existing Pavement: Flexible without Cemented Materials

Overlay Type: Asphalt Design Deflection: 0.98

Overlay Adjustment Factor: 0.94 WMAPT: 22

Seasonal Moisture Variation: 1.0

			Surface		FWD Measured	asured			Temperature	Adjusted	Isted	Permanent Deformation	nt Deform	nation		Fatigue	ne	
Station (km)	Station Lane Wheel (km) Path	el Type	Thickness (mm)	(°C)	Thickness Temp Deflection Curvatur (mm) (°C) (mm) (mm)	Curvature (mm)	DSF	SS	re DSF CSF Adjustment Factor Deflection Curvature Remaining Life Overlay (mm) Remaining Life Overlay (mm) Comment Deflection Curvature (mm) (mm) ESA's Yrs Granular Asphalt <sup>4</sup> ESA's Yrs <sup>8</sup> Asphalt <sup>8,9</sup>	r Deflection re (mm)	n Curvature R (mm)	Remaining Life Overlay (mm) Remaining Life CESA's Yrs Granular Asphalt <sup>4</sup> ESA's Yrs <sup>8</sup>	e Over Granula	lay (mm) ır Asphalt <sup>4</sup>	Remainir ESA's 8	ng Life Yrs <sup>8</sup>	Overlay (mm) Asphalt <sup>8,9</sup>	Comment
14.675	2 IWP	Seal	25	14.8	0.64		1.10	1.00	1.10 1.00 1.00 1.00	0.70	0.21	1.00E+08 20	0	0	N/A	N/A	N/A	
14.775	2 IWP	Seal	25	14.8	0.58		1.10 1.00	1.00	1.00 1.00	0.64	0.29	1.00E+08 20	0	0	N/A	N/A	N/A	
	Average	<u>a</u>	25	14.8	0.61	0.25				0.67	0.25	1.00E+08 20	0	0	N/A	N/A N/A	N/A	
Standa	Standard Deviation	Ē	O	0.0	0.04	90.0				0.04	90.0	0.00E+00 0	0	0	N/A	N/A	N/A	

N/A N/A

A/N

20 20

1.00E+08 1.00E+08

0.22 0.28

0,65 69'0

N/A XX

## Survey Notes

1 These remaining life and overlay calculations follow the methodology of the Austroads Guide to Pavement Technology Part 5 Appendix E

0.28 0.22

0.59 0.63

10th Percentile 90th Percentile The remaining life and overlay requirements assume that the asphalt surfaced pavement has not been progressively strengthened in stages or has significant remaining asphalt fatigue life

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The thickness of the asphalt overlay considering fatigue is the minimum required considering the design traffic

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Page 15 of 22

Ver:2 Rev:0

Pavement **Management Services** 

Report Date: 24-Sep-18 Report No.: R2017152

Project No.: 2017152

James Erskine Senior Pavement Engineer 24-Sep-18

James Erskine Senior Pavement Engineer 24-Sep-18

PA 07\_0155 MOD3 Report No. 625/25

**MULTIQUIP QUARRIES** 

Ardmore Park Quarry Appendix 3



Form No. TP5-R-001

Reviewed By:

Page 16 of 22

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia Ver:2 Rev:0



Prepared By:

Ardmore Park Quarry Appendix 3

### RESPONSE TO SUBMISSIONS

PA 07\_0155 MOD3 Report No. 625/25

Form No. TP5-R-001

Management Services Pavemen

Unit 7b, 26 Powers Road

Seven Hills, NSW 2147

Prepared By: James Erskine

Growth Rate: 2.5%

Client: Multiquip Quarries

Remaining Life and Overlay Requirements - Design Charts Method 23

Location: 3A1\_IWP - Oallen Ford Road from Bungonia Bypass to Lumley Road (Quarry Entrance)

Analysis Method: FPMS-QP4-002

Test Method: QT211

Tested By: John Muir Testing Date: 20-Jun-18 Test Equipment: FWD-016

Design Period: 20

Existing Pavement: Flexible without Cemented Materials Design Traffic Intensity: 6.18E+05

Overlay Type: Asphalt Design Deflection: 1.22

WMAPT: 22

Overlay Adjustment Factor: 0.94

Seasonal Moisture Variation: 1.0

CSF

DSF

Deflection Curvature **FWD Measured** 

> Thickness (mm)

Wheel

Station

1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 00.1 1.00 1.00 1.00

1.10 1.10 1.10 1.10

0.43

14.6 14.6 14.6 14.6 14.6 14.6 14.6

25 25 25 25 25 25 25 25 25 25 25 25

IWP

16.550

Seal Seal

IWP

Seal Seal

IWP IWP

16.650

16.750

0.81

98.0

Comment Remaining Life Overlay (mm) Asphalt<sup>8,9</sup> N/A N/A N/A N/A N/A Fatigue N/A N/A N/A N/A N/A N/A AN NA N/A N/A N/A N/A ESA's 8 N/A Granular Asphalt<sup>4</sup> Overlay (mm) Permanent Deformation Remaining Life Yrs 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 1.00E+08 1.00E+08 1.00E+08 4.74E+06 1.00E+08 1.07E+07 1.00E+08 1.00E+08 ESA's Adjustment Factor Deflection Curvature 0.28 0.22 0.23 0.07 0.30 0.27 0.27 Adjusted 0.47 0.69 0.89 0.41 99'0 0.67 99.0 99.0 0.67 0.24 Deflection Curvature 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1,00 1.00 1.00 1.00 1,00 1.00 1.00 00 1.00 Temperature 1.00 00. 00. 00 1.00 00. 00 00 00 00 00.

1.10

0.30

1.10 1.10 1.10

> 0.27 0.27

> 0.60 0.60

Seal

IWP WP

0.61

1.10

1.10 1.10

0.23 0.07

09'0

14.6

0.44

0.22 0.63

14.6

1.10 1.10 1.10

> 0.28 0.12 0.22

0.70

Seal

IWP IWP

16.950 17.050 17.150 17.250 17.350 17.450 17.550 17.650

IWP

16.850

Seal Seal Seal Seal Seal Seal

IWP

IWP IWP IWP IWP

0.61

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Ver:2 Rev:0

1.10

1,10

0.59

Seal

Seal

IWP IWP IWP

17.850

17.950

17.750

Page 17 of 22



Report Date: 24-Sep-18 Report No.: R2017152

Project No.: 2017152

### MULTIQUIP QUARRIES Ardmore Park Quarry Appendix 3

Form No. TP5-R-00

PA 07\_0155 MOD3 Report No. 625/25

			Surface		FWD M	FWD Measured			Temperature	Adju	Adjusted	Permanen	Permanent Deformation	uo		Fatigue	en	
Station La	Lane Wheel	eel Type	Thickness (mm)	(°C)	Thickness Temp Deflection Curvatu (mm) (°C) (mm) (mm)	ē.	DSF	CSF	Adjustment Factor Deflection Curvature		Deflection Curvature (mm)	Remaining Life ESA's Yrs	Overla Granular	/ (mm) Asphalt <sup>4</sup>		g Life Yrs <sup>8</sup>	Remaining Life Overlay (mm) ESA's Yrs8 Asphalt <sup>8,9</sup>	Comment
4.,	1 IWP	P Seal	25	14.6	0.37	0.15	1.10	1.00	1.00 1.00	0.41	0.15	1.00E+08 20	0	0	N/A	N/A	N/A	
	1 IWP	P Seal	25	14.6	0.42	0.20	1,10	1,00	1.00 1.00	0.46	0.20	1.00E+08 20	0	0	N/A	A/A	N/A	
	1 IWP	P Seal	52	14.6	1.16	0.45	1.10	1.00	1.00	1.28	0.45	4.51E+05 15	6	24	N/A	N/A	N/A	
	1 IWP	P Seal	52	14.6	0.58	0.29	1.10	1.00	1.00 1.00	0.64	0.29	1.00E+08 20	0	0	N/A	A/A	N/A	
	1 IWP	P Seal	52	14.8	0.85	0.31	1.10	1.00	1.00 1.00	0.94	0.31	5.34E+06 20	0	0	N/A	N/A	N/A	
	1 IWP	P Seal	25	14.8	99.0	0.27	1,10	1.00	1.00	0.73	0.27	1.00E+08 20	0	0	N/A	N/A	N/A	
	1 IWP	P Seal	25	14.8	0.78	0,34	1,10	1,00	1.00	0.86	0.34	1.83E+07 20	0	0	N/A	N/A	N/A	
	1 IWP	P Seal	25	14.8	1,08	96,0	1,10	1,00	1,00	1,19	0.36	7.37E+05 20	0	Q	N/A	N/A	N/A	
	1 (WP	P Seal	52	14.8	99'0	0.23	1.10	1.00	1.00 1.00	0,73	0.23	1.00E+08 20	0	0	N/A	N/A	N/A	
	1 IWP	P Seal	25	14.8	08.0	0.44	1.10	1.00	1.00	0.88	0.44	1.26E+07 20	0	0	N/A	N/A	N/A	
	1 IWP	P Seal	52	14.8	1.23	0.67	1.10	1.00	1.00 1.00	1,35	0,67	3.08E+05 11	4	24	N/A	N/A	N/A	
	1 IWP	P Seal	52	14.8	0.53	0.24	1.10	1.00	1.00 1.00	0.58	0.24	1.00E+08 20	0	a	N/A	N/A	N/A	
	1 IWP	P Seal	52	14.8	0.67	0.24	1,10	1,00	1.00	0.74	0.24	1.00E+08 20	o	0	N/A	A/A	N/A	
	1 IWP	P Seal	25	14.8	0.73	0.31	1.10	1.00	1.00	0.80	0.31	1.00E+08 20	0	0	N/A	N/A	N/A	
	1 IWP	P Seal	25	14.8	0.67	0.31	1,10	1.00	1.00 1.00	0.74	0.31	1.00E+08 20	0	0	N/A	N/A	N/A	
	1 IWP	P Seal	25	14.8	0.91	0.39	1.10	1.00	1.00 1.00	1.00	0.39	2.81E+06 20	0	0	N/A	N/A	N/A	
×	1 IWP	P Seal	25	14.8	0.55	0.14	1.10	1.00	1,00 1,00	09.0	0.14	1.00E+08 20	0	0	N/A	N/A	N/A	
1	Average	ge	52	14.7	0.66	0.27				0.72	0.27	7.59E+07 20	2	-	N/A	N/A	N/A	
arc	Standard Deviation	ou	0	0.1	0.22	0.11				0.24	0.11	4.17E+07 2	80	9	N/A	N/A	N/A	
H.	10th Percentile	ile			0.42	0.14				0,46	0.14	3.58E+06 20	0	0	N/A	N/A	N/A	
듄	90th Percentile	ile			0.89	0.41				0.98	0.41	1.00E+08 20	0	0	N/A	Y X	N/A	

# Survey Notes

- 1 These remaining life and overlay calculations follow the methodology of the Austroads Guide to Pavement Technology Part 5 Appendix E
- 3 The remaining life and overlay requirements assume that the pavement is flexible and does not include any cemented materials, where this is not the case a mechanistic analysis should be undertaken The remaining life and overlay requirements assume that the asphalt surfaced pavement has not been progressively strengthened in stages or has significant remaining asphalt fatigue life
- The asphalt overlay thickness to overcome permanent deformation is based on using asphalt with G320 binder, the use of other binders may result in a different thickness required
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  - s The aspiral targue femalining life is calculated considering a minimum form to aspiral overlay. 9 The thickness of the aspiralt overlay considering fatigue is the minimum required considering the design traffic

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Ver:2 Rev:0



Ardmore Park Quarry Appendix 3

**RESPONSE TO SUBMISSIONS** 

PA 07\_0155 MOD3 Report No. 625/25



Reviewed By:

James Erskine Senior Pavement Engineer

24-Sep-18

Page 19 of 22

Pavement Management Services Pty Ltd., ABN 64 002 245 329, Australia Ver.2 Rev:0

James Erskine Senior Pavement Engineer 24-Sep-18

Prepared By:



Form No. TP5-R-001

PA 07\_0155 MOD3 Report No. 625/25

Management Services Paveme

Seven Hills, NSW 2147 Unit 7b, 26 Powers Road

Prepared By: James Erskine

Client: Multiquip Quarries

Remaining Life and Overlay Requirements - Design Charts Method  $^{2,3}$ 

Report Date: 24-Sep-18

Report No.: R2017152

Project No.: 2017152

Location: 3A2 IWP - Oallen Ford Road from Lumley Road (Quarry Entrance) to Bungonia Bypass

Analysis Method: FPMS-QP4-002

Test Method: QT211

Tested By: John Muir

Testing Date: 20-Jun-18 Test Equipment: FWD-016

Existing Pavement: Flexible without Cemented Materials Design Traffic Intensity: 2.93E+06 Growth Rate: 2.5% Design Period: 20

Overlay Type: Asphalt

Design Deflection: 1.00

WMAPT: 22

Overlay Adjustment Factor: 0.94

Seasonal Moisture Variation: 1.0

1.00 00.1 00. 00

1.10

1.00

1.10

1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00

1.10

0.46

1.16

25 25 25 25 25 35 25 25 25 25 25

0.51 0.87

> WP IWP IWP

0.81

14.8 14.8 14.8 14.8 14.8 14.8 14.8 14.8 14.8

Seal Seal Seal Seal Seal Seal Seal

IWP IWP IWP IWP

16.375 16.475 16.575 16.675 16.775 16.875 16.975 17.075 17.175 17.275 17,375 17.475 17.575 7.675 17.775

1.10

CSF

DSF

Deflection Curvature **FWD Measured** 

Temp

Thickness (mm)

Wheel Path

Station

(km)

(mm)

8

1.10

0.19

0.73

00 00 00 00 00.

1.10

0.18 0.16

1.10

0.42 0.79

1.10

0.32 0.10 0.05

1.10

0.23 0.12

Seal Seal

Seal

IWP IWP IWP IWP IWP

1.10 1.10 1.10 1.10 1.10 1.10

00

1.10

00 00. 00 00. 00. 90. 1.00

0.15

0.88 0.64 0.30

Seal Seal

> IWP IWP

4.8

0.21

Comment Remaining Life Overlay (mm) Asphalt<sup>8,9</sup> N/A N/A N/A N/A N/A N/A N/A N/A Yrs N/A N/A N/A N/A A/A N/A N/A N/A N/A XX N/A N/A XX N/A N/A ESA's 8 N/A Granular Asphalt<sup>4</sup> Overlay (mm) 33 Permanent Deformation 8 Remaining Life Yrs 20 20 20 20 4 20 20 20 20 20 20 20 20 20 20 20 20 20 2.81E+07 1.07E+07 4.51E+05 4.23E+06 1.00E+08 1.00E+08 1.00E+08 1.51E+07 1.00E+08 1.00E+08 3.79E+06 1.00E+08 1.00E+08 1.00E+08 1.00E+08 1.00E+08 2.81E+07 1.00E+08 ESA's Adjustment Factor Deflection Curvature (mm) 0.19 0.18 0.16 0.32 0.10 0.05 0.15 0.30 0.21 Adjusted (mm) 0.25 0.13 0.78 0.46 0.89 1.28 0.56 96.0 0.80 0.87 0.97 0.70 0.33 0.84 Deflection Curvature 1,00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1,00 1.00 1.00 1.00 1.00 1.00 00. 1.00 1.00 Temperature

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Page 20 of 22

1.00

1.10

1,10

0.17

0.63

14.8

Seal

IWP

17.975 17.875

Seal

IWP

18.075

Seal

IWP WP

0.30

0.71

Seal Seal

Ver:2 Rev:0



Ardmore Park Quarry Appendix 3

### **RESPONSE TO SUBMISSIONS**

PA 07\_0155 MOD3 Report No. 625/25

(mm) (mm) ESA's	(mm) (mm) ESA's Yrs	(mm) ESA's Yrs	Deflection Curvature (mm) (mm) ESA's Yrs	Deflection Curvature (mm) (mm) ESA's Yrs	(mm) Deflection Curvature (mm) (mm) ESA's Yrs	(mm) (mm) Deflection Curvature (mm) (mm) ESA's Yrs	(°C) (mm) (mm) Deflection Curvature (mm) (mm) ESA's Yrs	) (°C) (mm) (mm) Deflection Curvature (mm) (mm) ESA's Yrs	(mm)         (°C)         (mm)         (mm)         Deflection Curvature         (mm)         (mm)         ESA's Vrs           25         14.8         0.36         0.18         1.10.100         1.00         1.00         0.40         0.18         1.00E±08         20	(mm) (°C) (mm) (mm) Deflection Curvature (mm) (mm) ESA's Vrs	Type (mm) (°C) (mm) (mm) Deflection Curvature (mm) ESA's Yrs
1			100 100 100 040 018 100F±08 20	CC	018 110 100 100 100 040 018 100E+08 20	000 000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000	00 00 100 000 000 000 000 000 000 000 0	00 00 100 000 000 000 000 000 000 000 0	25 148 036 018 110 100 100 100 040 018 100E+08 20		
0.40 0.18 1.00E+08 20	1.00 1.00 0.40 0.18 1.00E+08 20 0	1.00 0.40 0.18 1.00E+08 20		1.10 1.00 1.00 1.00 0.40 0.18 1.00E+08 20		0.36 0.18 1.10 1.00 1.00 0.40 0.18 1.00E+08 20	14.8 U.36 U.18 1.00 1.00 1.00 U.40 U.18 1.00E+U8 ZU	14.8 U.36 U.18 1.00 1.00 1.00 U.40 U.18 1.00E+U8 ZU		1.00 1.00 0.40 0.18 1.00E+08 20	Seal 25 14.8 0.36 0.18 1.10 1.00 1.00 0.40 0.18 1.00E+08 20
1.00 0.72 0.26 1.00E+08 20 0	0.72 0.26 1.00E+08 20	1.00 0.72 0.26 1.00E+08 20	1.00 1.00 0.72 0.26 1.00E+08 20	1,00 1,00 1.00 0,72 0,26 1,00E+08 20	1,10 1,00 1,00 0,72 0,26 1,00E+08 20	0.65 0.26 1,10 1,00 1,00 0,72 0,26 1,00E+08 20	14,8 0.65 0.26 1,10 1,00 1,00 0,72 0,26 1,00E+08 20	0.65 0.26 1,10 1,00 1,00 0,72 0,26 1,00E+08 20	14,8 0.65 0.26 1,10 1,00 1,00 0,72 0,26 1,00E+08 20	25 14,8 0.65 0.26 1,10 1,00 1,00 1,00 0,72 0,26 1,00E+08 20	Seal 25 14.8 0.65 0.26 1.10 1.00 1.00 0.72 0.26 1.00E+08 20
1.00 0.62 0.16 1.00E+08 20 0	0.62 0.16 1.00E+08 20	1.00 0.62 0.16 1.00E+08 20	1.00 1.00 0.62 0.16 1.00E+08 20	1.00 1.00 1.00 0.62 0.16 1.00E+08 20	1.10 1.00 1.00 1.00 0.62 0.16 1.00E+08 20	0.56 0.16 1.10 1.00 1.00 0.62 0.16 1.00E+08 20	14.8 0.56 0.16 1.10 1.00 1.00 0.62 0.16 1.00E+08 20	0.56 0.16 1.10 1.00 1.00 0.62 0.16 1.00E+08 20	14.8 0.56 0.16 1.10 1.00 1.00 0.62 0.16 1.00E+08 20	25 14.8 0.56 0.16 1.10 1.00 1.00 1.00 0.62 0.16 1.00E+08 20	Seal 25 14.8 0.56 0.16 1.10 1.00 1.00 0.62 0.16 1.00E+08 20
1.00 1,17 0.52 8.22E+05 7 63	1,17 0.52 8.22E+05 7	1.00 1,17 0.52 8.22E+05 7	1.00 1.00 1,17 0.52 8.22E+05 7	1.00 1.00 1.00 1.17 0.52 8.22E+05 7	1.10 1,00 1.00 1.00 1,17 0.52 8.22E+05 7	1.06 0.52 1.10 1.00 1.00 1.00 1.17 0.52 8.22E+05 7	14.8 1,06 0,52 1,10 1,00 1,00 1,00 1,17 0,52 8,22E+05 7	1.06 0.52 1.10 1.00 1.00 1.00 1.17 0.52 8.22E+05 7	14.8 1,06 0,52 1,10 1,00 1,00 1,00 1,17 0,52 8,22E+05 7	25 14.8 1,06 0,52 1,10 1,00 1,00 1,00 1,17 0,52 8.22E+05 7	Seal 25 14.8 1.06 0.52 1.10 1.00 1.00 1.17 0.52 8.22E+05 7
1.00 0.52 0.15 1.00E+08 20 0	0.52 0.15 1.00E+08 20	1.00 0.52 0.15 1.00E+08 20	1.00 1.00 0.52 0.15 1.00E+08 20	1.00 1.00 1.00 0.52 0.15 1.00E+08 20	1.10 1.00 1.00 1.00 0.52 0.15 1.00E+08 20	0.47 0.15 1.10 1.00 1.00 1.00 0.52 0.15 1.00E+08 20	14.8 0.47 0.15 1.10 1.00 1.00 1.00 0.52 0.15 1.00E+08 20	0.47 0.15 1.10 1.00 1.00 1.00 0.52 0.15 1.00E+08 20	14.8 0.47 0.15 1.10 1.00 1.00 1.00 0.52 0.15 1.00E+08 20	25 14.8 0.47 0.15 1.10 1.00 1.00 1.00 0.52 0.15 1.00E+08 20	Seal 25 14.8 0.47 0.15 1.10 1.00 1.00 0.52 0.15 1.00E+08 20
1.00 1.06 0.46 1.68E+06 13 24	1.06 0.46 1.68E+06 13	1.00 1.06 0.46 1.68E+06 13	1,00 1,00 1.06 0.46 1.68E+06 13	1.00 1.00 1.00 1.06 0.46 1.68E+06 13	1,10 1.00 1.00 1.00 1.06 0.46 1.68E+06 13	0.96 0.46 1,10 1.00 1.00 1.00 1.06 0.46 1.68E+06 13	14,8 0.96 0.46 1,10 1.00 1.00 1.00 1.06 0.46 1.68E+06 13	0.96 0.46 1,10 1.00 1.00 1.00 1.06 0.46 1.68E+06 13	14,8 0.96 0.46 1,10 1.00 1.00 1.00 1.06 0.46 1.68E+06 13	25 14,8 0.96 0.46 1,10 1,00 1,00 1,00 1,06 0.46 1,68E+06 13	Seal 25 14.8 0.96 0.46 1.10 1.00 1.00 1.00 1.06 0.46 1.68E+06 13
1.00 1.32 0.39 3.62E+05 3 112	1,32 0,39 3.62E+05 3	1.00 1.32 0.39 3.62E+05 3	1.00 1.00 1.32 0.39 3.62E+05 3	1,00 1,00 1,00 1,32 0,39 3.62E+05 3	1,10 1,00 1,00 1,00 1,32 0,39 3.62E+05 3	1.20 0.39 1,10 1,00 1,00 1,00 1,32 0.39 3.62E+05 3	14.8 1.20 0.39 1,10 1,00 1.00 1,00 1,32 0.39 3.62E+05 3	1.20 0.39 1,10 1,00 1,00 1,00 1,32 0.39 3.62E+05 3	14.8 1.20 0.39 1,10 1,00 1.00 1,00 1,32 0.39 3.62E+05 3	25 14.8 1.20 0.39 1,10 1,00 1.00 1,00 1,32 0.39 3.62E+05 3	Seal 25 14.8 1.20 0.39 1.10 1.00 1.00 1.00 1.32 0.39 3.62E+05 3
1,00 0,50 0,23 1,00E+08 20 0	0,50 0,23 1,00E+08 20	1,00 0,50 0,23 1,00E+08 20	1,00 1,00 0,50 0,23 1,00E+08 20	1,00 1,00 1,00 0,50 0,23 1,00E+08 20	1,10 1,00 1,00 1,00 0,50 0,23 1,00E+08 20	0.45 0.23 1.10 1.00 1.00 1.00 0.50 0.23 1.00E+08 20	14.8 0.45 0.23 1.10 1.00 1.00 1.00 0.50 0.23 1.00E+08 20	0.45 0.23 1.10 1.00 1.00 1.00 0.50 0.23 1.00E+08 20	14.8 0.45 0.23 1.10 1.00 1.00 1.00 0.50 0.23 1.00E+08 20	25 14.8 0.45 0.23 1,10 1,00 1,00 1,00 0,50 0,23 1,00E+08 20	Seal 25 14.8 0.45 0.23 1.10 1.00 1.00 0.50 0.23 1.00E+08 20
1.00 0.90 0.32 9.17E+06 20 0	0.90 0.32 9.17E+06 20	1.00 0.90 0.32 9.17E+06 20	1.00 1.00 0.90 0.32 9.17E+06 20	1.00 1.00 1.00 0.90 0.32 9.17E+06 20	1.10 1.00 1.00 1.00 0.90 0.32 9.17E+06 20	0.82 0.32 1.10 1.00 1.00 1.00 0.90 0.32 9.17E+06 20	14.8 0.82 0.32 1.10 1.00 1.00 1.00 0.90 0.32 9.17E+06 20	0.82 0.32 1.10 1.00 1.00 1.00 0.90 0.32 9.17E+06 20	14.8 0.82 0.32 1.10 1.00 1.00 1.00 0.90 0.32 9.17E+06 20	25 14.8 0.82 0.32 1.10 1.00 1.00 1.00 0.90 0.32 9.17E+06 20	Seal 25 14.8 0.82 0.32 1.10 1.00 1.00 0.90 0.32 9.17E+06 20
1,00 0.87 0.15 1.51E+07 20 0	0.87 0.15 1.51E+07 20	1.00 0.87 0.15 1.51E+07 20	1.00 1.00 0.87 0.15 1.51E+07 20	1.00 1.00 1.00 0.87 0.15 1.51E+07 20	1.10 1.00 1.00 0.87 0.15 1.51E+07 20	0.79 0.15 1.10 1.00 1.00 0.87 0.15 1.51E+07 20	14.8 0.79 0.15 1.10 1.00 1.00 1.00 0.87 0.15 1.51E+07 20	0.79 0.15 1.10 1.00 1.00 0.87 0.15 1.51E+07 20	14.8 0.79 0.15 1.10 1.00 1.00 1.00 0.87 0.15 1.51E+07 20	25 14.8 0.79 0.15 1,10 1,00 1,00 1,00 0,87 0,15 1,51E+07 20	Seal 25 14.8 0.79 0.15 1.10 1.00 1.00 0.87 0.15 1.51E+07 20
1.00 0.86 0.20 1.83E+07 20 0	0.86 0.20 1.83E+07 20	1.00 0.86 0.20 1.83E+07 20	1.00 1.00 0.86 0.20 1.83E+07 20	1.00 1.00 1.00 0.86 0.20 1.83E+07 20	1.10 1.00 1.00 1.00 0.86 0.20 1.83E+07 20	0.78 0.20 1.10 1.00 1.00 0.86 0.20 1.83E+07 20	14.8 0.78 0.20 1.10 1.00 1.00 0.86 0.20 1.83E+07 20	0.78 0.20 1.10 1.00 1.00 0.86 0.20 1.83E+07 20	14.8 0.78 0.20 1.10 1.00 1.00 0.86 0.20 1.83E+07 20	25 14.8 0.78 0.20 1.10 1.00 1.00 1.00 0.86 0.20 1.83E+07 20	Seal 25 14.8 0.78 0.20 1.10 1.00 1.00 0.86 0.20 1.83E+07 20
1.00 1,10 0.35 1,25E+06 10 39	1,10 0.35 1.25E+06 10	1.00 1.10 0.35 1.25E+06 10	1.00 1.00 1.10 0.35 1.25E+06 10	1.00 1.00 1.00 1.10 0.35 1.25E+06 10	1.10 1.00 1.00 1.00 1.10 0.35 1.25E+06 10	1.00 0.35 1.10 1.00 1.00 1.00 1.10 0.35 1.25E+06 10	14.8 1.00 0.35 1.10 1.00 1.00 1.00 1.10 0.35 1.25E+06 10	1.00 0.35 1.10 1.00 1.00 1.00 1.10 0.35 1.25E+06 10	14.8 1.00 0.35 1.10 1.00 1.00 1.00 1.10 0.35 1.25E+06 10	25 14.8 1.00 0.35 1.10 1.00 1.00 1.00 1.10 0.35 1.25E+06 10	Seal 25 14.8 1.00 0.35 1.10 1.00 1.00 1.00 1.00 1.10 0.35 1.25E+06 10
1.00 0.63 0.23 1.00E+08 20 0	0.63 0.23 1.00E+08 20	1.00 0.63 0.23 1.00E+08 20	1.00 1.00 0.63 0.23 1.00E+08 20	1,00 1,00 1.00 0.63 0.23 1.00E+08 20	1,10 1,00 1.00 1.00 0.63 0.23 1.00E+08 20	0.57 0.23 1.10 1.00 1.00 1.00 0.63 0.23 1.00E+08 20	14.8 0.57 0.23 1.10 1.00 1.00 0.63 0.23 1.00E+08 20	0.57 0.23 1.10 1.00 1.00 1.00 0.63 0.23 1.00E+08 20	14.8 0.57 0.23 1.10 1.00 1.00 0.63 0.23 1.00E+08 20	25 14.8 0.57 0.23 1.10 1.00 1.00 1.00 0.63 0.23 1.00E+08 20	Seal 25 14.8 0.57 0.23 1.10 1.00 1.00 0.63 0.23 1.00E+08 20
1.00 0.66 0.28 1.00E+08 20 0 0	0.66 0.28 1.00E+08 20	1.00 0.66 0.28 1.00E+08 20	1.00 1.00 0.66 0.28 1.00E+08 20	1.00 1.00 1.00 0.66 0.28 1.00E+08 20	1.10 1.00 1.00 1.00 0.66 0.28 1.00E+08 20	0.60 0.28 1.10 1.00 1.00 0.66 0.28 1.00E+08 20	14.8 0.60 0.28 1.10 1.00 1.00 1.00 0.66 0.28 1.00E+08 20	0.60 0.28 1.10 1.00 1.00 0.66 0.28 1.00E+08 20	14.8 0.60 0.28 1.10 1.00 1.00 1.00 0.66 0.28 1.00E+08 20	25 14.8 0.60 0.28 1.10 1.00 1.00 0.66 0.28 1.00E+08 20	Seal 25 14.8 0.60 0.28 1.10 1.00 1.00 0.66 0.28 1.00E+08 20
0.66 0.28 1.00E+08 20 0.43 0.15 1.00E+08 20	1.00 0.66 0.28 1.00E+08 20 1.00 0.43 0.15 1.00E+08 20	1.00 1.00 1.00 0.66 0.28 1.00E+08 20 1.00 1.00 0.43 0.15 1.00E+08 20	1.00 1.00 1.00 0.43 0.15 1.00E+08 20	1.10 1.00 1.00 1.00 0.66 0.28 1.00E+08 20 1.10 1.00 1.00 1.00 0.43 0.15 1.00E+08 20	0.28 1.10 1.00 1.00 1.00 0.66 0.28 1.00E+08 20 0.15 1.10 1.00 1.00 1.00 0.43 0.15 1.00E+08 20	0.60 0.28 1.10 1.00 1.00 1.00 0.66 0.28 1.00E+08 20 0.39 0.15 1.10 1.00 1.00 1.00 0.43 0.15 1.00E+08 20	14.8 0.39 0.15 1.10 1.00 1.00 0.66 0.28 1.00E+08 20	14.8 0.39 0.15 1.10 1.00 1.00 0.66 0.28 1.00E+08 20	25 14.8 0.39 0.15 1.10 1.00 1.00 0.66 0.28 1.00E+08 20 25 14.8 0.39 0.15 1.10 1.00 1.00 1.00 0.43 0.15 1.00E+08 20	Seal 25 14.8 0.60 0.28 1.10 1.00 1.00 0.66 0.28 1.00E+08 20 Seal 25 14.8 0.39 0.15 1.10 1.00 1.00 0.43 0.15 1.00E+08 20	Seal 25 14.8 0.60 0.28 1.10 1.00 1.00 0.66 0.28 1.00E+08 20 Seal 25 14.8 0.39 0.15 1.10 1.00 1.00 0.43 0.15 1.00E+08 20
0.63 0.23 1.00E+08 20 0.66 0.28 1.00E+08 20 0.43 0.15 1.00E+08 20	1.00 0.63 0.23 1.00E+08 20 0 1.00 0.66 0.28 1.00E+08 20 0 0.66 0.28 1.00E+08 20 0 0.66 0.28 1.00E+08 20 0.66 0.28 1.00E+08 20 0.66 0.68 0.68 0.68 0.68 0.68 0.68 0.6	1.00 1.00 1.00 0.66 0.28 1.00E+08 20 0 1.00 1.00 1.00 0.43 0.15 1.00E+08 20 0	1.00 1.00 1.00 0.66 0.28 1.00E+08 20 0 1.00 1.00 1.00 0.43 0.15 1.00E+08 20 0	1.10 1.00 1.00 1.00 0.66 0.28 1.00E+08 20 0 1.10 1.00 1.00 0.43 0.15 1.00E+08 20 0	0.23 1.10 1.00 1.00 1.00 0.63 0.23 1.00E+08 20 0 0.28 1.10 1.00 1.00 1.00 0.66 0.28 1.00E+08 20 0 0.15 1.10 1.00 1.00 0.43 0.15 1.00E+08 20 0	0.57 0.23 1,10 1,00 1,00 0.63 0.23 1,00E+08 20 0 0.60 0.28 1,00E+08 20 0.28 1,00E+08	14.8 0.57 0.23 1.10 1.00 1.00 0.63 0.23 1.00E+08 20 0 14.8 0.60 0.28 1.10 1.00 1.00 0.66 0.28 1.00E+08 20 0 14.8 0.39 0.15 1.10 1.00 1.00 0.43 0.15 1.00E+08 20 0	14.8 0.57 0.23 1.10 1.00 1.00 0.63 0.23 1.00E+08 20 0 14.8 0.60 0.28 1.10 1.00 1.00 0.66 0.28 1.00E+08 20 0 14.8 0.39 0.15 1.10 1.00 1.00 0.43 0.15 1.00E+08 20 0	25 14.8 0.57 0.23 1.10 1.00 1.00 0.63 0.23 1.00E+08 20 0 25 14.8 0.60 0.28 1.10 1.00 1.00 0.66 0.28 1.00E+08 20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Seal 25 14.8 0.60 0.28 1.10 1.00 1.00 0.66 0.28 1.00E+08 20 0 0.00 1.00 0.66 0.28 1.00E+08 20 0 0.00 1.00 0.66 0.28 1.00E+08 20 0 0.00 0.00 0.00 0.00 0.00 0.00 0.	Seal 25 14.8 0.60 0.28 1.10 1.00 1.00 0.66 0.28 1.00E+08 20 0 0.00 1.00 0.66 0.28 1.00E+08 20 0 0.00 1.00 0.66 0.28 1.00E+08 20 0 0.00 0.00 0.00 0.00 0.00 0.00 0.
1.06 0.46 1.68E+06 13 1.32 0.39 3.62E+05 3 0.50 0.23 1.00E+08 20 0.90 0.32 9.17E+06 20 0.87 0.15 1.51E+07 20 0.86 0.20 1.83E+07 20 1.10 0.35 1.25E+06 10 0.63 0.23 1.00E+08 20 0.66 0.28 1.00E+08 20	1,00 1.06 0.46 1.68E+06 13 1.00 0.50 0.39 3.62E+05 3 1.00 0.50 0.23 1.00E+08 20 1.00 0.90 0.32 9.17E+06 20 1.00 0.87 0.15 1.51E+07 20 1.00 0.86 0.20 1.83E+07 20 1.00 0.68 0.20 1.05E+06 10 1.00 0.68 0.23 1.00E+08 20 1.00 0.66 0.28 1.00E+08 20 1.00E+08 20 1.00 0.66 0.28 1.00E+08 20 1.00 0.66 0.66 0.28 1.00E+08 20 1.00 0.66 0.66 0.66 0.66 0.66 0.66 0.6	1.00 1.00 1.00 1.06 0.46 1.68E+06 13 1.00 1.00 1.00 1.32 0.39 3.62E+05 3 1.00 1.00 1.00 0.50 0.23 1.00E+08 20 1.00 1.00 1.00 0.90 0.32 9.17E+06 20 1.00 1.00 1.00 0.87 0.15 1.51E+07 20 1.00 1.00 1.00 1.00 0.86 0.20 1.83E+07 20 1.00 1.00 1.00 0.68 0.23 1.00E+08 20 1.00 1.00 0.63 0.23 1.00E+08 20 1.00 1.00 0.63 0.23 1.00E+08 20 1.00 1.00 0.66 0.28 1.00E+08 20 1.00E+08 20 1.00 1.00 0.66 0.28 1.00E+08 20 1.0	1.00         1.00         1.06         0.46         1.68E+06         13           1.00         1.00         1.00         1.32         0.39         3.62E+05         3           1.00         1.00         1.00         0.50         0.23         1.00E+08         20           1.00         1.00         1.00         0.90         0.32         9.17E+06         20           1.00         1.00         0.90         0.32         9.17E+07         20           1.00         1.00         0.86         0.20         1.83E+07         20           1.00         1.00         1.00         0.66         0.23         1.25E+06         10           1.00         1.00         1.00         0.63         0.23         1.00E+08         20           1.00         1.00         1.00         0.63         0.23         1.00E+08         20           1.00         1.00         1.00         0.66         0.28         1.00E+08         20           1.00         1.00         0.00         0.66         0.28         1.00E+08         20	1,10 1,00 1,00 1,00 1,00 0,30 0,39 3,62E+05 3 1,10 1,10 1,00 1,00 1,00 0,50 0,23 1,00E+08 20 1,10 1,00 1,00 1,00 0,90 0,32 9,17E+06 20 1,10 1,00 1,00 1,00 0,87 0,15 1,51E+07 20 1,10 1,00 1,00 1,00 1,00 0,86 0,20 1,83E+07 20 1,10 1,00 1,00 1,00 0,68 0,23 1,00E+08 20 1,10 1,00 1,00 1,00 0,68 0,23 1,00E+08 20 1,10 1,00 1,00 1,00 0,66 0,28 1,00E+08 20 1,10 1,00 1,00 1,00 0,66 0,28 1,00E+08 20 1,10 1,00 1,00 1,00 0,66 0,28 1,00E+08 20 1,10 1,00 1,00 1,00 1,00 1,00 1,00 1	0.39 1.10 1.00 1.00 1.00 1.06 0.46 1.68E+06 13 0.39 0.39 1.10 1.00 1.00 1.32 0.39 3.62E+05 3 0.23 1.10 1.00 1.00 1.00 0.50 0.20 1.7E+06 20 0.32 1.10 1.00 1.00 1.00 0.90 0.32 9.17E+06 20 0.15 1.10 1.00 1.00 1.00 0.87 0.15 1.51E+07 20 0.20 1.10 1.00 1.00 1.00 0.86 0.20 1.83E+07 20 0.23 1.10 1.00 1.00 1.00 1.00 0.86 0.23 1.25E+06 10 0.23 1.10 1.00 1.00 1.00 0.68 0.23 1.00E+08 20 0.23 1.10 1.00 1.00 1.00 0.66 0.28 1.00E+08 20 0.25 1.10 1.00 1.00 1.00 0.66 0.28 1.00E+08 20 0.25 1.10 1.00 1.00 1.00 0.66 0.28 1.00E+08 20 0.25 1.10 1.00 1.00 1.00 0.66 0.28 1.00E+08 20 0.25 1.10 1.00 1.00 1.00 0.66 0.28 1.00E+08 20 0.25 1.20E+08 10 0.25	0.96         0.46         1,10         1,00         1,00         1,00         1,00         1,00         1,00         1,00         1,00         1,00         1,00         1,00         1,00         1,00         1,00         1,00         1,00         1,00         1,00         1,00         1,00         1,00         0,20         0,23         1,00E+08         20           0.82         0,32         1,10         1,00         1,00         1,00         0,90         0,32         9,17E+06         20           0.79         0,15         1,10         1,00         1,00         1,00         0,86         0,25         9,17E+07         20           0.78         0,26         1,10         1,00         1,00         1,00         0,86         0,25         1,7EE+07         20           1,00         0,28         1,10         1,00         1,00         1,00         0,86         0,29         1,2EE+06         10           1,00         0,23         1,10         1,00         1,00         1,00         0,66         0,28         1,0E+08         20           1,00         0,23         1,10         1,00         1,00         1,00         0,66         0,28         1,0E+0	14.8         0.96         0.46         1,10         1,00         1,00         1,06         0.46         1,68E+06         13           14.8         1,20         0.39         1,10         1,00         1,00         1,32         0,39         3,62E+05         3           14.8         0.45         0.23         1,10         1,00         1,00         1,00         0,30         0,32         1,00E+08         20           14.8         0.79         0.32         1,10         1,00         1,00         1,00         0,32         9,17E+06         20           14.8         0.79         0.15         1,10         1,00         1,00         1,00         0,86         0,20         1,7EE+07         20           14.8         0.78         0.20         1,10         1,00         1,00         1,00         0,86         0,20         1,8BE+07         20           14.8         1,00         0.35         1,10         1,00         1,00         1,00         0,86         0,23         1,2EE+06         10           14.8         0.57         0.23         1,10         1,00         1,00         1,00         0,66         0,28         1,00E+08         20 <tr< td=""><td>14.8         0.96         0.46         1,10         1,00         1,00         1,06         0.46         1,68E+06         13           14.8         1,20         0.39         1,10         1,00         1,00         1,32         0,39         3,62E+05         3           14.8         0.45         0.23         1,10         1,00         1,00         1,00         0,30         0,32         1,00E+08         20           14.8         0.79         0.32         1,10         1,00         1,00         1,00         0,32         9,17E+06         20           14.8         0.79         0.15         1,10         1,00         1,00         1,00         0,86         0,20         1,7EE+07         20           14.8         0.78         0.20         1,10         1,00         1,00         1,00         0,86         0,20         1,8BE+07         20           14.8         1,00         0.35         1,10         1,00         1,00         1,00         0,86         0,23         1,2EE+06         10           14.8         0.57         0.23         1,10         1,00         1,00         1,00         0,66         0,28         1,00E+08         20      <tr< td=""><td>25         14.8         0.96         0.46         1,10         1,00         1,00         1,06         0.46         1,68E+06         13           25         14.8         1,20         0.39         1,10         1,00         1,00         1,32         0.39         3,62E+05         3           25         14.8         0.45         0.23         1,10         1,00         1,00         1,00         0,30         0,32         1,7E+06         20           25         14.8         0.79         0.15         1,10         1,00         1,00         0,87         0,15         1,7E+07         20           25         14.8         0.78         0.20         1,10         1,00         1,00         0,86         0.20         1,7E+07         20           25         14.8         0.78         0.20         1,10         1,00         1,00         0,86         0.20         1,8E+07         20           25         14.8         0.78         0.20         1,10         1,00         1,00         1,00         0,86         0.20         1,8E+07         20           25         14.8         0.60         0.23         1,10         1,00         1,00         1,00<!--</td--><td>Seal         25         14.8         0.96         0.46         1,10         1,00         1,00         1,06         0.46         1,68E+06         13           Seal         25         14.8         0.25         0.39         1,10         1,00         1,00         1,00         1,05         0.20         1,0E+08         20           Seal         25         14.8         0.45         0.23         1,10         1,00         1,00         1,00         0.90         0.32         1,7E+06         20           Seal         25         14.8         0.79         0.15         1,10         1,00         1,00         1,00         0.87         0.15         1,7E+06         20           Seal         25         14.8         0.79         0.15         1,10         1,00         1,00         0.86         0.20         1,7E+07         20           Seal         25         14.8         0.78         0.20         1,10         1,00         1,00         0.86         0.23         1,2E+07         20           Seal         25         14.8         0.00         0.35         1,10         1,00         1,00         1,00         0.85         1,2E+06         20</td><td>IWP         Seal         25         14.8         0.96         0.46         1.10         1.00         1.00         1.06         0.46         1.68E+05         13           IWP         Seal         25         14.8         1.20         0.39         1.10         1.00         1.00         1.05         0.32         0.32         1.00E+08         20           IWP         Seal         25         14.8         0.45         0.23         1.10         1.00         1.00         0.50         0.23         1.7E+06         20           IWP         Seal         25         14.8         0.79         0.15         1.10         1.00         1.00         0.90         0.32         9.17E+05         20           IWP         Seal         25         14.8         0.79         0.15         1.10         1.00         1.00         0.90         0.32         9.17E+05         20           IWP         Seal         25         14.8         0.78         0.20         1.10         1.00         1.00         0.86         0.20         1.8BE+07         20           IWP         Seal         25         14.8         0.00         0.35         1.10         1.00         1.00&lt;</td></td></tr<></td></tr<>	14.8         0.96         0.46         1,10         1,00         1,00         1,06         0.46         1,68E+06         13           14.8         1,20         0.39         1,10         1,00         1,00         1,32         0,39         3,62E+05         3           14.8         0.45         0.23         1,10         1,00         1,00         1,00         0,30         0,32         1,00E+08         20           14.8         0.79         0.32         1,10         1,00         1,00         1,00         0,32         9,17E+06         20           14.8         0.79         0.15         1,10         1,00         1,00         1,00         0,86         0,20         1,7EE+07         20           14.8         0.78         0.20         1,10         1,00         1,00         1,00         0,86         0,20         1,8BE+07         20           14.8         1,00         0.35         1,10         1,00         1,00         1,00         0,86         0,23         1,2EE+06         10           14.8         0.57         0.23         1,10         1,00         1,00         1,00         0,66         0,28         1,00E+08         20 <tr< td=""><td>25         14.8         0.96         0.46         1,10         1,00         1,00         1,06         0.46         1,68E+06         13           25         14.8         1,20         0.39         1,10         1,00         1,00         1,32         0.39         3,62E+05         3           25         14.8         0.45         0.23         1,10         1,00         1,00         1,00         0,30         0,32         1,7E+06         20           25         14.8         0.79         0.15         1,10         1,00         1,00         0,87         0,15         1,7E+07         20           25         14.8         0.78         0.20         1,10         1,00         1,00         0,86         0.20         1,7E+07         20           25         14.8         0.78         0.20         1,10         1,00         1,00         0,86         0.20         1,8E+07         20           25         14.8         0.78         0.20         1,10         1,00         1,00         1,00         0,86         0.20         1,8E+07         20           25         14.8         0.60         0.23         1,10         1,00         1,00         1,00<!--</td--><td>Seal         25         14.8         0.96         0.46         1,10         1,00         1,00         1,06         0.46         1,68E+06         13           Seal         25         14.8         0.25         0.39         1,10         1,00         1,00         1,00         1,05         0.20         1,0E+08         20           Seal         25         14.8         0.45         0.23         1,10         1,00         1,00         1,00         0.90         0.32         1,7E+06         20           Seal         25         14.8         0.79         0.15         1,10         1,00         1,00         1,00         0.87         0.15         1,7E+06         20           Seal         25         14.8         0.79         0.15         1,10         1,00         1,00         0.86         0.20         1,7E+07         20           Seal         25         14.8         0.78         0.20         1,10         1,00         1,00         0.86         0.23         1,2E+07         20           Seal         25         14.8         0.00         0.35         1,10         1,00         1,00         1,00         0.85         1,2E+06         20</td><td>IWP         Seal         25         14.8         0.96         0.46         1.10         1.00         1.00         1.06         0.46         1.68E+05         13           IWP         Seal         25         14.8         1.20         0.39         1.10         1.00         1.00         1.05         0.32         0.32         1.00E+08         20           IWP         Seal         25         14.8         0.45         0.23         1.10         1.00         1.00         0.50         0.23         1.7E+06         20           IWP         Seal         25         14.8         0.79         0.15         1.10         1.00         1.00         0.90         0.32         9.17E+05         20           IWP         Seal         25         14.8         0.79         0.15         1.10         1.00         1.00         0.90         0.32         9.17E+05         20           IWP         Seal         25         14.8         0.78         0.20         1.10         1.00         1.00         0.86         0.20         1.8BE+07         20           IWP         Seal         25         14.8         0.00         0.35         1.10         1.00         1.00&lt;</td></td></tr<>	25         14.8         0.96         0.46         1,10         1,00         1,00         1,06         0.46         1,68E+06         13           25         14.8         1,20         0.39         1,10         1,00         1,00         1,32         0.39         3,62E+05         3           25         14.8         0.45         0.23         1,10         1,00         1,00         1,00         0,30         0,32         1,7E+06         20           25         14.8         0.79         0.15         1,10         1,00         1,00         0,87         0,15         1,7E+07         20           25         14.8         0.78         0.20         1,10         1,00         1,00         0,86         0.20         1,7E+07         20           25         14.8         0.78         0.20         1,10         1,00         1,00         0,86         0.20         1,8E+07         20           25         14.8         0.78         0.20         1,10         1,00         1,00         1,00         0,86         0.20         1,8E+07         20           25         14.8         0.60         0.23         1,10         1,00         1,00         1,00 </td <td>Seal         25         14.8         0.96         0.46         1,10         1,00         1,00         1,06         0.46         1,68E+06         13           Seal         25         14.8         0.25         0.39         1,10         1,00         1,00         1,00         1,05         0.20         1,0E+08         20           Seal         25         14.8         0.45         0.23         1,10         1,00         1,00         1,00         0.90         0.32         1,7E+06         20           Seal         25         14.8         0.79         0.15         1,10         1,00         1,00         1,00         0.87         0.15         1,7E+06         20           Seal         25         14.8         0.79         0.15         1,10         1,00         1,00         0.86         0.20         1,7E+07         20           Seal         25         14.8         0.78         0.20         1,10         1,00         1,00         0.86         0.23         1,2E+07         20           Seal         25         14.8         0.00         0.35         1,10         1,00         1,00         1,00         0.85         1,2E+06         20</td> <td>IWP         Seal         25         14.8         0.96         0.46         1.10         1.00         1.00         1.06         0.46         1.68E+05         13           IWP         Seal         25         14.8         1.20         0.39         1.10         1.00         1.00         1.05         0.32         0.32         1.00E+08         20           IWP         Seal         25         14.8         0.45         0.23         1.10         1.00         1.00         0.50         0.23         1.7E+06         20           IWP         Seal         25         14.8         0.79         0.15         1.10         1.00         1.00         0.90         0.32         9.17E+05         20           IWP         Seal         25         14.8         0.79         0.15         1.10         1.00         1.00         0.90         0.32         9.17E+05         20           IWP         Seal         25         14.8         0.78         0.20         1.10         1.00         1.00         0.86         0.20         1.8BE+07         20           IWP         Seal         25         14.8         0.00         0.35         1.10         1.00         1.00&lt;</td>	Seal         25         14.8         0.96         0.46         1,10         1,00         1,00         1,06         0.46         1,68E+06         13           Seal         25         14.8         0.25         0.39         1,10         1,00         1,00         1,00         1,05         0.20         1,0E+08         20           Seal         25         14.8         0.45         0.23         1,10         1,00         1,00         1,00         0.90         0.32         1,7E+06         20           Seal         25         14.8         0.79         0.15         1,10         1,00         1,00         1,00         0.87         0.15         1,7E+06         20           Seal         25         14.8         0.79         0.15         1,10         1,00         1,00         0.86         0.20         1,7E+07         20           Seal         25         14.8         0.78         0.20         1,10         1,00         1,00         0.86         0.23         1,2E+07         20           Seal         25         14.8         0.00         0.35         1,10         1,00         1,00         1,00         0.85         1,2E+06         20	IWP         Seal         25         14.8         0.96         0.46         1.10         1.00         1.00         1.06         0.46         1.68E+05         13           IWP         Seal         25         14.8         1.20         0.39         1.10         1.00         1.00         1.05         0.32         0.32         1.00E+08         20           IWP         Seal         25         14.8         0.45         0.23         1.10         1.00         1.00         0.50         0.23         1.7E+06         20           IWP         Seal         25         14.8         0.79         0.15         1.10         1.00         1.00         0.90         0.32         9.17E+05         20           IWP         Seal         25         14.8         0.79         0.15         1.10         1.00         1.00         0.90         0.32         9.17E+05         20           IWP         Seal         25         14.8         0.78         0.20         1.10         1.00         1.00         0.86         0.20         1.8BE+07         20           IWP         Seal         25         14.8         0.00         0.35         1.10         1.00         1.00<
0.52 0.15 1.00E+08 1.06 0.46 1.68E+06 1.32 0.39 3.62E+05 0.50 0.23 1,00E+08 0.90 0.32 9.17E+06 0.87 0.15 1.51E+07 0.86 0.20 1.83E+07 1.10 0.35 1.25E+06 0.63 0.23 1.00E+08 0.66 0.28 1.00E+08	1.00 0.52 0.15 1.00E+08 1.00 1.06 0.46 1.68E+06 1.00 0.50 0.23 1.00E+08 1.00 0.90 0.32 9.17E+06 1.00 0.87 0.15 1.51E+07 1.00 0.86 0.20 1.83E+07 1.00 0.68 0.28 1.00E+08 1.00 0.68 0.28 1.00E+08 1.00 0.68 0.28 1.00E+08 1.00 0.66 0.28 1.00E+08	1.00         1.00         1.00         1.00 E+08           1.00         1.00         1.00         1.06         0.46         1.68E+06           1.00         1.00         1.00         1.032         0.39         3.62E+05           1.00         1.00         0.50         0.23         1,00E+08           1.00         1.00         0.90         0.32         9.17E+06           1.00         1.00         0.87         0.15         151E+07           1.00         1.00         0.86         0.20         1.3E+06           1.00         1.00         1.00         0.66         0.23         1.2E+06           1.00         1.00         1.00         0.66         0.23         1.2E+06           1.00         1.00         1.00         0.66         0.28         1.00E+08           1.00         1.00         0.66         0.28         1.00E+08	1.00         1.00         1.00         1.00         1.00 E+08           1.00         1.00         1.00         1.06         0.46         1.68E+06           1.00         1.00         1.00         1.02         0.32         3.62E+05           1.00         1.00         1.00         0.50         0.23         1.00E+08           1.00         1.00         1.00         0.90         0.32         9.17E+06           1.00         1.00         0.87         0.15         1.51E+07           1.00         1.00         0.86         0.20         1.83E+07           1.00         1.00         1.00         0.66         0.23         1.00E+08           1.00         1.00         0.66         0.23         1.00E+08           1.00         1.00         0.66         0.28         1.00E+08	1.10 1.00 1.00 1.00 0.52 0.15 1.00E+08 1.10 1.00 1.00 1.00 1.06 0.46 1.68E+06 1.10 1.00 1.00 1.00 0.50 0.23 1.00E+08 1.10 1.00 1.00 1.00 0.90 0.32 9.17E+06 1.10 1.00 1.00 1.00 0.87 0.15 1.51E+07 1.10 1.00 1.00 1.00 0.86 0.20 1.83E+07 1.10 1.00 1.00 1.00 0.68 0.20 1.83E+07 1.10 1.00 1.00 1.00 0.68 0.28 1.25E+06 1.10 1.00 1.00 0.68 0.28 1.00E+08 1.10 1.00 1.00 0.68 0.28 1.00E+08 1.10 1.00 1.00 0.66 0.28 1.00E+08	0.15 1.10 1.00 1.00 1.00 0.52 0.15 1.00E+08 0.46 1.10 1.00 1.00 1.00 1.06 0.46 1.68E+06 0.39 1.10 1.00 1.00 1.00 0.50 0.39 3.62E+05 0.23 1.10 1.00 1.00 1.00 0.90 0.32 1.00E+08 0.32 1.10 1.00 1.00 1.00 0.80 0.32 1.15E+07 0.20 1.10 1.00 1.00 1.00 0.86 0.20 1.83E+07 0.20 1.10 1.00 1.00 1.00 0.86 0.20 1.83E+07 0.23 1.10 1.00 1.00 1.00 0.68 0.23 1.00E+08 0.23 1.10 1.00 1.00 1.00 0.66 0.28 1.00E+08 0.28 1.10 1.00 1.00 1.00 0.66 0.28 1.00E+08	0.96 0.46 1.10 1.00 1.00 1.00 0.52 0.15 1.00E+08 1.20 0.39 1.10 1.00 1.00 1.00 1.32 0.39 3.62E+05 1.20 0.39 1.10 1.00 1.00 1.00 0.50 0.20 1.00E+08 0.45 0.23 1.10 1.00 1.00 1.00 0.50 0.20 1.70E+08 0.73 1.10 1.00 1.00 1.00 0.80 0.32 1.10E+08 0.73 1.10 1.00 1.00 1.00 0.86 0.20 1.8E+07 0.78 0.20 1.10 1.00 1.00 1.00 0.86 0.20 1.8E+07 1.00 0.35 1.10 1.00 1.00 1.00 0.86 0.20 1.8E+07 0.5E+08 0.57 0.23 1.10 1.00 1.00 1.00 0.68 0.23 1.00E+08 0.50 0.25 1.10 1.00 1.00 1.00 0.68 0.28 1.00E+08 0.50 0.25 0.25 0.25 0.25 0.25 0.25 0.25	14.8         0.47         0.15         1.10         1.00         1.00         0.52         0.15         1.00E+08           14.8         0.96         0.46         1.10         1.00         1.00         1.06         0.46         1.68E+06           14.8         0.45         0.23         1.10         1.00         1.00         1.00         0.50         0.23         1.00E+08           14.8         0.45         0.23         1.10         1.00         1.00         1.00         0.50         0.23         1.00E+08           14.8         0.79         0.15         1.10         1.00         1.00         1.00         0.87         0.15         1.51E+07           14.8         0.78         0.20         1.10         1.00         1.00         1.00         0.86         0.20         1.83E+07           14.8         1.00         0.35         1.10         1.00         1.00         1.00         0.86         0.20         1.83E+07           14.8         0.57         0.23         1.10         1.00         1.00         1.00         0.66         0.28         1.00E+08           14.8         0.60         0.28         1.10         1.00         1.00	14.8         0.47         0.15         1.10         1.00         1.00         0.52         0.15         1.00E+08           14.8         0.96         0.46         1.10         1.00         1.00         1.06         0.46         1.68E+06           14.8         0.45         0.23         1.10         1.00         1.00         1.00         0.50         0.23         1.00E+08           14.8         0.45         0.23         1.10         1.00         1.00         1.00         0.50         0.23         1.00E+08           14.8         0.79         0.15         1.10         1.00         1.00         1.00         0.87         0.15         1.51E+07           14.8         0.78         0.20         1.10         1.00         1.00         1.00         0.86         0.20         1.83E+07           14.8         1.00         0.35         1.10         1.00         1.00         1.00         0.86         0.20         1.83E+07           14.8         0.57         0.23         1.10         1.00         1.00         1.00         0.66         0.28         1.00E+08           14.8         0.60         0.28         1.10         1.00         1.00	25         14.8         0.47         0.15         1.10         1.00         1.00         0.05         0.15         1.00E+08           25         14.8         0.96         0.46         1.10         1.00         1.00         1.06         0.46         1.68E+06           25         14.8         1.20         0.39         1.10         1.00         1.00         1.06         0.46         1.68E+06           25         14.8         0.45         0.23         1.10         1.00         1.00         0.50         0.23         1.00E+08           25         14.8         0.79         0.15         1.10         1.00         1.00         1.00         0.30         9.17E+06           25         14.8         0.78         0.20         1.10         1.00         1.00         0.86         0.23         1.1E+07           25         14.8         0.78         0.20         1.10         1.00         1.00         0.86         0.20         1.3E+07           25         14.8         1.00         0.35         1.10         1.00         1.00         0.86         0.20         1.8BE+07           25         14.8         0.57         0.23         1.10	Seal         25         14.8         0.47         0.15         1.10         1.00         1.00         0.52         0.15         1.00E+08           Seal         25         14.8         0.36         0.46         1.10         1.00         1.00         1.06         0.46         1.68E+06           Seal         25         14.8         0.45         0.23         1.10         1.00         1.00         0.50         0.23         1.00E+08           Seal         25         14.8         0.45         0.23         1.10         1.00         1.00         0.50         0.23         1.00E+08           Seal         25         14.8         0.45         0.23         1.10         1.00         1.00         0.50         0.23         1.7E+05           Seal         25         14.8         0.79         0.15         1.10         1.00         1.00         0.90         0.32         1.7E+07           Seal         25         14.8         0.79         0.15         1.10         1.00         1.00         0.86         0.20         1.8BE+07           Seal         25         14.8         0.70         0.20         1.10         1.00         1.00         0.86	IWP         Seal         25         14.8         0.47         0.15         1.10         1.00         1.00         0.52         0.15         1.00E+08           IWP         Seal         25         14.8         0.96         0.46         1.10         1.00         1.00         1.06         0.46         1.00E+08           IWP         Seal         25         14.8         0.45         0.23         1.10         1.00         1.00         0.50         0.23         1.00E+08           IWP         Seal         25         14.8         0.45         0.23         1.10         1.00         1.00         0.50         0.23         1.00E+08           IWP         Seal         25         14.8         0.45         0.23         1.10         1.00         1.00         0.50         0.23         1.7E+05           IWP         Seal         25         14.8         0.79         0.15         1.10         1.00         1.00         0.86         0.20         1.7E+07           IWP         Seal         25         14.8         0.79         0.15         1.10         1.00         1.00         0.86         0.20         1.3E+07           IWP         Seal
0.52 1.06 1.06 0.50 0.90 0.86 0.86 0.86	1.00 0.52 1.00 1.06 1.00 1.00 1.00 1.00 1.00 1.00	1.00	1,00	1.10 1.00 1.00 1.00 0.52 1.10 1.00 1.00 1.00 0.52 1.10 1.00 1.00 1.00 1.00 0.50 1.10 1.00 1.00 1.00 0.50 1.10 1.00 1.00 1.00 0.90 1.10 1.00 1.00 1.00 0.86 1.10 1.00 1.00 1.00 0.86 1.10 1.00 1.00 1.00 0.68 1.10 1.00 1.00 1.00 0.68	0.52 1.10 1.00 1.00 1.00 1.00 1.17  0.46 1.10 1.00 1.00 1.00 1.00 0.52  0.39 1.10 1.00 1.00 1.00 1.00 1.32  0.23 1.10 1.00 1.00 1.00 0.50  0.15 1.10 1.00 1.00 1.00 0.86  0.20 1.10 1.00 1.00 1.00 0.86  0.21 1.10 1.00 1.00 1.00 0.86  0.22 1.10 1.00 1.00 1.00 0.63  0.23 1.10 1.00 1.00 1.00 0.63	1.06         0.52         1.10 1.00         1.00         1.00         1.17           0.47         0.15         1.10 1.00         1.00         1.00         1.17           0.96         0.46         1.10 1.00         1.00         1.00         1.06           1.20         0.39         1.10 1.00         1.00         1.00         1.32           0.45         0.23         1.10 1.00         1.00         1.00         0.50           0.82         0.32         1.10 1.00         1.00         1.00         0.86           0.78         0.20         1.10 1.00         1.00         1.00         0.86           1.00         0.35         1.10 1.00         1.00         1.00         0.86           1.00         0.25         1.10 1.00         1.00         1.00         0.86           1.00         0.28         1.10 1.00         1.00         1.00         0.66           0.60         0.28         1.10 1.00         1.00         1.00         0.66	14.8       1.06       0.52       1.10       1.00       1.00       1.00       1.17         14.8       0.47       0.15       1.10       1.00       1.00       1.00       0.52         14.8       0.96       0.46       1.10       1.00       1.00       1.00       1.06         14.8       0.45       0.23       1.10       1.00       1.00       1.00       0.50         14.8       0.82       0.32       1.10       1.00       1.00       0.96         14.8       0.79       0.15       1.10       1.00       1.00       0.96         14.8       0.78       0.20       1.10       1.00       1.00       0.96         14.8       0.57       0.23       1.10       1.00       1.00       1.00       0.66         14.8       0.57       0.23       1.10       1.00       1.00       1.00       0.66         14.8       0.60       0.28       1.10       1.00       1.00       0.66	14.8       1.06       0.52       1.10       1.00       1.00       1.00       1.17         14.8       0.47       0.15       1.10       1.00       1.00       1.00       0.52         14.8       0.96       0.46       1.10       1.00       1.00       1.00       1.06         14.8       0.45       0.23       1.10       1.00       1.00       1.00       0.50         14.8       0.82       0.32       1.10       1.00       1.00       0.96         14.8       0.79       0.15       1.10       1.00       1.00       0.96         14.8       0.78       0.20       1.10       1.00       1.00       0.96         14.8       0.57       0.23       1.10       1.00       1.00       1.00       0.66         14.8       0.57       0.23       1.10       1.00       1.00       1.00       0.66         14.8       0.60       0.28       1.10       1.00       1.00       0.66	25       14.8       1.06       0.52       1.10       1.00       1.00       1.00       1,17         25       14.8       0.47       0.15       1.10       1.00       1.00       1.00       1,17         25       14.8       0.96       0.46       1.10       1.00       1.00       1.00       0.52         25       14.8       0.45       0.23       1.10       1.00       1.00       1.00       0.50         25       14.8       0.82       0.32       1.10       1.00       1.00       0.50         25       14.8       0.78       0.15       1.10       1.00       1.00       0.96         25       14.8       0.78       0.15       1.10       1.00       1.00       0.96         25       14.8       0.78       0.20       1.10       1.00       1.00       0.08         25       14.8       1.00       0.35       1.10       1.00       1.00       1.00         25       14.8       0.57       0.23       1.10       1.00       1.00       0.66         25       14.8       0.60       0.28       1.10       1.00       1.00       0.00 <tr< td=""><td>Seal         25         14.8         1.06         0.52         1.10         1.00         1.00         1.07           Seal         25         14.8         0.47         0.15         1.10         1.00         1.00         1.00         1.17           Seal         25         14.8         0.96         0.46         1.10         1.00         1.00         1.00         0.52           Seal         25         14.8         0.45         0.23         1.10         1.00         1.00         1.00         0.50           Seal         25         14.8         0.78         0.32         1.10         1.00         1.00         0.96           Seal         25         14.8         0.79         0.15         1.10         1.00         1.00         0.96           Seal         25         14.8         0.78         0.20         1.10         1.00         1.00         0.96           Seal         25         14.8         0.78         0.20         1.10         1.00         1.00         0.66           Seal         25         14.8         0.67         0.23         1.10         1.00         1.00         0.66           Seal</td><td>IWP         Seal         25         14.8         1.06         0.52         1.10         1.00         1.00         1.07         1.17           IWP         Seal         25         14.8         0.47         0.15         1.10         1.00         1.00         1.00         1.17           IWP         Seal         25         14.8         0.45         0.46         1.10         1.00         1.00         1.00         0.52           IWP         Seal         25         14.8         0.45         0.23         1.10         1.00         1.00         1.00         1.00           IWP         Seal         25         14.8         0.45         0.23         1.10         1.00         1.00         0.50           IWP         Seal         25         14.8         0.79         0.15         1.00         1.00         1.00         0.86           IWP         Seal         25         14.8         0.79         0.15         1.10         1.00         1.00         0.86           IWP         Seal         25         14.8         0.79         0.10         1.00         1.00         0.66           IWP         Seal         25         14.8<!--</td--></td></tr<>	Seal         25         14.8         1.06         0.52         1.10         1.00         1.00         1.07           Seal         25         14.8         0.47         0.15         1.10         1.00         1.00         1.00         1.17           Seal         25         14.8         0.96         0.46         1.10         1.00         1.00         1.00         0.52           Seal         25         14.8         0.45         0.23         1.10         1.00         1.00         1.00         0.50           Seal         25         14.8         0.78         0.32         1.10         1.00         1.00         0.96           Seal         25         14.8         0.79         0.15         1.10         1.00         1.00         0.96           Seal         25         14.8         0.78         0.20         1.10         1.00         1.00         0.96           Seal         25         14.8         0.78         0.20         1.10         1.00         1.00         0.66           Seal         25         14.8         0.67         0.23         1.10         1.00         1.00         0.66           Seal	IWP         Seal         25         14.8         1.06         0.52         1.10         1.00         1.00         1.07         1.17           IWP         Seal         25         14.8         0.47         0.15         1.10         1.00         1.00         1.00         1.17           IWP         Seal         25         14.8         0.45         0.46         1.10         1.00         1.00         1.00         0.52           IWP         Seal         25         14.8         0.45         0.23         1.10         1.00         1.00         1.00         1.00           IWP         Seal         25         14.8         0.45         0.23         1.10         1.00         1.00         0.50           IWP         Seal         25         14.8         0.79         0.15         1.00         1.00         1.00         0.86           IWP         Seal         25         14.8         0.79         0.15         1.10         1.00         1.00         0.86           IWP         Seal         25         14.8         0.79         0.10         1.00         1.00         0.66           IWP         Seal         25         14.8 </td
	00.1 00.1 00.1 00.1 00.1 00.1 00.1 00.1	1.00	1.00	1.10 1.00 1.00 1.00 1.00 1.10 1.10 1.10	0.52 1.10 1.00 1.00 1.00 0.52 0.53 0.53 0.53 0.53 0.53 0.53 0.53 0.53	0.56 0.16 1.10 1.00 1.00 1.00 1.00 1.00 1.0	14.8         0.56         0.16         1.10         1.00         1.00           14.8         0.47         0.15         1.10         1.00         1.00         1.00           14.8         0.47         0.15         1.10         1.00         1.00         1.00           14.8         0.96         0.46         1.10         1.00         1.00         1.00           14.8         0.45         0.23         1.10         1.00         1.00         1.00           14.8         0.82         0.23         1.10         1.00         1.00         1.00           14.8         0.79         0.15         1.10         1.00         1.00         1.00           14.8         0.79         0.23         1.10         1.00         1.00         1.00           14.8         0.79         0.20         1.10         1.00         1.00         1.00           14.8         0.57         0.23         1.10         1.00         1.00         1.00           14.8         0.60         0.28         1.10         1.00         1.00         1.00           14.8         0.57         0.23         1.10         1.00         1.00         1.00	14.8         0.56         0.16         1.10         1.00         1.00           14.8         0.47         0.15         1.10         1.00         1.00         1.00           14.8         0.47         0.15         1.10         1.00         1.00         1.00           14.8         0.96         0.46         1.10         1.00         1.00         1.00           14.8         0.45         0.23         1.10         1.00         1.00         1.00           14.8         0.82         0.23         1.10         1.00         1.00         1.00           14.8         0.79         0.15         1.10         1.00         1.00         1.00           14.8         0.79         0.23         1.10         1.00         1.00         1.00           14.8         0.79         0.20         1.10         1.00         1.00         1.00           14.8         0.57         0.23         1.10         1.00         1.00         1.00           14.8         0.60         0.28         1.10         1.00         1.00         1.00           14.8         0.57         0.23         1.10         1.00         1.00         1.00	25         14.8         0.56         0.16         1.10         1.00         1.00           25         14.8         1.06         0.52         1.10         1.00         1.00         1.00           25         14.8         0.47         0.15         1.10         1.00         1.00         1.00           25         14.8         0.96         0.46         1.10         1.00         1.00         1.00           25         14.8         0.45         0.23         1.10         1.00         1.00         1.00           25         14.8         0.45         0.23         1.10         1.00         1.00         1.00           25         14.8         0.79         0.15         1.10         1.00         1.00         1.00           25         14.8         0.79         0.15         1.10         1.00         1.00         1.00           25         14.8         0.79         0.20         1.10         1.00         1.00         1.00           25         14.8         0.79         0.20         1.10         1.00         1.00           25         14.8         0.60         0.28         1.10         1.00         1.00 <td>Seal         25         14.8         0.56         0.16         1.10         1.00         1.00           Seal         25         14.8         0.56         0.16         1.10         1.00         1.00           Seal         25         14.8         0.47         0.15         1.10         1.00         1.00           Seal         25         14.8         0.96         0.46         1.10         1.00         1.00           Seal         25         14.8         0.95         0.23         1.10         1.00         1.00           Seal         25         14.8         0.75         0.23         1.10         1.00         1.00           Seal         25         14.8         0.75         0.23         1.10         1.00         1.00           Seal         25         14.8         0.75         0.23         1.10         1.00         1.00           Seal         25         14.8         0.79         0.15         1.00         1.00         1.00           Seal         25         14.8         0.79         0.20         1.10         1.00         1.00           Seal         25         14.8         0.57         0.23<td>WP         Seal         25         14.8         0.56         0.16         1.10         1.00         1.00           IWP         Seal         25         14.8         0.56         0.16         1.10         1.00         1.00           IWP         Seal         25         14.8         0.96         0.46         1.10         1.00         1.00           IWP         Seal         25         14.8         0.26         0.46         1.10         1.00         1.00           IWP         Seal         25         14.8         0.26         0.46         1.10         1.00         1.00           IWP         Seal         25         14.8         0.75         0.23         1.10         1.00         1.00           IWP         Seal         25         14.8         0.75         0.23         1.10         1.00         1.00           IWP         Seal         25         14.8         0.75         0.15         1.00         1.00           IWP         Seal         25         14.8         0.76         0.20         1.10         1.00         1.00           IWP         Seal         25         14.8         0.00         1.00</td></td>	Seal         25         14.8         0.56         0.16         1.10         1.00         1.00           Seal         25         14.8         0.56         0.16         1.10         1.00         1.00           Seal         25         14.8         0.47         0.15         1.10         1.00         1.00           Seal         25         14.8         0.96         0.46         1.10         1.00         1.00           Seal         25         14.8         0.95         0.23         1.10         1.00         1.00           Seal         25         14.8         0.75         0.23         1.10         1.00         1.00           Seal         25         14.8         0.75         0.23         1.10         1.00         1.00           Seal         25         14.8         0.75         0.23         1.10         1.00         1.00           Seal         25         14.8         0.79         0.15         1.00         1.00         1.00           Seal         25         14.8         0.79         0.20         1.10         1.00         1.00           Seal         25         14.8         0.57         0.23 <td>WP         Seal         25         14.8         0.56         0.16         1.10         1.00         1.00           IWP         Seal         25         14.8         0.56         0.16         1.10         1.00         1.00           IWP         Seal         25         14.8         0.96         0.46         1.10         1.00         1.00           IWP         Seal         25         14.8         0.26         0.46         1.10         1.00         1.00           IWP         Seal         25         14.8         0.26         0.46         1.10         1.00         1.00           IWP         Seal         25         14.8         0.75         0.23         1.10         1.00         1.00           IWP         Seal         25         14.8         0.75         0.23         1.10         1.00         1.00           IWP         Seal         25         14.8         0.75         0.15         1.00         1.00           IWP         Seal         25         14.8         0.76         0.20         1.10         1.00         1.00           IWP         Seal         25         14.8         0.00         1.00</td>	WP         Seal         25         14.8         0.56         0.16         1.10         1.00         1.00           IWP         Seal         25         14.8         0.56         0.16         1.10         1.00         1.00           IWP         Seal         25         14.8         0.96         0.46         1.10         1.00         1.00           IWP         Seal         25         14.8         0.26         0.46         1.10         1.00         1.00           IWP         Seal         25         14.8         0.26         0.46         1.10         1.00         1.00           IWP         Seal         25         14.8         0.75         0.23         1.10         1.00         1.00           IWP         Seal         25         14.8         0.75         0.23         1.10         1.00         1.00           IWP         Seal         25         14.8         0.75         0.15         1.00         1.00           IWP         Seal         25         14.8         0.76         0.20         1.10         1.00         1.00           IWP         Seal         25         14.8         0.00         1.00
		00.1 00.1 00.1 00.1 00.1 00.1 00.1 00.1	0.1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 00 1. 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  1.10     1.00       14.8     0.79     0.15     1.10     1.00       14.8     0.79     0.20     1.10     1.00       14.8     0.57     0.20     1.10     1.00       14.8     0.57     0.23     1.10     1.00       14.8     0.60     0.35     1.10     1.00       14.8     0.60     0.23     1.10     1.00       14.8     0.60     0.23     1.10     1.00       14.8     0.60     0.23     1.10     1.00       14.8     0.60     0.23     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.9     0.60 <t< td=""><td>14.8     0.65     0.26     1.10     1.00       14.8     0.65     0.26     1.10     1.00       14.8     1.06     0.52     1.10     1.00       14.8     0.47     0.15     1.10     1.00       14.8     0.96     0.46     1.10     1.00       14.8     0.45     0.23     1.10     1.00       14.8     0.45     0.23     1.10     1.00       14.8     0.82     0.32     1.10     1.00       14.8     0.79     0.15     1.10     1.00       14.8     0.79     0.20     1.10     1.00       14.8     0.57     0.20     1.10     1.00       14.8     0.57     0.23     1.10     1.00       14.8     0.60     0.35     1.10     1.00       14.8     0.60     0.23     1.10     1.00       14.8     0.60     0.23     1.10     1.00       14.8     0.60     0.23     1.10     1.00       14.8     0.60     0.23     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.9     0.60     <t< td=""><td>25       14.8       0.65       0.26       1.10       1.00       1.00         25       14.8       0.56       0.16       1.10       1.00       1.00         25       14.8       1.06       0.52       1.10       1.00       1.00         25       14.8       0.47       0.15       1.10       1.00       1.00         25       14.8       0.96       0.46       1.10       1.00       1.00         25       14.8       0.45       0.23       1.10       1.00       1.00         25       14.8       0.45       0.23       1.10       1.00       1.00         25       14.8       0.79       0.15       1.10       1.00       1.00         25       14.8       0.79       0.15       1.10       1.00       1.00         25       14.8       0.79       0.15       1.10       1.00       1.00         25       14.8       0.79       0.20       1.10       1.00       1.00         25       14.8       0.57       0.23       1.10       1.00       1.00         25       14.8       0.60       0.28       1.10       1.00       1.00</td><td>Seal 25 14.8 0.65 0.26 1.10 1.00 1.00 Seal 25 14.8 0.65 0.26 1.10 1.00 1.00 Seal 25 14.8 0.65 0.16 1.10 1.00 1.00 Seal 25 14.8 0.47 0.15 1.10 1.00 1.00 Seal 25 14.8 0.96 0.46 1.10 1.00 1.00 Seal 25 14.8 0.95 0.23 1.10 1.00 1.00 Seal 25 14.8 0.82 0.32 1.10 1.00 1.00 Seal 25 14.8 0.79 0.15 1.10 1.00 1.00 Seal 25 14.8 0.79 0.20 1.10 1.00 1.00 Seal 25 14.8 0.79 0.20 1.10 1.00 1.00 Seal 25 14.8 0.57 0.23 1.10 1.00 1.00 Seal 25 14.8 0.60 0.28 1.10 1.00 1.00 1.00 Seal 25 14.8 0.60 0.28 1.10 1.00 1.00 1.00 Seal 25 14.8 0.60 0.28 1.10 1.00 1.00 1.00 Seal 25 14.8 0.60 0.28 1.10 1.00 1.00 1.00 1.00 1.00 1.00 1.0</td><td>IWP         Seal         25         14.8         0.65         0.26         1.10         1.00         1.00           IWP         Seal         25         14.8         0.65         0.26         1.10         1.00         1.00           IWP         Seal         25         14.8         0.47         0.15         1.10         1.00         1.00           IWP         Seal         25         14.8         0.96         0.46         1.10         1.00         1.00           IWP         Seal         25         14.8         0.96         0.46         1.10         1.00         1.00           IWP         Seal         25         14.8         0.78         0.23         1.10         1.00         1.00           IWP         Seal         25         14.8         0.78         0.23         1.10         1.00         1.00           IWP         Seal         25         14.8         0.79         0.15         1.10         1.00           IWP         Seal         25         14.8         0.79         0.15         1.10         1.00           IWP         Seal         25         14.8         0.78         0.20         1.10</td></t<></td></t<>	14.8     0.65     0.26     1.10     1.00       14.8     0.65     0.26     1.10     1.00       14.8     1.06     0.52     1.10     1.00       14.8     0.47     0.15     1.10     1.00       14.8     0.96     0.46     1.10     1.00       14.8     0.45     0.23     1.10     1.00       14.8     0.45     0.23     1.10     1.00       14.8     0.82     0.32     1.10     1.00       14.8     0.79     0.15     1.10     1.00       14.8     0.79     0.20     1.10     1.00       14.8     0.57     0.20     1.10     1.00       14.8     0.57     0.23     1.10     1.00       14.8     0.60     0.35     1.10     1.00       14.8     0.60     0.23     1.10     1.00       14.8     0.60     0.23     1.10     1.00       14.8     0.60     0.23     1.10     1.00       14.8     0.60     0.23     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.9     0.60 <t< td=""><td>25       14.8       0.65       0.26       1.10       1.00       1.00         25       14.8       0.56       0.16       1.10       1.00       1.00         25       14.8       1.06       0.52       1.10       1.00       1.00         25       14.8       0.47       0.15       1.10       1.00       1.00         25       14.8       0.96       0.46       1.10       1.00       1.00         25       14.8       0.45       0.23       1.10       1.00       1.00         25       14.8       0.45       0.23       1.10       1.00       1.00         25       14.8       0.79       0.15       1.10       1.00       1.00         25       14.8       0.79       0.15       1.10       1.00       1.00         25       14.8       0.79       0.15       1.10       1.00       1.00         25       14.8       0.79       0.20       1.10       1.00       1.00         25       14.8       0.57       0.23       1.10       1.00       1.00         25       14.8       0.60       0.28       1.10       1.00       1.00</td><td>Seal 25 14.8 0.65 0.26 1.10 1.00 1.00 Seal 25 14.8 0.65 0.26 1.10 1.00 1.00 Seal 25 14.8 0.65 0.16 1.10 1.00 1.00 Seal 25 14.8 0.47 0.15 1.10 1.00 1.00 Seal 25 14.8 0.96 0.46 1.10 1.00 1.00 Seal 25 14.8 0.95 0.23 1.10 1.00 1.00 Seal 25 14.8 0.82 0.32 1.10 1.00 1.00 Seal 25 14.8 0.79 0.15 1.10 1.00 1.00 Seal 25 14.8 0.79 0.20 1.10 1.00 1.00 Seal 25 14.8 0.79 0.20 1.10 1.00 1.00 Seal 25 14.8 0.57 0.23 1.10 1.00 1.00 Seal 25 14.8 0.60 0.28 1.10 1.00 1.00 1.00 Seal 25 14.8 0.60 0.28 1.10 1.00 1.00 1.00 Seal 25 14.8 0.60 0.28 1.10 1.00 1.00 1.00 Seal 25 14.8 0.60 0.28 1.10 1.00 1.00 1.00 1.00 1.00 1.00 1.0</td><td>IWP         Seal         25         14.8         0.65         0.26         1.10         1.00         1.00           IWP         Seal         25         14.8         0.65         0.26         1.10         1.00         1.00           IWP         Seal         25         14.8         0.47         0.15         1.10         1.00         1.00           IWP         Seal         25         14.8         0.96         0.46         1.10         1.00         1.00           IWP         Seal         25         14.8         0.96         0.46         1.10         1.00         1.00           IWP         Seal         25         14.8         0.78         0.23         1.10         1.00         1.00           IWP         Seal         25         14.8         0.78         0.23         1.10         1.00         1.00           IWP         Seal         25         14.8         0.79         0.15         1.10         1.00           IWP         Seal         25         14.8         0.79         0.15         1.10         1.00           IWP         Seal         25         14.8         0.78         0.20         1.10</td></t<>	25       14.8       0.65       0.26       1.10       1.00       1.00         25       14.8       0.56       0.16       1.10       1.00       1.00         25       14.8       1.06       0.52       1.10       1.00       1.00         25       14.8       0.47       0.15       1.10       1.00       1.00         25       14.8       0.96       0.46       1.10       1.00       1.00         25       14.8       0.45       0.23       1.10       1.00       1.00         25       14.8       0.45       0.23       1.10       1.00       1.00         25       14.8       0.79       0.15       1.10       1.00       1.00         25       14.8       0.79       0.15       1.10       1.00       1.00         25       14.8       0.79       0.15       1.10       1.00       1.00         25       14.8       0.79       0.20       1.10       1.00       1.00         25       14.8       0.57       0.23       1.10       1.00       1.00         25       14.8       0.60       0.28       1.10       1.00       1.00	Seal 25 14.8 0.65 0.26 1.10 1.00 1.00 Seal 25 14.8 0.65 0.26 1.10 1.00 1.00 Seal 25 14.8 0.65 0.16 1.10 1.00 1.00 Seal 25 14.8 0.47 0.15 1.10 1.00 1.00 Seal 25 14.8 0.96 0.46 1.10 1.00 1.00 Seal 25 14.8 0.95 0.23 1.10 1.00 1.00 Seal 25 14.8 0.82 0.32 1.10 1.00 1.00 Seal 25 14.8 0.79 0.15 1.10 1.00 1.00 Seal 25 14.8 0.79 0.20 1.10 1.00 1.00 Seal 25 14.8 0.79 0.20 1.10 1.00 1.00 Seal 25 14.8 0.57 0.23 1.10 1.00 1.00 Seal 25 14.8 0.60 0.28 1.10 1.00 1.00 1.00 Seal 25 14.8 0.60 0.28 1.10 1.00 1.00 1.00 Seal 25 14.8 0.60 0.28 1.10 1.00 1.00 1.00 Seal 25 14.8 0.60 0.28 1.10 1.00 1.00 1.00 1.00 1.00 1.00 1.0	IWP         Seal         25         14.8         0.65         0.26         1.10         1.00         1.00           IWP         Seal         25         14.8         0.65         0.26         1.10         1.00         1.00           IWP         Seal         25         14.8         0.47         0.15         1.10         1.00         1.00           IWP         Seal         25         14.8         0.96         0.46         1.10         1.00         1.00           IWP         Seal         25         14.8         0.96         0.46         1.10         1.00         1.00           IWP         Seal         25         14.8         0.78         0.23         1.10         1.00         1.00           IWP         Seal         25         14.8         0.78         0.23         1.10         1.00         1.00           IWP         Seal         25         14.8         0.79         0.15         1.10         1.00           IWP         Seal         25         14.8         0.79         0.15         1.10         1.00           IWP         Seal         25         14.8         0.78         0.20         1.10
	00.1 00.1 00.1 00.1 00.1 00.1 00.1 00.1	00.1 00.1 00.1 00.1 00.1 00.1 00.1 00.1	00.1 00.1 00.1 00.1 00.1 00.1 00.1 00.1	00.1 01.1 00.1 01.1	0.26 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.23 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.20 1.10 1.00 0.20 1.10 1.00 0.20 1.10 1.00 0.20 1.10 1.00 0.20 1.10 1.00 0.20 1.10 1.00 0.20 1.10 1.00 0.20 1.10 1.00 0.20 1.10 1.00 0.20 1.10 1.00 0.20 1.10 1.00 0.20 1.10 1.00 0.20 1.10 1.00 0.20 1.10 1.00 0.20 1.10 1.00 0.20 1.10 1.00 0.20 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 0.15 1.10 1.00 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   1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.9     0.10 <t< td=""><td>14.8     0.65     0.26     1.10     1.00       14.8     0.65     0.26     1.10     1.00       14.8     1.06     0.52     1.10     1.00       14.8     0.47     0.15     1.10     1.00       14.8     0.96     0.46     1.10     1.00       14.8     0.45     0.23     1.10     1.00       14.8     0.79     0.15     1.10     1.00       14.8     0.79     0.15     1.10     1.00       14.8     0.79     0.15     1.10     1.00       14.8     0.57     0.23     1.10     1.00       14.8     0.57     0.23     1.10     1.00       14.8     0.57     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.9     0.10     <t< td=""><td>25       14.8       0.65       0.26       1.10       1.00         25       14.8       0.56       0.16       1.10       1.00         25       14.8       0.47       0.15       1.10       1.00         25       14.8       0.96       0.46       1.10       1.00         25       14.8       0.95       0.46       1.10       1.00         25       14.8       0.45       0.23       1.10       1.00         25       14.8       0.79       0.15       1.10       1.00         25       14.8       0.79       0.15       1.10       1.00         25       14.8       0.79       0.15       1.10       1.00         25       14.8       0.79       0.20       1.10       1.00         25       14.8       0.79       0.20       1.10       1.00         25       14.8       0.60       0.28       1.10       1.00         25       14.8       0.60       0.28       1.10       1.00         25       14.8       0.60       0.28       1.10       1.00         25       14.8       0.60       0.28       1.10       <td< td=""><td>Seal         25         14.8         0.36         0.18         1.10         1.00           Seal         25         14.8         0.65         0.26         1.10         1.00           Seal         25         14.8         1.06         0.52         1.10         1.00           Seal         25         14.8         0.47         0.15         1.10         1.00           Seal         25         14.8         0.26         0.46         1.10         1.00           Seal         25         14.8         0.96         0.46         1.10         1.00           Seal         25         14.8         0.75         0.23         1.10         1.00           Seal         25         14.8         0.79         0.15         1.10         1.00           Seal         25         14.8         0.79         0.15         1.10         1.00           Seal         25         14.8         0.79         0.23         1.10         1.00           Seal         25         14.8         0.60         0.28         1.10         1.00           Seal         25         14.8         0.60         0.28         1.10         1.00</td><td>IWP         Seal         25         14.8         0.36         0.18         1.10         1.00           IWP         Seal         25         14.8         0.65         0.26         1.10         1.00           IWP         Seal         25         14.8         1.06         0.52         1.10         1.00           IWP         Seal         25         14.8         1.06         0.52         1.10         1.00           IWP         Seal         25         14.8         0.47         0.15         1.10         1.00           IWP         Seal         25         14.8         0.96         0.46         1.10         1.00           IWP         Seal         25         14.8         0.96         0.45         0.10         1.00           IWP         Seal         25         14.8         0.45         0.23         1.10         1.00           IWP         Seal         25         14.8         0.75         0.15         1.10         1.00           IWP         Seal         25         14.8         0.78         0.23         1.10         1.00           IWP         Seal         25         14.8         0.60</td></td<></td></t<></td></t<>	14.8     0.65     0.26     1.10     1.00       14.8     0.65     0.26     1.10     1.00       14.8     1.06     0.52     1.10     1.00       14.8     0.47     0.15     1.10     1.00       14.8     0.96     0.46     1.10     1.00       14.8     0.45     0.23     1.10     1.00       14.8     0.79     0.15     1.10     1.00       14.8     0.79     0.15     1.10     1.00       14.8     0.79     0.15     1.10     1.00       14.8     0.57     0.23     1.10     1.00       14.8     0.57     0.23     1.10     1.00       14.8     0.57     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.8     0.60     0.28     1.10     1.00       14.9     0.10 <t< td=""><td>25       14.8       0.65       0.26       1.10       1.00         25       14.8       0.56       0.16       1.10       1.00         25       14.8       0.47       0.15       1.10       1.00         25       14.8       0.96       0.46       1.10       1.00         25       14.8       0.95       0.46       1.10       1.00         25       14.8       0.45       0.23       1.10       1.00         25       14.8       0.79       0.15       1.10       1.00         25       14.8       0.79       0.15       1.10       1.00         25       14.8       0.79       0.15       1.10       1.00         25       14.8       0.79       0.20       1.10       1.00         25       14.8       0.79       0.20       1.10       1.00         25       14.8       0.60       0.28       1.10       1.00         25       14.8       0.60       0.28       1.10       1.00         25       14.8       0.60       0.28       1.10       1.00         25       14.8       0.60       0.28       1.10       <td< td=""><td>Seal         25         14.8         0.36         0.18         1.10         1.00           Seal         25         14.8         0.65         0.26         1.10         1.00           Seal         25         14.8         1.06         0.52         1.10         1.00           Seal         25         14.8         0.47         0.15         1.10         1.00           Seal         25         14.8         0.26         0.46         1.10         1.00           Seal         25         14.8         0.96         0.46         1.10         1.00           Seal         25         14.8         0.75         0.23         1.10         1.00           Seal         25         14.8         0.79         0.15         1.10         1.00           Seal         25         14.8         0.79         0.15         1.10         1.00           Seal         25         14.8         0.79         0.23         1.10         1.00           Seal         25         14.8         0.60         0.28         1.10         1.00           Seal         25         14.8         0.60         0.28         1.10         1.00</td><td>IWP         Seal         25         14.8         0.36         0.18         1.10         1.00           IWP         Seal         25         14.8         0.65         0.26         1.10         1.00           IWP         Seal         25         14.8         1.06         0.52         1.10         1.00           IWP         Seal         25         14.8         1.06         0.52         1.10         1.00           IWP         Seal         25         14.8         0.47         0.15         1.10         1.00           IWP         Seal         25         14.8         0.96         0.46         1.10         1.00           IWP         Seal         25         14.8         0.96         0.45         0.10         1.00           IWP         Seal         25         14.8         0.45         0.23         1.10         1.00           IWP         Seal         25         14.8         0.75         0.15         1.10         1.00           IWP         Seal         25         14.8         0.78         0.23         1.10         1.00           IWP         Seal         25         14.8         0.60</td></td<></td></t<>	25       14.8       0.65       0.26       1.10       1.00         25       14.8       0.56       0.16       1.10       1.00         25       14.8       0.47       0.15       1.10       1.00         25       14.8       0.96       0.46       1.10       1.00         25       14.8       0.95       0.46       1.10       1.00         25       14.8       0.45       0.23       1.10       1.00         25       14.8       0.79       0.15       1.10       1.00         25       14.8       0.79       0.15       1.10       1.00         25       14.8       0.79       0.15       1.10       1.00         25       14.8       0.79       0.20       1.10       1.00         25       14.8       0.79       0.20       1.10       1.00         25       14.8       0.60       0.28       1.10       1.00         25       14.8       0.60       0.28       1.10       1.00         25       14.8       0.60       0.28       1.10       1.00         25       14.8       0.60       0.28       1.10 <td< td=""><td>Seal         25         14.8         0.36         0.18         1.10         1.00           Seal         25         14.8         0.65         0.26         1.10         1.00           Seal         25         14.8         1.06         0.52         1.10         1.00           Seal         25         14.8         0.47         0.15         1.10         1.00           Seal         25         14.8         0.26         0.46         1.10         1.00           Seal         25         14.8         0.96         0.46         1.10         1.00           Seal         25         14.8         0.75         0.23         1.10         1.00           Seal         25         14.8         0.79         0.15         1.10         1.00           Seal         25         14.8         0.79         0.15         1.10         1.00           Seal         25         14.8         0.79         0.23         1.10         1.00           Seal         25         14.8         0.60         0.28         1.10         1.00           Seal         25         14.8         0.60         0.28         1.10         1.00</td><td>IWP         Seal         25         14.8         0.36         0.18         1.10         1.00           IWP         Seal         25         14.8         0.65         0.26         1.10         1.00           IWP         Seal         25         14.8         1.06         0.52         1.10         1.00           IWP         Seal         25         14.8         1.06         0.52         1.10         1.00           IWP         Seal         25         14.8         0.47         0.15         1.10         1.00           IWP         Seal         25         14.8         0.96         0.46         1.10         1.00           IWP         Seal         25         14.8         0.96         0.45         0.10         1.00           IWP         Seal         25         14.8         0.45         0.23         1.10         1.00           IWP         Seal         25         14.8         0.75         0.15         1.10         1.00           IWP         Seal         25         14.8         0.78         0.23         1.10         1.00           IWP         Seal         25         14.8         0.60</td></td<>	Seal         25         14.8         0.36         0.18         1.10         1.00           Seal         25         14.8         0.65         0.26         1.10         1.00           Seal         25         14.8         1.06         0.52         1.10         1.00           Seal         25         14.8         0.47         0.15         1.10         1.00           Seal         25         14.8         0.26         0.46         1.10         1.00           Seal         25         14.8         0.96         0.46         1.10         1.00           Seal         25         14.8         0.75         0.23         1.10         1.00           Seal         25         14.8         0.79         0.15         1.10         1.00           Seal         25         14.8         0.79         0.15         1.10         1.00           Seal         25         14.8         0.79         0.23         1.10         1.00           Seal         25         14.8         0.60         0.28         1.10         1.00           Seal         25         14.8         0.60         0.28         1.10         1.00	IWP         Seal         25         14.8         0.36         0.18         1.10         1.00           IWP         Seal         25         14.8         0.65         0.26         1.10         1.00           IWP         Seal         25         14.8         1.06         0.52         1.10         1.00           IWP         Seal         25         14.8         1.06         0.52         1.10         1.00           IWP         Seal         25         14.8         0.47         0.15         1.10         1.00           IWP         Seal         25         14.8         0.96         0.46         1.10         1.00           IWP         Seal         25         14.8         0.96         0.45         0.10         1.00           IWP         Seal         25         14.8         0.45         0.23         1.10         1.00           IWP         Seal         25         14.8         0.75         0.15         1.10         1.00           IWP         Seal         25         14.8         0.78         0.23         1.10         1.00           IWP         Seal         25         14.8         0.60

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Survey Notes

1 These remaining life and overlay calculations follow the methodology of the Austroads Guide to Pavement Technology Part 5 Appendix E

The remaining life and overlay requirements assume that the asphalt surfaced pavement has not been progressively strengthened in stages or has significant remaining asphalt fatigue, life

3 The remaining life and overlay requirements assume that the pavement is flexible and does not include any cemented materials, where this is not the case a mechanistic analysis should be undertaken

4 The asphalt overlay thickness to overcome permanent deformation is based on using asphalt with C320 binder, the use of other binders may result in a different thickness required

5. It is possible that a thinner asphalt overlay thickness may overcome fatigue however there would be a higher risk of premature distress in this case and as such it has not been considered

The granular overlay requirements for design traffic volumes up to 1x10^8 ESA's can be derived using the Design Chart Method, while asphalt overlays are limited to a maximum design traffic volume of 1x10^7 ESA' The overlay requirements indicate the thickness of additional material required to overcome any structural deficiencies of the pavement based on the pavement consisting of an asphalt wearing course and being subject to both permanent deformation and fatigue

The asphalt fatigue remaining life is calculated considering a minimum 40mm of asphalt overlay

The thickness of the asphalt overlay considering fatigue is the minimum required considering the design traffic

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia

Page 21 of 22

James Erskine Senior Pavement Engineer 24-Sep-18

James Erskine Senior Pavement Engineer 24-Sep-18

PA 07\_0155 MOD3 Report No. 625/25

**MULTIQUIP QUARRIES** 

Ardmore Park Quarry Appendix 3



Form No. TP5-R-001

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Page 22 of 22

Pavement Management Services Pty Ltd, ABN 64 002 245 329, Australia Ver:2 Rev:0

Prepared By:

### MULTIQUIP QUARRIES Ardmore Park Quarry Appendix 3

RESPONSE TO SUBMISSIONS
PA 07\_0155 MOD3

Report No. 625/25

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