ACT Government
Transport Canberra and City Services

Freedom of Information – Access Application Form

Privacy notice

The personal information you supply on this form will only be used for the purpose of processing your request. Your application must include an email or postal address to which the respondent can send notices under the *Freedom of Information Act 2016* (the Act). If all or some of this information is not collected, Transport Canberra and City Services may not be able to communicate with you, inhibiting their obligations under the Act. This could mean the request cannot be dealt with. Your personal information will not be disclosed to a third party without your consent unless statutory obligations require otherwise.

The Transport Canberra and City Services Privacy Policy contains information on how you can access or seek to correct any of your personal information that is held by the Transport Canberra and City Services, as well as the process for lodging a complaint about an alleged breach of the *Information Privacy Act 2014*. The Privacy Policy can be found at www.cityservices.act.gov.au.

Applicant details

I wish to make an access application to Transport Canberra and City Services under the *Freedom of Information Act 2016.*

Name	[redacted]
Address (where notices relating to this request can be sent – either postal or electronic)	[redacted]
Telephone (Business hours)	[redacted]
Telephone (Mobile)	
Email	[redacted]

What documents are you requesting under the Act?

I am seeking the scoping proposal and resultant feasibility study for the intersection upgrades at Sulwood Drive and Mannheim Street in Kambah.

This information will provide important information for public consultation on the options explored and issues raised for consideration by the community and government as part of the upgrade.

Fee waver

If you wish to apply for a fee waiver, the Act sets out a number of provisions to do so:

- The information being requested was previously publicly available but no longer is.
- The information being requested is of special benefit to the public (Ombudsman guidelines see Section 66).
- The applicant is a concession card holder and demonstrates a material connection with the information requested (concession cards include a current health care or pensioner card issued under the Social Security Act 1991; a current pensioner concession card issued in relation to a pension under the Veterans' Entitlements Act 1986 or the Military Rehabilitation and Compensation Act 2004; a current gold card; or a card prescribed by regulation).
- The applicant is a not-for-profit organisation and the application relates to the activities or purposes of the organisation.
- The applicant is a member of the Legislative Assembly.

Transport Canberra and City Services must waive any fees for providing information if the information was not publicly available and the agency makes the information publicly available before or within 3 working days after giving it to the applicant.

To apply for a fee waver please complete the following.

I would like to apply for a fee waiver because (state reason/s from the list above). [provide details and evidence of how this reason applies]	
I would like	a copy of these documents sent to the above email address

Applicant's signature	Date of request
[redacted]	23/6/2021

ACT Government
Transport Canberra and City Services

[redacted]

Dear [redacted]

Freedom of Information Request - Reference 21-065

I refer to your application for access to government information received by Transport Canberra and City Services (TCCS) on 24 June 2021 under the *Freedom of Information Act 2016* (FOI Act) seeking the following government information:

> *"the scoping proposal and resultant feasibility study for the intersection upgrades at Sulwood Drive and Mannheim Street in Kambah."*

Authority
I am an Information Officer appointed by the Director-General under section 18 of the Act to deal with access applications made under Part 5 of the FOI Act.

Timeframes
A decision was initially due on 22 July 2021. Thank you for agreeing to an extension until 12 August 2021.

Decision on access
In accordance with the FOI Act, a search was conducted of records held by TCCS. This search identified two records as relevant to your request.

As is standard with feasibility studies, it is important to note that the information within the document is conceptual and proposed options or plans are likely to vary. As the purpose of a study is to ascertain if a proposed project could be successfully achieved, consultation is limited. It is standard practice that, should a feasibility study lead to a project, community consultation is sought during the design stage.

In reviewing the information within this document, I have found it contrary to the public interest to disclose some information. As such, I have decided to provide you with partial access to this government information. My reasons for this decision are detailed in the statement of reasons below.

Statement of Reasons
In making my decision on disclosing government information, I must identify all relevant factors in schedule 2 of the FOI Act and determine, on balance, where the public interest lies. In reaching my access decision, I have taken the following into account:

Factors favouring disclosure in the public interest (Schedule 2, Section 2.1)

- Section 2.1(a)(i) - promote open discussion of public affairs and enhance the government's accountability;
- Section 2.1(a)(ii) - contribute to positive and informed debate on important issues or matters of public interest;
- Section 2.1(a)(ii) - inform the community of the government's operations, including the policies, guidelines and codes of conduct followed by the government in its dealings with members of the community.

Factors favouring non-disclosure (Schedule 2, Section 2.2)

- Schedule 2.2(a)(ii) - prejudice the protection of an individual's right to privacy or any other right under the *Human Rights Act 2016;*
- Section 2.2 (a)(iii) - prejudice the security, law enforcement or public safety; and
- Schedule 2.2(a)(xii) - prejudice the competitive commercial activities of an agency.

I consider that it is in the public interest to release most of the information within the records identified as relevant to your application. However, in some instances, I have found that the disclosure of some information to be contrary to the public interest.

Information relating to privacy

In reviewing the information in scope of your applications, the personal information of third parties was identified, including the names and contact details of these parties. Deletions have been applied to information where it would prejudice the protection of an individual's right to privacy or any other right under the *Human Rights Act 2004*.

Factors in favour of release can still be met while protecting the personal information of these individuals. The protection of this information outweighs disclosure in this instance.

Public Safety

Information about the location of underground infrastructure is included in the drawings. Such infrastructure may fall under National legislation related to the identification of critical infrastructure and protection from acts of terrorism.

I have considered that the disclosure of this information may prejudice the security of infrastructure and potentially expose it to acts of vandalism. In this instance, I have found that the disclosure of this type of information could prejudice security or public safety and, on this basis the disclosure is contrary to public interest.

Considering the type of information to be withheld from release, I am satisfied that the factors in favour of release can still be met while protecting this information. In this instance, I find more weight in the factors favouring non-disclosure than in the public interest factors that favour release.

Competitive commercial activities

I have also identified cost estimates which are significant to future procurement negotiations. I have found that the disclosure of this information is likely to prejudice the competitive commercial activities of TCCS and are therefore contrary to the public interest to disclose.

Out of scope information

Some information within the records includes information on other proposed projects which is not relevant to the information you are seeking. However, I have included these sections of the report for context.

A copy of the information, with deletions applied to information, which is contrary to the public interest, is enclosed at Attachment B.

Online publishing – disclosure log

Under section 28 of the Act, TCCS maintains an online record of access applications called a disclosure log. Your original access application, my decision and documents will be published in the TCCS disclosure log between 3 – 10 business days from the date of this decision.

Your personal contact details will not be published. You may view the TCCS' disclosure log at https://www.cityservices.act.gov.au/about-us/freedom_of_information/disclosure-log.

Ombudsman review

My decision on your access request is a reviewable decision as identified in Schedule 3 of the Act. You have the right to seek an Ombudsman review of this outcome under section 73 of the Act within 20 working days from the day that my decision is published in TCCS' disclosure log or a longer period allowed by the Ombudsman.

If you wish to request a review of my decision, you may write to the Ombudsman at:

The ACT Ombudsman
GPO Box 442
CANBERRA ACT 2601
Via email: actfoi@ombudsman.gov.au

ACT Civil and Administrative Tribunal (ACAT) review

Under section 84 of the Act, if a decision is made under section 82 on an Ombudsman review, you may apply to the ACAT for review of the Ombudsman decision.

Further information may be obtained from ACAT at:

ACT Civil and Administrative Tribunal
Level 4, 1 Moore Street
GPO Box 370
CANBERRA CITY ACT 2601
Telephone: (02) 6207 1740
www.acat.act.gov.au

If you have any queries concerning the directorate's processing of your request, or would like further information, please contact the TCCS FOI team on (02) 6207 2987 or email to tccs.foi@act.gov.au.

Yours sincerely

Cherie Hughes
Information Officer

11 August 2021

FREEDOM OF INFORMATION REQUEST SCHEDULE

Please be aware that under the *Freedom of Information Act 2016*, some of the information provided to you will be released to the public through the ACT Government's Open Access Scheme. The Open Access release status column of the table below indicates what documents are intended for release online through open access.

Personal information or business affairs information will not be made available under this policy. If you think the content of your request would contain such information, please inform the contact officer immediately.

Information about what is published on open access is available online at: https://www.tccs.act.gov.au/about-us/freedom_of_information/disclosure-log

File number	WHAT ARE THE PARAMETERS OF THE REQUEST
FOI – 21-065	**Scoping proposal and resultant study in the intersection upgrades at Sulwood Drive and Mannheim Street in Kambah**

Ref No	Page Number	Description	Date	Status	Reason for non-release or deferral	Open Access release status
1	**1-21**	Major Projects Canberra – Infrastructure Delivery Partners Group – Mount Taylor Carpark, Sulwood Drive, Mannheim Street intersection, Wanniassa and Hume Circle, Fyshwick Design Services – Project Brief - 35496	6 May 2020	Full access		Documents to be published.
2	**22-346**	Mount Taylor Feasibility Report – Mount Taylor Design Services – ACT Reference No. 35496	14 April 2021	Partial access	Schedule 2, Section 2.2 (a)(ii) - Prejudice the Protection of an Individual's Right to Privacy Pages 23, 48-49, 110-130, 132-137, 140-167, 169, 258-261, 264, 266, 269, 271, 273, 298, 333-339, 341-344 Section 2.2 (a)(iii) - prejudice the security, law enforcement or public safety	

					Pages 51-52, 74, 77-80, 87-92 113-137, 143-145, 150-166, 252, 259, 302-303, 341-345 Schedule 2.2(a)(xii) - prejudice the competitive commercial activities of an agency Pages 61 ,66, 68, 82, 94. 104, 174 - 247	

Appendix E Cost Estimate

Appendix E1 – Cost Estimate Shared User Path

Appendix E2 – Cost Estimate Carpark

Appendix E3 – Cost Estimate Intersection Upgrade

Mt Taylor Feasibility Study SUP - Option 1

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	Total General				$ [redacted]
	Check the construction period - 4 months allowed				
MITS 01	Traffic Management				
	Total Traffic Management				$ [redacted]
MITS 02	Earthworks				
	Total Earthworks				$ [redacted]
MITS03	Underground Services				
	Total Drainage				$ [redacted]
MITS 04	Flexible Pavement Construction				
	Total Flexible Pavement				$ [redacted]
MITS 06	Minor Concrete Works				
	Total Minor Concrete				$ [redacted]
MITS 07	Segmental Paving				
	Total Segmental Paving				$ -
MITS 08	Incidental Works				
	Total Incidental Works				$ [redacted]
MITS 09	Landscape				
	Total Landscape				$ [redacted]
MITS 10	Concrete Works				
	Total Concrete Works				$ -
MITS 11	Pavement Marking				
	Total Pavement Marking				$ [redacted]
MITS 13	Traffic Signals				
	Total Traffic Signals				$ [redacted]
MITS 14	Road Signs				
	Total Road Signs				$ -
MITS 15	Road Furniture				
	Total Road Furniture				$ -
MITS 16	WSUD Features				
	Total WSUD Features				$ -
	Total Construction				$ [redacted]
	preliminaries (5%)			5%	$ [redacted]

	design procurement and management fees (15%)			15%	$ [redacted]
	Contingency (50%)			50%	$ [redacted]
	GST			**10%**	**$** [redacted]
	Lump Sum Fee				**$** [redacted]

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
MITS 00	**Preliminaries**				
MITS 00A	**General requirements**			[redacted]	
0A.1	Site Establishment	Lump sum	1		
0A.5	Project Signs	Number	2		
0A.6	Coordination with Utility Authorities	Lump sum	1		
0A.12	Survey Set Out and Control	Lump sum	1		
0A.13.1	Works by the Contractor	Provisional Sum	1		
0A.13 2	Works by the Service Authority	Provisional Sum	1		
0A.14	Additional Work	Provisional Sum	1		
0A.15.4	Kerb (various sizes and types)	m	160		
0A.15 5	Path or concrete paving (various thickness)	m^2	50		
0A15.1	Sewer	Each	1		
0A15.2	Stormwater	Each	1		
0A15.3	Water	Each	1		
0A15.4	Gas	Each	1		
0A15.5	Electricity	Each	1		
0A15.6	Telstra	Each	1		
0A15.7	NBN	Each	1		
MITS 00B	**Quality Construction**				
0B.1	Quality system documents and records	Lump sum	1		
0B.4.1.1	Civil	Provisional sum	1		
0B.4.1.2	Landscape	Provisional sum	1		
MITS 00C	**Control of Erosion and Sedimentation**				
0C.1.1	Establishment	Lump Sum	1		
	Total General				
	Check the construction period - 4 months allowed				
MITS 01	**Traffic Management**				
1.1	Control of traffic	Lump Sum	1		
1 5	Variable message signs	Weeks	16		
1.6	Safety Audit	Number	10		
1.7	Road Safety Audit	Number	2		
	Total Traffic Management				
MITS 02	**Earthworks**				
MITS 02A	**Clearing and Grubbing**				
2A.3	Removal of nominated trees	Number	50		
MITS 02B	**Bulk Earthworks**				
2B.1	Topsoil stripping	m^3	3,040		
2B.2.1	Within project site	m^3	8,760.86		
2B.3	Unsuitable Material	m^3	876		
2B.5	General fill	m^3	2,171		
2B.8	Preparation of cut and fill subgrades	m^2	11,120		
2B.10	Construction of swale batter drain (Cut off drain)	m	35		
MITS 02C	**Stabilisation**				
2C.1	Supply stabilising agent (in situ mixing only)				
	Total Earthworks				
MITS03	**Underground Services**				
MITS03A	**Trenching for Underground Services**				
MITS03B	**Pipe Drainage**				
3B.1	Stormwater pipes and pipe culverts				
3B.2	Stormwater pipe fittings				
3B.3	Stormwater pipe branch connections				
3B.4	Flexible joints				
3B.5	Splayed stormwater pipe				
3B.6	End caps for stormwater mains				
3B.7	End caps for stormwater ties				
3B.8	Scour stops				
MITS 03C	**Precast Box Culverts**				
3C.1	Cast insitu base slab				
3C.2	Precast RCBC				
3C.3	Cast insitu link slab				
MITS 03D	**Drainage Structures**				
3D.4	Special chambered MH			[redacted]	
3D 5	Stormwater sumps				
3D 5 2	**Grated sump Type 1 Relocated sump 1.5m**	Number	5		
3D.6	Stormwater sumps >1 8m				
3D.7	Surcharge structures				
3D 8	Headwalls				
3D 8.1.1	Culvert: to suit 375mm pipe	Number	5		
3D 8 2.1	Pipe Culvert 375mm pipe	Number (150m total)	5		
MITS 03E	**Water Supply Reticulation**				
3E.1	Water supply pipes				
3E 2	Water supply pipe bends				

3E 3	Water supply pipe tees				
3E.4	Water supply pipe reducers				
3E 5	Fire hydrants				
3E.6	Sluice valves				
3E.7	Restrained joints				
3E 8	End caps				
3E 9	Thrust blocks				
3E.11	Scour stops				
3E.12	Trench stops				
3E.13	Pipe and Trench Protection				
3E.14	Valve chambers				
3E.15	Scour installations				
3E.16	Contractor works on existing water supply				
3E.18	Water service ties				
3E.19	Ready tap connectors				
MITS 03F	**Sewerage systems reticulation**				
3F.1	Sewer pipes				
3F 2	Sewer pipe fittings				
3F 3	Flexible joints				
3F.4	Sewer main dead ends				
3F 5	Sewer main sealing discs				
3F.6	Sewer tie dead ends				
3F.7	Scour stops				
3F 8	Trench stops				
3F 9	Connect to existing sewer structures				
3F.15	Pipe and Trench Protection				
3F.16	Sewer MH				
3F.19	VD				
3F 20	VD >Min Drop				
3F 23	Special chambered MH				
3F 24	Contractor works on existing sewer				
MITS 03G	**Service Conduits**				
3G.1	Trenching for Service Authorities				
3G 2	Conduit provision in a shared trench				
3G 5	Electrical Conduits				
3G.6	End caps				
MITS 03H	**Road Openings and Restorations**				
MITS 03I	**Subsurface Drainage**				
MITS 03J	**Subsoil and Foundation Drains**				
MITS 03K	**Drainage Mats**				
	Total Drainage				$ [redacted]
MITS 04	**Flexible Pavement Construction**				
4.1.1	DGB20 (traffic category A)			[redacted]	
4.1 2	DGB20 (traffic category D)				
4.1 2 3	150 mm layer	m^2	11,120		
4 2	Subbase material				
4 2.1	DGS20 (traffic category A)				
4 2 2	DGS20 (traffic category D)				
4 2 2 2	150 mm layer	m^2	11,120		
4.4	Supply and Spray Primer, Primerbinder				
4.4.1	AMC00	Litres	14,678		
4.4 2	C170	Litres	14,678		
4 5	Supply and Spray Binder				
4.6	Supply, incorporate and spray cutter oil in binder				
4.7	Supply, incorporate and spray fulx oil in binder				
4.7 3	FGG-A Wearing Course	m^3	306		
4 8	Supply, Precoat, Apply and Incorporate aggregate	m^3			
4.13	Upper SMZ				
4.14	Lower SMZ				
4.15	Lower UZF (CBR≥8%)				
	Total Flexible Pavement				
MITS 06	**Minor Concrete Works**			[redacted]	
MITS 06A	**Concrete Kerbs and Open Drains**				
6A.1	Concrete lining of open drains				
6A.1.2	150mm	m^2	35		
6A.3.1	Remove batter drain	m	250		
6A.5	Kerbs				
6A.5.3	MK	m	24		
6A.6	Kerb reinforcement				
6A.7	Kerb ramps				
6A.7.4	3 0m path	Number	6		
6A.8	Vehicle crossings				
6A.11	Rock filled wire mattresses				
MITS 06B	**Concrete Paths Driveways Medians**				

6B.1	Paths, driveways, median toppings				
6B.2	Reinforcement for paths, driveways, median toppings				
	Total Minor Concrete				$ [redacted]
MITS 07	**Segmental Paving**				
7.1	Segmental Paving				
MITS 08	**Incidental Works**				
MITS 08A	**Fences and Barriers**				
8A.2	Gates				
8A.3	Barrier fences				
8A.4	Cycleway rails				
8A.4.2	Single post cycle rest rail	Number	18	$ [redacted]	[redacted]
8A.6	Bollards				
	Total Incidental Works				$ [redacted]
MITS 09	**Landscape**				
MITS 09A	**Topsoil**				
9A.1	Topsoil – grass areas	m^2	22,575	[redacted]	[redacted]
MITS 09B	**Grassing**				
9B.1	Detailed excavation, filling and trimming, finishing of surfaces	m^2	22,575	[redacted]	[redacted]
MITS 09C	**Planting**				
9C.7	Consolidation	Weeks	26	[redacted]	[redacted]
MITS 09D	**Irrigation**				
MITS 09E	**Consolidation**				
	Total Landscape				$ [redacted]
MITS 10	**Concrete Works**				
MITS 11	**Pavement Marking**				
11.2	Set Out of Pavement Marking	Lump Sum	1	$ [redacted]	[redacted]
11.3	Paint – Longitudinal Lines				
11.3.8.2	Path separation line S5	m	3,800	$ [redacted]	[redacted]
11.4	Paint –Symbols, Legends, Arrows, Chevrons, Traffic Islands and Kerbs				
11.5	Paint - Transverse Lines				
11.6	Paint - Long Life Material (LLM) - Longitudinal Lines				
11.7	Long Life Material (LLM) - Transverse Lines			[redacted]	
11.7.4	Stop Line (SL1)	m	25		
11.8	Long Life Material (LLM) - Symbols, Legends and Arrows				
11.9	Long Life Material (LLM) - Symbols, Legends and Arrows				
11.10	Installation of Retroreflective Raised Pavement Markers (RRPM)				
	Total Pavement Marking				$ [redacted]
MITS 13	**Traffic Signals**				
13.4	Mast arm and streetlight post			[redacted]	
13.4.1	10.5m light col/ 4.5m light outreach/ 8.5m signal outreach	Number	63		
13.5	Joint use post				
13.8	Pedestrian push button assemblies				
13.13	Cable conduit				
13.13.1.1	1 x 50 dia. Streetlighting Conduit and Cable - dig/lay/install	m	4000		
13.14	Vehicle detector loops				
13.19	CCTV	Provisional Sum			
	Total Traffic Signals				
MITS 14	**Road Signs**				
14.2	Manufacture of Guide Sign support structures				
14.3	Erection of Guide Sign support structures				
MITS 15	**Road Furniture**				
MITS 15A	**Guide Posts**				
MITS 15B	**Non Rigid Safety Barrier Systems**				
MITS 15C	**Rigid Road Safety Barrier Systems**				
MITS 16	**WSUD Features**				
MITS 16A	**Bio-Retention Systems**				
MITS 16B	**Ponds**				
16B 3	HDPE/Geotextile Liner Materials for Ponds				
MITS 16C	**Wetlands**				
MITS 16D	**Gross Pollutant Traps**				
	Total Construction			[redacted]	
	preliminaries (5%)				
	design procurement and management fees (15%)				
	Contingency (50%)				
	GST				

	Lump Sum Fee				[redacted]

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	Total General				[redacted]
	Check the construction period - 4 months allowed				
MITS 01	**Traffic Management**				
	Total Traffic Management				
MITS 02	**Earthworks**				
	Total Earthworks				
MITS03	**Underground Services**				
	Total Drainage				
MITS 04	**Flexible Pavement Construction**				
	Total Flexible Pavement				
MITS 06	**Minor Concrete Works**				
	Total Minor Concrete				
MITS 07	**Segmental Paving**				
	Total Segmental Paving				
MITS 08	**Incidental Works**				
	Total Incidental Works				
MITS 09	**Landscape**				
	Total Landscape				
MITS 10	**Concrete Works**				
	Total Concrete Works				
MITS 11	**Pavement Marking**				
	Total Pavement Marking				
MITS 13	**Traffic Signals**				
13.18	Installation and connection of Power Supply cable by Evo	Provisional Sum			
	Total Traffic Signals				
14.12	Provision of low maintenance sign socket system	Number			
	Total Road Signs				
15C.2	Terminal ends	Number			
	Total Road Furniture				
16.D.3	Davit unit and surround	Number			
	Total WSUD Features				
	Total Construction				
	preliminaries (5%)			5%	

	design, procurement and management fees (15%)			15%	[redacted]
	Contingency (50%)			50%	[redacted]
	GST			**10%**	[redacted]
	Lump Sum Fee				[redacted]

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
MITS 00	**Preliminaries**				
MITS 00A	**General requirements**				
0A.1	Site Establishment	Lump sum	1		
0A.5	Project Signs	Number	2		
0A.6	Coordination with Utility Authorities	Lump sum	1		
0A.12	Survey Set Out and Control	Lump sum	1		
0A.13.1	Works by the Contractor	Provisional Sum	1		
0A.13.2	Works by the Service Authority	Provisional Sum	1		
0A.14	Additional Work	Provisional Sum	1		
0A.15.4	Kerb (various sizes and types)	m	160		
0A.15.5	Path or concrete paving (various thickness)	m^2	50		
0A15.1	Sewer	Each	1		
0A15.2	Stormwater	Each	1		
0A15.3	Water	Each	1		
0A15.4	Gas	Each	1		
0A15.5	Electricity	Each	1		
0A15.6	Telstra	Each	1		
0A15.7	NBN	Each	1		
MITS 00B	**Quality Construction**				
0B.1	Quality system documents and records	Lump sum	1		
0B.4.1.1	Civil	Provisional sum	1		
0B.4.1.2	Landscape	Provisional sum	1		
MITS 00C	**Control of Erosion and Sedimentation**				
0C.1.1	Establishment	Lump Sum	1		
	Total General				
	Check the construction period - 4 months allowed				
MITS 01	**Traffic Management**				
1.1	Control of traffic	Lump Sum	1		
1.5	Variable message signs	Weeks	16		
1.6	Safety Audit	Number	10		
1.7	Road Safety Audit	Number	2		
	Total Traffic Management				
MITS 02	**Earthworks**				
MITS 02A	**Clearing and Grubbing**				
2A.3	Removal of nominated trees	Number	50		
MITS 02B	**Bulk Earthworks**				
2B.1	Topsoil stripping	m^3	3,040		
2B.2.1	Within project site	m^3	18,233.39		
2B.3	Unsuitable Material	m^3	1,823		
2B.5	General fill	m^3	2,491		
2B.8	Preparation of cut and fill subgrades	m^2	11,120		
2B.10	Construction of swale batter drain (Cut off drain)	m	160		
MITS 02C	**Stabilisation**				
2C.1	Supply stabilising agent (in situ mixing only)				
	Total Earthworks				
MITS03	**Underground Services**				
MITS03A	**Trenching for Underground Services**				
MITS03B	**Pipe Drainage**				
3B.1	Stormwater pipes and pipe culverts				
3B.2	Stormwater pipe fittings				
3B.3	Stormwater pipe branch connections				
3B.4	Flexible joints				
3B.5	Splayed stormwater pipe				
3B.6	End caps for stormwater mains				
3B.7	End caps for stormwater ties				
3B.8	Scour stops				
MITS 03C	**Precast Box Culverts**				
3C.1	Cast insitu base slab				
3C.2	Precast RCBC				
3C.3	Cast insitu link slab				
MITS 03D	**Drainage Structures**				
3D.4	Special chambered MH				
3D.5	Stormwater sumps				
3D.5.2	**Grated sump Type 1 Relocated sump 1.5m**	Number	5		
3D.6	Stormwater sumps >1.8m				
3D.7	Surcharge structures				
3D.8	Headwalls				
3D.8.1.1	Culvert: to suit 375mm pipe	Number	5		
3D.8.2.1	Pipe Culvert 375mm pipe	Number (150m total)	5		
MITS 03E	**Water Supply Reticulation**				
3E.1	Water supply pipes				
3E.2	Water supply pipe bends				
3E.3	Water supply pipe tees				
3E.4	Water supply pipe reducers				
3E.5	Fire hydrants				
3E.6	Sluice valves				

3E.7	Restrained joints				
3E.8	End caps				
3E.9	Thrust blocks				
3E.11	Scour stops				
3E.12	Trench stops				
3E.13	Pipe and Trench Protection				
3E.14	Valve chambers				
3E.15	Scour installations				
3E.16	Contractor works on existing water supply				
3E.18	Water service ties				
3E.19	Ready tap connectors				
MITS 03F	**Sewerage systems reticulation**				
3F.1	Sewer pipes				
3F.2	Sewer pipe fittings				
3F.3	Flexible joints				
3F.4	Sewer main dead ends				
3F.5	Sewer main sealing discs				
3F.6	Sewer tie dead ends				
3F.7	Scour stops				
3F.8	Trench stops				
3F.9	Connect to existing sewer structures				
3F.15	Pipe and Trench Protection				
3F.16	Sewer MH				
3F.19	VD				
3F.20	VD >Min Drop				
3F.23	Special chambered MH				
3F.24	Contractor works on existing sewer				
MITS 03G	**Service Conduits**				
3G.1	Trenching for Service Authorities				
3G.2	Conduit provision in a shared trench				
3G.5	Electrical Conduits				
3G.6	End caps				
MITS 03H	**Road Openings and Restorations**				
MITS 03I	**Subsurface Drainage**				
MITS 03J	**Subsoil and Foundation Drains**				
MITS 03K	**Drainage Mats**				
	Total Drainage				
MITS 04	**Flexible Pavement Construction**				
4.1.1	DGB20 (traffic category A)				
4.1.2	DGB20 (traffic category D)				
4.1.2.3	150 mm layer	m^2	11,120		
4.2	Subbase material				
4.2.1	DGS20 (traffic category A)				
4.2.2	DGS20 (traffic category D)				
4.2.2.2	150 mm layer	m^2	11,120		
4.4	Supply and Spray Primer, Primerbinder				
4.4.1	AMC00	Litres	14,678		
4.4.2	C170	Litres	14,678		
4.5	Supply and Spray Binder				
4.6	Supply, incorporate and spray cutter oil in binder				
4.7	Supply, incorporate and spray fulx oil in binder				
4.7.3	FGG-A Wearing Course	m^3	306		
4.8	Supply, Precoat, Apply and Incorporate aggregate	m^3			
4.13	Upper SMZ				
4.14	Lower SMZ				
4.15	Lower UZF (CBR≥8%)				
	Total Flexible Pavement				
MITS 06	**Minor Concrete Works**				
MITS 06A	**Concrete Kerbs and Open Drains**				
6A.1	Concrete lining of open drains				
6A.1.2	150mm	m^2	35		
6A.3.1	Remove batter drain	m	250		
6A.5	Kerbs				
6A.5.3	MK	m	24		
6A.6	Kerb reinforcement				
6A.7	Kerb ramps				
6A.7.4	3.0m path	Number	6		
6A.8	Vehicle crossings				
6A.11	Rock filled wire mattresses				
MITS 06B	**Concrete Paths Driveways Medians**				
6B.1	Paths, driveways, median toppings				
6B.2	Reinforcement for paths, driveways, median toppings				
	Total Minor Concrete				
MITS 07	**Segmental Paving**				
7.1	Segmental Paving				

MITS 08	**Incidental Works**			[redacted]
MITS 08A	**Fences and Barriers**			
8A.2	Gates			
8A.3	Barrier fences			
8A.4	Cycleway rails			
8A.4.2	Single post cycle rest rail	Number	18	
8A.6	Bollards			
	Total Incidental Works			
MITS 09	**Landscape**			
MITS 09A	**Topsoil**			
9A.1	Topsoil – grass areas	m^2	22,575	
MITS 09B	**Grassing**			
9B.1	Detailed excavation, filling and trimming, finishing of surfaces	m^2	22,575	
MITS 09C	**Planting**			
9C.7	Consolidation	Weeks	26	
MITS 09D	**Irrigation**			
MITS 09E	**Consolidation**			
	Total Landscape			
MITS 10	**Concrete Works**			
MITS 11	**Pavement Marking**			
11.2	Set Out of Pavement Marking	Lump Sum	1	
11.3	Paint – Longitudinal Lines			
11.3.8.2	Path separation line S5	m	3,800	
11.4	Paint –Symbols, Legends, Arrows, Chevrons, Traffic Islands and Kerbs			
11.5	Paint - Transverse Lines			
11.6	Paint - Long Life Material (LLM) - Longitudinal Lines			
11.7	Long Life Material (LLM) - Transverse Lines			
11.7.4	Stop Line (SL1)	m	20	
11.8	Long Life Material (LLM) - Symbols, Legends and Arrows			
11.9	Long Life Material (LLM) - Symbols, Legends and Arrows			
11.10	Installation of Retroreflective Raised Pavement Markers (RRPM)			
	Total Pavement Marking			
MITS 13	**Traffic Signals**			
13.4	Mast arm and streetlight post			
13.4.1	10.5m light col/ 4.5m light outreach/ 8.5m signal outreach	Number	63	
13.5	Joint use post			
13.8	Pedestrian push button assemblies			
13.13	Cable conduit			
13.13.1.1	1 x 50 dia. Streetlighting Conduit and Cable - dig/lay/install	m	4000	
13.14	Vehicle detector loops			
	Total Traffic Signals			
MITS 14	**Road Signs**			
14.2	Manufacture of Guide Sign support structures			
14.3	Erection of Guide Sign support structures			
MITS 15	**Road Furniture**			
MITS 15A	**Guide Posts**			
MITS 15B	**Non Rigid Safety Barrier Systems**			
MITS 15C	**Rigid Road Safety Barrier Systems**			
MITS 16	**WSUD Features**			
MITS 16A	**Bio-Retention Systems**			
MITS 16B	**Ponds**			
16B.3	HDPE/Geotextile Liner Materials for Ponds			
MITS 16C	**Wetlands**			
MITS 16D	**Gross Pollutant Traps**			
	Total Construction			
	preliminaries (5%)			
	design, procurement and management fees (15%)			
	Contingency (50%)			
	GST			
	Lump Sum Fee			

Mt Taylor Feasibility Study SUP - Option 3

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	Total General				[redacted]
	Check the construction period - 4 months allowed				
MITS 01	Traffic Management				
	Total Traffic Management				
MITS 02	Earthworks				
	Total Earthworks				
MITS03	Underground Services				
	Total Drainage				
MITS 04	Flexible Pavement Construction				
	Total Flexible Pavement				
MITS 06	Minor Concrete Works				
	Total Minor Concrete				
MITS 07	Segmental Paving				
	Total Segmental Paving				
MITS 08	Incidental Works				
	Total Incidental Works				
MITS 09	Landscape				
	Total Landscape				
MITS 10	Concrete Works				
	Total Concrete Works				
MITS 11	Pavement Marking				
	Total Pavement Marking				
MITS 13	Traffic Signals				
	Total Traffic Signals				
	Total Road Signs				
	Total Road Furniture				
	Total WSUD Features				
	Total Construction				
	preliminaries (5%)			5%	
	design,procurement and management fees (15%)			15%	
	Contingency (50%)			50%	
	GST			10%	
	Lump Sum Fee				

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
MITS 00	**Preliminaries**				
MITS 00A	**General requirements**				
0A.1	Site Establishment	Lump sum	1		
0A.5	Project Signs	Number	2		
0A.6	Coordination with Utility Authorities	Lump sum	1		
0A.12	Survey Set Out and Control	Lump sum	1		
0A.13.1	Works by the Contractor	Provisional Sum	1		
0A.13 2	Works by the Service Authority	Provisional Sum	1		
0A.14	Additional Work	Provisional Sum	1		
0A.15.4	Kerb (various sizes and types)	m	160		
0A.15 5	Path or concrete paving (various thickness)	m^2	50		
0A15.1	Sewer	Each	1		
0A15.2	Stormwater	Each	1		
0A15.3	Water	Each	1		
0A15.4	Gas	Each	1		
0A15.5	Electricity	Each	1		
0A15.6	Telstra	Each	1		
0A15.7	NBN	Each	1		
MITS 00B	**Quality Construction**				
0B.1	Quality system documents and records	Lump sum	1		
0B.4.1.1	Civil	Provisional sum	1		
0B.4.1.2	Landscape	Provisional sum	1		
MITS 00C	**Control of Erosion and Sedimentation**				
0C.1.1	Establishment	Lump Sum	1		
	Total General				
	Check the construction period - 4 months allowed				
MITS 01	**Traffic Management**				
1.1	Control of traffic	Lump Sum	1		
1 5	Variable message signs	Weeks	16		
1.6	Safety Audit	Number	10		
1.7	Road Safety Audit	Number	2		
	Total Traffic Management				
MITS 02	**Earthworks**				
MITS 02A	**Clearing and Grubbing**				
2A.3	Removal of nominated trees	Number	50		
MITS 02B	**Bulk Earthworks**				
2B.1	Topsoil stripping	m^3	3,040		
2B.2.1	Within project site	m^3	6,057 83		
2B.3	Unsuitable Material	m^3	606		
2B.5	General fill	m^3	1,044		
2B.8	Preparation of cut and fill subgrades	m^2	11,120		
2B.10	Construction of swale batter drain (Cut off drain)	m	160		
MITS 02C	**Stabilisation**				
2C.1	Supply stabilising agent (in situ mixing only)				
	Total Earthworks				
MITS03	**Underground Services**				
MITS03A	**Trenching for Underground Services**				
MITS03B	**Pipe Drainage**				
3B.1	Stormwater pipes and pipe culverts				
3B.2	Stormwater pipe fittings				
3B.3	Stormwater pipe branch connections				
3B.4	Flexible joints				
3B.5	Splayed stormwater pipe				
3B.6	End caps for stormwater mains				
3B.7	End caps for stormwater ties				
3B.8	Scour stops				
MITS 03C	**Precast Box Culverts**				
3C.1	Cast insitu base slab				
3C.2	Precast RCBC				
3C.3	Cast insitu link slab				
MITS 03D	**Drainage Structures**				
3D.4	Special chambered MH				
3D 5	Stormwater sumps				
3D 5 2	**Grated sump Type 1 Relocated sump 1.5m**	Number	5		
3D.6	Stormwater sumps >1.8m				
3D.7	Surcharge structures				
3D 8	Headwalls				
3D 8.1.1	Culvert: to suit 375mm pipe	Number	5		
3D 8 2.1	Pipe Culvert 375mm pipe	Number (150m total)	5		
MITS 03E	**Water Supply Reticulation**				
3E.1	Water supply pipes				
3E 2	Water supply pipe bends				
3E 3	Water supply pipe tees				
3E.4	Water supply pipe reducers				

3E 5	Fire hydrants				
3E.6	Sluice valves				
3E.7	Restrained joints				
3E 8	End caps				
3E 9	Thrust blocks				
3E.11	Scour stops				
3E.12	Trench stops				
3E.13	Pipe and Trench Protection				
3E.14	Valve chambers				
3E.15	Scour installations				
3E.16	Contractor works on existing water supply				
3E.18	Water service ties				
3E.19	Ready tap connectors				
MITS 03F	**Sewerage systems reticulation**				
3F.1	Sewer pipes				
3F 2	Sewer pipe fittings				
3F 3	Flexible joints				
3F.4	Sewer main dead ends				
3F 5	Sewer main sealing discs				
3F.6	Sewer tie dead ends				
3F.7	Scour stops				
3F 8	Trench stops				
3F 9	Connect to existing sewer structures				
3F.15	Pipe and Trench Protection				
3F.16	Sewer MH				
3F.19	VD				
3F 20	VD >Min Drop				
3F 23	Special chambered MH				
3F 24	Contractor works on existing sewer				
MITS 03G	**Service Conduits**				
3G.1	Trenching for Service Authorities				
3G 2	Conduit provision in a shared trench				
3G 5	Electrical Conduits				
3G.6	End caps				
MITS 03H	**Road Openings and Restorations**				
MITS 03I	**Subsurface Drainage**				
MITS 03J	**Subsoil and Foundation Drains**				
MITS 03K	**Drainage Mats**				
	Total Drainage				[redacted]
MITS 04	**Flexible Pavement Construction**				
4.1.1	DGB20 (traffic category A)				
4.1 2	DGB20 (traffic category D)				
4.1 2 3	150 mm layer	m^2	11,120		
4 2	Subbase material				
4 2.1	DGS20 (traffic category A)				
4 2 2	DGS20 (traffic category D)				
4 2 2 2	150 mm layer	m^2	11,120		
4.4	Supply and Spray Primer, Primerbinder				
4.4.1	AMC00	Litres	14,678		
4.4 2	C170	Litres	14,678		
4 5	Supply and Spray Binder				
4.6	Supply, incorporate and spray cutter oil in binder				
4.7	Supply, incorporate and spray fulx oil in binder				
4.7 3	FGG-A Wearing Course	m^3	306		
4 8	Supply, Precoat, Apply and Incorporate aggregate	m^3			
4.13	Upper SMZ				
4.14	Lower SMZ				
4.15	Lower UZF (CBR≥8%)				
	Total Flexible Pavement				
MITS 06	**Minor Concrete Works**				
MITS 06A	**Concrete Kerbs and Open Drains**				
6A.1	Concrete lining of open drains				
6A.1.2	150mm	m^2	35		
6A.3.1	Remove batter drain	m	250		
6A.5	Kerbs				
6A.5.3	MK	m	24		
6A.6	Kerb reinforcement				
6A.7	Kerb ramps				
6A.7.4	3.0m path	Number	6		
6A.8	Vehicle crossings				
6A.11	Rock filled wire mattresses				
MITS 06B	**Concrete Paths Driveways Medians**				
6B.1	Paths, driveways, median toppings				
6B.2	Reinforcement for paths, driveways, median toppings				
	Total Minor Concrete				

[redacted]

MITS 07	**Segmental Paving**				
7.1	Segmental Paving				
MITS 08	**Incidental Works**				
MITS 08A	**Fences and Barriers**				
8A.2	Gates				
8A.3	Barrier fences				
8A.4	Cycleway rails				
8A.4.2	Single post cycle rest rail	Number	18		
8A.6	Bollards				
	Total Incidental Works				
MITS 09	**Landscape**				
MITS 09A	**Topsoil**				
9A.1	Topsoil – grass areas	m^2	22,575		
MITS 09B	**Grassing**				
9B.1	Detailed excavation, filling and trimming, finishing of surfaces	m^2	22,575		
MITS 09C	**Planting**				
9C.7	Consolidation	Weeks	26		
MITS 09D	**Irrigation**				
MITS 09E	**Consolidation**				
	Total Landscape				
MITS 10	**Concrete Works**				
MITS 11	**Pavement Marking**				
11.2	Set Out of Pavement Marking	Lump Sum	1		
11.3	Paint – Longitudinal Lines				
11.3.8.2	Path separation line S5	m	3,800		
11.4	Paint –Symbols, Legends, Arrows, Chevrons, Traffic Islands and Kerbs				
11.5	Paint - Transverse Lines				
11.6	Paint - Long Life Material (LLM) - Longitudinal Lines				
11.7	Long Life Material (LLM) - Transverse Lines				
11.7.4	Stop Line (SL1)	m	20		
11.8	Long Life Material (LLM) - Symbols, Legends and Arrows				
11.9	Long Life Material (LLM) - Symbols, Legends and Arrows				
11.10	Installation of Retroreflective Raised Pavement Markers (RRPM)				
	Total Pavement Marking				
MITS 13	**Traffic Signals**				
13.4	Mast arm and streetlight post				
13.4.1	10.5m light col/ 4.5m light outreach/ 8.5m signal outreach	Number	63		
13.5	Joint use post				
13.8	Pedestrian push button assemblies				
13.13	Cable conduit				
13.13.1.1	1 x 50 dia. Streetlighting Conduit and Cable - dig/lay/install	m	4000		
13.14	Vehicle detector loops				
	Total Traffic Signals				
MITS 14	**Road Signs**				
14.2	Manufacture of Guide Sign support structures				
14.3	Erection of Guide Sign support structures				
MITS 15	**Road Furniture**				
MITS 15A	**Guide Posts**				
MITS 15B	**Non Rigid Safety Barrier Systems**				
MITS 15C	**Rigid Road Safety Barrier Systems**				
MITS 16	**WSUD Features**				
MITS 16A	**Bio-Retention Systems**				
MITS 16B	**Ponds**				
16B.3	HDPE/Geotextile Liner Materials for Ponds				
MITS 16C	**Wetlands**				
MITS 16D	**Gross Pollutant Traps**				
	Total Construction				
	preliminaries (5%)				
	design,procurement and management fees (15%)				
	Contingency (50%)				
	GST				
	Lump Sum Fee				

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	Total General				
	Check the construction period - 4 months allowed				
MITS 01	Traffic Management				
	Total Traffic Management				
MITS 02	Earthworks				
	Total Earthworks				
MITS03	Underground Services				
	Total Drainage				
MITS 04	Flexible Pavement Construction				
	Total Flexible Pavement				
MITS 06	Minor Concrete Works				
	Total Minor Concrete				
MITS 07	Segmental Paving				
	Total Segmental Paving				
MITS 08	Incidental Works				
	Total Incidental Works				
MITS 09	Landscape				
	Total Landscape				
MITS 10	Concrete Works				
	Total Concrete Works				
MITS 11	Pavement Marking				
	Total Pavement Marking				
MITS 13	Traffic Signals				
	Total Traffic Signals				
	Total Road Signs				
	Total Road Furniture				
	Total WSUD Features				
	Total Construction				
	preliminaries (5%)			5%	
	design, procurement and management fees (15%)			15%	
	Contingency (50%)			50%	
	GST			10%	
	Lump Sum Fee				

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
MITS 00	**Preliminaries**				
MITS 00A	**General requirements**				
0A.1	Site Establishment	Lump sum	1		
0A.5	Project Signs	Number	2		
0A.6	Coordination with Utility Authorities	Lump sum	1		
0A.12	Survey Set Out and Control	Lump sum	1		
0A.13.1	Works by the Contractor	Provisional Sum	1		
0A.13 2	Works by the Service Authority	Provisional Sum	1		
0A.14	Additional Work	Provisional Sum	1		
0A.15.4	Kerb (various sizes and types)	m	160		
0A.15 5	Path or concrete paving (various thickness)	m^2	50		
0A15.1	Sewer	Each	1		
0A15.2	Stormwater	Each	1		
0A15.3	Water	Each	1		
0A15.4	Gas	Each	1		
0A15.5	Electricity	Each	1		
0A15.6	Telstra	Each	1		
0A15.7	NBN	Each	1		
MITS 00B	**Quality Construction**				
0B.1	Quality system documents and records	Lump sum	1		
0B.4.1.1	Civil	Provisional sum	1		
0B.4.1.2	Landscape	Provisional sum	1		
MITS 00C	**Control of Erosion and Sedimentation**				
0C.1.1	Establishment	Lump Sum	1		
	Total General				
	Check the construction period - 4 months allowed				
MITS 01	**Traffic Management**				
1.1	Control of traffic	Lump Sum	1		
1 5	Variable message signs	Weeks	16		
1.6	Safety Audit	Number	10		
1.7	Road Safety Audit	Number	2		
	Total Traffic Management				
MITS 02	**Earthworks**				
MITS 02A	**Clearing and Grubbing**				
2A.3	Removal of nominated trees	Number	10		
MITS 02B	**Bulk Earthworks**				
2B.1	Topsoil stripping	m^3	3,040		
2B.2.1	Within project site	m^3	6,057 83		
2B.3	Unsuitable Material	m^3	606		
2B.5	General fill	m^3	1,044		
2B.8	Preparation of cut and fill subgrades	m^2	11,120		
2B.10	Construction of swale batter drain (Cut off drain)	m	160		
MITS 02C	**Stabilisation**				
2C.1	Supply stabilising agent (in situ mixing only)				
	Total Earthworks				
MITS03	**Underground Services**				
MITS03A	**Trenching for Underground Services**				
MITS03B	**Pipe Drainage**				
3B.1	Stormwater pipes and pipe culverts				
3B.2	Stormwater pipe fittings				
3B.3	Stormwater pipe branch connections				
3B.4	Flexible joints				
3B.5	Splayed stormwater pipe				
3B.6	End caps for stormwater mains				
3B.7	End caps for stormwater ties				
3B.8	Scour stops				
MITS 03C	**Precast Box Culverts**				
3C.1	Cast insitu base slab				
3C.2	Precast RCBC				
3C.3	Cast insitu link slab				
MITS 03D	**Drainage Structures**				
3D.4	Special chambered MH				
3D 5	Stormwater sumps				
3D 5 2	**Grated sump Type 1 Relocated sump 1.5m**	Number	5		
3D.6	Stormwater sumps >1.8m				
3D.7	Surcharge structures				
3D 8	Headwalls				
3D 8.1.1	Culvert: to suit 375mm pipe	Number	5		
3D 8 2.1	Pipe Culvert 375mm pipe	Number (150m total)	5		
MITS 03E	**Water Supply Reticulation**				
3E.1	Water supply pipes				
3E 2	Water supply pipe bends				
3E 3	Water supply pipe tees				
3E.4	Water supply pipe reducers				

3E 5	Fire hydrants				
3E.6	Sluice valves				
3E.7	Restrained joints				
3E 8	End caps				
3E 9	Thrust blocks				
3E.11	Scour stops				
3E.12	Trench stops				
3E.13	Pipe and Trench Protection				
3E.14	Valve chambers				
3E.15	Scour installations				
3E.16	Contractor works on existing water supply				
3E.18	Water service ties				
3E.19	Ready tap connectors				
MITS 03F	**Sewerage systems reticulation**				
3F.1	Sewer pipes				
3F 2	Sewer pipe fittings				
3F 3	Flexible joints				
3F.4	Sewer main dead ends				
3F 5	Sewer main sealing discs				
3F.6	Sewer tie dead ends				
3F.7	Scour stops				
3F 8	Trench stops				
3F 9	Connect to existing sewer structures				
3F.15	Pipe and Trench Protection				
3F.16	Sewer MH				
3F.19	VD				
3F 20	VD >Min Drop				
3F 23	Special chambered MH				
3F 24	Contractor works on existing sewer				
MITS 03G	**Service Conduits**				
3G.1	Trenching for Service Authorities				
3G 2	Conduit provision in a shared trench				
3G 5	Electrical Conduits				
3G.6	End caps				
MITS 03H	**Road Openings and Restorations**				
MITS 03I	**Subsurface Drainage**				
MITS 03J	**Subsoil and Foundation Drains**				
MITS 03K	**Drainage Mats**				
	Total Drainage				[redacted]
MITS 04	**Flexible Pavement Construction**				
4.1.1	DGB20 (traffic category A)				
4.1 2	DGB20 (traffic category D)				
4.1 2 3	150 mm layer	m^2	11,928	[redacted]	
4 2	Subbase material				
4 2.1	DGS20 (traffic category A)				
4 2 2	DGS20 (traffic category D)				
4 2 2 2	150 mm layer	m^2	11,928		
4.4	Supply and Spray Primer, Primerbinder				
4.4.1	AMC00	Litres	15,745		
4.4 2	C170	Litres	15,745		
4 5	Supply and Spray Binder				
4.6	Supply, incorporate and spray cutter oil in binder				
4.7	Supply, incorporate and spray fulx oil in binder				
4.7 3	FGG-A Wearing Course	m^3	328		
4 8	Supply, Precoat, Apply and Incorporate aggregate	m^3			
4.13	Upper SMZ				
4.14	Lower SMZ				
4.15	Lower UZF (CBR≥8%)				
	Total Flexible Pavement				
MITS 06	**Minor Concrete Works**				
MITS 06A	**Concrete Kerbs and Open Drains**				
6A.1	Concrete lining of open drains				
6A.5	Kerbs				
6A.5.3	MK	m	157	[redacted]	
6A.6	Kerb reinforcement				
6A.7	Kerb ramps				
6A.7.4	3.0m path	Number	14		
6A.8	Vehicle crossings				
6A.11	Rock filled wire mattresses				
MITS 06B	**Concrete Paths Driveways Medians**				
6B.1	Paths, driveways, median toppings				
6B.1.2	150mm N32 Paths	m^2	130		
6B.2	Reinforcement for paths, driveways, median toppings				
6B.2.2	SL82 mesh single layer	m^2	130		
	Total Minor Concrete				

MITS 07	**Segmental Paving**				
7.1	Segmental Paving				
MITS 08	**Incidental Works**				
MITS 08A	**Fences and Barriers**				
8A.2	Gates				
8A.3	Barrier fences				
8A.4	Cycleway rails				
8A.4.2	Single post cycle rest rail	Number	30	[redacted]	
8A.6	Bollards				
	Total Incidental Works				
MITS 09	**Landscape**				
MITS 09A	**Topsoil**				
9A.1	Topsoil – grass areas	m^2	22,575		
MITS 09B	**Grassing**				
9B.1	Detailed excavation, filling and trimming, finishing of surfaces	m^2	22,575		
MITS 09C	**Planting**				
9C.7	Consolidation	Weeks	26		
MITS 09D	**Irrigation**				
MITS 09E	**Consolidation**				
	Total Landscape				
MITS 10	**Concrete Works**				
MITS 11	**Pavement Marking**				
11.2	Set Out of Pavement Marking	Lump Sum	1		
11.3	Paint – Longitudinal Lines				
11.3.8.2	Path separation line S5	m	3,800		
11.4	Paint –Symbols, Legends, Arrows, Chevrons, Traffic Islands and Kerbs				
11.5	Paint - Transverse Lines				
11.6	Paint - Long Life Material (LLM) - Longitudinal Lines				
11.7	Long Life Material (LLM) - Transverse Lines				
11.7.4	Stop Line (SL1)	m	50		
11.8	Long Life Material (LLM) - Symbols, Legends and Arrows				
11.9	Long Life Material (LLM) - Symbols, Legends and Arrows				
11.10	Installation of Retroreflective Raised Pavement Markers (RRPM)				
	Total Pavement Marking				
MITS 13	**Traffic Signals**				
13.4	Mast arm and streetlight post				
13.4.1	10.5m light col/ 4.5m light outreach/ 8.5m signal outreach	Number	63		
13.5	Joint use post				
13.8	Pedestrian push button assemblies				
13.13	Cable conduit				
13.13.1.1	1 x 50 dia. Streetlighting Conduit and Cable - dig/lay/install	m	4000		
13.14	Vehicle detector loops				
	Total Traffic Signals				
MITS 14	**Road Signs**				
14.2	Manufacture of Guide Sign support structures				
14.3	Erection of Guide Sign support structures				
MITS 15	**Road Furniture**				
MITS 15A	**Guide Posts**				
MITS 15B	**Non Rigid Safety Barrier Systems**				
MITS 15C	**Rigid Road Safety Barrier Systems**				
MITS 16	**WSUD Features**				
MITS 16A	**Bio-Retention Systems**				
MITS 16B	**Ponds**				
16B.3	HDPE/Geotextile Liner Materials for Ponds				
MITS 16C	**Wetlands**				
MITS 16D	**Gross Pollutant Traps**				
	Total Construction				
	preliminaries (5%)				
	design, procurement and management fees (15%)				
	Contingency (50%)				
	GST				
	Lump Sum Fee				

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	Total General		-		[redacted]
	Check the construction period - 4 months allowed		-		
MITS 01	Traffic Management		-		
	Total Traffic Management		-		
			-		
MITS 02	Earthworks		-		
	Total Earthworks		-		
			-		
MITS03	Underground Services		-		
	Total Drainage		-		
			-		
MITS 04	Flexible Pavement Construction		-		
	Total Flexible Pavement		-		
			-		
MITS 06	Minor Concrete Works		-		
	Total Minor Concrete		-		
			-		
MITS 07	Segmental Paving		-		
	Total Segmental Paving		-		
			-		
MITS 08	Incidental Works		-		
	Total Incidental Works		-		
			-		
MITS 09	Landscape		-		
	Total Landscape		-		
			-		
MITS 10	Concrete Works		-		
	Total Concrete Works		-		
			-		
MITS 11	Pavement Marking		-		
	Total Pavement Marking		-		
			-		
MITS 13	Traffic Signals		-		
	Total Traffic Signals		-		
			-		
	Total Road Signs		-		
			-		
	Total Road Furniture		-		
			-		
	Total WSUD Features		-		
			-		
	Total Construction		-		
	preliminaries (5%)		-	5%	
	design, procurement and management fees (15%)		-	15%	
	Contingency (50%)		-	50%	
	GST		-	10%	
			-		
	Lump Sum Fee		-		

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
MITS 00	Preliminaries		-		
MITS 00A	General requirements		-		
0A.1	Site Establishment	Lump sum	1		
0A.5	Project Signs	Number	2		
0A.6	Coordination with Utility Authorities	Lump sum	1		
0A.12	Survey Set Out and Control	Lump sum	1		
0A.13.1	Works by the Contractor	Provisional Sum	1		
0A.13 2	Works by the Service Authority	Provisional Sum	1		
0A.14	Additional Work	Provisional Sum	1		
0A.15.4	Kerb (various sizes and types)	m	160		
0A.15 5	Path or concrete paving (various thickness)	m^2	50		
0A15.1	Sewer	Each	1		
0A15.2	Stormwater	Each	1		
0A15.3	Water	Each	1		
0A15.4	Gas	Each	1		
0A15.5	Electricity	Each	1		
0A15.6	Telstra	Each	1		
0A15.7	NBN	Each	1		
MITS 00B	Quality Construction		-		
0B.1	Quality system documents and records	Lump sum	1		
0B.3	Preparation of Works as Executed drawings		-		
0B.4.1.1	Civil	Provisional sum	1		
0B.4.1.2	Landscape	Provisional sum	1		
MITS 00C	Control of Erosion and Sedimentation		-		
0C.1	Erosion and sediment control		-		
0C.1.1	Establishment	Lump Sum	1		
	Total General		-		
	Check the construction period - 4 months allowed		-		
MITS 01	Traffic Management		-		
1.1	Control of traffic	Lump Sum	1		
1 5	Variable message signs	Weeks	16		
1.6	Safety Audit	Number	10		
1.7	Road Safety Audit	Number	2		
	Total Traffic Management		-		
			-		
MITS 02	Earthworks		-		
MITS 02A	Clearing and Grubbing		-		
2A.3	Removal of nominated trees	Number	10		
MITS 02B	Bulk Earthworks		-		
2B.1	Topsoil stripping	m^3	3,040		
2B.2	Cut	m^3	-		
2B.2.1	Within project site	m^3	8,373 83		
2B.3	Unsuitable Material	m^3	837		
2B.5	General fill	m^3	1,253		
2B.8	Preparation of cut and fill subgrades	m^2	11,120		
2B.10	Construction of swale batter drain (Cut off drain)	m	160		
MITS 02C	Stabilisation		-		
	Total Earthworks		-		
			-		
MITS03	Underground Services		-		
MITS03A	Trenching for Underground Services		-		
MITS03B	Pipe Drainage		-		
MITS 03C	Precast Box Culverts		-		
MITS 03D	Drainage Structures		-		
3D 5	Stormwater sumps		-		
3D 5 2	Grated sump Type 1 Relocated sump 1.5m	Number	5		
3D 8	Headwalls		-		
3D 8.1.1	Culvert: to suit 375mm pipe	Number	5		
3D 8 2.1	Pipe Culvert 375mm pipe	Number (150m total)	5		
MITS 03E	Water Supply Reticulation		-		
MITS 03F	Sewerage systems reticulation		-		
MITS 03G	Service Conduits		-		
MITS 03H	Road Openings and Restorations		-		
MITS 03I	Subsurface Drainage		-		
MITS 03J	Subsoil and Foundation Drains		-		
MITS 03K	Drainage Mats		-		
	Total Drainage		-		
			-		
MITS 04	Flexible Pavement Construction		-		
4.1 2	DGB20 (traffic category D)		-		
4.1 2 3	150 mm layer	m^2	13,396		
4 2 2	DGS20 (traffic category D)		-		
4 2 2 2	150 mm layer	m^2	13,396		
4.4	Supply and Spray Primer, Primerbinder		-		
4.4.1	AMC00	Litres	16,075		

4.4 2	C170	Litres	16,075	
4.7	Supply, incorporate and spray fulx oil in binder		-	
4.7 3	FGG-A Wearing Course	m^3	335	
	Total Flexible Pavement		-	
			-	
MITS 06	**Minor Concrete Works**		-	
MITS 06A	**Concrete Kerbs and Open Drains**		-	
6A.5	Kerbs		-	
6A.5.3	MK	m	109	
6A.7	Kerb ramps		-	
6A.7.4	3.0m path	Number	8	
MITS 06B	**Concrete Paths Driveways Medians**		-	
6B.1	Paths, driveways, median toppings		-	
6B.1.2	150mm N32 Paths	m^2	106	
6B.2	Reinforcement for paths, driveways, median toppings		-	
6B.2.2	SL82 mesh single layer	m^2	106	
	Total Minor Concrete		-	
			-	
MITS 07	**Segmental Paving**		-	
	Total Segmental Paving		-	
			-	
MITS 08	**Incidental Works**		-	
MITS 08A	**Fences and Barriers**		-	
8A.4	Cycleway rails		-	
8A.4.2	Single post cycle rest rail	Number	18	
MITS 08B	**Play Equipment and Organic Surfacing**		-	
MITS 08C	**Rubber Impact Attenuating Surfaces**		-	
MITS 08D	**Furniture and Fixtures**		-	
	Total Incidental Works		-	
			-	
MITS 09	**Landscape**		-	
MITS 09A	**Topsoil**		-	
9A.1	Topsoil – grass areas	m^2	22,575	
MITS 09B	**Grassing**		-	
9B.1	Detailed excavation, filling and trimming, finishing of surfaces	m^2	22,575	
MITS 09C	**Planting**		-	
9C.7	Consolidation	Weeks	26	
MITS 09D	**Irrigation**		-	
MITS 09E	**Consolidation**		-	
	Total Landscape		-	
			-	
MITS 10	**Concrete Works**		-	
	Total Concrete Works		-	
			-	
MITS 11	**Pavement Marking**		-	
11.2	Set Out of Pavement Marking	Lump Sum	1	
11.3	Paint – Longitudinal Lines		-	
11.3.8.2	Path separation line S5	m	3,800	
11.7	Long Life Material (LLM) - Transverse Lines		-	
11.7.4	Stop Line (SL1)	m	50	
	Total Pavement Marking		-	
			-	
MITS 13	**Traffic Signals**		-	
13.4	Mast arm and streetlight post		-	
13.4.1	10.5m light col/ 4.5m light outreach/ 8.5m signal outreach	Number	63	
13.13	Cable conduit		-	
13.13.1.1	1 x 50 dia. Streetlighting Conduit and Cable - dig/lay/install	m	4000	
	Total Traffic Signals		-	
			-	
MITS 14	**Road Signs**		-	
	Total Road Signs		-	
			-	
MITS 15	**Road Furniture**		-	
MITS 15A	**Guide Posts**		-	
MITS 15B	**Non Rigid Safety Barrier Systems**		-	
MITS 15C	**Rigid Road Safety Barrier Systems**		-	
	Total Road Furniture		-	
			-	
MITS 16	**WSUD Features**		-	
MITS 16A	**Bio-Retention Systems**		-	
MITS 16B	**Ponds**		-	
MITS 16C	**Wetlands**		-	
MITS 16D	**Gross Pollutant Traps**		-	
	Total WSUD Features		-	
			-	
	Total Construction		-	
	preliminaries (5%)		-	

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	Total General		-		
	Check the construction period - 4 months allowed		-		
MITS 01	Traffic Management		-		
	Total Traffic Management		-		
MITS 02	Earthworks		-		
	Total Earthworks		-		
MITS03	Underground Services		-		
	Total Drainage		-		
MITS 04	Flexible Pavement Construction		-		
	Total Flexible Pavement		-		
MITS 06	Minor Concrete Works		-		
	Total Minor Concrete		-		
MITS 08	Incidental Works		-		
	Total Incidental Works		-		
MITS 09	Landscape		-		
	Total Landscape		-		
MITS 11	Pavement Marking		-		
	Total Pavement Marking		-		
MITS 13	Traffic Signals		-		
	Total Traffic Signals		-		
	Total Road Signs		-		
	Total Road Furniture		-		
	Total Construction		-		
	preliminaries (5%)		-	5	
	design, procurement and management fees (15%)		-	15	
	Contingency (50%)		-	50	
	GST		-	10	
			-		
	Lump Sum Fee		-		

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
MITS 00	**Preliminaries**		-		
MITS 00A	**General requirements**		-		
0A.1	Site Establishment	Lump sum	1		
0A.5	Project Signs	Number	2		
0A.6	Coordination with Utility Authorities	Lump sum	1		
0A.12	Survey Set Out and Control	Lump sum	1		
0A.13.1	Works by the Contractor	Provisional Sum	1		
0A.13.2	Works by the Service Authority	Provisional Sum	1		
0A.14	Additional Work	Provisional Sum	1		
0A.15.4	Kerb (various sizes and types)	m	160		
0A.15.5	Path or concrete paving (various thickness)	m^2	50		
0A15.1	Sewer	Each	1		
0A15.2	Stormwater	Each	1		
0A15.3	Water	Each	1		
0A15.4	Gas	Each	1		
0A15.5	Electricity	Each	1		
0A15.6	Telstra	Each	1		
0A15.7	NBN	Each	1		
MITS 00B	**Quality Construction**		-		
0B.1	Quality system documents and records	Lump sum	1		
0B.4.1.1	Civil	Provisional sum	1		
0B.4.1.2	Landscape	Provisional sum	1		
MITS 00C	**Control of Erosion and Sedimentation**		-		
0C.1.1	Establishment	Lump Sum	1		
	Total General		-		
	Check the construction period - 4 months allowed		-		
MITS 01	**Traffic Management**		-		
1.1	Control of traffic	Lump Sum	1		
1.5	Variable message signs	Weeks	16		
1.6	Safety Audit	Number	10		
1.7	Road Safety Audit	Number	2		
	Total Traffic Management		-		
MITS 02	**Earthworks**		-		
MITS 02A	**Clearing and Grubbing**		-		
2A.3	Removal of nominated trees	Number	125		
MITS 02B	**Bulk Earthworks**		-		
2B.1	Topsoil stripping	m^3	3,040		
2B.2.1	Within project site	m^3	6,453.65		
2B.3	Unsuitable Material	m^3	645		
2B.5	General fill	m^3	7,399		
2B.8	Preparation of cut and fill subgrades	m^2	12,370		
2B.10	Construction of swale batter drain (Cut off drain)	m	160		
	Total Earthworks		-		
MITS03	**Underground Services**		-		
MITS 03D	**Drainage Structures**		-		
3D.5.2	**Grated sump Type 1 Relocated sump 1.5m**	Number	10		
3D.8	Headwalls		-		
3D.8.1.1	Culvert: to suit 375mm pipe	Number	10		
3D.8.2.1	Pipe Culvert 375mm pipe	Number (150m total)	10		
	Total Drainage		-		
MITS 04	**Flexible Pavement Construction**		-		
4.1	Base material		-		
4.1.2	DGB20 (traffic category D)		-		
4.1.2.3	150 mm layer	m^2	12,370		
4.2	Subbase material		-		
4.2.2	DGS20 (traffic category D)		-		
4.2.2.1	100 mm layer	m^2	12,370		
4.4	Supply and Spray Primer, Primerbinder		-		
4.4.1	AMC00	Litres	14,844		
4.4.2	C170	Litres	14,844		
4.7	Supply, incorporate and spray fulx oil in binder		-		
4.7.3	FGG-A Wearing Course	m^3	309		
	Total Flexible Pavement		-		
MITS 06	**Minor Concrete Works**		-		
MITS 06A	**Concrete Kerbs and Open Drains**		-		
6A.1	Concrete lining of open drains		-		
6A.1.2	150mm	m^2	35		
6A.3.1	Remove batter drain	m	250		
6A.5	Kerbs		-		
6A.5.3	MK	m	120		
6A.7	Kerb ramps		-		
6A.7.4	3.0m path	Number	6		
MITS 06B	**Concrete Paths Driveways Medians**		-		
6B.1	Paths, driveways, median toppings		-		
6B.1.2	150mm N32 Paths	m^2	120		
6B.2	Reinforcement for paths, driveways, median toppings		-		

6B.2.2	SL82 mesh single layer	m^2	120	[redacted]
	Total Minor Concrete		-	
MITS 08	**Incidental Works**		-	
MITS 08A	**Fences and Barriers**		-	
8A.4	Cycleway rails		-	
8A.4.2	Single post cycle rest rail	Number	18	
8A.4.3	Dual post cycle rest rail	Number	4	
	Total Incidental Works		-	
MITS 09	**Landscape**		-	
MITS 09A	**Topsoil**		-	
9A.1	Topsoil – grass areas	m^2	22,575	
MITS 09B	**Grassing**		-	
9B.1	Detailed excavation, filling and trimming, finishing of surfaces	m^2	22,575	
MITS 09C	**Planting**		-	
9C.7	Consolidation	Weeks	26	
	Total Landscape		-	
MITS 11	**Pavement Marking**		-	
11.2	Set Out of Pavement Marking	Lump Sum	1	
11.3.8.2	Path separation line S5	m	3,800	
11.6.7	Edgeline (E1)	m	120	
11.7.4	Stop Line (SL1)	m	50	
11.7.6	Pedestrian Crosswalk Line (PCW)	m	90	
	Total Pavement Marking		-	
MITS 13	**Traffic Signals**		-	
13.4	Mast arm and streetlight post		-	
13.4.1	10.5m light col/ 4.5m light outreach/ 8.5m signal outreach	Number	63	
13.13	Cable conduit		-	
13.13.1.1	1 x 50 dia. Streetlighting Conduit and Cable - dig/lay/install	m	4000	
13.18	Installation and connection of Power Supply cable by Evoenergy to new Signal Controller	Provisional Sum	1	
	Total Traffic Signals		-	
MITS 14	**Road Signs**		-	
14.7	Manufacture of General Signs	Number	-	
14.7.1	R1-1 STOP	Number	2	
14.7.2	R1-2 GIVEWAY	Number	4	
14.7.3	W6-9	Number	4	
14.7.4	W8-23	Number	4	
14.8	Erection of General Signs support structure	Number	6	
	Total Road Signs		-	
MITS 15	**Road Furniture**		-	
MITS 15B	**Non Rigid Safety Barrier Systems**		-	
15B.6	Steel Wire Rope Barrier	m	2,850	
15B.7	Steel Wire Rope Barrier Anchor Terminal	Number	8	
	Total Road Furniture		-	
	Total Construction		-	
	preliminaries (5%)		-	
	design, procurement and management fees (15%)		-	
	Contingency (50%)		-	
	GST		-	
			-	
	Lump Sum Fee		-	

	design, procurement and management fees (15%)		-	[redacted]
	Contingency (50%)		-	
	GST		-	
			-	
	Lump Sum Fee		-	

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	Check the construction period - 12 months allowed				
MITS 01	Traffic Management				
MITS 02	Earthworks				
MITS03	Underground Services				
MITS 04	Flexible Pavement Construction				
MITS 06	Minor Concrete Works				
	Total Minor Concrete				$ [redacted]
MITS 07	Segmental Paving				
MITS 08	Incidental Works				
MITS 09	Landscape				
MITS 10	Concrete Works				
MITS 11	Pavement Marking				
MITS 13	Traffic Signals				
	Total Traffic Signals				$ [redacted]
MITS 14	Road Signs				
MITS 15	Road Furniture				
MITS 16	WSUD Features				
	Total Construction				$ [redacted]
	Contingency (50%)			50%	$ [redacted]
	GST			10%	$ [redacted]
	Lump Sum Fee				$ [redacted]

SUP - Extra over for 3 singalised intersections

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
MITS 00	**Preliminaries**				
MITS 00A	**General requirements**				
MITS 00B	**Quality Construction**				
MITS 00C	**Control of Erosion and Sedimentation**				
	Check the construction period - 12 months allowed				
MITS 01	**Traffic Management**				
MITS 02	**Earthworks**				
MITS 02A	**Clearing and Grubbing**				
MITS 02B	**Bulk Earthworks**				
MITS 02C	**Stabilisation**				
2C.1	Supply stabilising agent (in situ mixing only)				
MITS03	**Underground Services**				
MITS03A	**Trenching for Underground Services**				
MITS03B	**Pipe Drainage**				
3B.1	Stormwater pipes and pipe culverts				
3B 2	Stormwater pipe fittings				
3B 3	Stormwater pipe branch connections				
3B.4	Flexible joints				
3B 5	Splayed stormwater pipe				
3B.6	End caps for stormwater mains				
3B.7	End caps for stormwater ties				
3B 8	Scour stops				
MITS 03C	**Precast Box Culverts**				
3C.1	Cast insitu base slab				
3C.2	Precast RCBC				
3C.3	Cast insitu link slab				
MITS 03D	**Drainage Structures**				
3D.4	Special chambered MH				
3D.5	Stormwater sumps				
3D.6	Stormwater sumps >1.8m				
3D.7	Surcharge structures				
3D.8	Headwalls				
MITS 03E	**Water Supply Reticulation**				
3E.1	Water supply pipes				
3E.2	Water supply pipe bends				
3E.3	Water supply pipe tees				
3E.4	Water supply pipe reducers				
3E.5	Fire hydrants				
3E.6	Sluice valves				
3E.7	Restrained joints				
3E.8	End caps				
3E.9	Thrust blocks				
3E.11	Scour stops				
3E.12	Trench stops				
3E.13	Pipe and Trench Protection				
3E.14	Valve chambers				
3E.15	Scour installations				
3E.16	Contractor works on existing water supply				
3E.18	Water service ties				
3E.19	Ready tap connectors				
MITS 03F	**Sewerage systems reticulation**				
3F.1	Sewer pipes				
3F.2	Sewer pipe fittings				
3F.3	Flexible joints				
3F.4	Sewer main dead ends				
3F.5	Sewer main sealing discs				
3F.6	Sewer tie dead ends				
3F.7	Scour stops				
3F.8	Trench stops				
3F.9	Connect to existing sewer structures				
3F.15	Pipe and Trench Protection				
3F.16	Sewer MH				
3F.19	VD				
3F.20	VD >Min Drop				
3F.23	Special chambered MH				
3F.24	Contractor works on existing sewer				
MITS 03G	**Service Conduits**				
3G.1	Trenching for Service Authorities				
3G.2	Conduit provision in a shared trench				
3G.5	Electrical Conduits				
3G.6	End caps				
MITS 03H	**Road Openings and Restorations**				

MITS 03I	**Subsurface Drainage**				
MITS 03J	**Subsoil and Foundation Drains**				
MITS 03K	**Drainage Mats**				
MITS 04	**Flexible Pavement Construction**				
4.1.1	DGB20 (traffic category A)				
4.1.2	DGB20 (traffic category D)				
4.2	Subbase material				
4.2.1	DGS20 (traffic category A)				
4.2.2	DGS20 (traffic category D)				
4.4	Supply and Spray Primer, Primerbinder				
4.5	Supply and Spray Binder				
4.6	Supply, incorporate and spray cutter oil in binder				
4.7	Supply, incorporate and spray fulx oil in binder				
4.8	Supply, Precoat, Apply and Incorporate aggregate	m^3			
MITS 06	**Minor Concrete Works**				
MITS 06A	**Concrete Kerbs and Open Drains**				
6A.1	Concrete lining of open drains				
6A 5	Kerbs				
6A.6	Kerb reinforcement				
6A.7	Kerb ramps				
6A.7.4	3.0m path	Number	6	[redacted]	[redacted]
6A 8	Vehicle crossings				
6A.11	Rock filled wire mattresses				
MITS 06B	**Concrete Paths Driveways Medians**				
6B.1	Paths, driveways, median toppings				
6B 2	Reinforcement for paths, driveways, median toppings				
	Total Minor Concrete				$ [redacted]
MITS 07	**Segmental Paving**				
7.1	Segmental Paving				
MITS 08	**Incidental Works**				
MITS 08A	**Fences and Barriers**				
8A 2	Gates				
8A 3	Barrier fences				
8A.4	Cycleway rails				
8A.6	Bollards				
MITS 09	**Landscape**				
MITS 09A	**Topsoil**				
MITS 09B	**Grassing**				
MITS 09C	**Planting**				
MITS 09D	**Irrigation**				
MITS 09E	**Consolidation**				
MITS 10	**Concrete Works**				
MITS 11	**Pavement Marking**				
11.3	Paint – Longitudinal Lines				
11.4	Paint –Symbols, Legends, Arrows, Chevrons, Traffic Islands and Kerbs				
11.5	Paint - Transverse Lines				
11.6	Paint - Long Life Material (LLM) - Longitudinal Lines				
11.7	Long Life Material (LLM) - Transverse Lines				
11.8	Long Life Material (LLM) - Symbols, Legends and Arrows				
11.9	Long Life Material (LLM) - Symbols, Legends and Arrows				
11.10	Installation of Retroreflective Raised Pavement Markers (RRPM)				
MITS 13	**Traffic Signals**				
13.1	Traffic signal post	Number	30	[redacted]	
13.4	Mast arm and streetlight post		-		
13.5	Joint use post		-		
13.6	Vehicle signal lanterns	Number	39		
13.7	Pedestrian signal lanterns	Number	12		
13.8	Pedestrian push button assemblies		-		
13.8.1	Standard push button assembly (non audio)	Number	18		
13.9	Control equipment	Number	3		
13.11	Multi-core cabling	m	1,239		
13.12	Twin screen cabling	m	605		
13.13	Cable conduit		-		
13.13.1	1 x 50 dia. Conduit	m	90		
13.13.2	1 x 100 dia. Conduit	m	68		
13.13.4	2 x 140 dia. Conduit	m	405		
13.14	Vehicle detector loops		-		

13.14.1	Vehicle detector loop	Each	12	[redacted]	
13.15	JC-1 Small conduit junction box	Number	18		
13.16	JB-R Large conduit junction box	Number	27		
13.17	Installation and connection of communications cable to new Signal Controller	Provisional Sum	3		
13.18	Installation and connection of Power Supply cable by Evoenergy to new Signal Controller	Provisional Sum	3		
13.19	CCTV	Provisional Sum			
	Total Traffic Signals				
MITS 14	**Road Signs**				
14.2	Manufacture of Guide Sign support structures				
14.3	Erection of Guide Sign support structures				
MITS 15	**Road Furniture**				
MITS 15A	**Guide Posts**				
MITS 15B	**Non Rigid Safety Barrier Systems**				
MITS 15C	**Rigid Road Safety Barrier Systems**				
MITS 16	**WSUD Features**				
MITS 16A	**Bio-Retention Systems**				
MITS 16B	**Ponds**				
16B.3	HDPE/Geotextile Liner Materials for Ponds				
MITS 16C	**Wetlands**				
MITS 16D	**Gross Pollutant Traps**				
	Total Construction			[redacted]	
	Contingency (50%)				
	GST				
	Lump Sum Fee				

Mt Taylor Feasibility Study SUP - Extra over for 3 Zebra crossings

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	Total General				$ -
	Check the construction period - 12 months allowed				
MITS 01	Traffic Management				
	Total Traffic Management				$ -
MITS 02	Earthworks				
	Total Earthworks				$ -
MITS03	Underground Services				
	Total Drainage				$ -
MITS 04	Flexible Pavement Construction				
	Total Flexible Pavement				$ -
MITS 06	Minor Concrete Works				
	Total Minor Concrete				$ [redacted]
MITS 07	Segmental Paving				
	Total Segmental Paving				$ -
MITS 08	Incidental Works				
	Total Incidental Works				$ -
MITS 09	Landscape				
	Total Landscape				$ -
MITS 10	Concrete Works				
	Total Concrete Works				$ -
MITS 11	Pavement Marking				
	Total Pavement Marking				$ [redacted]
MITS 13	Traffic Signals				
	Total Traffic Signals				$ -
MITS 14	Road Signs				
	Total Road Signs				$ [redacted]
MITS 15	Road Furniture				
	Total Road Furniture				$ -
MITS 16	WSUD Features				
	Total WSUD Features				$ -
	Total Construction				$ [redacted]
	Contingency (50%)			50%	$ [redacted]
	GST			0.10	$ [redacted]

Mt Taylor Feasibility Study SUP - Extra over for 3 Zebra crossings

	Lump Sum Fee				$ [redacted]

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
MITS 00	**Preliminaries**				
MITS 00A	**General requirements**				
MITS 00B	**Quality Construction**				
MITS 00C	**Control of Erosion and Sedimentation**				
	Check the construction period - 12 months allowed				
MITS 01	**Traffic Management**				
MITS 02	**Earthworks**				
MITS 02A	**Clearing and Grubbing**				
MITS 02B	**Bulk Earthworks**				
MITS 02C	**Stabilisation**				
2C.1	Supply stabilising agent (in situ mixing only)				
MITS03	**Underground Services**				
MITS03A	**Trenching for Underground Services**				
MITS03B	**Pipe Drainage**				
3B.1	Stormwater pipes and pipe culverts				
3B 2	Stormwater pipe fittings				
3B 3	Stormwater pipe branch connections				
3B.4	Flexible joints				
3B 5	Splayed stormwater pipe				
3B.6	End caps for stormwater mains				
3B.7	End caps for stormwater ties				
3B 8	Scour stops				
MITS 03C	**Precast Box Culverts**				
3C.1	Cast insitu base slab				
3C.2	Precast RCBC				
3C.3	Cast insitu link slab				
MITS 03D	**Drainage Structures**				
3D.4	Special chambered MH				
3D.5	Stormwater sumps				
3D.6	Stormwater sumps >1.8m				
3D.7	Surcharge structures				
3D.8	Headwalls				
MITS 03E	**Water Supply Reticulation**				
3E.1	Water supply pipes				
3E.2	Water supply pipe bends				
3E.3	Water supply pipe tees				
3E.4	Water supply pipe reducers				
3E.5	Fire hydrants				
3E.6	Sluice valves				
3E.7	Restrained joints				
3E.8	End caps				
3E.9	Thrust blocks				
3E.11	Scour stops				
3E.12	Trench stops				
3E.13	Pipe and Trench Protection				
3E.14	Valve chambers				
3E.15	Scour installations				
3E.16	Contractor works on existing water supply				
3E.18	Water service ties				
3E.19	Ready tap connectors				
MITS 03F	**Sewerage systems reticulation**				
3F.1	Sewer pipes				
3F.2	Sewer pipe fittings				
3F.3	Flexible joints				
3F.4	Sewer main dead ends				
3F.5	Sewer main sealing discs				
3F.6	Sewer tie dead ends				
3F.7	Scour stops				
3F.8	Trench stops				
3F.9	Connect to existing sewer structures				
3F.15	Pipe and Trench Protection				
3F.16	Sewer MH				
3F.19	VD				
3F.20	VD >Min Drop				
3F.23	Special chambered MH				
3F.24	Contractor works on existing sewer				
MITS 03G	**Service Conduits**				
3G.1	Trenching for Service Authorities				
3G.2	Conduit provision in a shared trench				
3G.5	Electrical Conduits				
3G.6	End caps				
MITS 03H	**Road Openings and Restorations**				

MITS 03I	**Subsurface Drainage**				
MITS 03J	**Subsoil and Foundation Drains**				
MITS 03K	**Drainage Mats**				
MITS 04	**Flexible Pavement Construction**				
4.1.1	DGB20 (traffic category A)				
4.1.2	DGB20 (traffic category D)				
4.2	Subbase material				
4.2.1	DGS20 (traffic category A)				
4.2.2	DGS20 (traffic category D)				
4.4	Supply and Spray Primer, Primerbinder				
4.5	Supply and Spray Binder				
4.6	Supply, incorporate and spray cutter oil in binder				
4.7	Supply, incorporate and spray fulx oil in binder				
4.8	Supply, Precoat, Apply and Incorporate aggregate	m^3			
MITS 06	**Minor Concrete Works**				
MITS 06A	**Concrete Kerbs and Open Drains**				
6A.1	Concrete lining of open drains				
6A 5	Kerbs				
6A.6	Kerb reinforcement				
6A.7	Kerb ramps				
6A 8	Vehicle crossings				
6A 8.5	Raised Zebra Crossing	Number	3	[redacted]	[redacted]
6A.11	Rock filled wire mattresses				
MITS 06B	**Concrete Paths Driveways Medians**				
6B.1	Paths, driveways, median toppings				
6B 2	Reinforcement for paths, driveways, median toppings				
	Total Minor Concrete				[redacted]
MITS 07	**Segmental Paving**				
7.1	Segmental Paving				
MITS 08	**Incidental Works**				
MITS 08A	**Fences and Barriers**				
8A 2	Gates				
8A 3	Barrier fences				
8A.4	Cycleway rails				
8A.6	Bollards				
MITS 09	**Landscape**				
MITS 09A	**Topsoil**				
MITS 09B	**Grassing**				
MITS 09C	**Planting**				
MITS 09D	**Irrigation**				
MITS 09E	**Consolidation**				
MITS 10	**Concrete Works**				
MITS 11	**Pavement Marking**				
11.3	Paint – Longitudinal Lines				
11.4	Paint –Symbols, Legends, Arrows, Chevrons, Traffic Islands and Kerbs				
11.4.6	Bicycle Pavement Marking (Cyclist, 1 3m x 1 0m)	Each	6	[redacted]	
11.5	Paint - Transverse Lines				
11.6	Paint - Long Life Material (LLM) - Longitudinal Lines				
11.7	Long Life Material (LLM) - Transverse Lines				
11.7.4	Stop Line (SL1)	m	45		
11.8	Long Life Material (LLM) - Symbols, Legends and Arrows				
11.9	Long Life Material (LLM) - Symbols, Legends and Arrows				
11.10	Installation of Retroreflective Raised Pavement Markers (RRPM)				
	Total Pavement Marking				
MITS 13	**Traffic Signals**				
13.4	Mast arm and streetlight post				
13.5	Joint use post				
13.8	Pedestrian push button assemblies				
13.13	Cable conduit				
13.14	Vehicle detector loops				
MITS 14	**Road Signs**				
14.2	Manufacture of Guide Sign support structures				
14.3	Erection of Guide Sign support structures				
14.7	Manufacture of General Signs	Number			
14.7.1	R1-1 STOP	Number	3	$ [redacted]	[redacted]
14.7.2	R1-2 GIVEWAY	Number	6	$ [redacted]	[redacted]

14.7.3	W6-9	Number	6	$ [redacted]	[redacted]
14.7.4	W8-23	Number	6	$ [redacted]	[redacted]
14.8	Erection of General Signs support structure	Number	9	$ [redacted]	[redacted]
	Total Road Signs				$ [redacted]
MITS 15	**Road Furniture**				
MITS 15A	**Guide Posts**				
MITS 15B	**Non Rigid Safety Barrier Systems**				
MITS 15C	**Rigid Road Safety Barrier Systems**				
MITS 16	**WSUD Features**				
MITS 16A	**Bio-Retention Systems**				
MITS 16B	**Ponds**				
16B.3	HDPE/Geotextile Liner Materials for Ponds				
MITS 16C	**Wetlands**				
MITS 16D	**Gross Pollutant Traps**				
					[redacted]
	Total Construction				
	Contingency (50%)			50%	
	GST			0.10	
	Lump Sum Fee				

Mt Taylor Feasibility Study Carpark - Option 1

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	Total General				$ [redacted]
	Check the construction period - 4 months allowed				
MITS 01	Traffic Management				
	Total Traffic Management				[redacted]
MITS 02	Earthworks				
	Total Earthworks				[redacted]
MITS03	Underground Services				
	Total Drainage				[redacted]
MITS 04	Flexible Pavement Construction				
	Total Flexible Pavement				[redacted]
MITS 06	Minor Concrete Works				
	Total Minor Concrete				[redacted]
MITS 07	Segmental Paving				
	Total Segmental Paving				$ -
MITS 08	Incidental Works				
	Total Incidental Works				$ -
MITS 09	Landscape				
	Total Landscape				[redacted]
MITS 10	Concrete Works				
	Total Concrete Works				$ -
MITS 11	Pavement Marking				
	Total Pavement Marking				[redacted]
MITS 13	Traffic Signals				
	Total Traffic Signals				[redacted]
MITS 14	Road Signs				
	Total Road Signs				[redacted]
MITS 15	Road Furniture				
	Total Road Furniture				$ -
MITS 16	WSUD Features				
	Total WSUD Features				$ -
	Total Construction				$ [redacted]
	preliminaries (5%)			5%	[redacted]
	design, procurement and management fees (15%)			15%	[redacted]

	Contingency (50%)			50%	[redacted]
	GST			**10%**	**$** [redacted]
	Lump Sum Fee				**$** [redacted]

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
MITS 00	**Preliminaries**				
MITS 00A	**General requirements**				
0A.1	Site Establishment	Lump sum	1		
0A.3	Items from Principal	Each	1		
0A.5	Project Signs	Number	2		
0A.6	Coordination with Utility Authorities	Lump sum	1		
0A.12	Survey Set Out and Control	Lump sum	1		
0A.13.1	Works by the Contractor	Provisional Sum	1		
0A.13.2	Works by the Service Authority	Provisional Sum	1		
0A.15.4	Kerb (various sizes and types)	m	300		
0A.15.5	Path or concrete paving (various thickness)	m^2	15		
0A15.1	Sewer	Each	1		
0A15.2	Stormwater	Each	1		
0A15.3	Water	Each	1		
0A15.4	Gas	Each	1		
0A15.5	Electricity	Each	1		
0A15.6	Telstra	Each	1		
0A15.7	NBN	Each	1		
MITS 00B	**Quality Construction**				
0B.1	Quality system documents and records	Lump sum	1		
0B.2	Quality verification and control – Additional testing	Provisional Sum	1		
0B.4.1.1	Civil	Provisional sum	1		
0B.4.1 2	Landscape	Provisional sum	1		
MITS 00C	**Control of Erosion and Sedimentation**				
0C.1.1	Establishment	Lump Sum	1		
0C.1.2	Maintenance for the duration of the Contract	Lump Sum	16		
	Total General				
	Check the construction period - 4 months allowed				
MITS 01	**Traffic Management**				
1.1	Control of traffic	Lump Sum	1		
1.7	Road Safety Audit	Number	2	$	
	Total Traffic Management				$
MITS 02	**Earthworks**				
MITS 02A	**Clearing and Grubbing**				
2A.3	Removal of nominated trees	Number	10		
MITS 02B	**Bulk Earthworks**				
2B.1	Topsoil stripping	m^3	429		
2B.3	Unsuitable Material	m^3	429	$	
2B.8	Preparation of cut and fill subgrades	m^2	2,357	$	
MITS 02C	**Stabilisation**				
2C.1	Supply stabilising agent (in situ mixing only)				
	Total Earthworks				$
MITS03	**Underground Services**				
MITS03A	**Trenching for Underground Services**				
MITS03B	**Pipe Drainage**				
3B.1	Stormwater pipes and pipe culverts				
3B.1.12	450mm dia FRC Class 2 RRJ 1.5 -3.0m depth	m	56	$	
3B.2	Stormwater pipe fittings				
3B.3	Stormwater pipe branch connections				
3B.4	Flexible joints				
3B.5	Splayed stormwater pipe				
3B.6	End caps for stormwater mains				
3B.7	End caps for stormwater ties				
3B.8	Scour stops				
MITS 03C	**Precast Box Culverts**				
3C.1	Cast insitu base slab				
3C 2	Precast RCBC				
3C 3	Cast insitu link slab				
MITS 03D	**Drainage Structures**				
3D.4	Special chambered MH				
3D.5	Stormwater sumps				
3D.5.1	R sump	Number	3	$	
3D.6	Stormwater sumps >1.8m				
3D.7	Surcharge structures				
3D.8	Headwalls				
MITS 03E	**Water Supply Reticulation**				
3E.1	Water supply pipes				

3E.2	Water supply pipe bends				
3E.3	Water supply pipe tees				
3E.4	Water supply pipe reducers				
3E.5	Fire hydrants				
3E.6	Sluice valves				
3E.7	Restrained joints				
3E.8	End caps				
3E.9	Thrust blocks				
3E.11	Scour stops				
3E.12	Trench stops				
3E.13	Pipe and Trench Protection				
3E.14	Valve chambers				
3E.15	Scour installations				
3E.16	Contractor works on existing water supply				
3E.18	Water service ties				
3E.19	Ready tap connectors				
MITS 03F	**Sewerage systems reticulation**				
3F.1	Sewer pipes				
3F.2	Sewer pipe fittings				
3F.3	Flexible joints				
3F.4	Sewer main dead ends				
3F.5	Sewer main sealing discs				
3F.6	Sewer tie dead ends				
3F.7	Scour stops				
3F.8	Trench stops				
3F.9	Connect to existing sewer structures				
3F.15	Pipe and Trench Protection				
3F.16	Sewer MH				
3F.19	VD				
3F.20	VD >Min Drop				
3F.23	Special chambered MH				
3F.24	Contractor works on existing sewer				
MITS 03G	**Service Conduits**				
3G.1	Trenching for Service Authorities				
3G.2	Conduit provision in a shared trench				
3G.5	Electrical Conduits				
3G.6	End caps				
MITS 03H	**Road Openings and Restorations**				
MITS 03I	**Subsurface Drainage**				
MITS 03J	**Subsoil and Foundation Drains**				
MITS 03K	**Drainage Mats**				
	Total Drainage				$ [redacted]
MITS 04	**Flexible Pavement Construction**				
4.1.1	DGB20 (traffic category A)				
4.1.2	DGB20 (traffic category D)				
4.1.2.3	150 mm layer	m^2	2,357	[redacted]	[redacted]
4.2	Subbase material				
4.2.1	DGS20 (traffic category A)				
4.2.2	DGS20 (traffic category D)				
4.2.2.2	150 mm layer	m^2	2,357	[redacted]	[redacted]
4.4	Supply and Spray Primer, Primerbinder				
4.5	Supply and Spray Binder				
4.6	Supply, incorporate and spray cutter oil in binder				
4.7	Supply, incorporate and spray fulx oil in binder				
4.8	Supply, Precoat, Apply and Incorporate aggregate	m^3			
4.9.1	AC14 (C450 Binder) wearing course 45 mm layer	Tonnes	255	[redacted]	[redacted]
4.13	Upper SMZ				
4.13.1	150 mm layer	m^3	354	[redacted]	[redacted]
4.14	Lower SMZ				
4.14.1	150 mm layer	m^3	354	$ [redacted]	[redacted]
4.15	Lower UZF (CBR≥8%)				
	Total Flexible Pavement				$ [redacted]
MITS 06	**Minor Concrete Works**				
MITS 06A	**Concrete Kerbs and Open Drains**				
6A.1	Concrete lining of open drains				
6A.5	Kerbs				
6A.5.1	KG	m	8	$ [redacted]	[redacted]
6A.6	Kerb reinforcement				
6A.7	Kerb ramps				
6A.7.4	3.0m path	Number	2	$ [redacted]	[redacted]
6A.8	Vehicle crossings				

6A.9	Remove existing concrete kerb	m	10	$ [redacted]	[redacted]
6A.11	Rock filled wire mattresses				
MITS 06B	**Concrete Paths Driveways Medians**				
6B.1	Paths, driveways, median toppings				
6B.1.1	100mm N25 Paths	m^2	20	$ [redacted]	[redacted]
6B.2	Reinforcement for paths, driveways, median toppings				
6B.2.3	SL81 mesh double layer	m^2	20	$ [redacted]	[redacted]
	Total Minor Concrete				$ [redacted]
MITS 07	**Segmental Paving**				
7.1	Segmental Paving				
MITS 08	**Incidental Works**				
MITS 08A	**Fences and Barriers**				
8A.2	Gates				
8A.3	Barrier fences				
8A.4	Cycleway rails				
8A.6	Bollards				
MITS 09	**Landscape**				
MITS 09A	**Topsoil**				
9A.1	Topsoil – grass areas	m^2	500	[redacted]	
9A.2	Topsoil – planting areas	m^2	250		
9A.3	Topsoil amelioration	m^3	500		
9A.4	Topsoil amelioration certification	m^3	1		
MITS 09B	**Grassing**				
9B.1	Detailed excavation, filling and trimming, finishing of surfaces	m^2	500		
MITS 09C	**Planting**				
9C.7	Consolidation	Weeks	13		
MITS 09D	**Irrigation**				
MITS 09E	**Consolidation**				
	Total Landscape				
MITS 10	**Concrete Works**				
MITS 11	**Pavement Marking**				
11.2	Set Out of Pavement Marking	Lump Sum	1	[redacted]	
11.3	Paint – Longitudinal Lines				
11.3.1	Barrier Line (B1)	m	1,000		
11.4	Paint –Symbols, Legends, Arrows, Chevrons, Traffic Islands and Kerbs				
11.4.11	Pavement Arrow (A10)	m^2	50		
11.5	Paint - Transverse Lines				
11.6	Paint - Long Life Material (LLM) - Longitudinal Lines				
11.7	Long Life Material (LLM) - Transverse Lines				
11.8	Long Life Material (LLM) - Symbols, Legends and Arrows				
11.9	Long Life Material (LLM) - Symbols, Legends and Arrows				
11.10	Installation of Retroreflective Raised Pavement Markers (RRPM)				
	Total Pavement Marking				[redacted]
MITS 13	**Traffic Signals**				
13.4	Mast arm and streetlight post				
13.4.1	10.5m light col/ 4.5m light outreach/ 8.5m signal outreach	Number	7	[redacted]	[redacted]
13.5	Joint use post				
13.8	Pedestrian push button assemblies				
13.13	Cable conduit				
13.13.1	1 x 50 dia. Streetlighting Conduit and Cable - dig/lay/install	m	260	$ [redacted]	[redacted]
13.14	Vehicle detector loops				
	Total Traffic Signals				[redacted]
MITS 14	**Road Signs**				
14.2	Manufacture of Guide Sign support structures				
14.3	Erection of Guide Sign support structures				
14.7	Manufacture of General Signs	Number	8	[redacted]	
14.8	Erection of General Signs support structure	Number	8		
	Total Road Signs				
MITS 15	**Road Furniture**				
MITS 15A	**Guide Posts**				
MITS 15B	**Non Rigid Safety Barrier Systems**				
MITS 15C	**Rigid Road Safety Barrier Systems**				
MITS 16	**WSUD Features**				
MITS 16A	**Bio-Retention Systems**				

MITS 16B	**Ponds**				
16B.3	HDPE/Geotextile Liner Materials for Ponds				
MITS 16C	**Wetlands**				
MITS 16D	**Gross Pollutant Traps**				
	Total Construction			[redacted]	
	preliminaries (5%)				
	design, procurement and management fees (15%)				
	Contingency (50%)				
	GST				
	Lump Sum Fee				

Mt Taylor Feasibility Study Carpark - Option 2

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	Total General				$ [redacted]
	Check the construction period - 4 months allowed				
MITS 01	**Traffic Management**				
	Total Traffic Management				$ [redacted]
MITS 02	**Earthworks**				
	Total Earthworks				$ [redacted]
MITS03	**Underground Services**				
	Total Drainage				$ [redacted]
MITS 04	**Flexible Pavement Construction**				
	Total Flexible Pavement				$ [redacted]
MITS 06	**Minor Concrete Works**				
	Total Minor Concrete				$ [redacted]
MITS 07	**Segmental Paving**				
	Total Segmental Paving				$ -
MITS 08	**Incidental Works**				
	Total Incidental Works				$ -
MITS 09	**Landscape**				
	Total Landscape				$ [redacted]
MITS 10	**Concrete Works**				
	Total Concrete Works				$ -
MITS 11	**Pavement Marking**				
	Total Pavement Marking				$ [redacted]
MITS 13	**Traffic Signals**				
	Total Traffic Signals				$ [redacted]
MITS 14	**Road Signs**				
	Total Road Signs				$ [redacted]
MITS 15	**Road Furniture**				
	Total Road Furniture				$ -
MITS 16	**WSUD Features**				
	Total WSUD Features				$ -
	Total Construction				[redacted]
	preliminaries (5%)			5%	
	design, procurement and management fees (15%)			15%	
	Contingency (50%)			50%	
	GST			**10%**	

	Lump Sum Fee				$ [redacted]

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
MITS 00	**Preliminaries**				
MITS 00A	**General requirements**				
0A.1	Site Establishment	Lump sum	1		
0A.3	Items from Principal	Each	1		
0A.5	Project Signs	Number	2		
0A.6	Coordination with Utility Authorities	Lump sum	1		
0A.12	Survey Set Out and Control	Lump sum	1		
0A.13.1	Works by the Contractor	Provisional Sum	1		
0A.13.2	Works by the Service Authority	Provisional Sum	1		
0A.15.4	Kerb (various sizes and types)	m	300		
0A.15.5	Path or concrete paving (various thickness)	m^2	15		
0A15.1	Sewer	Each	1		
0A15.2	Stormwater	Each	1		
0A15.3	Water	Each	1		
0A15.4	Gas	Each	1		
0A15.5	Electricity	Each	1		
0A15.6	Telstra	Each	1		
0A15.7	NBN	Each	1		
MITS 00B	**Quality Construction**				
0B.1	Quality system documents and records	Lump sum	1		
0B.2	Quality verification and control – Additional testing	Provisional Sum	1		
0B.4.1.1	Civil	Provisional sum	1		
0B.4.1 2	Landscape	Provisional sum	1		
MITS 00C	**Control of Erosion and Sedimentation**				
0C.1.1	Establishment	Lump Sum	1		
0C.1.2	Maintenance for the duration of the Contract	Lump Sum	16		
	Total General				
	Check the construction period - 4 months allowed				
MITS 01	**Traffic Management**				
1.1	Control of traffic	Lump Sum	1		
1.7	Road Safety Audit	Number	2		
	Total Traffic Management				
MITS 02	**Earthworks**				
MITS 02A	**Clearing and Grubbing**				
2A.3	Removal of nominated trees	Number	10		
MITS 02B	**Bulk Earthworks**				
2B.1	Topsoil stripping	m^3	697		
2B.8	Preparation of cut and fill subgrades	m^2	3,486		
MITS 02C	**Stabilisation**				
2C.1	Supply stabilising agent (in situ mixing only)				
	Total Earthworks				
MITS03	**Underground Services**				
MITS03A	**Trenching for Underground Services**				
MITS03B	**Pipe Drainage**				
3B.1	Stormwater pipes and pipe culverts				
3B.1.2	225mm dia FRC Class 2 RRJ 0.0 - 1.5m depth	m	8		
3B.2	Stormwater pipe fittings				
3B.3	Stormwater pipe branch connections				
3B.4	Flexible joints				
3B.5	Splayed stormwater pipe				
3B.6	End caps for stormwater mains				
3B.7	End caps for stormwater ties				
3B.8	Scour stops				
MITS 03C	**Precast Box Culverts**				
3C.1	Cast insitu base slab				
3C 2	Precast RCBC				
3C 3	Cast insitu link slab				
MITS 03D	**Drainage Structures**				
3D.4	Special chambered MH				
3D.5	Stormwater sumps				
3D.5.1	R sump	Number	1		
3D.6	Stormwater sumps >1.8m				
3D.7	Surcharge structures				
3D.8	Headwalls				
3D.8 2	Pipe Culvert 1/1-1/2: DN450 headwall	Number	1		
MITS 03E	**Water Supply Reticulation**				
3E.1	Water supply pipes				
3E.2	Water supply pipe bends				
3E.3	Water supply pipe tees				

3E.4	Water supply pipe reducers				
3E.5	Fire hydrants				
3E.6	Sluice valves				
3E.7	Restrained joints				
3E.8	End caps				
3E.9	Thrust blocks				
3E.11	Scour stops				
3E.12	Trench stops				
3E.13	Pipe and Trench Protection				
3E.14	Valve chambers				
3E.15	Scour installations				
3E.16	Contractor works on existing water supply				
3E.18	Water service ties				
3E.19	Ready tap connectors				
MITS 03F	**Sewerage systems reticulation**				
3F.1	Sewer pipes				
3F.2	Sewer pipe fittings				
3F.3	Flexible joints				
3F.4	Sewer main dead ends				
3F.5	Sewer main sealing discs				
3F.6	Sewer tie dead ends				
3F.7	Scour stops				
3F.8	Trench stops				
3F.9	Connect to existing sewer structures				
3F.15	Pipe and Trench Protection				
3F.16	Sewer MH				
3F.19	VD				
3F.20	VD >Min Drop				
3F.23	Special chambered MH				
3F.24	Contractor works on existing sewer				
MITS 03G	**Service Conduits**				
3G.1	Trenching for Service Authorities				
3G.2	Conduit provision in a shared trench				
3G.5	Electrical Conduits				
3G.6	End caps				
MITS 03H	**Road Openings and Restorations**				
MITS 03I	**Subsurface Drainage**				
MITS 03J	**Subsoil and Foundation Drains**				
MITS 03K	**Drainage Mats**				
	Total Drainage				$ [redacted]
MITS 04	**Flexible Pavement Construction**			[redacted]	
4.1.1	DGB20 (traffic category A)				
4.1.2	DGB20 (traffic category D)				
4.1.2.3	150 mm layer	m^2	2,250		
4.2	Subbase material				
4.2.1	DGS20 (traffic category A)				
4.2.2	DGS20 (traffic category D)				
4.2.2.1	100 mm layer	m^2	323		
4.2.2.2	150 mm layer	m^2	1,927		
4.4	Supply and Spray Primer, Primerbinder				
4.4.1	AMC00	Litres	2,970		
4.4.2	C170	Litres	1,632		
4.5	Supply and Spray Binder				
4.6	Supply, incorporate and spray cutter oil in binder				
4.7	Supply, incorporate and spray fulx oil in binder				
4.7.3	FGG-A Wearing Course	m^3	9		
4.8	Supply, Precoat, Apply and Incorporate aggregate	m^3			
4.9.1	AC14 (C450 Binder) wearing course	Tonnes	229		
4.9.2	AC14 (A15E Binder) wearing course	Tonnes	147		
4.9.3	AC20 (C450 Binder) correction course	Tonnes	392		
4.13	Upper SMZ				
4.13.1	150 mm layer	m^3	522		
4.14	Lower SMZ				
4.14.1	150 mm layer	m^3	522		
4.15	Lower UZF (CBR≥8%)				
4.15.1	300 mm layer	m^3	408		
	Total Flexible Pavement				
MITS 06	**Minor Concrete Works**				
MITS 06A	**Concrete Kerbs and Open Drains**				
6A.1	Concrete lining of open drains				
6A.5	Kerbs				

6A.5.3	MK	m	350	[redacted]
6A.6	Kerb reinforcement			
6A.7	Kerb ramps			
6A.7.4	3.0m path	Number	2	
6A.8	Vehicle crossings			
6A.9	Remove existing concrete kerb	m	20	
6A.11	Rock filled wire mattresses			
MITS 06B	**Concrete Paths Driveways Medians**			
6B.1	Paths, driveways, median toppings			
6B.1.1	100mm N25 Paths	m^2	70	
6B.2	Reinforcement for paths, driveways, median toppings			
6B.2.2	SL82 mesh single layer	m^2	70	
	Total Minor Concrete			
MITS 07	**Segmental Paving**			
7.1	Segmental Paving			
MITS 08	**Incidental Works**			
MITS 08A	**Fences and Barriers**			
8A.2	Gates			
8A.3	Barrier fences			
8A.4	Cycleway rails			
8A.6	Bollards			
MITS 09	**Landscape**			
MITS 09A	**Topsoil**			
9A.1	Topsoil – grass areas	m^2	600	
9A.2	Topsoil – planting areas	m^2	300	
9A.3	Topsoil amelioration	m^3	600	
9A.4	Topsoil amelioration certification	m^3	1	
MITS 09B	**Grassing**			
9B.1	Detailed excavation, filling and trimming, finishing of surfaces	m^2	600	
9B.6	Consolidation	Weeks	13	
MITS 09C	**Planting**			
MITS 09D	**Irrigation**			
MITS 09E	**Consolidation**			
	Total Landscape			
MITS 10	**Concrete Works**			
MITS 11	**Pavement Marking**			
11.2	Set Out of Pavement Marking	Lump Sum	1	
11.3	Paint – Longitudinal Lines			
11.3.1	Barrier Line (B1)	m	1,000	
11.4	Paint –Symbols, Legends, Arrows, Chevrons, Traffic Islands and Kerbs			
11.4.2	Chevron	m^2	90	
11.4.3	Coloured Surface Coating per approved marking.	m^2	2	
11.4.11	Pavement Arrow (A10)	m^2	50	
11.5	Paint - Transverse Lines			
11.6	Paint - Long Life Material (LLM) - Longitudinal Lines			
11.7	Long Life Material (LLM) - Transverse Lines			
11.8	Long Life Material (LLM) - Symbols, Legends and Arrows			
11.8.3	Pavement Arrow (A3)	Each	10	
11.9	Long Life Material (LLM) - Symbols, Legends and Arrows			
11.10	Installation of Retroreflective Raised Pavement Markers (RRPM)			
	Total Pavement Marking			
MITS 13	**Traffic Signals**			
13.4	Mast arm and streetlight post			
13.4.1	10.5m light col/ 4.5m light outreach/ 8.5m signal outreach	Number	10	
13.4.2	Relocate existing column	Number	3	
13.5	Joint use post			
13.8	Pedestrian push button assemblies			
13.13	Cable conduit			
13.13.1	1 x 50 dia. Streetlighting Conduit and Cable - dig/lay/install	m	715	
13.14	Vehicle detector loops			
	Total Traffic Signals			
MITS 14	**Road Signs**			
14.2	Manufacture of Guide Sign support structures			
14.3	Erection of Guide Sign support structures			
14.7	Manufacture of General Signs	Number	10	
14.8	Erection of General Signs support structure	Number	10	

	Total Road Signs				[redacted]
MITS 15	**Road Furniture**				
MITS 15A	**Guide Posts**				
MITS 15B	**Non Rigid Safety Barrier Systems**				
MITS 15C	**Rigid Road Safety Barrier Systems**				
MITS 16	**WSUD Features**				
MITS 16A	**Bio-Retention Systems**				
MITS 16B	**Ponds**				
16B.3	HDPE/Geotextile Liner Materials for Ponds				
MITS 16C	**Wetlands**				
MITS 16D	**Gross Pollutant Traps**				
					[redacted]
	Total Construction				
	preliminaries (5%)			5%	
	design, procurement and management fees (15%)			15%	
	Contingency (50%)			50%	
	GST			**10%**	
	Lump Sum Fee				

Mt Taylor Feasibility Study Carpark - Option 3

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	Total General				$ [redacted]
	Check the construction period - 4 months allowed				
MITS 01	Traffic Management				
	Total Traffic Management				$ [redacted]
MITS 02	Earthworks				
	Total Earthworks				$ [redacted]
MITS03	Underground Services				
	Total Drainage				$ [redacted]
MITS 04	Flexible Pavement Construction				
	Total Flexible Pavement				$ [redacted]
MITS 06	Minor Concrete Works				
	Total Minor Concrete				$ [redacted]
MITS 07	Segmental Paving				
	Total Segmental Paving				$ -
MITS 08	Incidental Works				
	Total Incidental Works				$ -
MITS 09	Landscape				
	Total Landscape				$ [redacted]
MITS 10	Concrete Works				
	Total Concrete Works				$ -
MITS 11	Pavement Marking				
	Total Pavement Marking				$ [redacted]
MITS 13	Traffic Signals				
	Total Traffic Signals				$ [redacted]
MITS 14	Road Signs				
	Total Road Signs				$ [redacted]
MITS 15	Road Furniture				
	Total Road Furniture				$ -
MITS 16	WSUD Features				
	Total WSUD Features				$ -
	Total Construction				$ [redacted]
	preliminaries (5%)			5%	$ [redacted]
	design, procurement and management fees (15%)			15%	$ [redacted]
	Contingency (50%)			50%	$ [redacted]
	GST			10%	$ [redacted]

	Lump Sum Fee				$ [redacted]

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
MITS 00	**Preliminaries**				
MITS 00A	**General requirements**				
0A.1	Site Establishment	Lump sum	1		
0A.3	Items from Principal	Each	1		
0A.5	Project Signs	Number	2		
0A.6	Coordination with Utility Authorities	Lump sum	1		
0A.12	Survey Set Out and Control	Lump sum	1		
0A.13.1	Works by the Contractor	Provisional Sum	1		
0A.13.2	Works by the Service Authority	Provisional Sum	1		
0A.15.4	Kerb (various sizes and types)	m	300		
0A.15.5	Path or concrete paving (various thickness)	m^2	15		
0A15.1	Sewer	Each	1		
0A15.2	Stormwater	Each	1		
0A15.3	Water	Each	1		
0A15.4	Gas	Each	1		
0A15.5	Electricity	Each	1		
0A15.6	Telstra	Each	1		
0A15.7	NBN	Each	1		
MITS 00B	**Quality Construction**				
0B.1	Quality system documents and records	Lump sum	1		
0B.2	Quality verification and control – Additional testing	Provisional Sum	1		
0B.4.1.1	Civil	Provisional sum	1		
0B.4.1 2	Landscape	Provisional sum	1		
MITS 00C	**Control of Erosion and Sedimentation**				
0C.1.1	Establishment	Lump Sum	1		
0C.1.2	Maintenance for the duration of the Contract	Lump Sum	16		
	Total General				
	Check the construction period - 4 months allowed				
MITS 01	**Traffic Management**				
1.1	Control of traffic	Lump Sum	1		
1.7	Road Safety Audit	Number	2		
	Total Traffic Management				
MITS 02	**Earthworks**				
MITS 02A	**Clearing and Grubbing**				
MITS 02B	**Bulk Earthworks**				
2B.1	Topsoil stripping	m^3	560		
2B.8	Preparation of cut and fill subgrades	m^2	2,357		
MITS 02C	**Stabilisation**				
2C.1	Supply stabilising agent (in situ mixing only)				
	Total Earthworks				
MITS03	**Underground Services**				
MITS03A	**Trenching for Underground Services**				
MITS03B	**Pipe Drainage**				
3B.1	Stormwater pipes and pipe culverts				
3B.2	Stormwater pipe fittings				
3B.3	Stormwater pipe branch connections				
3B.4	Flexible joints				
3B.5	Splayed stormwater pipe				
3B.6	End caps for stormwater mains				
3B.7	End caps for stormwater ties				
3B.8	Scour stops				
MITS 03C	**Precast Box Culverts**				
3C.1	Cast insitu base slab				
3C 2	Precast RCBC				
3C 3	Cast insitu link slab				
MITS 03D	**Drainage Structures**				
3D.4	Special chambered MH				
3D.5	Stormwater sumps				
3D.5.1	R sump	Number	1	$	
3D.6	Stormwater sumps >1.8m				
3D.7	Surcharge structures				
3D.8	Headwalls				
MITS 03E	**Water Supply Reticulation**				
3E.1	Water supply pipes				
3E.2	Water supply pipe bends				
3E.3	Water supply pipe tees				
3E.4	Water supply pipe reducers				
3E.5	Fire hydrants				
3E.6	Sluice valves				

3E.7	Restrained joints				
3E.8	End caps				
3E.9	Thrust blocks				
3E.11	Scour stops				
3E.12	Trench stops				
3E.13	Pipe and Trench Protection				
3E.14	Valve chambers				
3E.15	Scour installations				
3E.16	Contractor works on existing water supply				
3E.18	Water service ties				
3E.19	Ready tap connectors				
MITS 03F	**Sewerage systems reticulation**				
3F.1	Sewer pipes				
3F.2	Sewer pipe fittings				
3F.3	Flexible joints				
3F.4	Sewer main dead ends				
3F.5	Sewer main sealing discs				
3F.6	Sewer tie dead ends				
3F.7	Scour stops				
3F.8	Trench stops				
3F.9	Connect to existing sewer structures				
3F.15	Pipe and Trench Protection				
3F.16	Sewer MH				
3F.19	VD				
3F.20	VD >Min Drop				
3F.23	Special chambered MH				
3F.24	Contractor works on existing sewer				
MITS 03G	**Service Conduits**				
3G.1	Trenching for Service Authorities				
3G.2	Conduit provision in a shared trench				
3G.5	Electrical Conduits				
3G.6	End caps				
MITS 03H	**Road Openings and Restorations**				
MITS 03I	**Subsurface Drainage**				
MITS 03J	**Subsoil and Foundation Drains**				
MITS 03K	**Drainage Mats**				
	Total Drainage				
MITS 04	**Flexible Pavement Construction**				
4.1.1	DGB20 (traffic category A)				
4.1.2	DGB20 (traffic category D)				
4.1.2.3	150 mm layer	m^2	1,277		
4.2	Subbase material				
4.2.1	DGS20 (traffic category A)				
4.2.2	DGS20 (traffic category D)				
4.2.2.2	150 mm layer	m^2	1,277		
4.4	Supply and Spray Primer, Primerbinder				
4.4.2	C170	Litres	1,532		
4.5	Supply and Spray Binder				
4.6	Supply, incorporate and spray cutter oil in binder				
4.7	Supply, incorporate and spray fulx oil in binder				
4.8	Supply, Precoat, Apply and Incorporate aggregate	m^3			
4.9.1	AC14 (C450 Binder) wearing course	Tonnes	152		
4.9.2	AC14 (A15E Binder) wearing course	Tonnes	181		
4.9.3	AC20 (C450 Binder) correction course	Tonnes	483		
4.13	Upper SMZ				
4.13.1	150 mm layer	m^3	462		
4.14	Lower SMZ				
4.14.1	150 mm layer	m^3	462		
4.15	Lower UZF (CBR≥8%)				
4.15.1	300 mm layer	m^3	503		
	Total Flexible Pavement				
MITS 06	**Minor Concrete Works**				
MITS 06A	**Concrete Kerbs and Open Drains**				
6A.1	Concrete lining of open drains				
6A.5	Kerbs				
6A.5.7	PK (MOD) Permeable Kerb (Match existing)	m	132		
6A.6	Kerb reinforcement				
6A.7	Kerb ramps				
6A.7.4	3.0m path	Number	1		
6A.8	Vehicle crossings				
6A.11	Rock filled wire mattresses				

MITS 06B	**Concrete Paths Driveways Medians**				
6B.1	Paths, driveways, median toppings				
6B.2	Reinforcement for paths, driveways, median toppings				
	Total Minor Concrete				$ [redacted]
MITS 07	**Segmental Paving**				
7.1	Segmental Paving				
MITS 08	**Incidental Works**				
MITS 08A	**Fences and Barriers**				
8A.2	Gates				
8A.3	Barrier fences				
8A.4	Cycleway rails				
8A.6	Bollards				
MITS 09	**Landscape**				
MITS 09A	**Topsoil**				
9A.1	Topsoil – grass areas	m²	250		
MITS 09B	**Grassing**				
9B.1	Detailed excavation, filling and trimming, finishing of surfaces	m²	250		
9B.5	Bitumen and Straw Mulching	m²	250		
MITS 09C	**Planting**				
9C 3	Planting (shrubs and grass)	Number	250		
9C.7	Consolidation	Weeks	13		
MITS 09D	**Irrigation**				
MITS 09E	**Consolidation**				
	Total Landscape				
MITS 10	**Concrete Works**				
MITS 11	**Pavement Marking**				
11.2	Set Out of Pavement Marking	Lump Sum	1		
11.3	Paint – Longitudinal Lines				
11.3.1	Barrier Line (B1)	m	1,000		
11.4	Paint –Symbols, Legends, Arrows, Chevrons, Traffic Islands and Kerbs				
11.4.2	Chevron	m²	424		
11.4.4	Access Symbol Pavement Marking	m²	2		
11.4.11	Pavement Arrow (A10)	m²	50		
11.5	Paint - Transverse Lines				
11.6	Paint - Long Life Material (LLM) - Longitudinal Lines				
11.6.7	Edgeline (E1)	m	1,209		
11.6.8	Edgeline (E3)	m	292		
11.7	Long Life Material (LLM) - Transverse Lines				
11.7.1	Turn Line (T1)	m	130		
11.8	Long Life Material (LLM) - Symbols, Legends and Arrows				
11.8.3	Pavement Arrow (A3)	Each	3		
11.9	Long Life Material (LLM) - Symbols, Legends and Arrows				
11.10	Installation of Retroreflective Raised Pavement Markers (RRPM)				
	Total Pavement Marking				
MITS 13	**Traffic Signals**				
13.4	Mast arm and streetlight post				
13.4.1	10.5m light col/ 4.5m light outreach/ 8.5m signal outreach	Number	14		
13.4.2	Relocate existing colume	Number	1		
13.5	Joint use post				
13.8	Pedestrian push button assemblies				
13.13	Cable conduit				
13.13.1	1 x 50 dia. Streetlighting Conduit and Cable - dig/lay/install	m	905		
13.14	Vehicle detector loops				
	Total Traffic Signals				
MITS 14	**Road Signs**				
14.2	Manufacture of Guide Sign support structures				
14.3	Erection of Guide Sign support structures				
14.6	Relocate Guide Sign	Number	4		
14.7	Manufacture of General Signs	Number	4		
14.8	Erection of General Signs support structure	Number	4		
	Total Road Signs				
MITS 15	**Road Furniture**				
MITS 15A	**Guide Posts**				
MITS 15B	**Non Rigid Safety Barrier Systems**				
MITS 15C	**Rigid Road Safety Barrier Systems**				

MITS 16	**WSUD Features**				
MITS 16A	**Bio-Retention Systems**				
MITS 16B	**Ponds**				
16B.3	HDPE/Geotextile Liner Materials for Ponds				
MITS 16C	**Wetlands**				
MITS 16D	**Gross Pollutant Traps**				
					[redacted]
	Total Construction				
	preliminaries (5%)			5%	
	design, procurement and management fees (15%)			15%	
	Contingency (50%)			50%	
	GST			**10%**	
	Lump Sum Fee				

Mt Taylor Feasibility Study Intersection Option 1

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	Total General				$ [redacted]
	Check the construction period - 4 months allowed				
MITS 01	Traffic Management				
	Total Traffic Management				$ [redacted]
MITS 02	Earthworks				
	Total Earthworks				$ [redacted]
MITS03	Underground Services				
	Total Drainage				$ [redacted]
MITS 04	Flexible Pavement Construction				
	Total Flexible Pavement				$ [redacted]
MITS 06	Minor Concrete Works				
	Total Minor Concrete				$ [redacted]
MITS 07	Segmental Paving				
	Total Segmental Paving				$ -
MITS 08	Incidental Works				
	Total Incidental Works				$ -
MITS 09	Landscape				
	Total Landscape				$ [redacted]
MITS 10	Concrete Works				
	Total Concrete Works				$ -
MITS 11	Pavement Marking				
	Total Pavement Marking				$ [redacted]
MITS 13	Traffic Signals				
	Total Traffic Signals				$ [redacted]
MITS 14	Road Signs				
	Total Road Signs				$ [redacted]
MITS 15	Road Furniture				
	Total Road Furniture				$ -
MITS 16	WSUD Features				
	Total WSUD Features				$ -
	Total Construction				$ [redacted]
	preliminaries (5%)			5%	$ [redacted]
	design, procurement and management fees (15%)			15%	$ [redacted]

	Contingency (50%)			50%	[redacted]
	GST			**10%**	
	Lump Sum Fee				

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	Total General				[redacted]
	Check the construction period - 4 months allowed				
MITS 01	**Traffic Management**				
	Total Traffic Management				
MITS 02	**Earthworks**				
	Total Earthworks				
MITS03	**Underground Services**				
	Total Drainage				
MITS 04	**Flexible Pavement Construction**				
	Total Flexible Pavement				
MITS 06	**Minor Concrete Works**				
	Total Minor Concrete				
MITS 07	**Segmental Paving**				
	Total Segmental Paving				
MITS 08	**Incidental Works**				
	Total Incidental Works				
MITS 09	**Landscape**				
	Total Landscape				
MITS 10	**Concrete Works**				
MITS 11	**Pavement Marking**				
	Total Pavement Marking				
MITS 13	**Traffic Signals**				
	Total Traffic Signals				
MITS 14	**Road Signs**				
	Total Road Signs				
MITS 15	**Road Furniture**				
	Total Road Furniture				
MITS 16	**WSUD Features**				
	Total WSUD Features				
	Total Construction				
	preliminaries (5%)			5%	
	design, procurement and management fees (15%)			15%	
	Contingency (50%)			50%	
	GST			**10%**	
	Lump Sum Fee				

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
MITS 00	**Preliminaries**				
MITS 00A	**General requirements**				
0A.1	Site Establishment	Lump sum	1		
0A.5	Project Signs	Number	2		
0A.6	Coordination with Utility Authorities	Lump sum	1		
0A.12	Survey Set Out and Control	Lump sum	1		
0A.13.1	Works by the Contractor	Provisional Sum	1		
0A.13 2	Works by the Service Authority	Provisional Sum	1		
0A.14	Additional Work	Provisional Sum	1		
0A.15 5	Path or concrete paving (various thickness)	m^2	150		
0A15.1	Sewer	Each	1		
0A15.2	Stormwater	Each	1		
0A15.3	Water	Each	1		
0A15.4	Gas	Each	1		
0A15.5	Electricity	Each	1		
0A15.6	Telstra	Each	1		
0A15.7	NBN	Each	1		
MITS 00B	**Quality Construction**				
0B.1	Quality system documents and records	Lump sum	1		
0B 2	Quality verification and control – Additional testing	Provisional Sum	1		
0B.4.1.1	Civil	Provisional sum	1		
0B.4.1.2	Landscape	Provisional sum	1		
0B.4.1.3	Streetlight	Provisional sum	1		
0B.4.1.4	NBN	Provisional sum	1		
MITS 00C	**Control of Erosion and Sedimentation**				
0C.1.1	Establishment	Lump Sum	1		
	Total General				
	Check the construction period - 4 months allowed				
MITS 01	**Traffic Management**				
1.1	Control of traffic	Lump Sum	1		
1.5	Variable message signs	Weeks	16		
1.7	Road Safety Audit	Number	6		
	Total Traffic Management				
MITS 02	**Earthworks**				
MITS 02A	**Clearing and Grubbing**				
2A.3	Removal of nominated trees	Number	6		
MITS 02B	**Bulk Earthworks**				
2B.1	Topsoil stripping	m^3	341		
2B 2.1	Within project site	m^3	150		
2B 3	Unsuitable Material	m^3	15		
2B 5	General fill	m^3	150		
2B 8	Preparation of cut and fill subgrades	m^2	1,325		
2B.10	Construction of swale batter drain (Cut off drain)	m	154		
MITS 02C	**Stabilisation**				
2C.1	Supply stabilising agent (in situ mixing only)				
	Total Earthworks				
MITS03	**Underground Services**				
MITS03A	**Trenching for Underground Services**				
MITS03B	**Pipe Drainage**				
3B.1	Stormwater pipes and pipe culverts				
3B.1.12	450mm dia FRC Class 2 RRJ 1.5 -3 0m depth	m	5		
3B 2	Stormwater pipe fittings				
3B 3	Stormwater pipe branch connections				
3B.4	Flexible joints				
3B 5	Splayed stormwater pipe				
3B.6	End caps for stormwater mains				
3B.7	End caps for stormwater ties				
3B 8	Scour stops				
3B 9.2	300mm dia connection to existing manhole	Each	1		
MITS 03C	**Precast Box Culverts**				
3C.1	Cast insitu base slab				
3C 2	Precast RCBC				
3C 3	Cast insitu link slab				
MITS 03D	**Drainage Structures**				
3D.4	Special chambered MH				
3D.5	Stormwater sumps				
3D.6	Stormwater sumps >1 8m				
3D.6.1	R sump	Number	1		
3D.7	Surcharge structures				

3D.8	Headwalls				
MITS 03E	**Water Supply Reticulation**				
3E.1	Water supply pipes				
3E.2	Water supply pipe bends				
3E.3	Water supply pipe tees				
3E.4	Water supply pipe reducers				
3E.5	Fire hydrants				
3E.6	Sluice valves				
3E.7	Restrained joints				
3E.8	End caps				
3E.9	Thrust blocks				
3E.11	Scour stops				
3E.12	Trench stops				
3E.13	Pipe and Trench Protection				
3E.14	Valve chambers				
3E.15	Scour installations				
3E.16	Contractor works on existing water supply				
3E.18	Water service ties				
3E.19	Ready tap connectors				
MITS 03F	**Sewerage systems reticulation**				
3F.1	Sewer pipes				
3F.2	Sewer pipe fittings				
3F.3	Flexible joints				
3F.4	Sewer main dead ends				
3F.5	Sewer main sealing discs				
3F.6	Sewer tie dead ends				
3F.7	Scour stops				
3F.8	Trench stops				
3F.9	Connect to existing sewer structures				
3F.15	Pipe and Trench Protection				
3F.16	Sewer MH				
3F.19	VD				
3F.20	VD >Min Drop				
3F.23	Special chambered MH				
3F.24	Contractor works on existing sewer				
MITS 03G	**Service Conduits**				
3G.1	Trenching for Service Authorities				
3G.2	Conduit provision in a shared trench				
3G.5	Electrical Conduits				
3G.6	End caps				
MITS 03H	**Road Openings and Restorations**				
MITS 03I	**Subsurface Drainage**				
MITS 03J	**Subsoil and Foundation Drains**				
MITS 03K	**Drainage Mats**				
	Total Drainage				[redacted]
MITS 04	**Flexible Pavement Construction**				
4.1.1	DGB20 (traffic category A)				
4.1.2	DGB20 (traffic category D)				
4.1.2.3	150 mm layer	m^2	238	[redacted]	
4.2	Subbase material				
4.2.1	DGS20 (traffic category A)				
4.2.2	DGS20 (traffic category D)				
4.2.2.1	100 mm layer	m^2	238		
4.4	Supply and Spray Primer, Primerbinder				
4.4.1	AMC00	Litres	285		
4.5	Supply and Spray Binder				
4.6	Supply, incorporate and spray cutter oil in binder				
4.7	Supply, incorporate and spray fulx oil in binder				
4.7.3	FGG-A Wearing Course	m^3	6		
4.8	Supply, Precoat, Apply and Incorporate aggregate	m^3			
4.9.2	AC14 (A15E Binder) wearing course	Tonnes	157		
4.9.3	AC20 (C450 Binder) correction course	Tonnes	420		
4.11	Mill Existing Pavement	Lump Sum	1		
4.13	Upper SMZ				
4.13.1	150 mm layer	m^3	220		
4.14	Lower SMZ				
4.14.1	150 mm layer	m^3	220		
4.15	Lower UZF (CBR≥8%)				
4.15.1	300 mm layer	m^3	437		
	Total Flexible Pavement				
MITS 06	**Minor Concrete Works**				
MITS 06A	**Concrete Kerbs and Open Drains**				

6A.1	Concrete lining of open drains					
6A.3	Batter drains	m²	140			
6A.3.1	Remove batter drain	m	5			
6A.5	Kerbs					
6A.5.1	KG	m	1,268			
6A.6	Kerb reinforcement					
6A.7	Kerb ramps					
6A.7.4	3.0m path	Number	8			
6A.8	Vehicle crossings					
6A.9	Remove existing concrete kerb	m	215			
6A.11	Rock filled wire mattresses					
MITS 06B	**Concrete Paths Driveways Medians**					
6B.1	Paths, driveways, median toppings					
6B.1.2	150mm N32 Paths	m²	854			
6B 2	Reinforcement for paths, driveways, median toppings					
6B 2.2	SL82 mesh single layer	m²	854			
	Total Minor Concrete					
MITS 07	**Segmental Paving**					
7.1	Segmental Paving					
MITS 08	**Incidental Works**					
MITS 08A	**Fences and Barriers**					
8A.2	Gates					
8A.3	Barrier fences					
8A.4	Cycleway rails					
8A.6	Bollards					
MITS 09	**Landscape**					
MITS 09A	**Topsoil**					
9A.1	Topsoil – grass areas	m²	2,000			
9A.2	Topsoil – planting areas	m²	500			
9A.3	Topsoil amelioration	m³	2,000			
9A.4	Topsoil amelioration certification	Number	1			
MITS 09B	**Grassing**					
9B.1	Detailed excavation, filling and trimming, finishing of surfaces	m²	2,000			
MITS 09C	**Planting**					
9C.6	Mulching	m³	150			
9C.7	Consolidation	Weeks	13			
MITS 09D	**Irrigation**					
MITS 09E	**Consolidation**					
	Total Landscape					
MITS 10	**Concrete Works**					
MITS 11	**Pavement Marking**					
11.2	Set Out of Pavement Marking	Lump Sum	1			
11.3	Paint – Longitudinal Lines					
11.3 8.2	Path separation line S5	m	80			
11.3.12	Edge Line (E1)	m	182			
11.3.16	Path Line (SP1)	m	70			
11.4	Paint –Symbols, Legends, Arrows, Chevrons, Traffic Islands and Kerbs					
11.5	Paint - Transverse Lines					
11.6	Paint - Long Life Material (LLM) - Longitudinal Lines					
11.6 5	Merge Line (M1)	m	1,048			
11.6.10	Lane Line (L9)	m	792			
11.7	Long Life Material (LLM) - Transverse Lines					
11.7.1	Turn Line (T1)	m	46			
11.7.4	Stop Line (SL1)	m	27			
11.7.6	Pedestrian Crosswalk Line (PCW)	m	122			
11.8	Long Life Material (LLM) - Symbols, Legends and Arrows					
11.8 3	Pavement Arrow (A3)	Each	16			
11.9	Long Life Material (LLM) - Symbols, Legends and Arrows					
11.9 2	Zebra Crossing (PX)	m²	34			
11.10	Installation of Retroreflective Raised Pavement Markers (RRPM)					
	Total Pavement Marking					
MITS 13	**Traffic Signals**					
13.1	Traffic signal post	Number	10			
13.4	Mast arm and streetlight post					
13.4.1	10.5m light col/ 4.5m light outreach/ 8.5m signal outreach	Number	13			
13.4 2	Relocate existing column	Number	5			
13.5	Joint use post					

13.6	Vehicle signal lanterns	Number	13	[redacted]	
13.7	Pedestrian signal lanterns	Number	4		
13.8	Pedestrian push button assemblies				
13.8.1	Standard push button assembly (non audio)	Number	6		
13.9	Control equipment	Number	1		
13.11	Multi-core cabling	m	413		
13.12	Twin screen cabling	m	201.705		
13.13	Cable conduit				
13.13.1	1 x 50 dia. Conduit	m	30		
13.13.1.1	1 x 50 dia. Streetlighting Conduit and Cable - dig/lay/install	m	1055		
13.13.2	1 x 100 dia. Conduit	m	22.5		
13.13.4	2 x 140 dia. Conduit	m	135		
13.14	Vehicle detector loops				
13.14.1	Vehicle detector loop	Each	4		
13.15	JC-1 Small conduit junction box	Number	6		
13.16	JB-R Large conduit junction box	Number	9		
13.17	Installation and connection of communications cable to new Signal Controller	Provisional Sum	1		
13.18	Installation and connection of Power Supply cable by Evoenergy to new Signal Controller	Provisional Sum	1		
13.19	CCTV	Provisional Sum	1		
	Total Traffic Signals				
MITS 14	**Road Signs**				
14.2	Manufacture of Guide Sign support structures				
14.3	Erection of Guide Sign support structures				
14.7	Manufacture of General Signs	Number	6	[redacted]	
14.8	Erection of General Signs support structure	Number	6		
	Total Road Signs				
MITS 15	**Road Furniture**				
MITS 15A	**Guide Posts**				
MITS 15B	**Non Rigid Safety Barrier Systems**				
MITS 15C	**Rigid Road Safety Barrier Systems**				
MITS 16	**WSUD Features**				
MITS 16A	**Bio-Retention Systems**				
MITS 16B	**Ponds**				
16B.3	HDPE/Geotextile Liner Materials for Ponds				
MITS 16C	**Wetlands**				
MITS 16D	**Gross Pollutant Traps**				
	Total Construction			[redacted]	
	preliminaries (5%)				
	design, procurement and management fees (15%)				
	Contingency (50%)				
	GST				
	Lump Sum Fee				

Mt Taylor Feasibility Study Intersection - Option 2

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	[redacted]
	Total General				
	Check the construction period - 4 months allowed				
MITS 01	**Traffic Management**				
	Total Traffic Management				
MITS 02	**Earthworks**				
	Total Earthworks				
MITS03	**Underground Services**				
	Total Drainage				
MITS 04	**Flexible Pavement Construction**				
	Total Flexible Pavement				
MITS 06	**Minor Concrete Works**				
	Total Minor Concrete				
MITS 07	**Segmental Paving**				
	Total Segmental Paving				
MITS 08	**Incidental Works**				
	Total Incidental Works				
MITS 09	**Landscape**				
	Total Landscape				
MITS 10	**Concrete Works**				
	Total Concrete Works				
MITS 11	**Pavement Marking**				
	Total Pavement Marking				
MITS 13	**Traffic Signals**				
	Total Traffic Signals				
	Total Road Signs				
	Total Road Furniture				
	Total WSUD Features				
	Total Construction				
	preliminaries (5%)			5%	
	design, procurement and management fees (15%)			15%	
	Contingency (50%)			50%	
	GST			**10%**	
	Lump Sum Fee				

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
MITS 00	**Preliminaries**				
MITS 00A	**General requirements**				
0A.1	Site Establishment	Lump sum	1		
0A.5	Project Signs	Number	2		
0A.6	Coordination with Utility Authorities	Lump sum	1		
0A.12	Survey Set Out and Control	Lump sum	1		
0A.13.1	Works by the Contractor	Provisional Sum	1		
0A.13 2	Works by the Service Authority	Provisional Sum	1		
0A.14	Additional Work	Provisional Sum	1		
0A.15 5	Path or concrete paving (various thickness)	m^2	150		
0A15.1	Sewer	Each	1		
0A15.2	Stormwater	Each	1		
0A15.3	Water	Each	1		
0A15.4	Gas	Each	1		
0A15.5	Electricity	Each	1		
0A15.6	Telstra	Each	1		
0A15.7	NBN	Each	1		
MITS 00B	**Quality Construction**				
0B.1	Quality system documents and records	Lump sum	1		
0B 2	Quality verification and control – Additional testing	Provisional Sum	1		
0B.4.1.1	Civil	Provisional sum	1		
0B.4.1.2	Landscape	Provisional sum	1		
0B.4.1.3	Streetlight	Provisional sum	1		
0B.4.1.4	NBN	Provisional sum	1		
MITS 00C	**Control of Erosion and Sedimentation**				
0C.1.1	Establishment	Lump Sum	1		
	Total General				
	Check the construction period - 4 months allowed				
MITS 01	**Traffic Management**				
1.1	Control of traffic	Lump Sum	1		
1.5	Variable message signs	Weeks	16		
1.7	Road Safety Audit	Number	6		
	Total Traffic Management				
MITS 02	**Earthworks**				
MITS 02A	**Clearing and Grubbing**				
2A.3	Removal of nominated trees	Number	10		
MITS 02B	**Bulk Earthworks**				
2B.1	Topsoil stripping	m^3	260		
2B 2.1	Within project site	m^3	150		
2B 3	Unsuitable Material	m^3	15		
2B 8	Preparation of cut and fill subgrades	m^2	8,186		
2B.10	Construction of swale batter drain (Cut off drain)	m	154		
MITS 02C	**Stabilisation**				
2C.1	Supply stabilising agent (in situ mixing only)				
	Total Earthworks				
MITS03	**Underground Services**				
MITS03A	**Trenching for Underground Services**				
MITS03B	**Pipe Drainage**				
3B.1	Stormwater pipes and pipe culverts				
3B.1.12	450mm dia FRC Class 2 RRJ 1.5 -3 0m depth	m	5		
3B 2	Stormwater pipe fittings				
3B 3	Stormwater pipe branch connections				
3B.4	Flexible joints				
3B 5	Splayed stormwater pipe				
3B.6	End caps for stormwater mains				
3B.7	End caps for stormwater ties				
3B 8	Scour stops				
3B 9.2	300mm dia connection to existing manhole	Each	1		
MITS 03C	**Precast Box Culverts**				
3C.1	Cast insitu base slab				
3C 2	Precast RCBC				
3C 3	Cast insitu link slab				
MITS 03D	**Drainage Structures**				
3D.4	Special chambered MH				
3D.5	Stormwater sumps				
3D.6	Stormwater sumps >1 8m				
3D.6.1	R sump	Number	1		
3D.7	Surcharge structures				
3D.8	Headwalls				
MITS 03E	**Water Supply Reticulation**				
3E.1	Water supply pipes				

3E.2	Water supply pipe bends				
3E.3	Water supply pipe tees				
3E.4	Water supply pipe reducers				
3E.5	Fire hydrants				
3E.6	Sluice valves				
3E.7	Restrained joints				
3E.8	End caps				
3E.9	Thrust blocks				
3E.11	Scour stops				
3E.12	Trench stops				
3E.13	Pipe and Trench Protection				
3E.14	Valve chambers				
3E.15	Scour installations				
3E.16	Contractor works on existing water supply				
3E.18	Water service ties				
3E.19	Ready tap connectors				
MITS 03F	**Sewerage systems reticulation**				
3F.1	Sewer pipes				
3F.2	Sewer pipe fittings				
3F.3	Flexible joints				
3F.4	Sewer main dead ends				
3F.5	Sewer main sealing discs				
3F.6	Sewer tie dead ends				
3F.7	Scour stops				
3F.8	Trench stops				
3F.9	Connect to existing sewer structures				
3F.15	Pipe and Trench Protection				
3F.16	Sewer MH				
3F.19	VD				
3F.20	VD >Min Drop				
3F.23	Special chambered MH				
3F.24	Contractor works on existing sewer				
MITS 03G	**Service Conduits**				
3G.1	Trenching for Service Authorities				
3G.2	Conduit provision in a shared trench				
3G.5	Electrical Conduits				
3G.6	End caps				
MITS 03H	**Road Openings and Restorations**				
MITS 03I	**Subsurface Drainage**				
MITS 03J	**Subsoil and Foundation Drains**				
MITS 03K	**Drainage Mats**				
	Total Drainage				
MITS 04	**Flexible Pavement Construction**				
4.1.1	DGB20 (traffic category A)				
4.1.2	DGB20 (traffic category D)				
4.1.2.3	150 mm layer	m^2	209		
4.2	Subbase material				
4.2.1	DGS20 (traffic category A)				
4.2.2	DGS20 (traffic category D)				
4.2.2.1	100 mm layer	m^2	209		
4.4	Supply and Spray Primer, Primerbinder				
4.5	Supply and Spray Binder				
4.6	Supply, incorporate and spray cutter oil in binder				
4.7	Supply, incorporate and spray fulx oil in binder				
4.7.3	FGG-A Wearing Course	m^3	5		
4.8	Supply, Precoat, Apply and Incorporate aggregate	m^3			
4.9.2	AC14 (A15E Binder) wearing course	Tonnes	972		
4.9.3	AC20 (C450 Binder) correction course	Tonnes	2,593		
4.11	Mill Existing Pavement	Lump Sum	1		
4.13	Upper SMZ				
4.13.1	150 mm layer	m^3	1,351		
4.14	Lower SMZ				
4.14.1	150 mm layer	m^3	1,351		
4.15	Lower UZF (CBR≥8%)				
4.15.1	300 mm layer	m^3	2,701		
	Total Flexible Pavement				
MITS 06	**Minor Concrete Works**				
MITS 06A	**Concrete Kerbs and Open Drains**				
6A.1	Concrete lining of open drains				
6A.5	Kerbs				
6A.5.3	MK	m	1,300		
6A.6	Kerb reinforcement				

6A.7	Kerb ramps			[redacted]	
6A.7.4	3.0m path	Number	8		
6A.8	Vehicle crossings				
6A.9	Remove existing concrete kerb	m	242		
6A.11	Rock filled wire mattresses				
MITS 06B	**Concrete Paths Driveways Medians**				
6B.1	Paths, driveways, median toppings				
6B.1.2	150mm N32 Paths	m^2	1,630		
6B 2	Reinforcement for paths, driveways, median toppings				
6B 2.2	SL82 mesh single layer	m^2	1,630		
	Total Minor Concrete				
MITS 07	**Segmental Paving**				
7.1	Segmental Paving				
MITS 08	**Incidental Works**				
MITS 08A	**Fences and Barriers**				
8A.2	Gates				
8A.3	Barrier fences				
8A.4	Cycleway rails				
8A.6	Bollards				
MITS 09	**Landscape**				
MITS 09A	**Topsoil**			[redacted]	
9A.1	Topsoil – grass areas	m^2	2,000		
9A.2	Topsoil – planting areas	m^2	500		
9A.3	Topsoil amelioration	m^3	2,000		
9A.4	Topsoil amelioration certification	Number	1		
MITS 09B	**Grassing**				
9B.1	Detailed excavation, filling and trimming, finishing of surfaces	m^2	2,000		
MITS 09C	**Planting**				
9C.6	Mulching	m^3	150		
9C.7	Consolidation	Weeks	13		
MITS 09D	**Irrigation**				
MITS 09E	**Consolidation**				
	Total Landscape				
MITS 10	**Concrete Works**				
MITS 11	**Pavement Marking**			[redacted]	
11.2	Set Out of Pavement Marking	Lump Sum	1		
11.3	Paint – Longitudinal Lines				
11.3 8.2	Path separation line S5	m	80		
11.3.12	Edge Line (E1)	m	182		
11.3.16	Path Line (SP1)	m	70		
11.4	Paint –Symbols, Legends, Arrows, Chevrons, Traffic Islands and Kerbs				
11.5	Paint - Transverse Lines				
11.6	Paint - Long Life Material (LLM) - Longitudinal Lines				
11.6 5	Merge Line (M1)	m	1,048		
11.6.10	Lane Line (L9)	m	792		
11.7	Long Life Material (LLM) - Transverse Lines				
11.7.1	Turn Line (T1)	m	46		
11.7.4	Stop Line (SL1)	m	27		
11.7.6	Pedestrian Crosswalk Line (PCW)	m	122		
11.8	Long Life Material (LLM) - Symbols, Legends and Arrows				
11.8 3	Pavement Arrow (A3)	Each	16		
11.9	Long Life Material (LLM) - Symbols, Legends and Arrows				
11.9 2	Zebra Crossing (PX)	m^2	34		
11.10	Installation of Retroreflective Raised Pavement Markers (RRPM)				
	Total Pavement Marking				
MITS 13	**Traffic Signals**				
13.1	Traffic signal post	Number	10		
13.4	Mast arm and streetlight post				
13.4.1	10.5m light col/ 4.5m light outreach/ 8.5m signal outreach	Number	25		
13.4 2	Relocate existing column	Number	8		
13.5	Joint use post				
13.6	Vehicle signal lanterns	Number	13		
13.7	Pedestrian signal lanterns	Number	4		
13.8	Pedestrian push button assemblies				
13.8.1	Standard push button assembly (non audio)	Number	6		
13.9	Control equipment	Number	1		
13.11	Multi-core cabling	m	408		

13.12	Twin screen cabling	m	359.31	$	[redacted]
13.13	Cable conduit				
13.13.1	1 x 50 dia. Conduit	m	45	$	
13.13.1.1	1 x 50 dia. Streetlighting Conduit and Cable - dig/lay/install	m	1840	$	
13.13.2	1 x 100 dia. Conduit	m	20	$	
13.13.4	2 x 140 dia. Conduit	m	135	$	
13.14	Vehicle detector loops				
13.14.1	Vehicle detector loop	Each	6	$	
13.14.3	Cycle Scoot loop	Each	1	$	
13.15	JC-1 Small conduit junction box	Number	9	$	
13.16	JB-R Large conduit junction box	Number	8	$	
13.17	Installation and connection of communications cable to new Signal Controller	Provisional Sum	1	$	
13.18	Installation and connection of Power Supply cable by Evoenergy to new Signal Controller	Provisional Sum	1	$	
13.19	CCTV	Provisional Sum			
	Total Traffic Signals				$ [redacted]
MITS 14	**Road Signs**				
14.2	Manufacture of Guide Sign support structures				
14.3	Erection of Guide Sign support structures				
14.7	Manufacture of General Signs	Number	6	$ [redacted]	[redacted]
14.8	Erection of General Signs support structure	Number	6	$	
	Total Road Signs				$ [redacted]
MITS 15	**Road Furniture**				
MITS 15A	**Guide Posts**				
MITS 15B	**Non Rigid Safety Barrier Systems**				
MITS 15C	**Rigid Road Safety Barrier Systems**				
MITS 16	**WSUD Features**				
MITS 16A	**Bio-Retention Systems**				
MITS 16B	**Ponds**				
16B.3	HDPE/Geotextile Liner Materials for Ponds				
MITS 16C	**Wetlands**				
MITS 16D	**Gross Pollutant Traps**				
	Total Construction				[redacted]
	preliminaries (5%)			5%	[redacted]
	design, procurement and management fees (15%)			15%	
	Contingency (50%)			50%	
	GST			**10%**	[redacted]
	Lump Sum Fee				$ [redacted]

Mt Taylor Feasibility Study Intersection - Option 3

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	Total General				$ [redacted]
	Check the construction period - 4 months allowed				
MITS 01	Traffic Management				
	Total Traffic Management				$ [redacted]
MITS 02	Earthworks				
	Total Earthworks				$ -
MITS03	Underground Services				
	Total Drainage				$ -
MITS 04	Flexible Pavement Construction				
	Total Flexible Pavement				$ [redacted]
MITS 06	Minor Concrete Works				
	Total Minor Concrete				$ [redacted]
MITS 07	Segmental Paving				
	Total Segmental Paving				$ -
MITS 08	Incidental Works				
	Total Incidental Works				$ -
MITS 09	Landscape				
	Total Landscape				$ [redacted]
MITS 10	Concrete Works				
	Total Concrete Works				$ -
MITS 11	Pavement Marking				
	Total Pavement Marking				$ [redacted]
MITS 13	Traffic Signals				
	Total Traffic Signals				$ [redacted]
MITS 14	Road Signs				
	Total Road Signs				$ [redacted]
MITS 15	Road Furniture				
	Total Road Furniture				$ -
MITS 16	WSUD Features				
	Total WSUD Features				$ -
	Total Construction				$ [redacted]
	preliminaries (5%)			5%	$ [redacted]
	design, procurement and management fees (15%)			15%	$ [redacted]
	Contingency (50%)			50%	$ [redacted]
	GST			10%	$ [redacted]
	Lump Sum Fee				$ [redacted]

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
MITS 00	**Preliminaries**				
MITS 00A	**General requirements**				
0A.1	Site Establishment	Lump sum	1		
0A.5	Project Signs	Number	2		
0A.6	Coordination with Utility Authorities	Lump sum	1		
0A.12	Survey Set Out and Control	Lump sum	1		
0A.13.1	Works by the Contractor	Provisional Sum	1		
0A.13 2	Works by the Service Authority	Provisional Sum	1		
0A.14	Additional Work	Provisional Sum	1		
0A.15 5	Path or concrete paving (various thickness)	m^2	150		
0A15.1	Sewer	Each	1		
0A15.2	Stormwater	Each	1		
0A15.3	Water	Each	1		
0A15.4	Gas	Each	1		
0A15.5	Electricity	Each	1		
0A15.6	Telstra	Each	1		
0A15.7	NBN	Each	1		
MITS 00B	**Quality Construction**				
0B.1	Quality system documents and records	Lump sum	1		
0B.2	Quality verification and control – Additional testing	Provisional Sum	1		
0B.4.1.1	Civil	Provisional sum	1		
0B.4.1.2	Landscape	Provisional sum	1		
0B.4.1.3	Streetlight	Provisional sum	1		
0B.4.1.4	NBN	Provisional sum	1		
MITS 00C	**Control of Erosion and Sedimentation**				
0C.1.1	Establishment	Lump Sum	1		
	Total General				
	Check the construction period - 4 months allowed				
MITS 01	**Traffic Management**				
1.1	Control of traffic	Lump Sum	1		
1 5	Variable message signs	Weeks	16		
1.7	Road Safety Audit	Number	6		
	Total Traffic Management				
MITS 02	**Earthworks**				
MITS 02A	**Clearing and Grubbing**				
MITS 02B	**Bulk Earthworks**				
MITS 02C	**Stabilisation**				
2C.1	Supply stabilising agent (in situ mixing only)				
MITS03	**Underground Services**				
MITS03A	**Trenching for Underground Services**				
MITS03B	**Pipe Drainage**				
3B.1	Stormwater pipes and pipe culverts				
3B.2	Stormwater pipe fittings				
3B.3	Stormwater pipe branch connections				
3B.4	Flexible joints				
3B.5	Splayed stormwater pipe				
3B.6	End caps for stormwater mains				
3B.7	End caps for stormwater ties				
3B.8	Scour stops				
MITS 03C	**Precast Box Culverts**				
3C.1	Cast insitu base slab				
3C.2	Precast RCBC				
3C.3	Cast insitu link slab				
MITS 03D	**Drainage Structures**				
3D.4	Special chambered MH				
3D 5	Stormwater sumps				
3D.6	Stormwater sumps >1.8m				
3D.7	Surcharge structures				
3D 8	Headwalls				
MITS 03E	**Water Supply Reticulation**				
3E.1	Water supply pipes				
3E 2	Water supply pipe bends				
3E 3	Water supply pipe tees				
3E.4	Water supply pipe reducers				
3E 5	Fire hydrants				
3E.6	Sluice valves				
3E.7	Restrained joints				
3E 8	End caps				
3E 9	Thrust blocks				
3E.11	Scour stops				
3E.12	Trench stops				
3E.13	Pipe and Trench Protection				
3E.14	Valve chambers				

3E.15	Scour installations				
3E.16	Contractor works on existing water supply				
3E.18	Water service ties				
3E.19	Ready tap connectors				
MITS 03F	**Sewerage systems reticulation**				
3F.1	Sewer pipes				
3F 2	Sewer pipe fittings				
3F 3	Flexible joints				
3F.4	Sewer main dead ends				
3F 5	Sewer main sealing discs				
3F.6	Sewer tie dead ends				
3F.7	Scour stops				
3F 8	Trench stops				
3F 9	Connect to existing sewer structures				
3F.15	Pipe and Trench Protection				
3F.16	Sewer MH				
3F.19	VD				
3F 20	VD >Min Drop				
3F 23	Special chambered MH				
3F 24	Contractor works on existing sewer				
MITS 03G	**Service Conduits**				
3G.1	Trenching for Service Authorities				
3G 2	Conduit provision in a shared trench				
3G 5	Electrical Conduits				
3G.6	End caps				
MITS 03H	**Road Openings and Restorations**				
MITS 03I	**Subsurface Drainage**				
MITS 03J	**Subsoil and Foundation Drains**				
MITS 03K	**Drainage Mats**				
MITS 04	**Flexible Pavement Construction**				
4.1.1	DGB20 (traffic category A)				
4.1 2	DGB20 (traffic category D)				
4.1 2 3	150 mm layer	m^2	[redacted]		
4 2	Subbase material				
4 2.1	DGS20 (traffic category A)				
4 2 2	DGS20 (traffic category D)				
4 2 2.1	100 mm layer	m^2			
4.4	Supply and Spray Primer, Primerbinder				
4.4.1	AMC00	Litres			
4 5	Supply and Spray Binder				
4.6	Supply, incorporate and spray cutter oil in binder				
4.7	Supply, incorporate and spray fulx oil in binder				
4.7 3	FGG-A Wearing Course	m^3			
4 8	Supply, Precoat, Apply and Incorporate aggregate	m^3			
4.11	Mill Existing Pavement	Lump Sum			
4.13	Upper SMZ				
4.14	Lower SMZ				
4.15	Lower UZF (CBR≥8%)				
	Total Flexible Pavement				
MITS 06	**Minor Concrete Works**				
MITS 06A	**Concrete Kerbs and Open Drains**				
6A.1	Concrete lining of open drains				
6A.5	Kerbs				
6A.5.1	KG	m	[redacted]		
6A.6	Kerb reinforcement				
6A.7	Kerb ramps				
6A.7.4	3.0m path	Number			
6A.8	Vehicle crossings				
6A.8.5	Raised Zebra Crossing	Number			
6A.9	Remove existing concrete kerb	m			
6A.11	Rock filled wire mattresses				
MITS 06B	**Concrete Paths Driveways Medians**				
6B.1	Paths, driveways, median toppings				
6B.1.2	150mm N32 Paths	m^2			
6B.2	Reinforcement for paths, driveways, median toppings				
6B.2.2	SL82 mesh single layer	m^2			
	Total Minor Concrete				
MITS 07	**Segmental Paving**				
7.1	Segmental Paving				
MITS 08	**Incidental Works**				
MITS 08A	**Fences and Barriers**				
8A.2	Gates				

8A.3	Barrier fences				
8A.4	Cycleway rails				
8A.6	Bollards				
MITS 09	**Landscape**				
MITS 09A	**Topsoil**				
9A.1	Topsoil – grass areas	m^2			
9A.2	Topsoil – planting areas	m^2			
9A.3	Topsoil amelioration	m^3			
9A.4	Topsoil amelioration certification	Number			
MITS 09B	**Grassing**				
9B.1	Detailed excavation, filling and trimming, finishing of surfaces	m^2			
MITS 09C	**Planting**				
9C.6	Mulching	m^3			
9C.7	Consolidation	Weeks			
MITS 09D	**Irrigation**				
MITS 09E	**Consolidation**				
	Total Landscape				
MITS 10	**Concrete Works**				
MITS 11	**Pavement Marking**				
11.2	Set Out of Pavement Marking	Lump Sum			
11.3	Paint – Longitudinal Lines				
11.4	Paint –Symbols, Legends, Arrows, Chevrons, Traffic Islands and Kerbs				
11.5	Paint - Transverse Lines				
11.6	Paint - Long Life Material (LLM) - Longitudinal Lines				
11.7	Long Life Material (LLM) - Transverse Lines				
11.7.4	Stop Line (SL1)	m			
11.8	Long Life Material (LLM) - Symbols, Legends and Arrows				
11.9	Long Life Material (LLM) - Symbols, Legends and Arrows				
11.9.2	Zebra Crossing (PX)	m^2			
11.10	Installation of Retroreflective Raised Pavement Markers (RRPM)				
	Total Pavement Marking				
MITS 13	**Traffic Signals**				
13.4	Mast arm and streetlight post				
13.4.1	10 5m light col/ 4 5m light outreach/ 8.5m signal outreach	Number			
13.5	Joint use post				
13.8	Pedestrian push button assemblies				
13.13	Cable conduit				
13.13.1.1	1 x 50 dia. Streetlighting Conduit and Cable - dig/lay/install	m			
13.14	Vehicle detector loops				
	Total Traffic Signals				
MITS 14	**Road Signs**				
14.2	Manufacture of Guide Sign support structures				
14.3	Erection of Guide Sign support structures				
14.7	Manufacture of General Signs	Number			
14.7.1	R1-1 STOP	Number			
14.7.2	R1-2 GIVEWAY	Number			
14.7.3	W6-9	Number			
14.7.4	W8-23	Number			
14.8	Erection of General Signs support structure	Number			
	Total Road Signs				
MITS 15	**Road Furniture**				
MITS 15A	**Guide Posts**				
MITS 15B	**Non Rigid Safety Barrier Systems**				
MITS 15C	**Rigid Road Safety Barrier Systems**				
MITS 16	**WSUD Features**				
MITS 16A	**Bio-Retention Systems**				
MITS 16B	**Ponds**				
16B 3	HDPE/Geotextile Liner Materials for Ponds				
MITS 16C	**Wetlands**				
MITS 16D	**Gross Pollutant Traps**				
	Total Construction				
	preliminaries (5%)			5%	
	design, procurement and management fees (15%)			15%	
	Contingency (50%)			50%	
	GST			**10%**	
	Lump Sum Fee				

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	Total General				$ [redacted]
	Check the construction period - 4 months allowed				
MITS 01	**Traffic Management**				
	Total Traffic Management				$ [redacted]
MITS 02	**Earthworks**				
	Total Earthworks				$ [redacted]
MITS03	**Underground Services**				
	Total Drainage				$ [redacted]
MITS 04	**Flexible Pavement Construction**				
	Total Flexible Pavement				$ [redacted]
MITS 06	**Minor Concrete Works**				
	Total Minor Concrete				$ [redacted]
	Total Segmental Paving				$ -
	Total Incidental Works				$ -
	Total Landscape				$ [redacted]
	Total Concrete Works				$ -
	Total Pavement Marking				$ [redacted]
	Total Traffic Signals				$ [redacted]
	Total Road Signs				$ [redacted]
	Total Road Furniture				$ -
	Total WSUD Features				$ -
	Total Construction				$ [redacted]
	preliminaries (5%)			5%	$ [redacted]
	design, procurement and management fees (15%)			15%	$ [redacted]
	Contingency (50%)			50%	$ [redacted]
	GST			**10%**	$ [redacted]
	Lump Sum Fee				$ [redacted]

PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
MITS 00	Preliminaries				
MITS 00A	General requirements				
0A.1	Site Establishment	Lump sum	1		
0A.5	Project Signs	Number	2		
0A.6	Coordination with Utility Authorities	Lump sum	1		
0A.12	Survey Set Out and Control	Lump sum	1		
0A.13.1	Works by the Contractor	Provisional Sum	1		
0A.13 2	Works by the Service Authority	Provisional Sum	1		
0A.14	Additional Work	Provisional Sum	1		
0A.15 5	Path or concrete paving (various thickness)	m^2	150		
0A15.1	Sewer	Each	1		
0A15.2	Stormwater	Each	1		
0A15.3	Water	Each	1		
0A15.4	Gas	Each	1		
0A15.5	Electricity	Each	1		
0A15.6	Telstra	Each	1		
0A15.7	NBN	Each	1		
MITS 00B	Quality Construction				
0B.1	Quality system documents and records	Lump sum	1		
0B 2	Quality verification and control – Additional testing	Provisional Sum	1		
0B.4.1.1	Civil	Provisional sum	1		
0B.4.1.2	Landscape	Provisional sum	1		
0B.4.1.3	Streetlight	Provisional sum	1		
0B.4.1.4	NBN	Provisional sum	1		
MITS 00C	Control of Erosion and Sedimentation				
0C.1.1	Establishment	Lump Sum	1		
	Total General				
	Check the construction period - 4 months allowed				
MITS 01	Traffic Management				
1.1	Control of traffic	Lump Sum	1		
1.5	Variable message signs	Weeks	16		
1.7	Road Safety Audit	Number	6		
	Total Traffic Management				
MITS 02	Earthworks				
MITS 02A	Clearing and Grubbing				
2A.3	Removal of nominated trees	Number	6		
MITS 02B	Bulk Earthworks				
2B.1	Topsoil stripping	m^3	582		
2B 2.1	Within project site	m^3	2,000		
2B 3	Unsuitable Material	m^3	200		
2B 8	Preparation of cut and fill subgrades	m^2	3,210		
2B.10	Construction of swale batter drain (Cut off drain)	m	369		
MITS 02C	Stabilisation				
2C.1	Supply stabilising agent (in situ mixing only)				
	Total Earthworks				
MITS03	Underground Services				
MITS03A	Trenching for Underground Services				
MITS03B	Pipe Drainage				
3B.1	Stormwater pipes and pipe culverts				
3B.1.12	450mm dia FRC Class 2 RRJ 1.5 -3 0m depth	m	5	$ [redacted]	$ [redacted]
3B 2	Stormwater pipe fittings				
3B 3	Stormwater pipe branch connections				
3B.4	Flexible joints				
3B 5	Splayed stormwater pipe				
3B.6	End caps for stormwater mains				
3B.7	End caps for stormwater ties				
3B 8	Scour stops				
3B 9.2	300mm dia connection to existing manhole	Each	1	$ [redacted]	$ [redacted]
MITS 03C	Precast Box Culverts				
3C.1	Cast insitu base slab				
3C 2	Precast RCBC				
3C 3	Cast insitu link slab				
MITS 03D	Drainage Structures				
3D.4	Special chambered MH				
3D.5	Stormwater sumps				
3D.6	Stormwater sumps >1 8m				
3D.6.1	R sump	Number	1	$ [redacted]	$ [redacted]
3D.7	Surcharge structures				
3D.8	Headwalls				
MITS 03E	Water Supply Reticulation				

3E.1	Water supply pipes				
3E.2	Water supply pipe bends				
3E.3	Water supply pipe tees				
3E.4	Water supply pipe reducers				
3E.5	Fire hydrants				
3E.6	Sluice valves				
3E.7	Restrained joints				
3E.8	End caps				
3E.9	Thrust blocks				
3E.11	Scour stops				
3E.12	Trench stops				
3E.13	Pipe and Trench Protection				
3E.14	Valve chambers				
3E.15	Scour installations				
3E.16	Contractor works on existing water supply				
3E.18	Water service ties				
3E.19	Ready tap connectors				
MITS 03F	**Sewerage systems reticulation**				
3F.1	Sewer pipes				
3F.2	Sewer pipe fittings				
3F.3	Flexible joints				
3F.4	Sewer main dead ends				
3F.5	Sewer main sealing discs				
3F.6	Sewer tie dead ends				
3F.7	Scour stops				
3F.8	Trench stops				
3F.9	Connect to existing sewer structures				
3F.15	Pipe and Trench Protection				
3F.16	Sewer MH				
3F.19	VD				
3F.20	VD >Min Drop				
3F.23	Special chambered MH				
3F.24	Contractor works on existing sewer				
MITS 03G	**Service Conduits**				
3G.1	Trenching for Service Authorities				
3G.2	Conduit provision in a shared trench				
3G.5	Electrical Conduits				
3G.6	End caps				
MITS 03H	**Road Openings and Restorations**				
MITS 03I	**Subsurface Drainage**				
MITS 03J	**Subsoil and Foundation Drains**				
MITS 03K	**Drainage Mats**				
	Total Drainage				
MITS 04	**Flexible Pavement Construction**				
4.1.1	DGB20 (traffic category A)				
4.1.2	DGB20 (traffic category D)				
4.1.2.3	150 mm layer	m^2	3,135		
4.2	Subbase material				
4.2.1	DGS20 (traffic category A)				
4.2.2	DGS20 (traffic category D)				
4.2.2.1	100 mm layer	m^2	220		
4.2.2.2	150 mm layer	m^2	2,915		
4.4	Supply and Spray Primer, Primerbinder				
4.4.1	AMC00	Litres	264		
4.5	Supply and Spray Binder				
4.6	Supply, incorporate and spray cutter oil in binder				
4.7	Supply, incorporate and spray fulx oil in binder				
4.7.3	FGG-A Wearing Course	m^3	6		
4.8	Supply, Precoat, Apply and Incorporate aggregate	m^3			
4.9.1	AC14 (C450 Binder) wearing course 45 mm layer	Tonnes	315		
4.9.2	AC14 (A15E Binder) wearing course	Tonnes	67		
4.9.3	AC20 (C450 Binder) correction course	Tonnes	177		
4.11	Mill Existing Pavement	Lump Sum	1		
4.13	Upper SMZ				
4.13.1	150 mm layer	m^3	530		
4.14	Lower SMZ				
4.14.1	150 mm layer	m^3	530		
4.15	Lower UZF (CBR≥8%)				
4.15.1	300 mm layer	m^3	185		
	Total Flexible Pavement				
MITS 06	**Minor Concrete Works**				
MITS 06A	**Concrete Kerbs and Open Drains**				

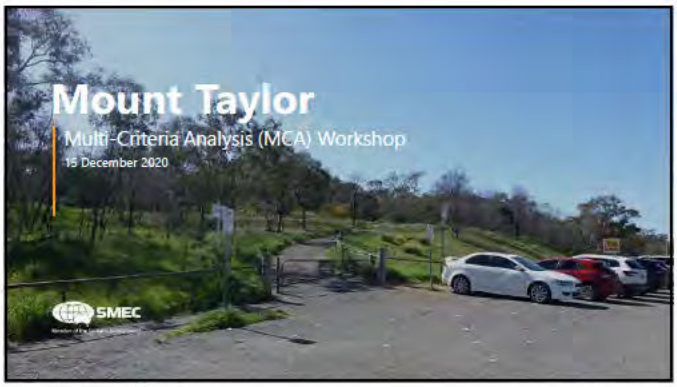
6A.1	Concrete lining of open drains				
6A.5	Kerbs				
6A.5.3	MK	m	1,025		
6A.5.7	PK (MOD) Permeable Kerb (Match existing)	m	400		
6A.6	Kerb reinforcement				
6A.7	Kerb ramps				
6A.7.4	3.0m path	Number	10		
6A.8	Vehicle crossings				
6A.9	Remove existing concrete kerb	m	215		
6A.11	Rock filled wire mattresses				
MITS 06B	**Concrete Paths Driveways Medians**				
6B.1	Paths, driveways, median toppings				
6B.1.2	150mm N32 Paths	m^2	825		
6B 2	Reinforcement for paths, driveways, median toppings				
6B 2.2	SL82 mesh single layer	m^2	825		
	Total Minor Concrete				
MITS 07	**Segmental Paving**				
7.1	Segmental Paving				
MITS 08	**Incidental Works**				
MITS 08A	**Fences and Barriers**				
8A.2	Gates				
8A.3	Barrier fences				
8A.4	Cycleway rails				
8A.6	Bollards				
MITS 09	**Landscape**				
MITS 09A	**Topsoil**				
9A.1	Topsoil – grass areas	m^2	2,500		
9A.2	Topsoil – planting areas	m^2	1,000		
9A.3	Topsoil amelioration	m^3	2,500		
9A.4	Topsoil amelioration certification	Number	1		
MITS 09B	**Grassing**				
9B.1	Detailed excavation, filling and trimming, finishing of surfaces	m^2	2,000		
MITS 09C	**Planting**				
9C.6	Mulching	m^3	200		
9C.7	Consolidation	Weeks	13		
MITS 09D	**Irrigation**				
MITS 09E	**Consolidation**				
	Total Landscape				
MITS 10	**Concrete Works**				
MITS 11	**Pavement Marking**				
11.2	Set Out of Pavement Marking	Lump Sum	1		
11.3	Paint – Longitudinal Lines				
11.3.12	Edge Line (E1)	m	427		
11.3.16	Path Line (SP1)	m	70		
11.4	Paint –Symbols, Legends, Arrows, Chevrons, Traffic Islands and Kerbs				
11.4 2	Chevron	m^2	282		
11.4 20	Lettering "SLOW DOWN 10KM/H"	Each	1		
11.5	Paint - Transverse Lines				
11.6	Paint - Long Life Material (LLM) - Longitudinal Lines				
11.6 5	Merge Line (M1)	m	346		
11.6.10	Lane Line (L9)	m	90		
11.7	Long Life Material (LLM) - Transverse Lines				
11.7 3	Short Taper (TB1)	m	32		
11.7.4	Stop Line (SL1)	m	20		
11.7.6	Pedestrian Crosswalk Line (PCW)	m	54		
11.8	Long Life Material (LLM) - Symbols, Legends and Arrows				
11.8 3	Pavement Arrow (A3)	Each	27		
11.9	Long Life Material (LLM) - Symbols, Legends and Arrows				
11.9 2	Zebra Crossing (PX)	m^2	32		
11.10	Installation of Retroreflective Raised Pavement Markers (RRPM)				
	Total Pavement Marking				
MITS 13	**Traffic Signals**				
13.1	Traffic signal post	Number	10		
13.4	Mast arm and streetlight post				
13.4.1	10.5m light col/ 4.5m light outreach/ 8.5m signal outreach	Number	30		
	Relocate Existing Column	Number	5		
13.5	Joint use post				

				[redacted]
13.6	Vehicle signal lanterns	Number	13	
13.7	Pedestrian signal lanterns	Number	4	
13.8	Pedestrian push button assemblies			
13.8.1	Standard push button assembly (non audio)	Number	5	
13.9	Control equipment	Number	1	
13.11	Multi-core cabling	m	358	
13.12	Twin screen cabling	m	201.6	
13.13	Cable conduit			
13.13.1	1 x 50 dia. Conduit	m	50	
13.13.1.1	1 x 50 dia. Streetlighting Conduit and Cable - dig/lay/install	m	1900	
13.13.2	1 x 100 dia. Conduit	m	30	
13.13.4	2 x 140 dia. Conduit	m	100	
13.14	Vehicle detector loops			
13.14.1	Vehicle detector loop	Each	5	
13.15	JC-1 Small conduit junction box	Number	7	
13.16	JB-R Large conduit junction box	Number	9	
13.17	Installation and connection of communications cable to new Signal Controller	Provisional Sum	1	
13.18	Installation and connection of Power Supply cable by Evoenergy to new Signal Controller	Provisional Sum	1	
13.19	CCTV	Provisional Sum	1	
	Total Traffic Signals			
MITS 14	**Road Signs**			
14.2	Manufacture of Guide Sign support structures			
14.3	Erection of Guide Sign support structures			
14.7	Manufacture of General Signs	Number	6	
14.8	Erection of General Signs support structure	Number	6	
	Total Road Signs			
MITS 15	**Road Furniture**			
MITS 15A	**Guide Posts**			
MITS 15B	**Non Rigid Safety Barrier Systems**			
MITS 15C	**Rigid Road Safety Barrier Systems**			
MITS 16	**WSUD Features**			
MITS 16A	**Bio-Retention Systems**			
MITS 16B	**Ponds**			
16B.3	HDPE/Geotextile Liner Materials for Ponds			
MITS 16C	**Wetlands**			
MITS 16D	**Gross Pollutant Traps**			
	Total Construction			
	preliminaries (5%)			
	design, procurement and management fees (15%)			
	Contingency (50%)			
	GST			
	Lump Sum Fee			

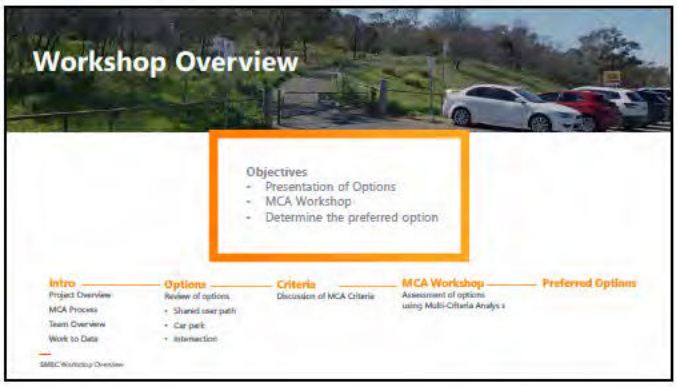
Appendix F MCA Workshop

Appendix F1 – MCA Workshop Slides

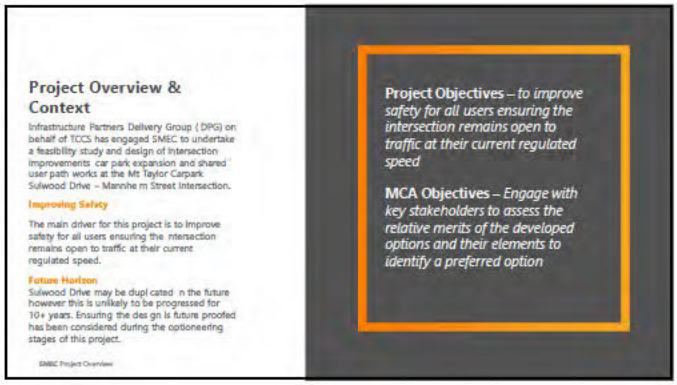
Appendix F2 – MCA Workshop Meeting Minutes


Mount Taylor
Multi-Criteria Analysis (MCA) Workshop
15 December 2020
SMEC

1


Workshop Overview
Objectives
- Presentation of Options
- MCA Workshop
- Determine the preferred option
Intro
Project Overview
MCA Process
Team Overview
Work to Data
Options
Review of options
- Shared user path
- Car park
- Intersection
Criteria
Discussion of MCA Criteria
MCA Workshop
Assessment of options using Multi-Criteria Analysis
Preferred Options

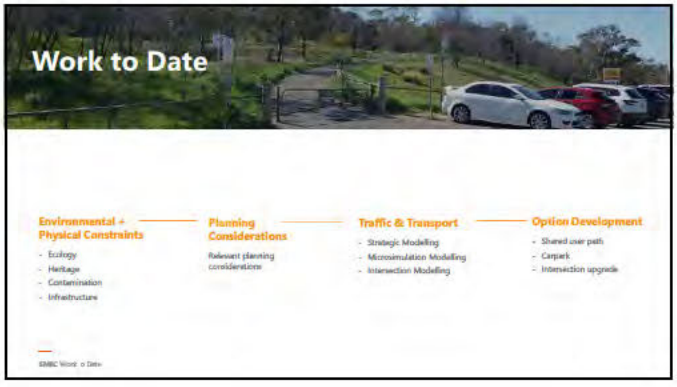
2


Project Overview & Context
Infrastructure Partners Delivery Group (DPG) on behalf of TCCS has engaged SMEC to undertake a feasibility study and design of intersection improvements car park expansion and shared user path works at the Mt Taylor Carpark Sulwood Drive – Mannhe m Street Intersection.
Improving Safety
The main driver for this project is to improve safety for all users ensuring the intersection remains open to traffic at their current regulated speed.
Future Horizon
Sulwood Drive may be dupl cated n the future however this is unlikely to be progressed for 10+ years. Ensuring the des gn is future proofed has been considered during the optioneering stages of this project.
Project Objectives – to improve safety for all users ensuring the intersection remains open to traffic at their current regulated speed
MCA Objectives – Engage with key stakeholders to assess the relative merits of the developed options and their elements to identify a preferred option

3


Team Overview
Leigh Costa
Project Manager (TCCS)
Contract Manager (IDPG)
MCA Lead (SMEC)
Project Manager (SMEC)
Assistant Project Manager (SMEC)
Transport Planning (SMEC)
Planning & Environmental Constraints (SMEC)

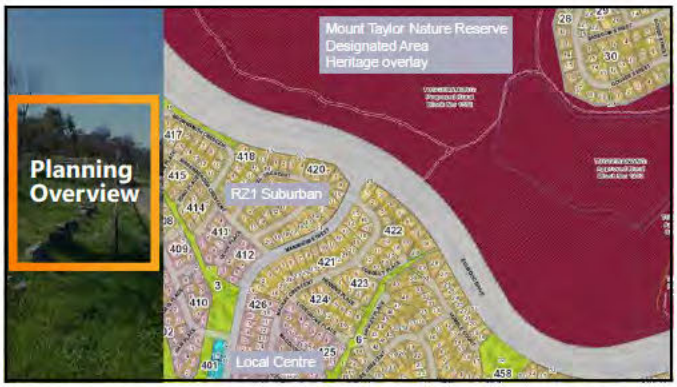
4


Work to Date
Environmental + Physical Constraints
- Ecology
- Heritage
- Contamination
- Infrastructure
Planning Considerations
Relevant planning considerations
Traffic & Transport
- Strategic Modelling
- Microsimulation Modelling
- Intersection Modelling
Option Development
- Shared user path
- Carpark
- Intersection upgrade

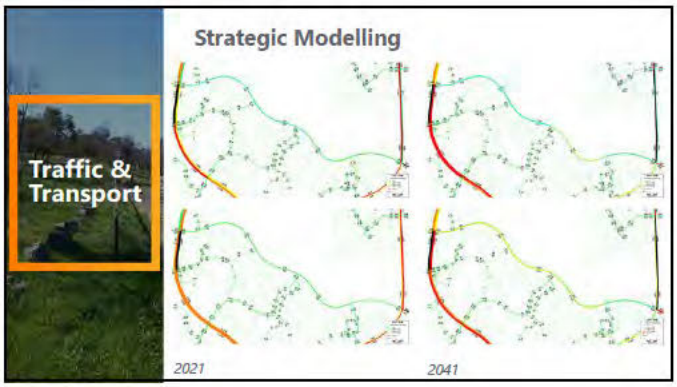
5


Constraints Overview
Road Reserves
Vegetation_Communities
VEG_COMM
Urban Open Space
Urban and disturbed areas

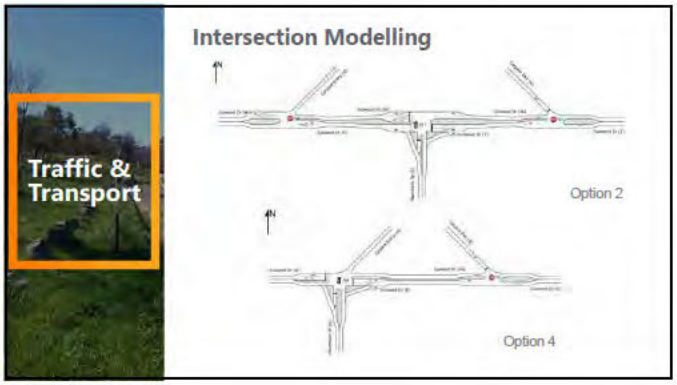
6


Planning Overview
Mount Taylor Nature Reserve
Designated Area
Heritage overlay
R21 Suburban
Local Centre

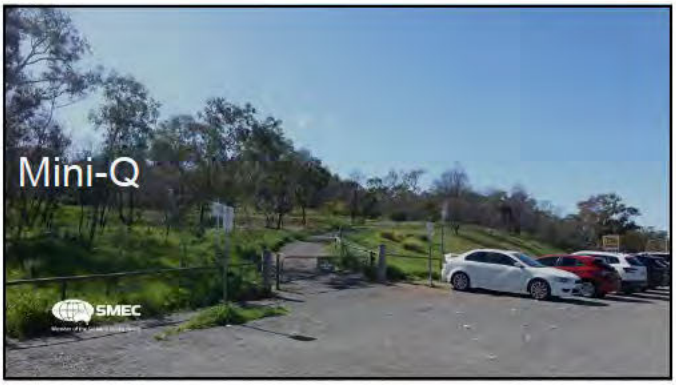
7


Traffic & Transport
Strategic Modelling
2021
2041

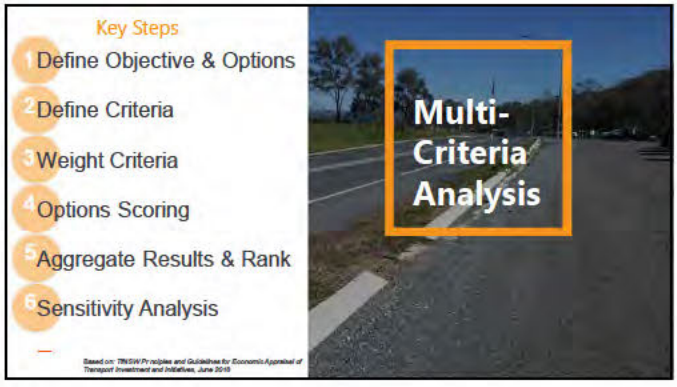
8


Traffic & Transport
Intersection Modelling
Option 2
Option 4

9


Mini-Q
SMEC

10


Key Steps
1 Define Objective & Options
2 Define Criteria
3 Weight Criteria
4 Options Scoring
5 Aggregate Results & Rank
6 Sensitivity Analysis
Multi-Criteria Analysis

11


1 Define Objectives & Options
Project Objectives – to improve safety for all users ensuring the intersection remains open to traffic at their current regulated speed
MCA Objectives – Engage with key stakeholders to assess the relative merits of the developed options and their elements to identify a preferred option

12

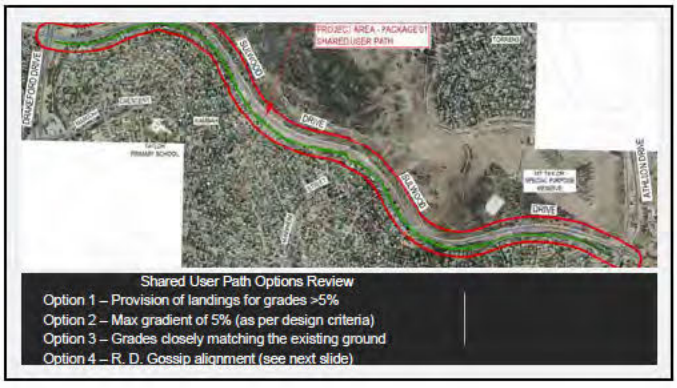
13

14

15

16

17

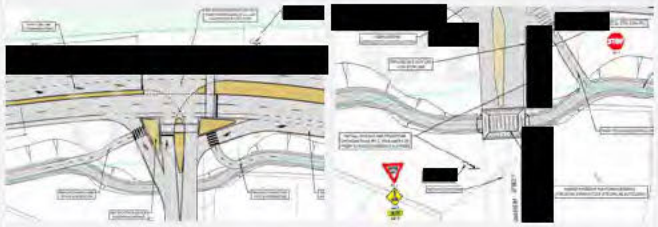


18

SUP Option 4 – R. D. Gossip 2D alignment

19

SUP – Signalised intersection and Zebra Crossing



20

SUP – Pedestrian Road Crossings Options

21

4 Option Scoring - SUP

User Safety

Key considerations:
- Path geometry
- CPTED
- Interaction with vehicles (intersections)
- Proximity to Sulwood Dve

22

4 Option Scoring - SUP

Operation

Key considerations:
- Ride comfort
- Access to path / network integration
- Accessibility
- Amenity

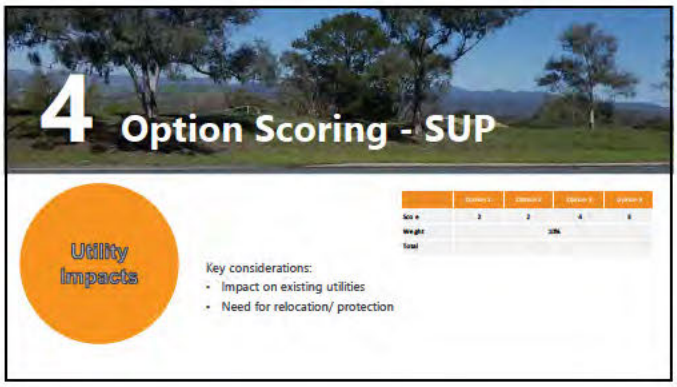
23

4 Option Scoring - SUP

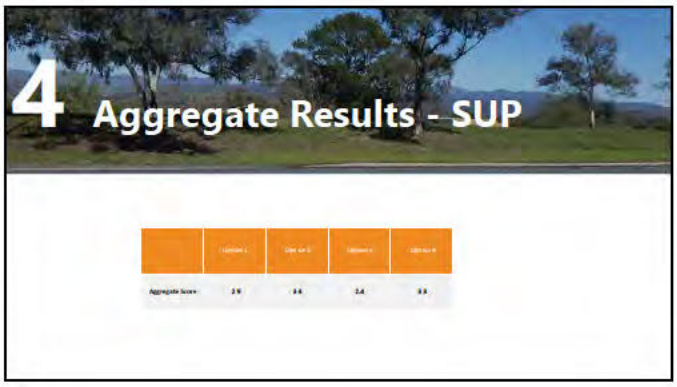
Enviro & Residential Impacts

Key considerations:
- Impact on nature reserve
- Impacts on plantings / vegetation
- Impacts on adjacent landowners

24

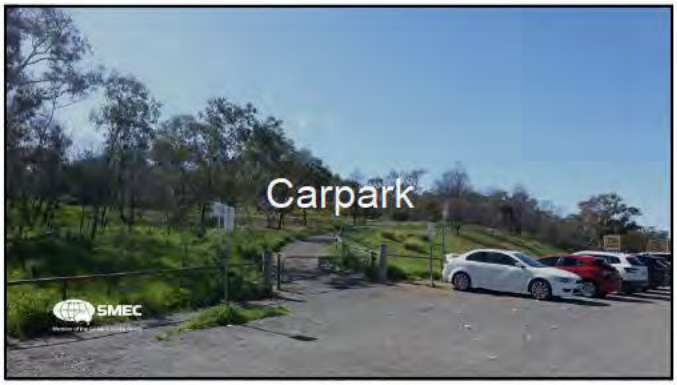


25

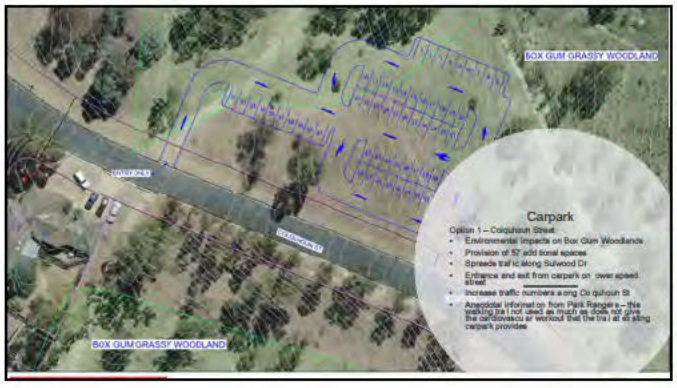


26

27

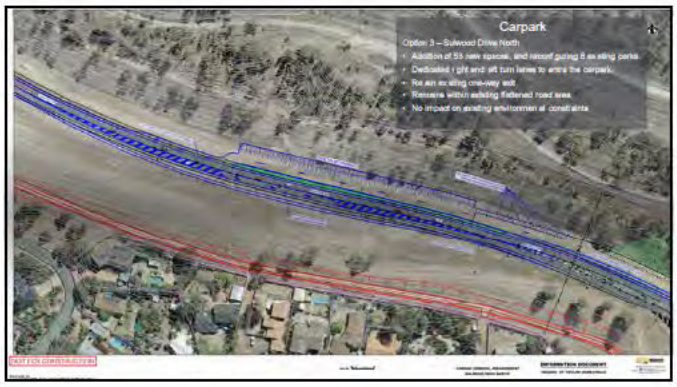


28



29

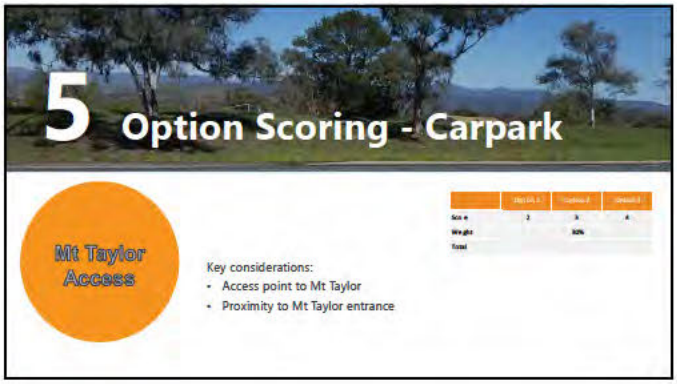
30



31

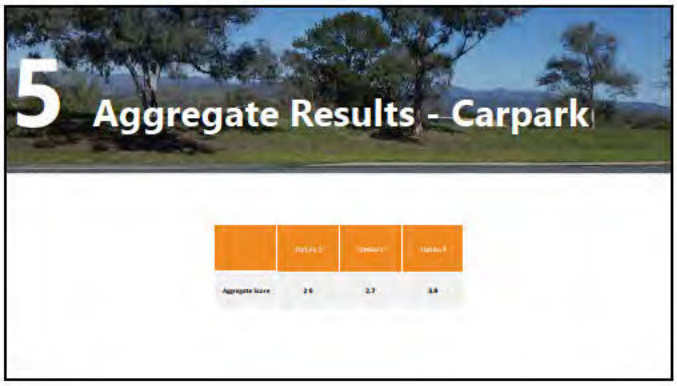
32

33



34

35



36

37

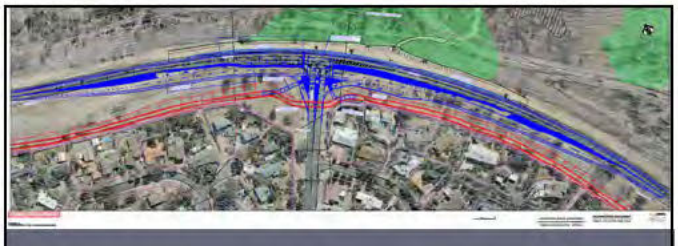
38

Intersection

Option 1 – One lane each way on Sulwood Drive, Signalised

- Pedestrian crossing of Sulwood Drive at signalised intersection (western approach only)
- Connection with proposed shared user path
- Dedicated right turn lane into and out of existing carpark

39



Intersection

Option 2 – Two lanes each way on Sulwood Drive, Signalised (future proofed)

- Pedestrian crossing of Sulwood Drive at signalised intersection (western approach only)
- Dedicated right turn lane into and out of existing carpark

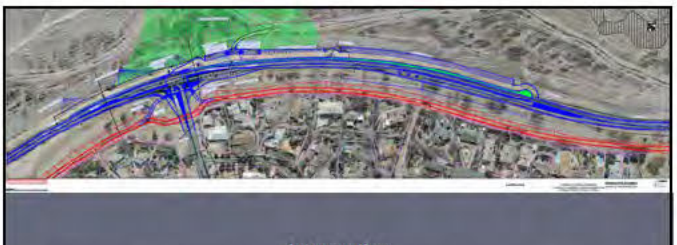
40

Intersection

Option 3 – Unsignalised intersection

- Dedicated right turn lane into existing carpark
- Right turn lane at egress
- Two stage pedestrian crossing of Sulwood Drive

41



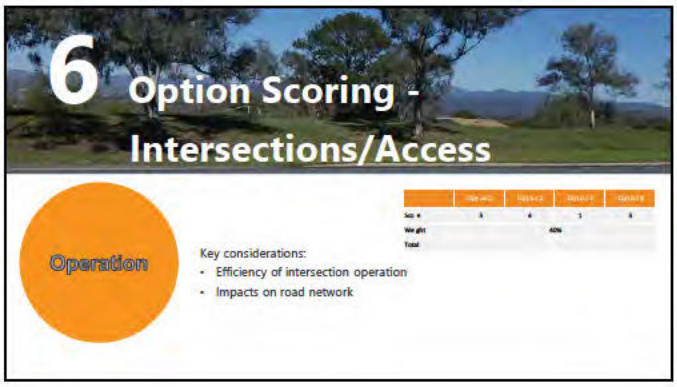
Intersection

Option 4 – Signalised intersection breaking into existing carpark and reconfiguration and extension of existing carpark

- Dedicated right turn lane into carpark
- Right turn lane at egress

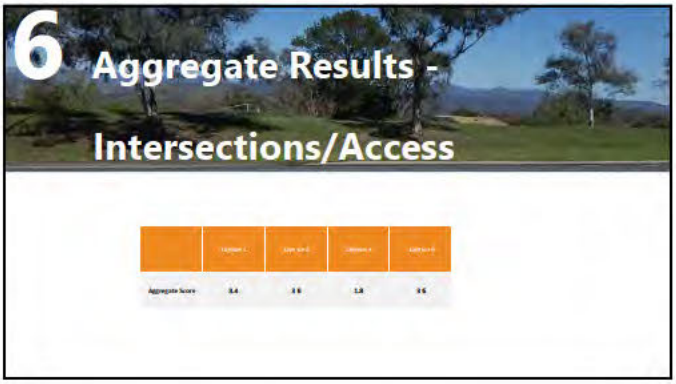
42

43



44

45



46

47

48


Thank you
SMEC
Member of the Surbana Jurong Group
CELEBRATING
76 YEARS
OF IMPACT

49

WORKSHOP MINUTES

PROJECT NAME: Mount Taylor Car park, Intersection and Shared Path Concept Design

SMEC PROJECT NUMBER: 3002809

Member of the Surbana Jurong Group

WORKSHOP TITLE:	**MCA Workshop (Package A – Mt Taylor)**	**WORKSHOP #**	MCA01
VENUE:	**MS Teams**	**START TIME:**	2:00 pm
MEETING DATE:	**15/12/2020**	**FINISH TIME:**	4:30 pm

ATTENDEES

NAME	COMPANY	PRESENT	NAME	COMPANY	PRESENT
Leigh Costa	TCCS	Y	[redacted]	SMEC	Y
Jody Yap	TCCS	Y	[redacted]	SMEC	Y
Colin Maher	ACT Government	Y	[redacted]	SMEC	Y
Snezana Dimitrovska	ACT Government	Y	[redacted]	SMEC	Y
Chris Bunnik	ACT Government	N	[redacted]	SMEC	Y
Nik Gansel	ACT Government	N	[redacted]	SMEC	Y
Neil Pincombe	ACT Government	N	Tessa Roberts	ACT Government	Y
Anthonie Lambert	ACT Government	Y	Tim Wyatt	ACT Government	N
Kamal Uddin	TCCS	Y	Thapa Dilip	ACT Government	Y
Steven Hare	ACT Government	Y	Rahman Nahin	ACT Government	Y
Ilija Kovacevic	ACT Government	Y			

	AGENDA	
ITEM	DETAILS	
1.0	**Welcome**	[redacted]
2.0	**Introductions & Workshop Outcomes**	[redacted]
3.0	**Project overview**	[redacted]
4.0	**Constraints Overview**	[redacted] /

MEETING RECORD (Cont'd)

	AGENDA	
ITEM	DETAILS	
	Environmental constraints • Box gum woodlands – can be cleared but subject to flora and fauna, EPBC act, and clearing requires a DA to ensure not significant, SMEC don't believe it would be given minor, and topography to Northern edge of road reserve. – minor for road reserve • If outside of road reserve boundary– increased constraints including different approval pathway. Majority of project within road reserve boundary. • SUP – improving cycle and connectivity. • SMEC spoke with Mt Taylor Rangers. Rangers highlighted: – Community interest, with SMEC suggesting early consultation. – User preference on the track close to existing carpark given the cardiovascular workout it offers – Noted antisocial behaviour and illegal dumping occurring at site on Colquhoun Street • S. Hare asked is all options were contained within road reserve. All except Colquhoun Street carpark option. • From an ecology perspective – orchards and significant plantings on this site, along with impact to Box Gum Woodlands at Colquhoun Street site. [redacted] suggested Colquhoun St site not a favourable from ecological perspective • S. Dimitrovska asked if pedestrian safety is in scope and been considered at Mannheim St – Sulwood Dr intersection? – SMEC have considered this in Intersection upgrade options, and the SUP intersection options (including Inkster and Livingston Ave intersections with Sulwood Drive).	[redacted]
	Services will be discussed with individual options. • Highlight – 900 mm bulk supply main in southern verge of Sulwood Drive • HV underground lines in [redacted]	[redacted]
	Traffic conditions • Considerable increase in congestion along Athllon and Drakeford, increase in congestion on Sulwood Dr especially in the output data from CSTM 2041 modelling scenarios. • Sidra analysis. Will be discussed • K. Uddin requested traffic analysis data and documentation (and cc in Tim Whyatt) to review to provide in principal support. SMEC will provide in Draft Feasibility report for Package A (Mt Taylor) in Mid-January. K. Uddin request to receive prior with a scheduled meeting to discuss.	[redacted]
5.0	**Multi-Criteria Assessment**	[redacted]

MEETING RECORD (Cont'd)

Member of the Surbana Jurong Group

	AGENDA	
ITEM	DETAILS	
5.1	MCA Process • Overview of process [redacted] (SMEC) – independent of design team, brought in to facilitate the MCA workshop, therefore no preconceptions of specific options. MCA Workshop: • A decision tool, used when difficult to quantify benefits of options • Approach outlined by tfNSW – six step process adopted for this workshop. • K. Uddin – how did reach weighting or criteria? –[redacted] – options scoring not yet done, this is today. Weighting will become evident, as we run through each project. Sensitivity analysis will be done by design team to see impact on the outcomes and ensure robust results. – 1. Project objectives, - safety and ensure traffic remain open to speed environment. MCA objective ensure stakeholder engagement and input. – 2. Define Criteria – specific to each sub package (shared user path, carpark and intersection upgrade) • 3. Weighting criteria – SMEC have come up with these, can be contentious with varying opinions, and this is why criteria were circulated prior to meeting. Preference to have discussion on the weighting prior to the workshop. SMEC did not receive any feedback after circulation. Sensitivity analysis will help with determining the weighting. Process involves shift weighting by +/-10% of each criterion. • Scoring options – using 1 to 5 in this MCA. Poor (1), Moderate (3, benchmark) and very well (5). • Criteria are defined with prompts on the slides for each package, and open to discussion throughout process	[redacted]

MEETING RECORD (Cont'd)

Member of the Surbana Jurong Group

5.2	Package 1: Shared User Path – Drakeford Dr – Athllon Dr • Overview of options - options 1-3, formalise existing path on southern side of Sulwood Drive. Involves crossing 3 intersections (3 vertical alignments). Option 4 (R.D Gossip 2D alignment) involves majority on the northern side of Sulwood Dr, crossing Sulwood on either side of Mannheim Street intersection due to constraints around existing carpark on the northern side of Sulwood Drive. • Option 2 – earthworks impacts to Icon water assets, running along same alignment of • Option 3 – poor accessibility – max grades 14% near park. Utilities and Drainage • Option 1 – impacts to 900mm bulk supply. Big pump station just [redacted]. Horizontally avoiding valves etc along the alignment. Few areas where fill that may impact. SMEC still investigating • Impacts to HV line [redacted]. SMEC in communications with Evo Energy regarding this. • S. Hare – will these options require relocation of bulk water main – SMEC - yes for options 1 & 2. This will make options unfeasible (hard constraint) if require relocation of water main. SMEC understand this is not the preferred option. Lead time too long and expense makes it unfeasible. In concept stage, so can look at shifting horizontal alignment. Signalised option • Full control of ped/cyclist treatments Raised Zebra crossing • Only cater for east-west movements (across Mannheim st/Inkster/Livingston) • North-south movement across Sulwood Dr not controlled Low cost bollard options. • Riders may not be compliant with bollards and signs. Does not physically slow cyclists down Questions? - S. Dimitrovska - Would it be best to determine the alignment before determining the treatment. [redacted] – determine when into the scoring **MCA Scoring – SUP** USER SAFETY User safety – - option 3 has some high grades (14%), and other grades >5%.	

MEETING RECORD (Cont'd)

- Platforms in option1, possible safety concern.
- As a cyclist higher risk of crossing Sulwood Dr (80km/hr), for option 4
- No bus services along Sulwood Drive

Geometry

- Options 1-3 same horizonal alignment, differing vertical grade
- Option 4 – R.D Gossip, runs mainly northern side, to existing carpark, small section on the southern side.
- C. Maher – would like to see alignment along northern side for project for whole length, option 4 closest, excluding the carpark, very constrained at this site. Concern pure north side option not in MCA process. – Possible some loss of parking.
- SMEC will have conversation with client about a northern option.
- C. Maher – have not done landings on other projects as cost too significant and not compliant anyway.
- Option 3 – not DDA compliant, option 2 – is. Reasonable to go with compliant option for MCA process (S. Hare).

Interaction with vehicles

- option1 -3 same performance,
- option 4 significantly worse crossing Sulwood Drive, and Colquhoun St and Mannheim Street (significant reduction in performance)

CPTED

- K. Uddin concerned with passive surveillance (options 1-3) at back of residential area
- Option 1 -3, between earth mound and property boundary. Along existing goat track/fire track access. L. Costa – would be used as an emergency fire access. Not expecting any backburning activities, only access and mowing vehicles. scores very low from CPTED criteria
- opt 4 – pretty clear area
- Intent for lighting – will need to investigate receptivity of residents with light spill into their backyard. lighting will not resolve passive surveillance issue.
- Shared path on other side of mound, within clear zone, and need to consider Sulwood Dr duplication. Drainage and earthworks exercise.

Proximity to Sulwood Drive

- For safety, all options look clear from Sulwood Dr
- Balanced out CPTED and crossing Sulwood Dr (opt 4)
- Grades – from safety perspective is the differentiator.
- Vertical grade of option 4 unknown, assume ground conforming

SCORE

MEETING RECORD (Cont'd)

Member of the Surbana Jurong Group

Option1 – 3
Option 2 – 4
Option 3 – 2
Option 4 – 3

OPERATION

Ride Comfort

- Geometry – option 2 best option, option 1 reasonable poor due to landings, option 3 – steep, option 4 – on par with option 3

Access to path/network integration

- Access from Kambah and feeder paths – cut throughs, opt 1-3 same, opt 4 – requires crossing Sulwood Dr (score poorer)
- Option 4 – have to cross Sulwood Dr, makes it longer in length and duration. S. Dimitrovska – crossing of Sulwood Dr will need to be signalised to get past roads safety

Accessibility

- Option 1 - ok
- Option 2 – preferable
- Option 3& 4 – poorer score

Amenity

- Probably captured in other consideration – summary item.
- Option 4 – get a view, rider enjoyment

Comment:

- C. Maher disagree with operation. Local connection to residential areas. Destinations have better connection option 4. Rider usage increase,

SCORE

Option 1 - 3
Option 2 – 4
Option 3 - 2
Option 4 – 3

ENVIRONMENTAL AND RESIDENTIAL IMPACTS

Nature reserve

- No impact outside road reserve boundary

Planting

- Low impact

Impact on adjacent landowners

- Option 4 better
- Option 1-3 existing path, will get more traffic on a formal path – possibility to raise concerns and pushback from residents

MEETING RECORD (Cont'd)

	AGENDA	
ITEM	DETAILS	
	SCORE Option 1 – 3 Option 2 - 2 Option 3 - 3 Option4 – 4.5 UTILITIES - Option 1-3 along 900 mm bulk water main (1&2 more given cut and fill) option3 lesser impact - Option 4 – little impact on icon water, but impact the Evo energy HV line - Steven Hare – if hitting water main – hard constraint. Protection required for 1&2, Option 1 - 2 Option2 - 2 Option 3 - 4 Option 4 – 3 Comment: - Impacts – program complications, communications with ICON water - Max cut – 5m option2, 3m option 1 – to maintain grades. Significant cuts, impact still under investigation and consider realignment and refinement to make work better. FINAL opt 1 - 2.9 opt 2 - 3.4 opt 3 - 2.4 opt 4 - 3.3 Going forward: - Take option2 & 4 where weak and strong, possibly combine, perhaps address where scored poorly - Option to stay on northside to be discussed with project team – May be able to update grades, or CPTED requirements in options to increase scoring (hybrid option to come forward). - Redirect effort into refining options. Develop north side option.	
7.0	**Workshop Close**	[redacted]

MEETING RECORD (Cont'd)

AGENDA		
ITEM	DETAILS	
7.1	NEED TO RECONVENE MEETING – WORKSHOP 2 scheduled for 1-3pm 16/12/2020. END OF WORKSHOP 1	

ACTIONS	
ACTION	TIMEFRAME
Compile Options Report	Deliverable – on completion of Feasibility Report

WORKSHOP MINUTES

PROJECT NAME: Mount Taylor Car park, Intersection and Shared Path Concept Design

SMEC PROJECT NUMBER: 3002809

Member of the Surbana Jurong Group

WORKSHOP TITLE:	**MCA Workshop (Package A – Mt Taylor)**	**WORKSHOP #**	MCA02
VENUE:	**MS Teams**	**START TIME:**	1:00 pm
MEETING DATE:	**16/12/2020**	**FINISH TIME:**	3:00 pm

ATTENDEES

NAME	COMPANY	PRESENT	NAME	COMPANY	PRESENT
Leigh Costa	TCCS	Y	[redacted]	SMEC	Y
Jody Yap	TCCS	Y	[redacted]	SMEC	Y
Colin Maher	ACT Government	N	[redacted]	SMEC	Y
Snezana Dimitrovska	ACT Government	Y	[redacted]	SMEC	N
Chris Bunnik	ACT Government	N	[redacted]	SMEC	Y
Nik Gansel	ACT Government	N	[redacted]	SMEC	Y
Neil Pincombe	ACT Government	N	Tessa Roberts	ACT Government	N
Anthonie Lambert	ACT Government	Y	Tim Wyatt	ACT Government	N
Kamal Uddin	TCCS	Y	Thapa Dilip	ACT Government	Y
Steven Hare	ACT Government	Y	Rahman Nahin	ACT Government	N
Ilija Kovacevic	ACT Government	N			

	AGENDA	
ITEM	DETAILS	
1.0	**Welcome**	[redacted]
2.0	**Recap from Workshop 1** Recap – objectives, project overview, MCA process and criteria and weighting for the criteria. Shared User Path – option 2 preferred, only just above option 4 (on Northern side of Sulwood Dr) review the alignment to see if can have purely on North to eliminate crossing of Sulwood drive and crossing of Inkster/Livingston and Mannhiem.	[redacted]
3.0	**Multi-Criteria Assessment**	[redacted]

MEETING RECORD (Cont'd)

	AGENDA	
ITEM	DETAILS	
3.1	**Package 3: Car park expansion** • Overview of options • Criteria/ weighting • Assessment of options Traffic counts – doesn't show capacity in line with anecdotal evidence. K. Uddin suggestive impacts of covid19 and shift in people's behaviour. S. Dimitrovska – Minister very interested in the carpark, and high interest from the community. Options overview: opt 1 – off Colquhoun St • Impact to Box Gum woodland, • Spread out the traffic/distribute it along the tracks • Entry and exit on lower volume and lower speed road • Park rangers – not much interest in developing this option, antisocial behaviour and illegal dumping in the area. – carpark may help improve this. Better cardio workout at existing carpark track. • Heat mapping from Strava show more use at existing carpark – this may be due to more parking available. • There is an existing marked track in the area. Possibly build it and they will come • Some slight grades in the carpark area – will look at drainage impacts if/when progressed • Downfall of this options ecology, and the residents • S. Dimitrovska this option has some traction, and is 'outside the box' opt 2 – south of Sulwood Dr opposite existing carpark • Reduces need for right turn • Disadvantages – if Sulwood Dr duplicated, lose 33 carparks • If shifted further south – much larger earthworks and impact to cost and residents impacted by loss of earth mound. • Mindful of probably not being duplicated for 20+yrs. Consensus that to get 20yr use or carpark prior to duplication is ok. • Need to get pedestrians across Sulwood Drive. Further work required opt 3 – expansion of existing carpark to the west • Dedicated right turn in • Remain within flattened area to avoid ecological impacts	

MEETING RECORD (Cont'd)

- Advantage – safe right turn in, and no pedestrians crossing Sulwood Dr
- Would need to tweak option 4 SUP to fit this option if SUP proceeds.
- S. Dimitrovska – left out at exit, would like to see this. SMEC has looked at egress options in package 3 of works to improve safety. Have investigated an acceleration lane for right turn exist. This is in next package (intersection upgrade), assumed this will be applied to carpark if taken forward without intersection works.

USER SAFETY

Pedestrian movement in carpark

- Internal movements and safety regards to pedestrians and passing vehicles.
- opt 1 – pedestrians will navigate through the carpark.
  - Option will require acquisition of land. – Planning issue.
  - Relatively short distance to start of track (middle concern).
  - Compact layout so shorter distance to entry
- opt 2 – provided a path so pedestrians removed for potential conflict quickly
- opt 3 – much longer distance of possible interaction with vehicles

Pedestrian interaction with roads

- Option 2 – have to cross Sulwood Dr – score will be much lower

Access / Egress safety:

- opt 1 – low speed, low risk, access to Colquhoun right turn entrance lane, marginally better than option 3
- Option 2 – significantly higher risk than opt 1. Short left turn entrance lane due to physical constraint of Mannheim Street intersection. Sulwood Dr quite cluttered with turn movements. Sight line when two opposing movements.
- opt 3 – better than option 2 but not as good as opt 1. Although access to Colquhoun Street needs to be considered. Colquhoun does not have an acceleration right turn lane into Sulwood Dr.

CPTED

- opt 1 score worse, away from main road, will require community consultation. Only one house with passive surveillance
- 2 & 3 notably better, and similar.

Proximity to Sulwood Drive

- Option 1 away from Sulwood Dr – scores much better (5)
- opt 2 scores - 3

MEETING RECORD (Cont'd)

- Option 3 scores– 2

SCORE
Option 1 – (18) - 4
Option 2 – (13) – 2
Option 3 – (15) - 3

Comment:
RZ1 – prohibits building or carpark but provides for use of Mt Taylor Reserve so would be permitted.

OPERATION
Number of spaces

- Option 1 – 57 (Score 3)
- Option 2 – 66 (Score 4)
- Option 3 – 53 (Score 3)

Access

- Option 1 – key consideration is the access to Colquhoun rather than the carpark. Right turn in lane provided, but no deceleration lane on Sulwood Drive for left in, also no acceleration lane for right turn out onto Sulwood Drive. S. Dimitrovska – would need to improve this intersection due to increased traffic volume.
    - [redacted] – assumption this intersection would be upgraded if this option is perused (opt1) (score – 3)
- Option 2 opposing movements in a short distance. Not a great option operationally. Splitting volumes in carparks so advantageous. (score 2)
- Option 3 Depends on how the intersection is dealt with. Assuming intersection upgrade, and right-turn out of existing carpark, and acceleration lane right-turn out of the carpark with carpark upgrade (score – 3)

Legibility

- Referring to how access, move around in it and how exit carpark (within)
- opt 1 – could create confusion (score 2)
- Option 2 – could have to reverse out in western part of carpark, looks confusing (score 1)
- Option 3 – very simple. One way (score 4)

Ease of use criteria -REMOVED

- Works hand in hand with legibility and access

SCORE
Option 1 – (8) - 3
Option 2 – (7) - 2
Option 3 – (10) – 4

MEETING RECORD (Cont'd)

MT TAYLOR WALKING PATH ACCESS

Access point to Mt Taylor

- opt 1 – anecdotal evidence suggests less popular, and reduced cardiovascular workout – (poorer score from fitness perspective) (score 1.5)
- opt 2 – have to cross Sulwood Dr, length of journey (score 3)
- opt 3 – longer journey from car to start of track (Score 4) – need to look at the combination of SUP. Needs to be resolved with Design and Project team.

Proximity to Mt Taylor entrance - REMOVED

- a/a

SCORE

Option 1 -2

Option 2 -3

Option 3 -4

ENVIRO & RESIDENTIAL IMPACTS

Impact on nature reserve, plantings and vegetation

- opt1 – Box Gum Grassy woodland impact, and outside round boundary.
- opt2 -within destroyed area. May have some disturbances
- opt3 – some minor clearing required. For the most part site is clear

Impacts on adjacent landowners

- opt 1 – changes nature of traffic on Colquhoun St. may be met with resistance from residents. Possibly impact minimal number of residents.
- opt 2 – close to residents, however noise mound between the two. Intended to be retained. It will bring cars closer to them
- opt 3 – minimal impact. Education with community already done at this site, not as big impact as it is already understood.

SCORE

Option 1 – (4) – 1

Option 2 – (11) -4

Option 3 – (12) – 4.5

FINAL SCORE (Carpark)

Option 1 – 2.6

Option 2 -2.7

Option 3 -3.9 – Clearly identified preferred option

MEETING RECORD (Cont'd)

Member of the Surbana Jurong Group

3.2	**Package 2: Access Improvements** • Overview of options [redacted] – brief overview of options Option 4 – will need to check light poles and drainage pit • Criteria/ weighting • Assessment of options USER SAFETY Safety performance of intersections • opt 1 - Right turn into carpark still uncontrolled but vehicles only have to cross only one lane of traffic to enter from eastbound direction. • opt 2 – similar vehicles have to cross two lanes on traffic on Sulwood Drive to enter from eastbound direction. Benefit of an additional lane at egress of car park, more space between acceleration lane and the left turn lane into Mannheim Street. • opt 3 – no signalisation, weaving on westbound lane Sulwood Drive given close proximity of egress and Mannheim Street intersection. Possible continuation of pavement in carpark to move the exit further away from Mannheim Street intersection to avoid congestion - (as in option 4) • opt 4 – right turn into carpark has own phase at signalised intersection. Need to investigate turn paths. Possible design updates required if go with this option. Similar to option 3 (carpark) creating additional carpark to east. Provides more pavement before diverge lane and acceleration lane at egress along Sulwood Drive. Vulnerable road users • opt 1 – signalised option for crossing, can provide on road cycle lane • opt 2 – similar to above • opt 3 – not as well catered for Mannheim and Sulwood actual especially for SUP users crossing Mannheim Street behaviour vs practical behaviour is very different. Less safe but more convenient. • opt 4 – (same 1&2) – only risk with driver confusion SCORE Option 1 – (4+3) 4 Option 2 – (3+3) 3.5 Option 3 – (2+1) 1.5 Option 4 – (5+3) 4.5 OPERATION Efficiency of intersection operation	

MEETING RECORD (Cont'd)

- opt 1 – on par with opt 4, opt 4 performing slightly better
- opt 2 - best with LoS B
- opt 3 – fails in 2041 (LoS must be no worse the D) given to line of site from Mannheim getting onto Sulwood Dr
- opt 4 on par with opt 1, opt 4 performing slightly better

Impact on road network

- opt 1 on par with opt 4, opt 4 performing slightly better
- opt 2 - LoS D
- opt 3 – worse performance in 2041
- opt 4 - on par with opt 4, opt 4 performing slightly better

SCORE
Option 1 - 3
Option 2 - 4
Option 3 - 1
Option 4 – 3

CONSTRUCTABILITY
Impact on existing road network

- opt 1 – a lot of work close to live traffic
- opt 2 – can do offline pavement work and connect in
- opt 3 – best for constructability– just shoulder widening – however issues on Mannheim street. Lower duration of time, so lower impact
- opt 4 - a lot of work close to live traffic

Impacts on existing carpark

- a/a

SCORE
Option 1 -3
Option 2 -3
Option 3 - 4
Option 4 – 3

FINAL SCORE
Option 1 - 3.4
Option 2 - 3.6
Option 3 - 1.8
Option 4 – 3.6

COMMENTS:
cost not considered – but should it be? Hasn't been factored into the MCA. Criteria provided ahead of time for comment. Project team to discuss. Indicative costs will be provided with feasibility report. Revisited once preferred option identified. Can do a cost

MEETING RECORD (Cont'd)

	comparison once MCA rated. MCA provides the scale of preference SUMMARY Carpark – definitive winner Option 3 – extend existing carpark to the west Some work needed on SUP- and need for a northern alignment Intersection - Signals preferred, but how are these arranged needs further thought. – clear approach. But arrangement and configuration need to be looked into. Need to look at the exist and moving it further away from the intersection	
6.0	**Next Steps**	[redacted]
	Need to agree on preferred option MCA will help inform this. Not definitive. Have identify what is beneficial Opportunity for project team to refine options with understanding on what aspects need improvement. Once determined preferred option, report produced. SD - can be a combination of options. [redacted] – will water pipe be potholed before preferred option identified. – Was not intended to be, but SMEC will look into this given the critical nature of the constraint. To discuss with project team. [redacted] would like constraints known. SH – once have draft report, get ministers review, to ensure reasonable level of acceptance given interest. [redacted] – MCA provided a lot of valuable insight into project, and what needs to be looked into further.	
7.0	**Workshop Close**	[redacted]
	Valuable process and thank you. Ensured engagement and buy in from all stakeholders.	
8.0	**Lessons Learned**	
	Info package provided ahead of time of drawings so everyone can reference.	

MEETING RECORD (Cont'd)

Member of the Surbana Jurong Group

	Taking longer than expected as dependent on number of criteria and understanding of the project. Not proportional to the budget of the project.	

ACTIONS	
ACTION	**TIMEFRAME**
MCA outcomes	Deliverable – on completion of Feasibility Report

Appendix G Tree Assessment

TREE ASSESSMENT REPORT

Mount Taylor Shared Path, intersection upgrade and car park
Sulwood Drive and Part Block 1552, Tuggeranong, ACT

ISSUE 1_ 19 January 2021

Unit 5, 61 Dundas Court
PHILLIP ACT 2606
POBox 88 Waramanga ACT 2611
P 02 6281 6066
eld@envirolinks.com.au
www.envirolinks.com.au
ABN 64 078 436 478

Prepared by
Enviro Links Design Pty Ltd (2020)

For
SMEC

Contents

1 Introduction

Enviro Links Design Pty Ltd was engaged by the ACT government care of SMEC to undertake the tree assessment for the Mount Taylor Shared Path, intersection upgrade and car park (Sulwood Drive and part Block 1552 Tuggeranong). The report highlights the value of individual trees and groups to assist with the area of the proposed works and feasibility study.

Figure 1: Extent of Tree Assessment

2 Methodology

The following describes in general terms the processes and criteria that trees and tree groups were assessed.

Tree Number/Group: A unique reference number is assigned to each tree or group of trees. Each tree/group of trees is numbered and referenced in the Plan and Report as applicable.

2.1 Tree Data

Species

» Botanical Name

Height, Canopy and Trunk Circumference (Physical Dimensions)

» Height in metres
» Canopy diameter in metres shown as the maximum crown width of the tree or group of trees
» For Single Trunks circumference in metres, measured 1 metre above ground level
» For multiple trunks the cumulative total of each trunk in metres at 1 metre above ground level

Number of Trunks

» Number of trunks at 1 metre above ground level

Health and vigour

» The general health and vigour Tree

Structural defects and decay

» Structural defects or evidence of internal decay

Past Damage or root disturbance

» Evidence of past damage to the tree or disturbance within the root zone

Disease or infestation

» Evidence of past or present disease or insect infestation

Stage

» Current growth stage (e.g. juvenile, semi-mature, mature or over mature)

Quality Ranking

» Tree quality classification trees are to be classified as being of:
Exceptional (E), High (H), Medium (M), or Low (L) quality. Refer to notes below

Notes

» Habitat – nests, birds, other wildlife
» General comments and notes

2.2 Quality Ranking

E - Exceptional Value
Trees that are outstanding examples of their species and have significant visual impact. They have most of the following: mature specimens with grand appearance and stature; may have unusual character; may be a rare species; well balanced; cultural heritage importance; significant scientific value; presents a low hazard/safety risk. Significant value within the landscape context of the site and should be preserved.

H - High Value
Trees that are good examples of their species and have significant visual impact. They have most of the following: high arboricultural value or potential; good form; healthy specimens with good size and little or no epicormic shoots or other arboricultural problems. Good value within the landscape context of the site and should be preserved if at all possible.

M - Medium Value
Trees generally complying with most of the following: reasonable form or reasonable current size with good health / growth potential; healthy specimen with significant growth (or with moderate tree surgery a large tree can be modified from fair to good health, ie can carry some deadwood); has value within the landscape context of the site; presents a medium to low hazard/safety risk. Does not justify special attention of construction expenditure but justifies a minor design adjustment to save or could be removed if necessary. Retain if appropriate to land use and future management cost and risks.

P - Poor Value
Trees generally complying with most of the following: specimen with low growth or poor form and possible health problems; trees of little value; presents a high or very high hazard/safety risk. Expendable, remove if necessary - retain if appropriate to land use and future management costs and risks.

D - Dead Tree

2.3 Limitations

The tree assessment was undertaken by non-invasive visual review means only. No coring, probing, excavation, dissection or laboratory analysis was undertaken. Assessments were made on visual and physical (external and above ground measurement) only.

3 Tree Assessment Summary

The tree assessment was undertaken on the 16th of January 2021. A total of 10 individual trees and 24 Tree Group were assessed.

The majority of trees are on unleased territory land and require approval for removal or tree damaging activities. There are no registered trees in the area.

The trees consist primarily of native planted trees along the road corridor, there are a limited number of remanent trees, self-seeded natives and a selection of planted exotic tree species.

The assessment identified;

- 1 high quality tree group;
- 3 high quality trees;
- 21 medium quality tree groups
- 3 medium quality individual trees
- 2 poor quality tree groups: and
- 2 poor quality trees.

The three high quality trees are all Eucalypt trees one is likely remnant tree and two are possibly a remnant tree or very early planting. Tree 3 is a high quality Eucalyptus blakelyi, it would likely be an exceptional quality tree if not for the pruning to accommodate the electrical lines, while the canopy is slightly lopsided due to this pruning the tree appears to be in good health and is of significant visual amenity value to the area. Tree 7 is a remnant Eucalyptus rossii while the tree has had past limb failure this has resulted in habitat creation with at least one active hollow. Tree 7 is at the top of a hill within an open space, it is a significant landscape marker. Tree 1 is a Eucalyptus mannifera the tree is a significant landscape feature dominating the western end of site.

The high quality tree group (G21) is a stand of Eucalyptus melliodora. The trees are a mix of mature and over mature, noting the over mature trees have hollows and may provide good habitat value. The group also reads well in the landscape as a strong visual element.

Tree 2 is a medium quality Eucalyptus bridgesiana, the tree is located near a pedestrian underpass and is a good landscape marker, it is on a slight lean away from the path. Previous major limb failure is noted near the base of the tree, the tree is uplifting the adjacent storm water culvert and potentially damaging other storm water infrastructure below ground level.

Tree 4 is a poor quality Eucalyptus sp, the tree is on an adjacent residential block and is a regulated tree. The tree has significant past insect damage and a lopsided canopy.

The majority of trees are medium quality groups (with some medium quality individual trees) that were planted as informal road screening trees. The groups are predominantly mixed eucalyptus sp (with some shrubs and Casuarina cunninghamiana) and are generally in good health, the success/health and vigour of the trees is mixed with some species (Eucalyptus cinerea, Eucalyptus sideroxylon and Eucalyptus macrorhyncha) showing signs of decline or not being as successful. The groups form part of the strong landscape setting for the area. The trees are typically planted close together, often resulting in taller narrower trees. The effect of the group would not be significantly impacted by select tree removals.

Group 12 is a poor quality group, the group is mixed eucalypt species. The group is located close to the top of the hill along a cutting for the road, it is likely soil conditions and hydrology impact of the earthworks have contributed to their lack of success.

Group 5 and 10 are planted between the existing track and the adjacent residential blocks. They are likely resident plantings with a mix of fruit trees, exotic ornamental trees and some native trees. Group 5 is a medium quality group of trees. Group 10 is a poor quality group of trees. Group 11 is a medium quality group of pinus sp trees.

The following images are representative of the typical tree and vegetation character of the site.

Figure 2: Tree 1

Figure 3: Tree 2

Figure 4: Tree 3

Figure 5: Tree 7

Figure 6: Tree 8

Figure 7: Tree Group 1

Figure 8: Tree Group 2

Figure 9: Tree Group 3

Figure 10: Tree Group 20

Figure 11: Tree Group 23

4 Appendix 1 – Tree Assessment Table

ELD No.	Botanical Name	Height (m)	No. Trunks	Trunk circ. (m)	Canopy dia. (m)	Health and Vigour	Structural defects and decay	Past Damage or root disturbance	Disease or infestation	Stage	Quality Rating	Protected Status
						(G-good, F-fair, P-poor, DW-deadwood, EPI-epicormic growth)	(OC- occluded fork, AGL – Above Ground Level)	(AGL - Above Ground Level)	(AGL – Above Ground Level)	Juvenile (J), Semi-mature (SM), Mature (M), Over mature (OM)	Low (L), Poor (P), Medium (M), High (H), Exceptional *(NOTE: Quality Rating also noted with (E) specify an exceptional rating due to heritage listed status)*	Unleased Land (Yes -TCCS) *Tree Act* (Yes - Y, No - N) - Note: N* denotes a tree not regulated due to ACT Declared Weed Species status
G1	Casuarina cunninghamiana	8-9	1	0.75-2	2-8	Fair				M	M	(Yes -TCCS)
G2	Eucalyptus blakelyi Eucalyptus mannifera Eucalyptus polyanthemos Eucalyptus sideroxylon	6-10	1	2.4	6-8	Good - slender form				M	M	(Yes -TCCS)
G3	Eucalyptus blakelyi Eucalyptus melliodora Eucalyptus polyanthemos Eucalyptus viminalis	6-8	1-2	0.5-2	4-8	Fair to Good - some in poor form/with die back				M	M-	(Yes -TCCS)
G4	Eucalyptus blakelyi Eucalyptus mannifera Eucalyptus melliodora Eucalyptus macrorhyncha	6-10	1	1.2-2	5-8	Good - some dead wood	some larger trees with minor OC			M	M	(Yes -TCCS)
G5	Pyrus sp Ulmus sp Cupressus sp Albazia sp	4-6	1	0.65-1.2	4-5	Good				J and M	M-	(Yes -TCCS)
G6	Eucalyptus melliodora Eucalyptus mannifera Eucalyptus polyanthemos Eucalyptus macrorhyncha	6-10	1-4	1-2	4-9	Fair to Good				M	M-	(Yes -TCCS)
G7	Eucalyptus polyanthemos Eucalyptus melliodora	8-10	1-4	1-1.9	4-7	Fair				M	M-	(Yes -TCCS)
G8	Eucalyptus melliodora Eucalyptus blakelyi Eucalyptus polyanthemos Eucalyptus cinerea	3-11	1-2	.65-1.95	2-6	Fair to Good				J and M	M-	(Yes -TCCS)
G9	Eucalyptus mannifera	6-10	1	2-2.5	5-8	Fair				M	M-	(Yes -TCCS)

ELD No.	Botanical Name	Height (m)	No. Trunks	Trunk circ. (m)	Canopy dia. (m)	Health and Vigour	Structural defects and decay	Past Damage or root disturbance	Disease or infestation	Stage	Quality Rating	Protected Status
						(G-good, F-fair, P-poor, DW-deadwood, EPI-epicormic growth)	(OC- occluded fork, AGL - Above Ground Level)	(AGL - Above Ground Level)	(AGL - Above Ground Level)	Juvenile (J), Semi-mature (SM), Mature (M), Over mature (OM)	Low (L), Poor (P), Medium (M), High (H), Exceptional *(NOTE: Quality Rating also noted with (E) specify an exceptional rating due to heritage listed status)*	Unleased Land (Yes -TCCS) *Tree Act* (Yes - Y, No - N) - Note: N" denotes a tree not regulated due to ACT Declared Weed Species status
G10	Quercus palustris Cupressus sp Casuarina cunninghamiana Ulmus sp Pyrus sp Pyrus sp (fruit trees) Malus sp (fruit trees)	4-7	1	0.85-1.2	4-5	Fair				M	P	(Yes -TCCS)
G11	Pinus sp	10-12	1	1-2	5-9	Fair - some minor dieback in lower branches				M	M-	(Yes -TCCS)
G12	Eucalyptus blakelyi Eucalyptus mannifera Eucalyptus polyanthemos	5-7	1-3	0.8-2	4-8	Poor to Fair - some tree within the group are dead and others have dieback, trees generally stunted				M	P	(Yes -TCCS)
G13	Eucalyptus blakelyi Eucalyptus mannifera Eucalyptus polyanthemos Eucalyptus sideroxylon	5-12	1-4	0.7-2.4	4-11	Good				M	M	(Yes -TCCS)
G14	Eucalyptus macrorhyncha Eucalyptus sideroxylon	10-11	1	2.5	9	Good				M	M+	(Yes -TCCS)
G15	Eucalyptus blakelyi Eucalyptus macrorhyncha Eucalyptus mannifera Eucalyptus melliodora Eucalyptus polyanthemos	4-12	1-3	0.45-2.5	3-8	Fair to Good				M	M	(Yes -TCCS)
G16	Fraxinus sp	5-6	1	0.65	4-5	Fair				M	M-	(Yes -TCCS)
G17	Eucalyptus macrorhyncha Eucalyptus melliodora	7-13	1-2	0.75-2.6	3-8	Fair to Good - generally good				M	M	(Yes -TCCS)
G18	Eucalyptus sideroxylonEucalyptus blakelyi	4-8	1	0.75-2	2-6	Fair to Good				M	M-	(Yes -TCCS)
G19	Eucalyptus mannifera	8-11	1	1-2	6-7	Good				M	M-	(Yes -TCCS)
G20	Eucalyptus blakelyi Eucalyptus mannifera Eucalyptus melliodora	4-7	1-3	0.75-2	2-6	Fair to Good - a few in poor condition				J and M	M-	(Yes -TCCS)

enviro links design

ELD No.	Botanical Name	Height (m)	No. Trunks	Trunk circ. (m)	Canopy dia. (m)	Health and Vigour	Structural defects and decay	Past Damage or root disturbance	Disease or infestation	Stage	Quality Rating	Protected Status
						(G-good, F-fair, P-poor, DW-deadwood, EPI-epicormic growth)	(OC- occluded fork, AGL - Above Ground Level)	(AGL - Above Ground Level)	(AGL - Above Ground Level)	Juvenile (J), Semi-mature (SM), Mature (M), Over mature (OM)	Low (L), Poor (P), Medium (M), High (H), Exceptional *(NOTE: Quality Rating also noted with (E) specify an exceptional rating due to heritage listed status)*	Unleased Land (Yes -TCCS) *Tree Act* (Yes - Y, No - N) - Note: N" denotes a tree **not** regulated due to ACT Declared Weed Species status
G21	Eucalyptus melliodora	8-12	1-2	2.5	6-9	Poor to Good - some appear to be in decline, hollows and habitat value noted within canopy and in trees in decline				M-OM	H-	(Yes -TCCS)
G22	Eucalyptus blakelyi	5-10	1	0.85-2.1	3-8	Good				J and M	M	(Yes -TCCS)
G23	Eucalyptus polyanthemos Eucalyptus melliodora Euclayptus blakelyi	5-8	1-5	0.75-2.5	3-10	Good				J and M	M	(Yes -TCCS)
G24	Eucalyptus mannifera Eucalyptus blakelyi	2-10	1-3	0.3-2.2	2-11	Good - many juveniles trees within the group				J and M	M	(Yes -TCCS)
1	Eucalyptus mannifera	9.5	1	2.5	10	Good				M	H	(Yes -TCCS)
2	Eucalyptus bridgesiana	10	1	3.2	8.5	Good - slight lean, minor deadwood, birds observed in tree (possible nesting)	past major limb failure has left a deepscar/indent near the base			M	M+	(Yes -TCCS)
3	Eucalyptus blakelyi	14	1	3.4	12	Good - canopy is slightly lopsided due to pruning for overhead elevtrical lines				M	H-	(Yes -TCCS)
4	Eucalyptus melliodora	12	1	3.2	12	Poor to fair - lopsided canopy, deadwood, past insect damage				M	P	Y
5	Eucalytpus mannifera	10	1	2.4	8	Good				M	M-	(Yes -TCCS)
6	Cassuarina cunninghamiana	11	1	2.5	7	Fair				M	M-	(Yes -TCCS)
7	Eucalyptus rossii	14.5	1	3.9	14	Good - some past limb failure, hollows present with probable nesting birds, minor deadwood				M	H+	(Yes -TCCS)

ELD No.	Botanical Name	Height (m)	No. Trunks	Trunk circ. (m)	Canopy dia. (m)	Health and Vigour	Structural defects and decay	Past Damage or root disturbance	Disease or infestation	Stage	Quality Rating	Protected Status
						(G-good, F-fair, P-poor, DW-deadwood, EPI-epicormic growth)	(OC- occluded fork, AGL - Above Ground Level)	(AGL - Above Ground Level)	(AGL - Above Ground Level)	Juvenile (J), Semi-mature (SM), Mature (M), Over mature (OM)	Low (L), Poor (P), Medium (M), High (H), Exceptional *(NOTE: Quality Rating also noted with (E) specify an exceptional rating due to heritage listed status)*	**Unleased Land** (Yes -TCCS) ***Tree Act*** (Yes - Y, No - N) - Note: N" denotes a tree **not** regulated due to ACT Declared Weed Species status
8	Eucalyptus melliodora	14	1	3.7	10	Good - deadwood, poor form, birds observed in canopy	slightly OC on major limb near base, past limb failure and damage to trunk			M	M-	(Yes -TCCS)
9	Eucalyptus mannifera	5	1	0.75	4	Good				J	P	(Yes -TCCS)
10	Eucalyptus blakelyi	7	1	2.1	5	Poor - appears to be in decline, significant epicormic growth and major deadwood				M	P	(Yes -TCCS)

5 Appendix 1 – Tree Location Plan

MT TAYLOR SHARED PATH, INTERSECTION AND CAR PARK

KAMBAH, ACT

TREE ASSESSMENT

PREPARED FOR: SMEC

DRAWING LIST

DWG NO.	DRAWING TITLE	REVISION
TA00	TREE ASSESSMENT COVER SHEET	A
TA01	TREE ASSESSMENT PLAN SHEET 1	A
TA02	TREE ASSESSMENT PLAN SHEET 2	A
TA03	TREE ASSESSMENT PLAN SHEET 3	A
TA04	TREE ASSESSMENT PLAN SHEET 4	A
TA05	TREE ASSESSMENT PLAN SHEET 5	A
TA06	TREE ASSESSMENT PLAN SHEET 6	A

PLEASE NOTE TREE LOCATIONS WERE LOCATED BY AERIAL PHOTOGRAPHY AND WERE VERIFIED FROM SITE INSPECTION UNDERTAKEN BY ENVIRO LINKS DESIGN PTY LTD. JANUARY 2021. TREE GROUP NUMBERS AND TREE/GROUP VALUES ALLOCATED BY ENVIRO LINKS DESIGN.

E,H,M,P,D

VALUE RANKING : INDIVIDUAL TREES
The delineation within the value classification is based on the works being on leased land and therefore under the jurisdiction of the TCCS Urban TreeScapes Unit (UTU) All trees on Government Land are regarded as protected trees and can not be removed or damaged or works undertaken near them without the approval of the UTU. (The Tree Act. and Regulated Tree definitions are therefore applicable to leased site, unless otherwise advised).

E

EXCEPTIONAL VALUE - trees that are outstanding examples of their species and have significant visual impact. They have most of the following: mature specimens with grand appearance and stature; may have unusual character; may be a rare species; well balanced; cultural heritage importance; significant scientific value; presents a low hazard/safety risk. Significant value within the landscape context of the site and should be preserved.

H

HIGH VALUE - trees that are good examples of their species and have significant visual impact. They have most of the following: high arboricultural value or potential; good form; healthy specimens with good size and little or no epicormic shoots or other arboricultural problems. Good value within the landscape context of the site and should be preserved if at all possible.

M

MEDIUM VALUE - trees generally complying with most of the following: reasonable form or reasonable current size with good health / growth potential; healthy specimen with significant growth (or with moderate tree surgery a large tree can be modified from fair to good health, ie can carry some deadwood); has value within the landscape context of the site; presents a medium to low hazard/safety risk. Does not justify special attention of construction expenditure but justifies a minor design adjustment to save or could be removed if necessary. Retain if appropriate to land use and future management cost and risks.

P

POOR VALUE - trees generally complying with most of the following: specimen with low growth or poor form and possible health problems; trees of little value; presents a high or very high hazard/safety risk. Expendable, remove if necessary - retain if appropriate to land use and future management costs and risks.

NOTE: ALL TREES ON ACT GOVERNMENT PUBLIC LAND FALL UNDER PROTECTED STATUS.

TREE ASSESSMENT ELEMENTS

Number: Unique and sequential identification number
Name: Botanical name
Height: (m)
Trunk: Diameter (m) at 1 metre above natural ground level
Canopy: Diameter (m) at the furthest point from the trunk (m)
Health: The general health and vigour Tree
Defects / Decay: Structural defects or evidence of internal decay
Damage / Disturbance: Evidence of past damage to the tree or disturbance within the root zone
Disease: Evidence of past or present disease or insect infestation;
Stage: Current growth stage (e.g. juvenile, semi-mature, mature or over mature).
Quality: Tree quality classification trees are to be classified as being of Exceptional (E), High (H), Medium (M), Poor (P), or Low (L) quality.
Tree Act Status: Refer notes below

NOTE: TREE MEASUREMENTS WERE COLLECTED FROM THE SURVEYORS PROVIDED DIMENSIONS.

Tree 'Regulated' Status by Virtue of Size (On - Lease)
Under the Tree Protection Act 2005 a tree is termed a Regulated Tree and is to be protected if it is growing on Urban Leased land and has at least one of:
* A height of 12m or more; or
* A trunk circumference of 1.5m (approx 0.5m in diameter) or more at 1m above ground level; or
* Two or more trunks and the total circumference of all the trunks, 1m above ground level, is 1 5m or more, or
* A minimum crown width of 12m or more, and
* Must be alive - all dead trees have been ranked as Non Protected tree.
* Is not a weed species under the Pest Plant & Animals Declaration 2005

Tree Protected Status
YES - The tree has a dimension that any activity must be assessed under the Tree Protection Act on Leased land; or is on Government land eg. road verge, park, etc as all trees on Government land are protected.
NO - The tree if on Leased land is sufficiently small or declared a Weed Species that it does not require assessment under the Tree Protection Act.
NA - Not applicable as Off Lease but often protected as these trees are generally on Government (Unleased) land.

Trees nominated as Protected can only be removed / pruned if approval in writing gained from all applicable Government agencies.

Future Tree Approvals
On-Leased land: if a tree has protected status then approval must be gained from TCCS Urban TreeScapes Unit prior to removal, lopping or ground damaging activty.

Off-Leased (Territory) land: Please note all trees located external to the leased block boundary i.e. the verge or open space, cannot be removed, pruned or damaged without the approval of the Urban TreeScapes Unit, City Services (13 22 81) as on Government land.

Tree Management:
Trees within lease require a Tree Management Plan (TMP) and on the verge a Landscape Management Protection Plan (LMPP) outlining removals, pruning, tree protection measures, site access and restorative works issues as part of the design process.

ISSUE	DESCRIPTION	DWN	APP'D	DATE
A	FOR INFORMATION	MR	JK	19.01.21

NORTH

NOTES
- COPYRIGHT AND PROPERTY OF ENVIRO LINKS DESIGN PTY LTD. MAY BE USED ON Y FOR THE STATED PROJECT AND ISSUE STATUS, AND IN ACCORDANCE WITH TERMS OF ENGAGEMENT FOR WHICH IT WAS COMMISSIONED.
- TO BE R AD IN CONJUNCTION WITH ALL RELEVANT CONTRACTS, SPEC FICATIONS, REPORTS, DRAWINGS AND D VELOPMENT APPROVAL CONDIT ONS. OBTAIN ANY OUTSTANDING STATUTORY APPROVALS PRIOR TO COMMENCEMENT OF WORKS.
- FIGURED DIMENSIONS TO BE TAKEN IN PREFERENCE TO SCALED MEASUREMENTS. DIMENSIONS IN M LL METRES UNLESS NOTED OTHERWISE.

WHERE ISSUED FOR CONSTRUCTION:
- CONTRACTOR IS RESPONS BLE FOR LOCATING ALL SERVICES AND OBTAIN NG NECESSARY CL ARANCES AND APPROVALS. CONTRACTOR TO VER FY D MENSIONS, L VELS & DETAILS TO SITE CONDIT ONS AND PRIOR WORKS, AND REPORT ALL DISCREPANCIES TO THE SUPER NTENDENT FOR RESOLUT ON BEFORE COMMENCING WORK.
- PRESENT SAMPLES AND GAIN APPROVAL FROM SUPERINTENDENT FOR ANY NOMINATED MATER ALS OR FIN SHES.
- ADOPT AND IMPLEMENT APPROVED TREE MANAGEMENT PLAN, LANDSCAPE MANAGEMENT & PROTECTION P AN & ENV RONMENTAL AUTHOR SATIONS.
- ALL WORKS TO BE IN ACCORDANCE WITH CURRENT TCCS MUN CIPAL INFRASTRUCTURE TECHNICAL SPECIF CATION AND MUNICIPAL INFRASTRUCTURE STANDARDS UNLESS OTHERWISE PRESCR BED. ALL DISTURBANCE Y WORKS MUST BE RE NSTATED TO EXIST NG CONDITION.

PROJECT TEAM: SMEC

CLIENT: ACT Government, Transport Canberra & City Services

ANDSCAPE ARCHITECT: enviro links design
5 / 61 Dundas Court PHILLIP ACT 2606
Ph:(02) 6281 6066 www.e virolinks.com.au

PROJECT: MT TAYLOR SULWOOD DRIVE CARPARK, INTERSECTION UPGRADE AND SHARED PATH

TITLE: TREE ASSESSMENT COVER SHEET
SCALE: NTS
ISSUE: A
JOB NO.: 2031
DWG NO.: TA-00

ISSUE	DESCRIPTION	DWN	APP'D	DATE
A	FOR INFORMATION	MR	JK	19.01.21

NORTH

© COPYRIGHT

NOTES
- COPYRIGHT AND PROPERTY OF ENVIRO LINKS DESIGN PTY LTD. MAY BE USED ON Y FOR THE STATED PROJECT AND ISSUE STATUS, AND IN ACCORDANCE WITH TERMS OF ENGAGEMENT FOR WH CH IT WAS COMM SSIONED.
- TO BE R AD IN CONJUNCTION WITH ALL RELEVANT CONTRACTS, SPECIFICATIONS, REPORTS, DRAWINGS AND DEVELOPMENT APPROVAL CONDITIONS. OBTAIN ANY OUTSTANDING STATUTORY APPROVALS PRIOR TO COMMENCEMENT OF WORKS.
- FIGURED DIMENSIONS TO BE TAKEN IN PREFERENCE TO SCALED MEASUREMENTS. DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE.

WHERE ISSUED FOR CONSTRUCTION:
- CONTRACTOR S RESPONSIBLE FOR LOCATING ALL SERVICES AND OBTAINING NECESSARY CLEARANCES AND APPROVALS. CONTRACTOR TO VERI Y DIMENSIONS, LEVELS & DETAILS TO SITE CONDITIONS AND PRIOR WORKS, AND REPORT ALL DISCREPANCIES TO THE SUPERINTENDENT FOR RESOLUTION BEFORE COMMENCING WORK.
- PRESENT SAMPLES AND GAIN APPROVAL FROM SUPERINTENDENT FOR ANY NOMINATED MATERIALS OR FINISHES.
- ADOPT AND IMPLEMENT APPROVED TREE MANAGEMENT PLAN, LANDSCAPE MANAGEMENT & PROTECTION PLAN & ENVIRONMENTAL AUTHORISATIONS. ALL WORKS TO BE IN ACCORDANCE WITH CURRENT TCCS MUNICIPAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS AND MUNICIPAL INFRASTRUCTURE STANDARDS UNLESS OTHERWISE PRESCRIBED. ALL DISTURBANCE BY WORKS MUST BE REINSTATED TO EXISTING CONDITION.

PROJECT TEAM
SMEC

CLIENT
ACT Government
Transport Canberra & City Services

LANDSCAPE ARCHITECT
enviro links design
5 / 61 Dundas Court PHILLIP ACT 2606
Ph:(02) 6281 6066 www.envirolinks.com.au

PROJECT
MT TAYLOR SULWOOD DRIVE
CARPARK, INTERSECTION UPGRADE
AND SHARED PATH

TITLE
TREE ASSESSMENT PLAN
SHEET 1

SCALE
1:2000@A3
0 10 20 30 40m

ISSUE
A

JOB NO.
2031

DWG NO.
TA-01

ISSUE	DESCRIPTION	DWN	APP'D	DATE
A	FOR INFORMATION	MR	JK	19.01.21

NORTH

NOTES
- COPYRIGHT AND PROPERTY OF ENVIRO L NKS DESIGN PTY LTD. MAY BE USED ON Y FOR THE STATED PROJECT AND ISSUE STATUS, AND IN ACCORDANCE WITH TERMS OF ENGAGEMENT FOR WH CH IT WAS COMM SSIONED.
- TO BE R AD IN CONJUNCTION WITH ALL RELEVANT CONTRACTS, SPECIFICATIONS, REPORTS, DRAWINGS AND DEVELOPMENT APPROVAL COND TIONS. OBTAIN ANY OUTSTANDING STATUTORY APPROVALS PRIOR TO COMMENCEMENT OF WORKS.
- FIGURED DIMENSIONS TO BE TAKEN IN PREFERENCE TO SCALED MEASUREMENTS. DIMENS ONS IN MILLIMETRES UNLESS NOTED OTHERWISE.

WHERE ISSUED FOR CONSTRUCTION:
- CONTRACTOR S RESPONSIBLE FOR LOCATING ALL SERVICES AND OBTAINING NECESSARY CLEARANCES AND APPROVALS. CONTRACTOR TO VERI Y DIMENS ONS, LEVELS & DETAILS TO SITE CONDIT ONS AND PRIOR WORKS, AND REPORT ALL DISCREPANC ES TO THE SUPER NTENDENT FOR RESOLUTION BEFORE COMMENCING WORK.
- PRESENT SAMPLES AND GAIN APPROVAL FROM SUPERINTENDENT FOR ANY NOM NATED MATER ALS OR FINISHES.
- ADOPT AND MPLEMENT APPROVED TREE MANAGEMENT P AN, LANDSCAPE MANAGEMENT & PROTECT ON PLAN & ENV RONMENTAL AUTHORISATIONS. ALL WORKS TO BE IN ACCORDANCE WITH CURRENT TCCS MUNICI AL INFRASTRUCTURE TECHNICAL SPEC FICATION AND MUNIC PAL INFRASTRUCTURE STANDARDS UNLESS OTHERWISE PRESCR BED. ALL D STURBANCE BY WORKS MUST BE REINSTATED TO EX STING CONDIT ON.

PROJECT TEAM: SMEC

CLIENT: ACT Government, Transport Canberra & City Services

LANDSCAPE ARCHITECT: enviro links design
5 / 61 Dundas Court PHILLIP ACT 2606
Ph:(02) 6281 6066 www.envirolinks.com.au

PROJECT: MT TAYLOR SULWOOD DRIVE CARPARK, INTERSECTION UPGRADE AND SHARED PATH

TITLE: TREE ASSESSMENT PLAN SHEET 2

SCALE: 1:2000@A3 (0 10 20 30 40m)

ISSUE: A

JOB NO.: 2031

DWG NO.: TA-02

ISSUE	DESCRIPTION	DWN	APP'D	DATE
A	FOR INFORMATION	MR	JK	19.01.21

NORTH

NOTES
- COPYRIGHT AND PROPERTY OF ENVIRO LINKS DESIGN PTY LTD. MAY BE USED ONLY FOR THE STATED PROJECT AND ISSUE STATUS, AND IN ACCORDANCE WITH TERMS OF ENGAGEMENT FOR WHICH IT WAS COMMISSIONED.
- TO BE READ IN CONJUNCTION WITH ALL RELEVANT CONTRACTS, SPECIFICATIONS, REPORTS, DRAWINGS AND DEVELOPMENT APPROVAL CONDITIONS. OBTAIN ANY OUTSTANDING STATUTORY APPROVALS PRIOR TO COMMENCEMENT OF WORKS.
- FIGURED DIMENSIONS TO BE TAKEN IN PREFERENCE TO SCALED MEASUREMENTS. DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE.

WHERE ISSUED FOR CONSTRUCTION:
- CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL SERVICES AND OBTAINING NECESSARY CLEARANCES AND APPROVALS. CONTRACTOR TO VERIFY DIMENSIONS, LEVELS & DETAILS TO SITE CONDITIONS AND PRIOR WORKS, AND REPORT ALL DISCREPANCIES TO THE SUPERINTENDENT FOR RESOLUTION BEFORE COMMENCING WORK.
- PRESENT SAMPLES AND GAIN APPROVAL FROM SUPERINTENDENT FOR ANY NOMINATED MATERIALS OR FINISHES.
- ADOPT AND IMPLEMENT APPROVED TREE MANAGEMENT PLAN, LANDSCAPE MANAGEMENT & PROTECTION PLAN & ENVIRONMENTAL AUTHORISATIONS. ALL WORKS TO BE IN ACCORDANCE WITH CURRENT TCCS MUNICIPAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS AND MUNICIPAL INFRASTRUCTURE STANDARDS UNLESS OTHERWISE PRESCRIBED. ALL DISTURBANCE BY WORKS MUST BE REINSTATED TO EXISTING CONDITION.

PROJECT TEAM
SMEC

CLIENT
ACT Government
Transport Canberra & City Services

LANDSCAPE ARCHITECT
enviro links design
5/61 Dundas Court PHILLIP ACT 2606
Ph:(02) 6281 6066 www.envirolinks.com.au

PROJECT
MT TAYLOR SULWOOD DRIVE
CARPARK, INTERSECTION UPGRADE
AND SHARED PATH

TITLE
TREE ASSESSMENT PLAN
SHEET 3

SCALE
1:2000@A3
0 10 20 30 40m

ISSUE
A

JOB NO.
2031

DWG NO.
TA-03

ISSUE	DESCRIPTION	DWN	APP'D	DATE
A	FOR INFORMATION	MR	JK	19.01.21

NORTH

© COPYRIGHT

NOTES
- COPYRIGHT AND PROPERTY OF ENVIRO L NKS DESIGN PTY LTD. MAY BE USED ON Y FOR THE STATED PROJECT AND ISSUE STATUS, AND IN ACCORDANCE WITH TERMS OF ENGAGEMENT FOR WH CH IT WAS COMM SSIONED.
- TO BE R AD IN CONJUNCTION WITH ALL RELEVANT CONTRACTS, SPECIFICATIONS, REPORTS, DRAWINGS AND DEVELOPMENT APPROVAL COND TIONS. OBTAIN ANY OUTSTANDING STATUTORY APPROVALS PRIOR TO COMMENCEMENT OF WORKS.
- FIGURED DIMENSIONS TO BE TAKEN IN PREFERENCE TO SCALED MEASUREMENTS. DIMENS ONS IN MILLIMETRES UNLESS NOTED OTHERWISE.

WHERE ISSUED FOR CONSTRUCTION:
- CONTRACTOR S RESPONSIBLE FOR LOCATING ALL SERVICES AND OBTAINING NECESSARY CLEARANCES AND APPROVALS. CONTRACTOR TO VERI Y DIMENS ONS, LEVELS & DETAILS TO SITE CONDIT ONS AND PRIOR WORKS, AND REPORT ALL DISCREPANC ES TO THE SUPER NTENDENT FOR RESOLUTION BEFORE COMMENCING WORK.
- PRESENT SAMPLES AND GAIN APPROVAL FROM SUPERINTENDENT FOR ANY NOM NATED MATER ALS OR FINISHES.
- ADOPT AND MPLEMENT APPROVED TREE MANAGEMENT P AN, LANDSCAPE MANAGEMENT & PROTECT ON PLAN & ENV RONMENTAL AUTHORISATIONS. ALL WORKS TO BE IN ACCORDANCE WITH CURRENT TCCS MUNICI AL NFRASTRUCTURE TECHNICAL SPEC FICATION AND MUNIC PAL INFRASTRUCTURE STANDARDS UNLESS OTHERWISE PRESCR BED. ALL D STURBANCE BY WORKS MUST BE REINSTATED TO EX STING CONDIT ON.

PROJECT TEAM: SMEC

CLIENT: ACT Government, Transport Canberra & City Services

LANDSCAPE ARCHITECT: enviro links design
5 / 61 Dundas Court PHILLIP ACT 2606
Ph:(02) 6281 6066 www.enviroinks.com.au

PROJECT
MT TAYLOR SULWOOD DRIVE
CARPARK, INTERSECTION UPGRADE
AND SHARED PATH

TITLE
TREE ASSESSMENT PLAN
SHEET 4

SCALE 1:2000@A3 (0 10 20 30 40m)

ISSUE: A

JOB NO. 2031

DWG NO. TA-04

ISSUE	DESCRIPTION	DWN	APP'D	DATE
A	FOR INFORMATION	MR	JK	19.01.21

NORTH

NOTES
- COPYRIGHT AND PROPERTY OF ENV RO LINKS DESIGN PTY LTD. MAY BE USED ON Y FOR THE STATED PROJECT AND ISSUE STATUS, AND IN ACCORDANCE W TH TERMS OF ENGAGEMENT FOR WH CH IT WAS COMM SSIONED.
- TO BE R AD IN CONJUNCT ON WITH ALL RELEVANT CONTRACTS, SPECIFICATIONS, REPORTS, DRAWINGS AND DEVELOPMENT APPROVAL COND TIONS. OBTAIN ANY OUTSTANDING STATUTORY APPROVALS PRIOR TO COMMENCEMENT OF WORKS.
- FIGURED D MENSIONS TO BE TAKEN IN PREFERENCE TO SCALED M ASUREMENTS. DIMENS ONS IN MILLIMETRES UNLESS NOTED OTHERWISE.

WHERE ISSUED FOR CONSTRUCTION:
- CONTRACTOR S RESPONSIBLE FOR LOCATING ALL SERVICES AND OBTAINING NECESSARY CL ARANCES AND APPROVALS. CONTRACTOR TO VERI Y DIMENS ONS, LEVELS & DETAILS TO SITE CONDIT ONS AND PR OR WORKS, AND REPORT ALL DISCREPANC ES TO THE SUPER NTENDENT FOR RESOLUTION BEFORE COMMENCING WORK.
- PRESENT SAMPLES AND GAIN APPROVAL FROM SUPERINTENDENT FOR ANY NOM NATED MATER ALS OR FINISHES.
- ADOPT AND MPLEMENT APPROVED TREE MANAGEMENT P AN, LANDSCAPE MANAGEMENT & PROTECT ON PLAN & ENVIRONMENTAL AUTHORISATIONS.
- ALL WORKS TO BE IN ACCORDANCE WITH CURRENT TCCS MUNICI AL NFRASTRUCTURE TECH CAL SPECIFICATION AND MUNIC PAL NFRASTRUCTURE STANDARDS UNLESS OTHERWISE PRESCRIBED. ALL D STURBANCE BY WORKS MUST BE RE NSTATED TO EX STING CONDITION.

PROJECT TEAM
SMEC

CLIENT
ACT Government
Transport Canberra & City Services

LANDSCAPE ARCHITECT
enviro links design
5 / 61 Dundas Court PHILLIP ACT 2606
Ph:(02) 6281 6066 www.envirolinks.com.au

PROJECT
MT TAYLOR SULWOOD DRIVE
CARPARK, INTERSECTION UPGRADE
AND SHARED PATH

TITLE
TREE ASSESSMENT PLAN
SHEET 5

SCALE
1:2000@A3
0 10 20 30 40m

ISSUE
A

JOB NO.
2031

DWG NO.
TA-05

ISSUE	DESCRIPTION	DWN	APP'D	DATE
A	FOR INFORMATION	MR	JK	19.01.21

NORTH

NOTES
- COPYRIGHT AND PROPERTY OF ENVIRO L NKS DESIGN PTY LTD. MAY BE USED ON Y FOR THE STATED PROJECT AND ISSUE STATUS, AND IN ACCORDANCE WITH TERMS OF ENGAGEMENT FOR WH CH IT WAS COMM SSIONED.
- TO BE R AD IN CONJUNCTION WITH ALL RELEVANT CONTRACTS, SPECIFICATIONS, REPORTS, DRAWINGS AND DEVELOPMENT APPROVAL COND TIONS. OBTAIN ANY OUTSTANDING STATUTORY APPROVALS PRIOR TO COMMENCEMENT OF WORKS.
- FIGURED DIMENSIONS TO BE TAKEN IN PREFERENCE TO SCALED MEASUREMENTS. DIMENS ONS IN MILLIMETRES UNLESS NOTED OTHERWISE.

WHERE ISSUED FOR CONSTRUCTION:
- CONTRACTOR S RESPONSIBLE FOR LOCATING ALL SERVICES AND OBTAINING NECESSARY CLEARANCES AND APPROVALS. CONTRACTOR TO VERI Y DIMENS ONS, LEVELS & DETAILS TO SITE CONDIT ONS AND PRIOR WORKS, AND REPORT ALL DISCREPANC ES TO THE SUPER NTENDENT FOR RESOLUTION BEFORE COMMENCING WORK.
- PRESENT SAMPLES AND SEEK APPROVAL FROM SUPERINTENDENT FOR ANY NOM NATED MATER ALS OR FINISHES.
- ADOPT AND MPLEMENT APPROVED TREE MANAGEMENT P AN, LANDSCAPE MANAGEMENT & PROTECT ON PLAN & ENV RONMENTAL AUTHORISATIONS. ALL WORKS TO BE IN ACCORDANCE WITH CURRENT TCCS MUNICI AL NFRASTRUCTURE TECHNICAL SPEC FICATION AND MUNIC PAL INFRASTRUCTURE STANDARDS UNLESS OTHERWISE PRESCR BED. ALL D STURBANCE BY WORKS MUST BE REINSTATED TO EX STING CONDIT ON.

PROJECT TEAM
SMEC

CLIENT
ACT Government
Transport Canberra & City Services

LANDSCAPE ARCHITECT
enviro links design
5 / 51 Dundas Court PHILLIP ACT 2606
Ph:(02) 6281 6066 www.envirolinks.com.au

PROJECT
MT TAYLOR SULWOOD DRIVE
CARPARK, INTERSECTION UPGRADE
AND SHARED PATH

TITLE
TREE ASSESSMENT PLAN
SHEET 6

SCALE
1:2000@A3
0 10 20 30 40m

ISSUE
A

JOB NO.
2031

DWG NO.
TA-06

Appendix H Geotechnical Investigations

Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on Geotechnical Investigation

Proposed Intersection Upgrading Sulwood Drive and Mannheim Street, Kambah

Prepared for
SMEC Australia Pty Ltd

Project 103121.01
March 2021

Douglas Partners
Geotechnics / Environment / Groundwater

Document History

Document details

Project No.	103121.01	Document No.	R.001.Rev0
Document title	Report on Geotechnical Investigation Proposed Intersection Upgrading		
Site address	Sulwood Drive and Mannheim Street, Kambah		
Report prepared for	SMEC Australia Pty Ltd		
File name	103121.01.R.001.Rev0.Geotechnical Report		

Document status and review

Status	Prepared by	Reviewed by	Date issued
Revision 0	[redacted]	[redacted]	16 March 2021

Distribution of copies

Status	Electronic	Paper	Issued to
Revision 0	1		SMEC Australia Pty Ltd

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author	[redacted]	16 March 2021
Reviewer	[redacted]	16 March 2021

bsi. ISO 9001 Quality Management
FS 604853

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
Unit 2, 73 Sheppard Street
Hume ACT 2620
PO Box 1487
Fyshwick ACT 2609
Phone (02) 6260 2788

Douglas Partners
Geotechnics | Environment | Groundwater

Table of Contents

Page

Douglas Partners
Geotechnics I Environment I Groundwater

Report on Geotechnical Investigation
Proposed Intersection Upgrading
Sulwood Drive and Mannheim Street, Kambah

1. Introduction

This report presents the results of a geotechnical investigation undertaken for a proposed intersection upgrading at Sulwood Drive and Mannheim Street, Kambah. The investigation was commissioned in an email dated 24 November 2020 from SMEC Australia Pty Ltd and was undertaken in accordance with Douglas Partners' proposal CAN200167.P.003.Rev3, dated 6 November 2020.

It is understood that the proposed development of the site includes upgrading of the intersection between Sulwood Drive and Mannheim Street in Kambah and the upgrade and extension of the Mt Taylor carpark opposite the intersection. The investigation was carried out to provide information on the following at the investigated locations:

- Subsurface strata including groundwater conditions (if encountered),
- Existing pavement conditions,
- Site preparation and earthworks,
- Design subgrade CBR values.

The investigation included the drilling of seven boreholes and laboratory testing of selected samples. The details of the field work are presented in this report, together with comments and recommendations on the items listed above.

This report must be read in conjunction with the notes “About This Report” included in Appendix A.

2. Proposed Development

It is understood that the proposed development of the site includes upgrading of the intersection between Sulwood Drive and Mannheim Street in Kambah, and the upgrade and a formalised extension of the Mt Taylor carpark at the eastern end only along Sulwood Drive. It is understood that cut and fill depths are likely to be less than 0.5 m deep.

3. Site Description

The intersection upgrading site (red outline in Figure 1 below) is estimated to be 400 m along Sulwood Drive (200 m either side of the intersection with Mannheim Drive) and approximately 100 m along Mannheim Drive approaching the intersection. The existing pavement of Sulwood drive has a sealed surface with one lane in each direction, and a median turning lane (for eastbound traffic) and left turn slip lane (for westbound traffic) for turning into Mannheim Street. Traffic islands are located along both

streets within the intersection. Mount Taylor Nature Reserve is located to the north of Sulwood Drive, while the residential suburb of Kambah is to the south.

The existing carpark (yellow outline in Figure 1 below) is approximately 350 m in length along the northern edge of Sulwood Drive, starting approximately 150 m west of the intersection with Mannheim Drive and ending approximately 200 m to the east. The carpark is one way, with traffic driving west to east. The carpark surface comprises of well compacted, dense sandy/gravelly fill. Parking is perpendicular to the flow of traffic near the trailhead, and parallel elsewhere. An extension to the existing carpark is proposed to the east. This extension extends up to approximately 450 m east along Sulwood Drive (green outline in Figure 1 below) from Mannheim Street and is proposed to contain 77 new parking spaces,

Figure 1: Approximate extents of the proposed intersection upgrade (in red), car park upgrade (in yellow) and car park extension (in green)

4. Regional Geology

Reference to the Canberra 1:100 000 Geological Series Sheet by Abell, R.S. (1992) indicates that the westernmost section of road alignment and carpark to be upgraded (see Figure 2 below) lies within the Laidlaw Volcanics of Silurian age, which consists of very coarse-grained, porphyritic rhyodacitic ignimbrite. The eastern majority of the site consists of Deakin volcanics, an early Siluarian age igneous rock unit comprising of rhyodacitic ignimbrite and minor volcaniclastic sedimentary rocks.

Figure 2: Geology mapping along the alignment (approximately marked with a red line)

5. Field Work Methods

The field investigation undertaken comprised the drilling of seven boreholes (Bores 1 – 7) to depths of 0.9 – 1.5 m. The borehole locations were nominated by the client. Due to the presence of existing buried services four of the bore holes were moved from their original nominated locations. These include:

- Bores 2 and 5 were moved south along Mannheim Street away from the intersection with Sulwood Drive due to a water main running through the original test locations and high voltage (HV) power in the area.
- Bore 1 was moved into the middle of the eastbound lane due to a buried electrical service located in [redacted].

- Bore 7 was moved away from [redacted] and further into the gravel verge due to a buried electrical service.

The boreholes were drilled using a CAT305E CR mini-excavator fitted with a 300 mm diameter spiral auger. The bores were logged on-site by a geotechnical engineer with samples taken to assist in strata identification and for laboratory testing. Dynamic cone penetrometer (DCP) tests (AS1289 6.3.2) were also undertaken at approximately subgrade level to provide an indication of the strength profile of the site subgrade soils. The approximate locations of the field tests are shown on Drawing 1 (Appendix B). The surface levels shown on the logs were interpolated from Nearmap.

6. Field Work Results

Details of the conditions encountered in the field tests are given in the logs included in Appendix C. These should be read in conjunction with the accompanying explanatory notes which define classification methods and descriptive terms.

In summary, the field tests encountered variable subsurface conditions comprising between 50 mm and 100 mm of wearing course underlain by 100 mm to 230 mm of pavement gravels. The car park area around Bore 7 was unsealed. The pavement gravels were underlain by medium dense to dense and hard, dry to wet sand and clay fill with variable gravel content to depths of between 0.3 m to the limit of investigation depth of 1.5 m. Fill was absent below the pavement gravels in Bore 1. When encountered, natural soils included very stiff to hard and dense to very dense, dry to moist silty/sandy clay or gravelly/clayey sand to limit of investigation depths of between 0.9 m and 1.5 m. Low to medium strength rhyodacite was encountered within Bore 1 from 0.9 m depth.

Table 1 below provides a summary of the encountered soils and depths.

Table 1 – Summary of Strata Encountered

Bore No	Depth Wearing Course (m)	Depth Roadbase (m)	Depth Filling (m)	Depth Clayey/ Sandy Soils (m)	Depth to Top of Rock (m)
1	0.05	0.15	0.3	0.9	0.9
2	0.05	0.2	>1.5	NE	NE
3	0.1	0.3	>0.9	NE	NE
4	0.05	0.15	>1.5	NE	NE
5	0.05	0.28	1.1	>1.5	NE
6	0.06	0.2	1.0	>1.5	NE
7	NE	NE	0.2/1.3	>1.5	NE

NE = Not Encountered

No free groundwater was observed in the boreholes during the field investigation, however wet soils were encountered in Bore 2 from 0.2 m to 0.6 m depth. It is noted that the boreholes were backfilled

immediately following drilling precluding longer term monitoring of groundwater levels. Groundwater conditions rarely remain constant and can change seasonally due to variations in rainfall and other factors. For these reasons, it is noted that the moisture condition of the site soils may vary considerably from the time of the investigation compared to at the time of construction.

7. Laboratory Testing

Selected soil samples collected from the boreholes were tested in the laboratory for the measurement of field moisture content, compaction properties and California Bearing Ratio (CBR), soil plasticity and particle size distribution.

The detailed laboratory test report sheets are included in Appendix D, with the results summarised in Tables 2 to 4.

Table 2: Summary of CBR Testing

Bore No	Depth (m)	FMC (%)	OMC (%)	MDD (t/m^3)	CBR (%)	Swell (%)	Field Description
1	0.4 – 0.6	4.9	14.0	1.85	14	0.5	Sandy Clay
2	0.4 – 0.6	9.1	9.0	2.08	40	0.0	FILL/Clayey Gravelly Sand
3	0.4 – 0.6	10.1	11.5	1.95	11	0.0	FILL/Clayey Sand

Where: OMC = Optimum Moisture Content CBR = California bearing ratio (soaked)
MDD = Maximum dry density (standard)

The CBR testing was carried out on samples compacted to about 98% standard maximum dry density at close to optimum moisture content. The samples were soaked for four days under surcharge loading of 4.5 kg.

Table 3: Results of Moisture Content and Soil Index Tests

Bore No	Sample Depth (m)	FMC (%)	W_L (%)	W_P (%)	PI (%)	LS (%)	Field Description
1	0.05 – 0.15	2.1	NT	NT	NT	NT	FILL/Sandy Gravel
1	0.15 – 0.3	6.6	NT	NT	NT	NT	FILL/Clayey Sand/Sandy Clay
1	0.4 – 0.6	10.1	30	17	13	7.5	Sandy Clay
2	0.05 – 0.2	3.5	NT	NT	NT	NT	FILL/Sandy Gravel
2	0.4 – 0.6	9.1	28	15	13	6.5	FILL/Clayey Gravelly Sand
3	0.1 – 0.2	7.9	NT	NT	NT	NT	FILL/Gravelly Sand
3	0.4 – 0.6	8.8	26	16	10	6.0	FILL/Clayey Sand
7	0.4 – 0.6	4.9	NT	NT	NT	NT	Gravelly Clayey Sand

Where: FMC = Field moisture content; W_P = Plastic limit; W_L = Liquid limit; PI = Plasticity index; LS = Linear shrinkage; NT = not tested

Table 4: Results of Particle Size Distribution Tests

Bore No	Sample Depth (m)	Percent passing sieve size (%)						Field Description
		26.5 mm	13.2 mm	6.7 mm	2.36 mm	0.425 mm	0.075 mm	
1	0.4 – 0.6	99	97	96	86	55	36	Sandy Clay
2	0.4 – 0.6	95	90	82	60	29	17	FILL/Clayey Gravelly Sand
3	0.4 – 0.6	96	91	88	76	46	29	FILL/Clayey Sand

8. Comments

8.1 Subgrade Preparation

8.1.1 General

The investigation has encountered a significant geotechnical risk to adequate subgrade performance in the form of extensive existing service trenches and wet, soft conditions associated with Bore 2. The design of the proposed intersection upgrade and car park works must take into consideration the poor subgrade support that loosely backfilled service trenches provide. To mitigate these issues, the allowance for extensive site preparation measures or factoring in of some form of bridging solution such that near-uniform support should be provided to the future pavement.

Prevailing weather conditions at the time of construction will be critical in achieving satisfactory subgrade performance. If pavement construction does not immediately follow subgrade preparation (thus exposing the subgrade to weather), subgrade deterioration would be expected, thus requiring rectification. In conjunction with subgrade preparation procedures, consideration should also be given to installing temporary drainage systems prior to installation of the final works.

All earthworks should be undertaken under close supervision and consultation with the geotechnical consultant in order to avoid any unnecessary earthworks.

8.1.2 Stripping

Site preparation for the construction of pavements should include the removal of vegetation and silty topsoils (where encountered) and other deleterious materials from the proposed construction areas.

In areas of existing filling, it is understood no density testing records or fill certification is available, therefore in accordance with AS3798 – 2007 the filling must be considered uncontrolled. The depth to which the uncontrolled filling is stripped will be dependent on the degree of risk that is considered acceptable by the design engineers. It is suggested to reduce risk, a minimum of 0.5 m of select controlled fill be provided below design subgrade level subject to foundation inspection by a qualified geotechnical engineer and heavy test roll.

Depending on design levels, this may require that the uncontrolled filling be stripped to at least 0.5 m below design subgrade level and controlled fill placed, or in areas where filling of 0.5 m or greater is required to reach design subgrade level, following stripping of unsuitable material, inspection by a geotechnical engineer and heavy test roll may be sufficient. Following acceptable foundation conditions, the surface should be tyned, moisture conditioned and compacted to at least 98% standard maximum dry density followed by a test roll in the presence of a geotechnical engineer.

In areas of existing service trenches, it is recommended that the backfill materials are fully removed to at least the base of the service or to expose the natural soil.

8.1.3 Excavation Conditions

The fill and natural soils could be expected to be removed using conventional earthmoving plant and as such no difficulties are anticipated with the exception of any boulders present in the filling matrix.

Though it is not anticipated that excavation of bedrock will be required, excavation within any medium to high strength or greater bedrock will require the use of large excavators with toothed buckets, single tyne rippers and rock hammers to remove bedrock. The excavatability of the rock will be largely dependent on the degree of fracturing and the dip of bedding within the rock mass.

Whilst groundwater was not observed, wet conditions were noted in Bore 2 during the fieldwork, it is noted that the extent of groundwater inflow would be dependent on prior weather conditions.

8.1.4 Excavation Batters

For permanent excavations in the topsoil, filling and natural soils, maximum gradients of 2.5H:1V (horizontal:vertical) are recommended. To minimise surface erosion, the batters should be protected with toe and spoon drains and vegetated as soon as possible after construction. For temporary excavations, maximum gradients of 1H:1V are suggested for fill and natural soils and possibly flatter in areas of collapsing soil.

Batters for low strength or greater bedrock should be individually inspected and treated accordingly.

8.1.5 Reuse of Excavated Material as Filling

In general, the fill would likely be considered suitable for general filling or controlled fill subject to appropriate laboratory testing for the intended fill use and culling of any unsuitable fractions such as rock particles in excess of 75 – 100 mm. The existing sandy clay fill which is required to be over-excavated could be reused as subgrade filling, however it is likely that the process of excavating, placing and compaction may break-down the material such that a lower CBR value material is obtained.

Although not encountered during the investigation, should silty sandy soils be encountered (particularly within the car park extension) it will be difficult to handle and compact and will require careful moisture control. The soils can be placed in the verge, in landscape mounds or other non-structural applications along with any topsoils should they be encountered also during construction.

Natural sandy/clayey soils encountered are likely to be considered suitable for use as general fill or as controlled fill.

Any material required to be transported off site must be done so in accordance with the latest NSW EPA requirements.

8.1.6 Filling Placement and Compaction

Following stripping as outlined in Section 8.1.2, stripped surfaces must be test rolled in the presence of a geotechnical engineer prior to placement of any fill. Any areas exhibiting significant deflections under test rolling should be appropriately treated as suggested by an experienced geotechnical engineer.

Select subgrade fill should be placed in near horizontal layers of maximum loose thickness of 200 mm and compacted to achieve at least 98% standard maximum dry density ratio. The material should have moisture content within the range of ±2% of standard optimum at the time of placement, though should be reviewed by an experienced geotechnical engineer at the commencement of earthworks.

All fill batters should be constructed no steeper than 3H:1V (horizontal:vertical), vegetated or other acceptable means to reduce the effects of erosion and suitably protected against erosion with toe and spoon drains constructed as a means of controlling surface flows on the batters.

All fill placed within construction platforms should be compacted to a minimum of 98% standard maximum dry density (ACT, 2019). To validate compaction levels within any proposed filling, field inspections and in-situ testing must be undertaken.

8.2 Pavement Design Considerations

Whilst the CBR test result is an accurate determination of a small remoulded laboratory sample, it is considered that the values obtained significantly over state the in-situ CBR strength and as such suggested to be downgraded for design purposes. This also allows for variability in the subgrade material across the site, as such based on the field work results, DP's involvement in nearby sites and allowing for variability in subgrade soils, a CBR value of 5% is suggested for design purposes. Subgrade replacement will be required in areas where a CBR value of less than the design value is obtained such as any areas of medium to high and high plasticity clayey soils.

It must be noted that the above design CBR values are applicable to the current subgrade conditions. Review of design CBR values must be undertaken following the determination of the extent of bulk earthworks, particularly following wet weather and if the contractor adopts poor construction methods. Where imported fill is proposed to be used, it must be tested prior to being delivered to site to ensure it meets the minimum CBR requirements of the design.

All earthworks should be undertaken under close supervision and consultation with the geotechnical consultant in order to avoid any unnecessary over-excavation.

Prevailing weather conditions at the time of construction and the control that can be exercised over construction traffic will be critical in achieving satisfactory subgrade performance. If pavement construction does not immediately follow subgrade preparation (thus exposing the subgrade to weather and traffic), subgrade deterioration would be expected, thus requiring rectification. In conjunction with subgrade preparation procedures, consideration should also be given to installing temporary drainage systems prior to installation of the final works.

Surface and subsoil drainage must be installed and maintained to protect the pavement and subgrade. Subsoil drains should be located at a minimum of 0.5 m depth below the subgrade level.

The standard of construction, the selection of materials and quality of workmanship for the roads should satisfy the latest requirements of Government, ACT (2019).

9. References

ACT. (2019). *Standard Specification for Urban Infrstructure Works, Edition 1, Revision 0.* ACT Government.

AS 1289.6.3.2. (1997). *Methods for testing soils for engineering purposes - Soil strength and consolidation tests - Determination of the penetration resistance of a soil - 9kg dynamic cone penetrometer test.* Reconfirmed 2013: Standards Australia.

AS 3798. (2007). *Guidelines on Earthworks for Commercial and Residential Developments.* Standards Australia.

BMR. (1992). *Geology of Canberra 1:100 000 Geological Series Sheet 8727.* Bureau of Mineral Resources.

10. Limitations

Douglas Partners (DP) has prepared this report (or services) for this project at in accordance with DP's proposal dated 6 November 2020and acceptance received from SMEC Australia Pty Ltd dated 24 November 2020. This report is provided for the exclusive use of SMEC Australia Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the geotechnical components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The scope for work for this investigation/report did not include the assessment of surface or sub-surface materials or groundwater for contaminants, within or adjacent to the site. Should evidence of filling of unknown origin be noted in the report, and in particular the presence of building demolition materials, it should be recognised that there may be some risk that such filling may contain contaminants and hazardous building materials.

Douglas Partners Pty Ltd

Appendix A

About This Report

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

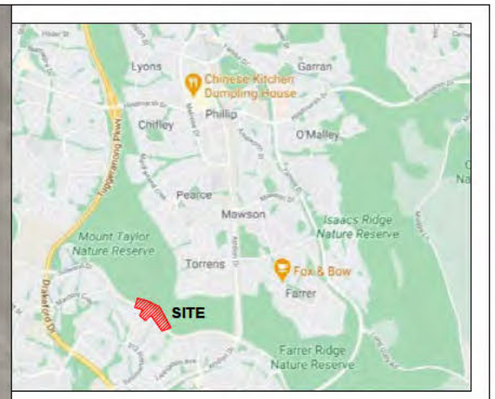
Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Appendix B

Drawing 1 – Test Location Plan



Locality Plan

LEGEND

Test Bore Location

0 20 40 60 80 100
1:2000 @ A3

NOTE: Base drawing from Google Earth, dated 27 April 2019

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: SMEC Australia Pty Ltd	TITLE: **Test Location Plan** **Proposed Intersection Upgrading** **Sulwood Drive and Mannheim Street, Kambah**	PROJECT No: 103121.01
	OFFICE: Canberra DRAWN BY: ADFH		DRAWING No: 1
	SCALE: As Shown DATE: 05.01.2021		REVISION: 0

Appendix C

Explanatory Notes
Borehole Logs (Bores 1 – 7)

Sampling Methods

Douglas Partners

Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

Sampling Methods

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Soil Descriptions

Douglas Partners

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are generally based on Australian Standard AS1726:2017, Geotechnical Site Investigations. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	19 - 63
Medium gravel	6.7 - 19
Fine gravel	2.36 – 6.7
Coarse sand	0.6 - 2.36
Medium sand	0.21 - 0.6
Fine sand	0.075 - 0.21

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

The proportions of secondary constituents of soils are described as follows:

In fine grained soils (>35% fines)

Term	Proportion of sand or gravel	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	>30%	Sandy Clay
With	15 – 30%	Clay with sand
Trace	0 - 15%	Clay with trace sand

In coarse grained soils (>65% coarse)
- with clays or silts

Term	Proportion of fines	Example
And	Specify	Sand (70%) and Clay (30%)
Adjective	>12%	Clayey Sand
With	5 - 12%	Sand with clay
Trace	0 - 5%	Sand with trace clay

In coarse grained soils (>65% coarse)
- with coarser fraction

Term	Proportion of coarser fraction	Example
And	Specify	Sand (60%) and Gravel (40%)
Adjective	>30%	Gravelly Sand
With	15 - 30%	Sand with gravel
Trace	0 - 15%	Sand with trace gravel

The presence of cobbles and boulders shall be specifically noted by beginning the description with ‘Mix of Soil and Cobbles/Boulders’ with the word order indicating the dominant first and the proportion of cobbles and boulders described together.

Soil Descriptions

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	VS	<12
Soft	S	12 - 25
Firm	F	25 - 50
Stiff	St	50 - 100
Very stiff	VSt	100 - 200
Hard	H	>200
Friable	Fr	-

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	Density Index (%)
Very loose	VL	<15
Loose	L	15-35
Medium dense	MD	35-65
Dense	D	65-85
Very dense	VD	>85

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Extremely weathered material – formed from in-situ weathering of geological formations. Has soil strength but retains the structure or fabric of the parent rock;
- Alluvial soil – deposited by streams and rivers;
- Estuarine soil – deposited in coastal estuaries;
- Marine soil – deposited in a marine environment;
- Lacustrine soil – deposited in freshwater lakes;
- Aeolian soil – carried and deposited by wind;
- Colluvial soil – soil and rock debris transported down slopes by gravity;
- Topsoil – mantle of surface soil, often with high levels of organic material.
- Fill – any material which has been moved by man.

Moisture Condition – Coarse Grained Soils

For coarse grained soils the moisture condition should be described by appearance and feel using the following terms:

- Dry (D) Non-cohesive and free-running.
- Moist (M) Soil feels cool, darkened in colour.
  Soil tends to stick together.
  Sand forms weak ball but breaks easily.
- Wet (W) Soil feels cool, darkened in colour.
  Soil tends to stick together, free water forms when handling.

Moisture Condition – Fine Grained Soils

For fine grained soils the assessment of moisture content is relative to their plastic limit or liquid limit, as follows:

- ‘Moist, dry of plastic limit’ or ‘w <PL’ (i.e. hard and friable or powdery).
- ‘Moist, near plastic limit’ or ‘w ≈ PL (i.e. soil can be moulded at moisture content approximately equal to the plastic limit).
- ‘Moist, wet of plastic limit’ or ‘w >PL’ (i.e. soils usually weakened and free water forms on the hands when handling).
- ‘Wet’ or ‘w ≈LL’ (i.e. near the liquid limit).
- ‘Wet’ or ‘w >LL’ (i.e. wet of the liquid limit).

Rock Strength

Rock strength is defined by the Unconfined Compressive Strength and it refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects.

The Point Load Strength Index $Is_{(50)}$ is commonly used to provide an estimate of the rock strength and site specific correlations should be developed to allow UCS values to be determined. The point load strength test procedure is described by Australian Standard AS4133.4.1-2007. The terms used to describe rock strength are as follows:

Strength Term	Abbreviation	Unconfined Compressive Strength MPa	Point Load Index * $Is_{(50)}$ MPa
Very low	VL	0.6 - 2	0.03 - 0.1
Low	L	2 - 6	0.1 - 0.3
Medium	M	6 - 20	0.3 - 1.0
High	H	20 - 60	1 - 3
Very high	VH	60 - 200	3 - 10
Extremely high	EH	>200	>10

* Assumes a ratio of 20:1 for UCS to $Is_{(50)}$. It should be noted that the UCS to $Is_{(50)}$ ratio varies significantly for different rock types and specific ratios should be determined for each site.

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
Residual Soil	RS	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely weathered	XW	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible
Highly weathered	HW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately weathered	MW	The whole of the rock material is discoloured , usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly weathered	SW	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh	FR	No signs of decomposition or staining.
Note: If HW and MW cannot be differentiated use DW (see below)		
Distinctly weathered	DW	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching or may be decreased due to deposition of weathered products in pores.

Rock Descriptions

Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with occasional fragments
Fractured	Core lengths of 30-100 mm with occasional shorter and longer sections
Slightly Fractured	Core lengths of 300 mm or longer with occasional sections of 100-300 mm
Unbroken	Core contains very few fractures

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections} \geq \text{100 mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or stronger. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

Symbols & Abbreviations

Douglas Partners

Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	Pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

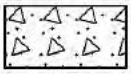
Symbols & Abbreviations

Graphic Symbols for Soil and Rock

General

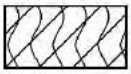

Asphalt


Road base

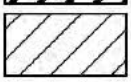

Concrete


Filling

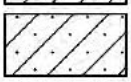
Soils


Topsoil

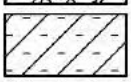

Peat

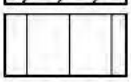

Clay

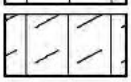

Silty clay

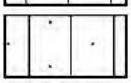

Sandy clay

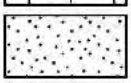

Gravelly clay

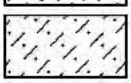

Shaly clay

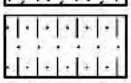

Silt

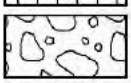

Clayey silt


Sandy silt


Sand

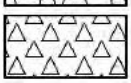

Clayey sand


Silty sand


Gravel


Sandy gravel


Cobbles, boulders

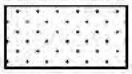

Talus

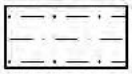
Sedimentary Rocks

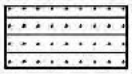

Boulder conglomerate

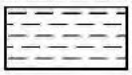

Conglomerate


Conglomeratic sandstone

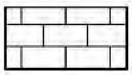

Sandstone


Siltstone

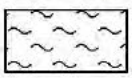

Laminite

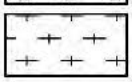

Mudstone, claystone, shale

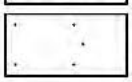

Coal


Limestone

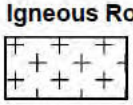
Metamorphic Rocks

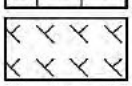

Slate, phyllite, schist

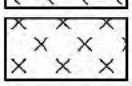

Gneiss

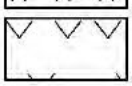

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

BOREHOLE LOG

CLIENT: SMEC Australia Pty Ltd
PROJECT: Proposed Intersection Upgrading
LOCATION: Sulwood Drive and Mannheim Street, Kambah

SURFACE LEVEL: 653 AHD
EASTING: 688488
NORTHING: 6082921
DIP/AZIMUTH: 90°/--

BORE No: 1
PROJECT No: 103121.01
DATE: 6/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
653	0.05	WEARING COURSE: blue grey, 7-14mm aggregate, 50mm thick, wearing course							
		FILL/Sandy GRAVEL (GP): 15mm to 30mm gravel, poorly graded, grey brown, fine to coarse grained sand, moist to dry, apparently dense, ROADBASE FILL		B	0.05				
	0.15	FILL/Clayey SAND/Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace gravel to 20mm, moist to dry, w<PL, apparently very stiff, FILL		B	0.15				
	0.3	Silty CLAY (CI): medium plasticity, grey, moist, w<PL, very stiff, residual			0.3				
	0.4	Sandy CLAY (CL/CI): low to medium plasticity, pale grey brown, fine to coarse grained sand, with gravel to 40mm, dry to moist, w<PL, hard, extremely weathered rhyodacite		B	0.4				
					0.6				
	0.9	RHYODACITE: fine to coarse grained, dark brown, dry to moist, low strength, highly weathered, highly fractured							
652	1			D	1.0				1
		-from 1.3m, low to medium strength, moderately weathered							
	1.5	Bore discontinued at 1.5m -limit of investigation							

RIG: CAT 305ECR mini excavator **DRILLER:** Bingley **LOGGED:** ADFH **CASING:** N/A

TYPE OF BORING: 300mm diameter auger

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in MGA94 Zone 55. Surface levels and coordinates are approximate only and must not be relied upon

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: SMEC Australia Pty Ltd
PROJECT: Proposed Intersection Upgrading
LOCATION: Sulwood Drive and Mannheim Street, Kambah

SURFACE LEVEL: 649 AHD
EASTING: 688564
NORTHING: 6082816
DIP/AZIMUTH: 90°/--

BORE No: 2
PROJECT No: 103121.01
DATE: 6/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
649	0.05	WEARING COURSE: blue grey, 7-14mm aggregate, 50mm thick, wearing course							
		FILL/Sandy GRAVEL (GP): 15mm to 30mm gravel, poorly graded, grey brown, fine to coarse grained sand, moist to dry, apparently dense, ROADBASE FILL		B	0.05				
	0.2	FILL/Clayey Gravelly SAND (SW): fine to coarse grained sand, brown, gravel to 60mm, low plasticity clay, moist to wet, medium dense, FILL			0.2				
				B	0.4				
		-from 0.6m, moist to dry, dense			0.6				
648	1			D	0.7				1
	1.2	Bore discontinued at 1.2m -limit of investigation							

RIG: CAT 305ECR mini excavator **DRILLER:** Bingley **LOGGED:** ADFH **CASING:** N/A

TYPE OF BORING: 300mm diameter auger

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in MGA94 Zone 55. Surface levels and coordinates are approximate only and must not be relied upon

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: SMEC Australia Pty Ltd
PROJECT: Proposed Intersection Upgrading
LOCATION: Sulwood Drive and Mannheim Street, Kambah

SURFACE LEVEL: 656 AHD
EASTING: 688651
NORTHING: 6082834
DIP/AZIMUTH: 90°/--

BORE No: 3
PROJECT No: 103121.01
DATE: 6/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 50mm)
656		WEARING COURSE: 7mm to 10mm aggregate, blue grey, 100mm thick, wearing course, two layers							
	0.1	FILL/Gravelly SAND (SW): fine to coarse grained sand, brown, gravel to 20mm, with low plasticity clay, moist to dry, w<PL, apparently dense, ROADBASE FILL		B	0.1 0.2				
	0.3	FILL/Clayey SAND: fine to coarse grained sand, brown/grey brown, low plasticity clay, with gravel to 50mm, moist to dry, dense, FILL		B	0.4 0.6				
	0.9	Bore discontinued at 0.9m -refusal on high to very high strength boulder		D	0.9				
655	1								1

RIG: CAT 305ECR mini excavator **DRILLER:** Bingley **LOGGED:** ADFH **CASING:** N/A

TYPE OF BORING: 300mm diameter auger

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in MGA94 Zone 55. Surface levels and coordinates are approximate only and must not be relied upon

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: SMEC Australia Pty Ltd
PROJECT: Proposed Intersection Upgrading
LOCATION: Sulwood Drive and Mannheim Street, Kambah

SURFACE LEVEL: 654 AHD
EASTING: 688553
NORTHING: 6082891
DIP/AZIMUTH: 90°/--

BORE No: 4
PROJECT No: 103121.01
DATE: 6/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
654	0.05	WEARING COURSE: blue grey, 7-14mm aggregate, 50mm thick, wearing course							
	0.15	FILL/Sandy GRAVEL (GP): 15mm to 30mm gravel, poorly graded, grey brown, fine to coarse grained sand, moist to dry, apparently dense, ROADBASE FILL							
		FILL/Clayey SAND/Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, with gravel to 20mm, trace cobbles to 80mm, dry to moist, hard, REGRADE FILL		D	0.2				
				D	0.4				
		-from 0.60m, apparently stiff to very stiff			0.6				
				B					
					0.8				
653	1								1
				D	1.2				
	1.5	Bore discontinued at 1.5m -limit of investigation							

RIG: CAT 305ECR mini excavator **DRILLER:** Bingley **LOGGED:** ADFH **CASING:** N/A

TYPE OF BORING: 300mm diameter auger

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in MGA94 Zone 55. Surface levels and coordinates are approximate only and must not be relied upon

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: SMEC Australia Pty Ltd
PROJECT: Proposed Intersection Upgrading
LOCATION: Sulwood Drive and Mannheim Street, Kambah

SURFACE LEVEL: 645 AHD
EASTING: 688569
NORTHING: 6082814
DIP/AZIMUTH: 90°/--

BORE No: 5
PROJECT No: 103121.01
DATE: 6/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
645	0.05	WEARING COURSE: blue grey, 7-14mm aggregate, 50mm thick, wearing course							
		FILL/Sandy GRAVEL (GP): 15mm to 30mm gravel, poorly graded, grey brown, fine to coarse grained sand, moist to dry, apparently dense, ROADBASE FILL		D	0.1				
	0.28	FILL/Clayey SAND (SC): fine to coarse grained, red brown, low plasticity clay, with fine to coarse gravel, trace silt, dense, FILL		D	0.7				
	0.9	FILL/Clayey SAND (SC): fine to coarse grained sand, dark grey brown, low plasticity clay, with silt, trace gravel, dense, FILL		D	1.0				
644	1								1
	1.1	Sandy CLAY (CL/CI): low to medium plasticity, light brown-brown, fine to coarse grained sand, trace gravel and silt, w<PL, very stiff, possible FILL		D	1.3				
	1.5	Bore discontinued at 1.5m -limit of investigation							

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: CAT 305ECR mini excavator **DRILLER:** Bingley **LOGGED:** TBO **CASING:** N/A

TYPE OF BORING: 300mm diameter auger

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in MGA94 Zone 55. Surface levels and coordinates are approximate only and must not be relied upon

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: SMEC Australia Pty Ltd
PROJECT: Proposed Intersection Upgrading
LOCATION: Sulwood Drive and Mannheim Street, Kambah

SURFACE LEVEL: 655 AHD
EASTING: 688731
NORTHING: 6082768
DIP/AZIMUTH: 90°/--

BORE No: 6
PROJECT No: 103121.01
DATE: 6/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 100mm)
655	0.06	WEARING COURSE: 7mm to 10mm aggregate, blue-grey, 60mm thick, wearing course							
		FILL/Sandy GRAVEL (GP): 10mm to 30mm gravel, poorly graded, grey brown, fine to coarse grained sand, moist to dry, dense, ROADBASE FILL							
	0.2								
		FILL/Clayey SAND (SC): fine to coarse grained, dark brown, low plasticity clay, moist to dry, dense, SELECT FILL							
	0.29	at 0.25m, cobble to 170mm							
		FILL/Gravelly Clayey SAND (SC): fine to coarse grained sand, pale brown, gravel to 20mm, moist to dry, w<PL, dense, FILL		D	0.8				
654	1 1.0	Clayey SAND (SC): fine to coarse grained sand, pale brown, low plasticity clay, moist to dry, dense		D	1.2				1
	1.5	Bore discontinued at 1.5m -limit of investigation							

RIG: CAT 305ECR mini excavator **DRILLER:** Bingley **LOGGED:** AJT/TBO **CASING:** N/A

TYPE OF BORING: 300mm diameter auger

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in MGA94 Zone 55. Surface levels and coordinates are approximate only and must not be relied upon

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: SMEC Australia Pty Ltd
PROJECT: Proposed Intersection Upgrading
LOCATION: Sulwood Drive and Mannheim Street, Kambah

SURFACE LEVEL: 651 AHD
EASTING: 688871
NORTHING: 6082585
DIP/AZIMUTH: 90°/--

BORE No: 7
PROJECT No: 103121.01
DATE: 6/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 70mm)
651	0.0	FILL/Clayey SAND (SC): fine to coarse grained sand, pale brown, low plasticity clay, with gravel, trace silt, dry to moist, dense, FILL		B	0.0				
	0.2	Gravelly Clayey SAND (SC): fine to coarse grained sand, dark brown, low plasticity clay, gravel to 8mm, dry to moist, dense to very dense, possible FILL			0.2				
		-from 0.40m, with silt, trace gravel to 20mm		B	0.4				
					0.6				
650	1			D	0.9				1
	1.3	Clayey SAND (SC): fine to coarse grained sand, dark red brown, low plasticity clay, with extremely weathered rhyodacite gravel to 15mm, dry to moist, dense, possible residual							
	1.5	Bore discontinued at 1.5m -limit of investigation							

RIG: CAT 305ECR mini excavator **DRILLER:** Bingley **LOGGED:** ADFH **CASING:** N/A

TYPE OF BORING: 300mm diameter auger

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in MGA94 Zone 55. Surface levels and coordinates are approximate only and must not be relied upon

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

Appendix D

Results of Laboratory Testing (7 sheets)

Material Test Report

Douglas Partners
Geotechnics | Environment | Groundwater
Douglas Partners Pty Ltd
Goulburn Laboratory
54 Sinclair Street Goulburn NSW 2580
Phone: 02 4822 8395
[redacted]@douglaspartners.com.au

Accredited for compliance wi h ISO/IEC 17025 - Testing

[redacted]

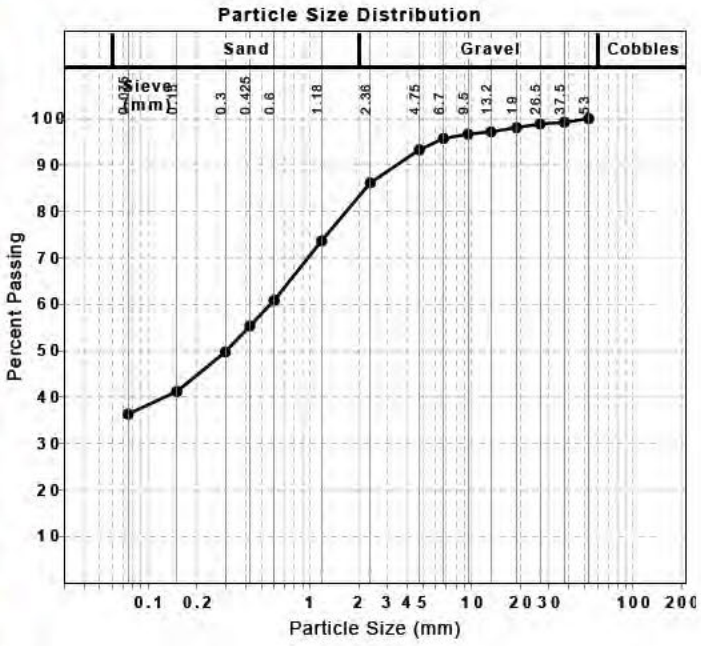
Approved Signatory: [redacted]
Laboratory Manager
Laboratory Accreditation Number: 828

Report Number: **103121.01-1**
Issue Number: 1
Date Issued: 27/01/2021
Client: SMEC Australia Pty Ltd
Suite 2, Level 1, Lyneham ACT 2602
Contact: [redacted]
Project Number: 103121.01
Project Name: Proposed Intersection Upgrading
Project Location: Sulwood Drive and Mannheim Street, Kambah
Work Request: 5374
Sample Number: GU-5374C
Date Sampled: 06/01/2021
Dates Tested: 15/01/2021 - 25/01/2021
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: **1, Depth: 0.4-0.6**
Material: Sandy Clay (CL/CI)

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
53 mm	**100**			0		
37.5 mm	**99**			1		
26.5 mm	**99**			0		
19 mm	**98**			1		
13.2 mm	**97**			1		
9.5 mm	**97**			0		
6.7 mm	**96**			1		
4.75 mm	**93**			2		
2.36 mm	**86**			7		
1.18 mm	**74**			12		
0.6 mm	**61**			13		
0.425 mm	**55**			6		
0.3 mm	**50**			6		
0.15 mm	**41**			9		
0.075 mm	**36**			5		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	30		
Plastic Limit (%)	17		
Plasticity Index (%)	**13**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.1		
Linear Shrinkage (%)	7.5		
Cracking Crumbling Curling	None		



Material Test Report

Douglas Partners
Geotechnics I Environment I Groundwater
Douglas Partners Pty Ltd
Goulburn Laboratory
54 Sinclair Street Goulburn NSW 2580
Phone: 02 4822 8395
[redacted]@douglaspartners.com.au

Accredited for compliance wi h ISO/IEC 17025 - Testing

[redacted]

Approved Signatory: [redacted]
Laboratory Manager
Laboratory Accreditation Number: 828

Report Number: 103121.01-1
Issue Number: 1
Date Issued: 27/01/2021
Client: SMEC Australia Pty Ltd
Suite 2, Level 1, Lyneham ACT 2602
Contact: [redacted]
Project Number: 103121.01
Project Name: Proposed Intersection Upgrading
Project Location: Sulwood Drive and Mannheim Street, Kambah
Work Request: 5374
Sample Number: GU-5374C
Date Sampled: 06/01/2021
Dates Tested: 15/01/2021 - 25/01/2021
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: **1, Depth: 0.4-0.6**
Material: Sandy Clay (CL/CI)

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**14**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m^3)	1.85		
Optimum Moisture Content (%)	14.0		
Laboratory Density Ratio (%)	98.5		
Laboratory Moisture Ratio (%)	98.0		
Dry Density after Soaking (t/m^3)	1.81		
Field Moisture Content (%)	4.9		
Moisture Content at Placement (%)	13.7		
Moisture Content Top 30mm (%)	16.7		
Moisture Content Rest of Sample (%)	15.1		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	121.1		
Swell (%)	0.5		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)			

Material Test Report

Douglas Partners
Geotechnics | Environment | Groundwater
Douglas Partners Pty Ltd
Goulburn Laboratory
54 Sinclair Street Goulburn NSW 2580
Phone: 02 4822 8395
[redacted]@douglaspartners.com.au

Accredited for compliance wi h ISO/IEC 17025 - Testing

[redacted]

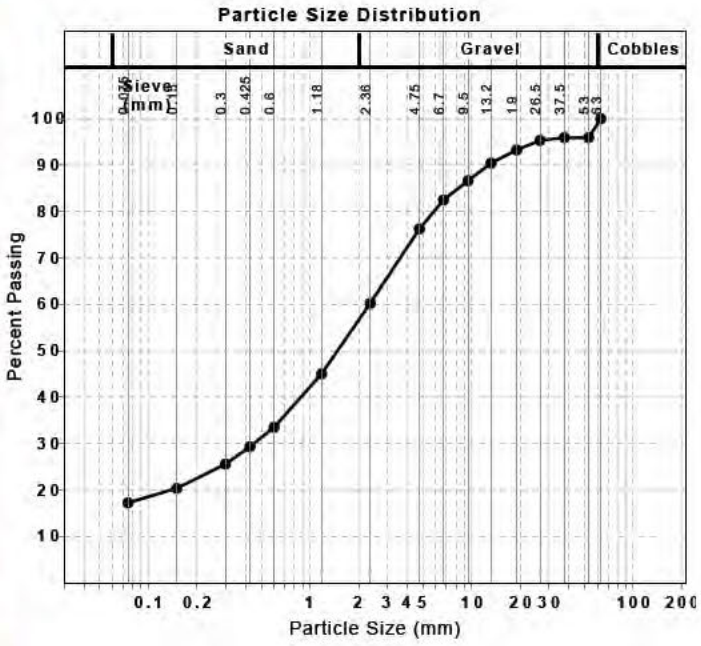
Approved Signatory: [redacted]
Laboratory Manager
Laboratory Accreditation Number: 828

Report Number: **103121.01-1**
Issue Number: 1
Date Issued: 27/01/2021
Client: SMEC Australia Pty Ltd
Suite 2, Level 1, Lyneham ACT 2602
Contact: [redacted]
Project Number: 103121.01
Project Name: Proposed Intersection Upgrading
Project Location: Sulwood Drive and Mannheim Street, Kambah
Work Request: 5374
Sample Number: GU-5374E
Date Sampled: 06/01/2021
Dates Tested: 15/01/2021 - 25/01/2021
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: **2, Depth: 0.4-0.6**
Material: Fill/Sandy Clay (CL/CI)

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
63 mm	**100**			0		
53 mm	**96**			4		
37.5 mm	**96**			0		
26.5 mm	**95**			1		
19 mm	**93**			2		
13.2 mm	**90**			3		
9.5 mm	**87**			4		
6.7 mm	**82**			4		
4.75 mm	**76**			6		
2.36 mm	**60**			16		
1.18 mm	**45**			15		
0.6 mm	**34**			12		
0.425 mm	**29**			4		
0.3 mm	**26**			4		
0.15 mm	**20**			5		
0.075 mm	**17**			3		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	28		
Plastic Limit (%)	15		
Plasticity Index (%)	**13**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.1		
Linear Shrinkage (%)	6.5		
Cracking Crumbling Curling	None		



Material Test Report

Douglas Partners
Geotechnics I Environment I Groundwater
Douglas Partners Pty Ltd
Goulburn Laboratory
54 Sinclair Street Goulburn NSW 2580
Phone: 02 4822 8395
[redacted]@douglaspartners.com.au

Accredited for compliance wi h ISO/IEC 17025 - Testing

[redacted]

Approved Signatory: [redacted]
Laboratory Manager
Laboratory Accreditation Number: 828

Report Number: 103121.01-1
Issue Number: 1
Date Issued: 27/01/2021
Client: SMEC Australia Pty Ltd
Suite 2, Level 1, Lyneham ACT 2602
Contact: [redacted]
Project Number: 103121.01
Project Name: Proposed Intersection Upgrading
Project Location: Sulwood Drive and Mannheim Street, Kambah
Work Request: 5374
Sample Number: GU-5374E
Date Sampled: 06/01/2021
Dates Tested: 15/01/2021 - 25/01/2021
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: **2, Depth: 0.4-0.6**
Material: Fill/Sandy Clay (CL/CI)

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	5 mm		
CBR %	**40**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m^3)	2.08		
Optimum Moisture Content (%)	9.0		
Laboratory Density Ratio (%)	98.0		
Laboratory Moisture Ratio (%)	98.0		
Dry Density after Soaking (t/m^3)	2.05		
Field Moisture Content (%)	9.1		
Moisture Content at Placement (%)	8.7		
Moisture Content Top 30mm (%)	8.9		
Moisture Content Rest of Sample (%)	9.0		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	121.5		
Swell (%)	0.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	3.4		

Material Test Report

Douglas Partners
Geotechnics | Environment | Groundwater
Douglas Partners Pty Ltd
Goulburn Laboratory
54 Sinclair Street Goulburn NSW 2580
Phone: 02 4822 8395
[redacted]@douglaspartners.com.au

Accredited for compliance wi h ISO/IEC 17025 - Testing

[redacted]

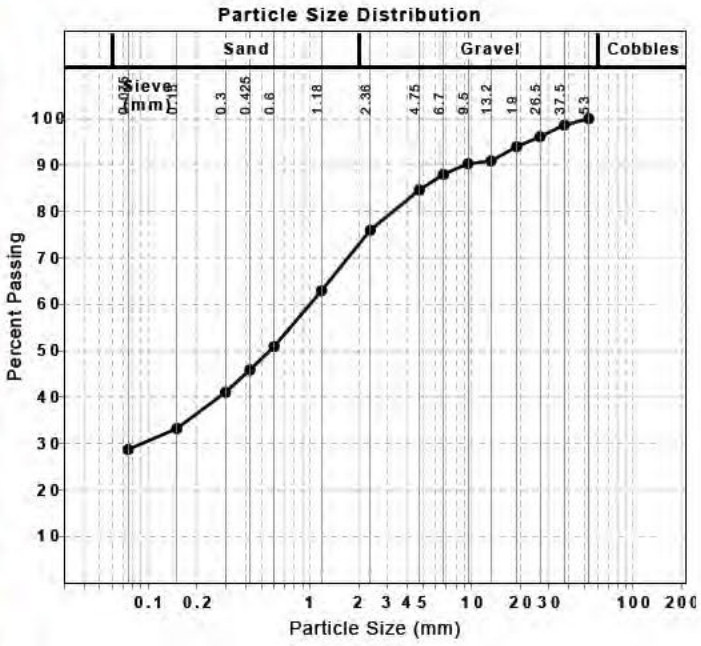
Approved Signatory: [redacted]
Laboratory Manager
Laboratory Accreditation Number: 828

Report Number: **103121.01-1**
Issue Number: 1
Date Issued: 27/01/2021
Client: SMEC Australia Pty Ltd
Suite 2, Level 1, Lyneham ACT 2602
Contact: [redacted]
Project Number: 103121.01
Project Name: Proposed Intersection Upgrading
Project Location: Sulwood Drive and Mannheim Street, Kambah
Work Request: 5374
Sample Number: GU-5374G
Date Sampled: 06/01/2021
Dates Tested: 15/01/2021 - 25/01/2021
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: **3, Depth: 0.4-0.6**
Material: Fill/ Sandy Clay (CL/CI)

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
53 mm	**100**			0		
37.5 mm	**99**			1		
26.5 mm	**96**			3		
19 mm	**94**			2		
13.2 mm	**91**			3		
9.5 mm	**90**			1		
6.7 mm	**88**			2		
4.75 mm	**85**			3		
2.36 mm	**76**			9		
1.18 mm	**63**			13		
0.6 mm	**51**			12		
0.425 mm	**46**			5		
0.3 mm	**41**			5		
0.15 mm	**33**			8		
0.075 mm	**29**			5		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	26		
Plastic Limit (%)	16		
Plasticity Index (%)	**10**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.1		
Linear Shrinkage (%)	6.0		
Cracking Crumbling Curling	None		



Material Test Report

Douglas Partners
Geotechnics I Environment I Groundwater
Douglas Partners Pty Ltd
Goulburn Laboratory
54 Sinclair Street Goulburn NSW 2580
Phone: 02 4822 8395
[redacted] douglaspartners.com.au

Accredited for compliance wi h ISO/IEC 17025 - Testing

[redacted]

Approved Signatory: [redacted]
Laboratory Manager
Laboratory Accreditation Number: 828

Report Number: 103121.01-1
Issue Number: 1
Date Issued: 27/01/2021
Client: SMEC Australia Pty Ltd
Suite 2, Level 1, Lyneham ACT 2602
Contact: [redacted]
Project Number: 103121.01
Project Name: Proposed Intersection Upgrading
Project Location: Sulwood Drive and Mannheim Street, Kambah
Work Request: 5374
Sample Number: GU-5374G
Date Sampled: 06/01/2021
Dates Tested: 15/01/2021 - 25/01/2021
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: **3, Depth: 0.4-0.6**
Material: Fill/ Sandy Clay (CL/CI)

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	5 mm		
CBR %	**11**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m^3)	1.95		
Optimum Moisture Content (%)	11.5		
Laboratory Density Ratio (%)	98.5		
Laboratory Moisture Ratio (%)	96.5		
Dry Density after Soaking (t/m^3)	1.92		
Field Moisture Content (%)	10.1		
Moisture Content at Placement (%)	11.2		
Moisture Content Top 30mm (%)	11.9		
Moisture Content Rest of Sample (%)	12.2		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	122.1		
Swell (%)	0.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	3.4		

Material Test Report

Douglas Partners
Geotechnics | Environment | Groundwater
Douglas Partners Pty Ltd
Goulburn Laboratory
54 Sinclair Street Goulburn NSW 2580
Phone: 02 4822 8395
[redacted]@douglaspartners.com.au

Report Number: 103121.01-1
Issue Number: 1
Date Issued: 27/01/2021
Client: SMEC Australia Pty Ltd
Suite 2, Level 1, Lyneham ACT 2602
Contact: [redacted]
Project Number: 103121.01
Project Name: Proposed Intersection Upgrading
Project Location: Sulwood Drive and Mannheim Street, Kambah
Work Request: 5374
Dates Tested: 15/01/2021 - 15/01/2021

Accredited for compliance wi h ISO/IEC 17025 - Testing
[redacted]

Approved Signatory: [redacted]
Laboratory Manager
Laboratory Accreditation Number: 828

Moisture Content AS 1289 2.1.1			
Sample Number	Sample Location	Moisture Content (%)	Material
GU-5374A	1, Depth: 0.05-0.15	2.1 %	fill/sandy Gravel (GP)
GU-5374B	1, Depth: .15-.03	6.6 %	Fill/ Clayey Sand/ Sandy Clay (CL)
GU-5374C	1, Depth: 0.4-0.6	10.1 %	Sandy Clay (CL/CI)
GU-5374D	2, Depth: 0.05-0.2	3.5 %	Fill/Sandy Gravel (GP)
GU-5374E	2, Depth: 0.4-0.6	9.1 %	Fill/Sandy Clay (CL/CI)
GU-5374F	3, Depth: 0.1-0.2	7.9 %	Fill/Gravelly Sand (SW)
GU-5374G	3, Depth: 0.4-0.6	8.8 %	Fill/ Sandy Clay (CL/CI)
GU-5374H	7, Depth: 0.4-0.6	4.9 %	Gravelly Clayey Sand

Appendix I Preferred options drawing package

MT TAYLOR
NATURE RESERVE

RECONFIGURE 8 x EXISTING PARALLEL PARK NG TO M NIMUM DIMENSIONS

MEDIAN TO BE LANDSCAPED WITH DRYLAND GRASSES

LEFT TURN LANE TO SULWOOD DRIVE NORTH PARKING

NEW 52 x 90 PARK NG

UTILITY SERVICE RELOCATION (TO BE CONFIRMED)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52

1 2 3 4 5

477.232 300 SULWOOD DRIVE 995.974 600

JOINS DRG No.

MATCH TO EXISTING

NEW RIGHT TURN LANE TO SULWOOD NORTH PARK NG

PROPOSED SHARED USER PATH

CLOSE EXISTING CARPARK ENTRY

NEW RIGHT TU
TO EXISTING

[redacted]

15 23

EXISTING VEE-CHANNEL LIN

EXISTING VEE-CHANNEL UNLINED

5

NOT FOR CONSTRUCTION - INFORMATION O

150mm ON ORIGINAL

A1

DRAWING FILE LOCATION / NAME: V:_Vault\Projects\3002\3002809\110_CADD\CAD\Info_Docs\20210303_OPTIONS_COMBINED\3002809-2361.dwg

PLOT DATE: 25 Mar 2021 TIME: 14:14:56

EXTERNAL REFERENCE FILES:
3002809_SMEC_A1
UF_CADASTA_MGA94
UF_CIVIL_MGA94
UF_SURV_MGA94
UF_NT_OPTIA_PAV
UF_NT_OPTIA_DES
UF_NT_OPTIA_DRN_OPT ONS_3mm
UF_GIS_ECOLOGY
DGW_ML_Taylor
Projected_Plans_ML_Taylor
Plan_A_ML_Taylor
Road_Reserves_ML_Taylor
UF_SURV_OPT
UF_DR_DRN
UF_NT_OPTI_FRAME_250
UF_NT_OPTI_DRN
UF_SUP_OPTS_DES
UF_SUP_OBS_CTRL_OPTS
UF_SUP_OPTS_DRN

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	25.03.2021	FOR INFORMATION ONLY		R.R.

TITLE	NAME
DRAFTER	[redacted]
DRAFTING CHECK	
DESIGNER	
DESIGN CHECK	
PROJECT MANAGER	
PROJECT DIRECTOR	

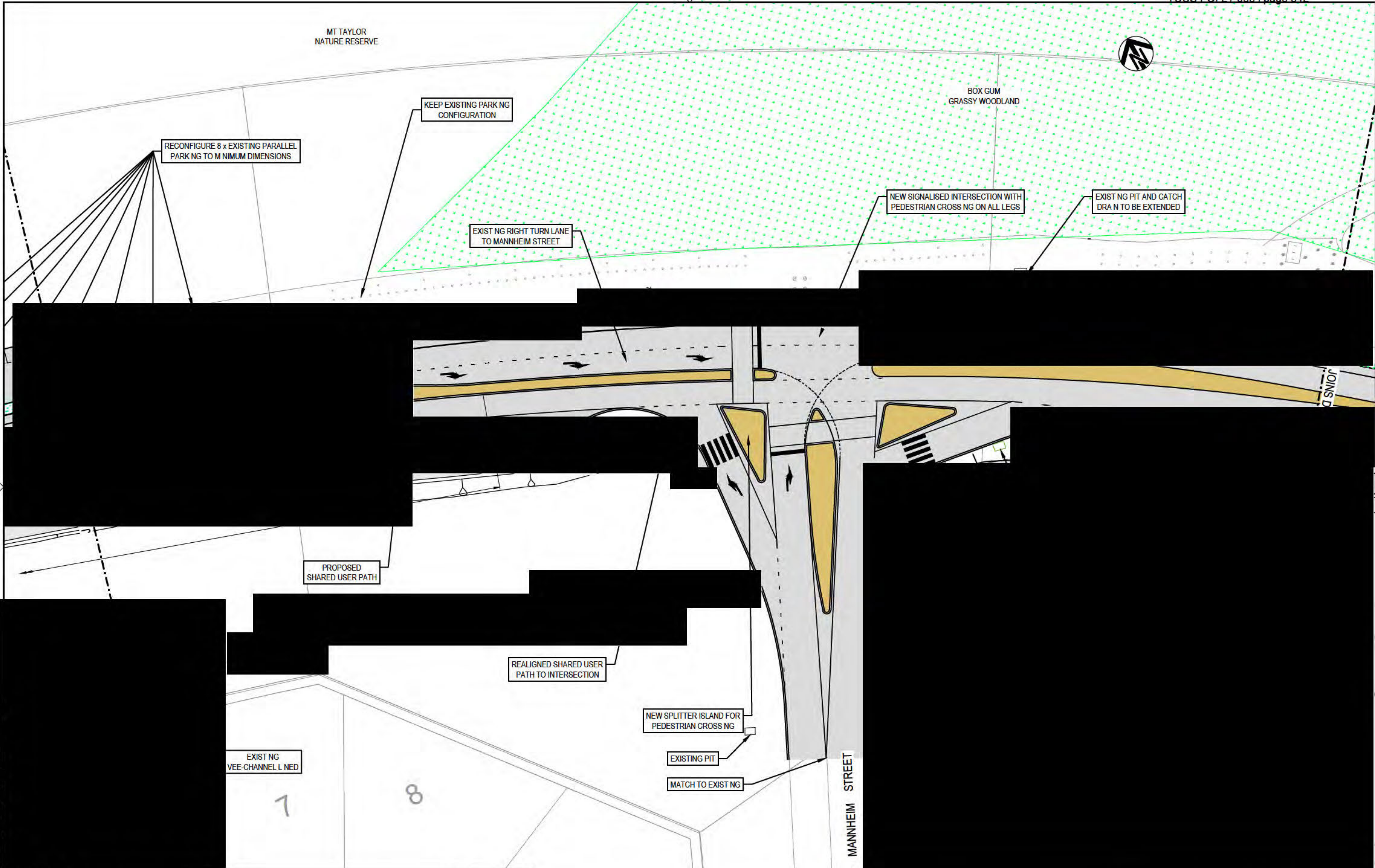
SCALES AT A1 SIZE DRAWING
SCALE 1:250 2.5 0 5 10 12.5 m

DESIGNER: SMEC
Member of the Surbana Jurong Group
SMEC AUSTRALIA PTY LTD
© ABN 47 065 475 149
SUITE 2, LEVEL 1, 243 NORTHBOURNE AVENUE
LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002809

CLIENT:

PROJECT TITLE: SULWOOD DR - MANNHEIM ST INTERSECTION, WANNIASSA
INTERSECTION UPGRADE - FEASIB LITY STUDY
COMBINED OPTIONS
GENERAL ARRANGEMENT PLAN
SHEET 1 OF 5

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIB LITY	3002809-2361	A



150 mm ON ORIGINAL
A1

DRAW NG FILE LOCATION / NAME
V:_Vault\Projects\3002\3002809\110_CADD\CAD\Info_Docs\20210303_OPTIONS_COMBINED\3002809-2362.dwg

PLOT DATE	TIME
25 Mar 2021	14:15:06

EXTERNAL REFERENCE F LES
X_3002809_SMEC_a1, X_MT_CADASTA_MGA94, X_MT_CADASTA, X_MT_UTILX_MGA94, X_MT_NT_OPT1A_PAV, X_MT_NT_OPT1A_DES, X_MT_NT_COMBINED_OPT ONS_SHT, X_MT_GIS_ECOLOGY, BGW_Mt_Taylor, Protected_Plants_Mt_Taylor, PTWL_Mt_Taylor, Road_Reserves_Mt_Taylor, X_MT_SURV_CPK, X_MT_CPK_DRN, X_MT_NT_OPT1_FRAME_250, X_MT_NT_OPT1_DRN, X_MT_SUP_OPT5_DES, X_MT_SUP_DES_CTRL_OPT5, X_MT_SUP_OPT5_PAV

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	25.03.2021	FOR INFORMATION ONLY		R.R.

TITLE	NAME
DRAFTER	[redacted]
DRAFTING CHECK	
DESIGNER	
DESIGN CHECK	
PROJECT MANAGER	
PROJECT DIRECTOR	

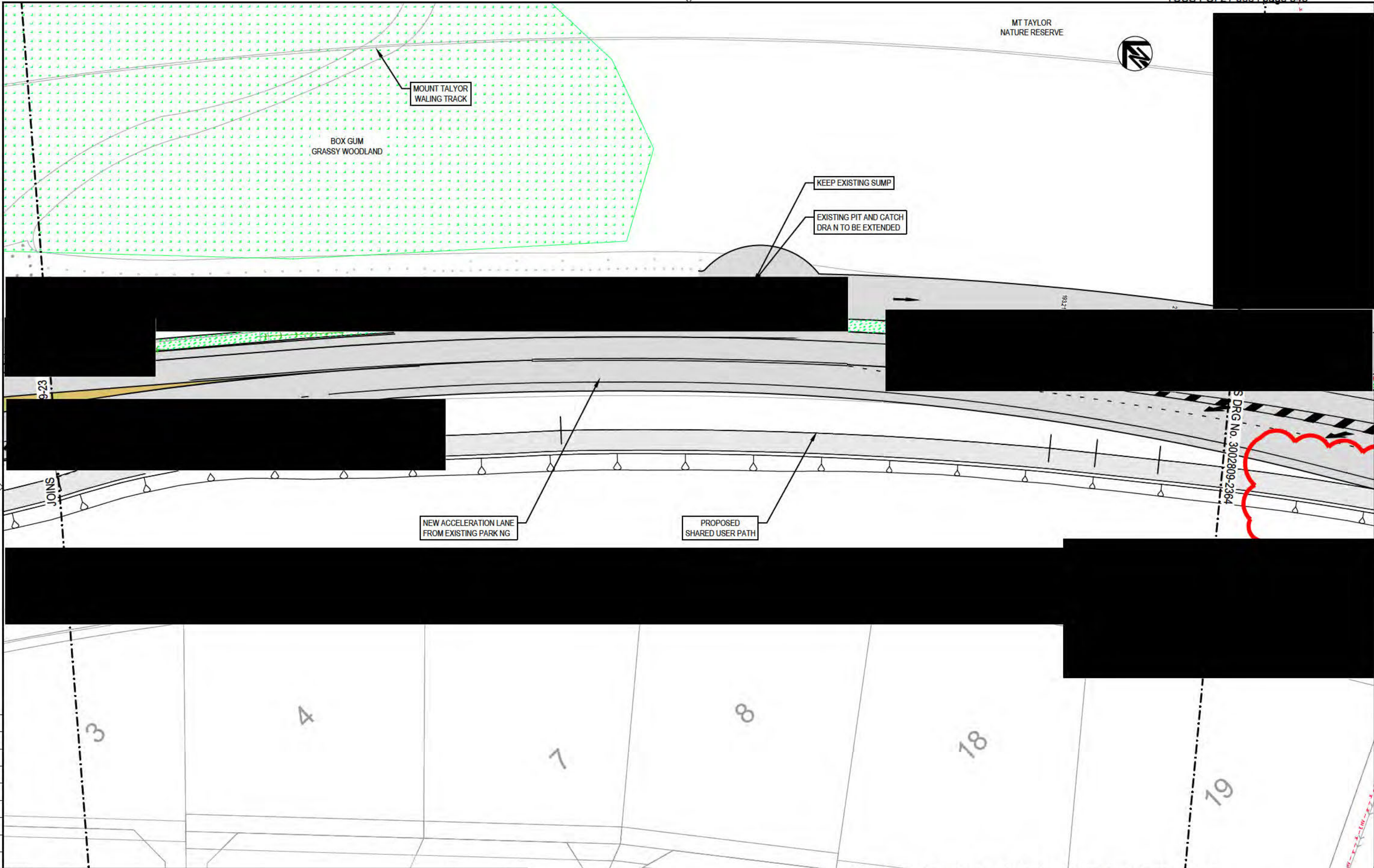
SCALES AT A1 SIZE DRAWING
SCALE 1:250 2.5 0 5 10 12.5 m

DES GNER
SMEC
Member of the Surbana Jurong Group
SMEC AUSTRALIA PTY LTD
© ABN 47 065 475 149
SUITE 2, LEVEL 1, 243 NORTHBOURNE AVENUE
LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002809

CLIENT

PROJECT TITLE SULWOOD DR - MANNHEIM ST INTERSECTION, WANNIASSA
INTERSECTION UPGRADE - FEASIB LITY STUDY
COMBINED OPTIONS
GENERAL ARRANGEMENT PLAN
SHEET 2 OF 5

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIB LITY	3002809-2362	A



NOT FOR CONSTRUCTION - INFORMATION ONLY

DRAW NG FILE LOCATION / NAME	PLOT DATE	TIME
V:_Vault\Projects\3002\3002809\110_CADD\CAD\Info_Docs\20210303_OPTIONS_COMBINED\3002809-2363.dwg	25 Mar 2021	14:15:17

EXTERNAL REFERENCE F LES: X_3002809_SMEC_a1, X_MT_CADASTA_MGA94, X_MT_CADASTA, X_MT_UTILX_MGA94, X_MT_NT_OPT1A_PAV, X_MT_NT_OPT1A_DES, X_MT_NT_COMBINED_OPT ONS_SHT, X_MT_GIS_ECOLOGY, BGW_Mt_Taylor, Protected_Plants_Mt_Taylor, PTWL_Mt_Taylor, Road_Reserves_Mt_Taylor, X_MT_SURV_CPK, X_MT_CPK_DRN, X_MT_NT_OPT1_FRAME_250, X_MT_NT_OPT1_DRN, X_MT_SUP_OPT5_DES, X_MT_SUP_DES_CTRL_OPT5, X_MT_SUP_OPT5_PAV

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	25.03.2021	FOR INFORMATION ONLY		R.R.

TITLE	NAME
DRAFTER	[redacted]
DRAFTING CHECK	
DESIGNER	
DESIGN CHECK	
PROJECT MANAGER	
PROJECT DIRECTOR	

SCALES AT A1 SIZE DRAWING
SCALE 1:250 — 2.5 0 5 10 12.5 m

DES GNER
SMEC
Member of the Surbana Jurong Group
SMEC AUSTRALIA PTY LTD
© ABN 47 065 475 149
SUITE 2, LEVEL 1, 243 NORTHBOURNE AVENUE
LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002809

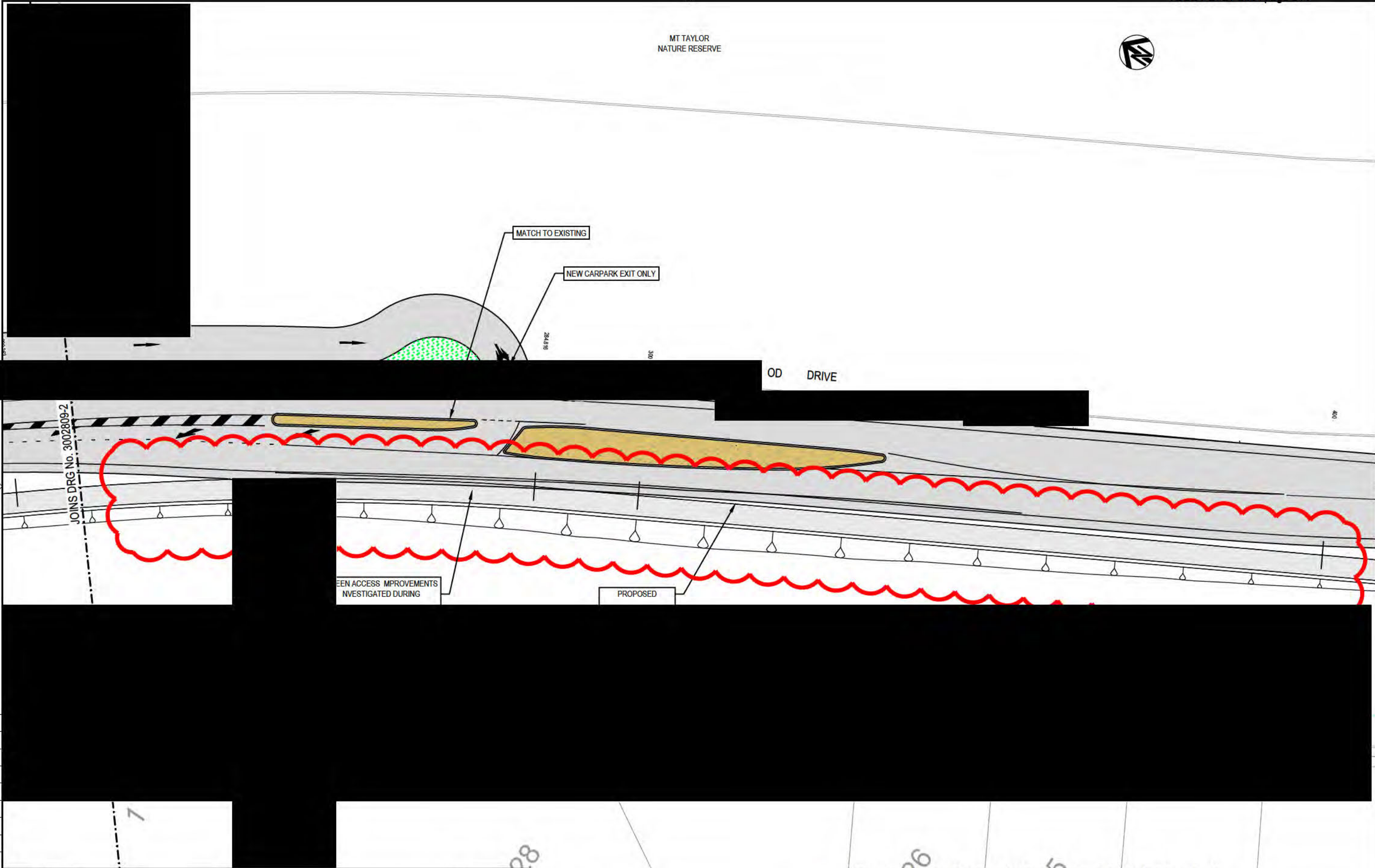
CLIENT

PROJECT TITLE
SULWOOD DR - MANNHEIM ST INTERSECTION, WANNIASSA
INTERSECTION UPGRADE - FEASIB LITY STUDY
COMBINED OPTIONS
GENERAL ARRANGEMENT PLAN
SHEET 3 OF 5

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIB LITY	3002809-2363	A

150 mm ON ORIGINAL · A1

[redacted]



[redacted]

NOT FOR CONSTRUCTION - INFORMATION ONLY

150 mm ON ORIGINAL

A1

DRAWING FILE LOCATION / NAME
V:_Vault\Projects\3002\3002809\110_CADD\CAD\Info_Docs\20210303_OPTIONS_COMBINED\3002809-2364.dwg

PLOT DATE: 25 Mar 2021 | TIME: 14:15:38

EXTERNAL REFERENCE FILES
X_3002809_SMEC_a1, X_MT_CADASTA_MGA94, X_MT_CADASTA, X_MT_UTILX_MGA94, X_MT_NT_OPT1A_PAV, X_MT_NT_OPT1A_DES, X_MT_NT_COMBINED_OPT ONS_SHT, X_MT_GIS_ECOLOGY, BGW_Mt_Taylor, Protected_Plants_Mt_Taylor, PTWL_Mt_Taylor, Road_Reserves_Mt_Taylor, X_MT_SURV_CPK, X_MT_CPK_DRN, X_MT_NT_OPT1_FRAME_250, X_MT_NT_OPT1_DRN, X_MT_SUP_OPT5_DES, X_MT_SUP_DES_CTRL_OPT5, X_MT_SUP_OPT5_PAV

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	25.03.2021	FOR INFORMATION ONLY		R.R.

TITLE	NAME
DRAFTER	[redacted]
DRAFTING CHECK	
DESIGNER	
DESIGN CHECK	
PROJECT MANAGER	
PROJECT DIRECTOR	

SCALES AT A1 SIZE DRAWING
SCALE 1:250 — 2.5 0 5 10 12.5 m

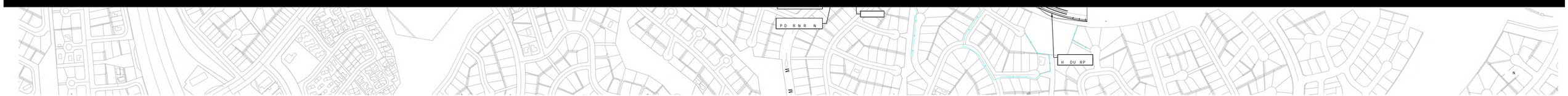
DESIGNER
SMEC
Member of the Surbana Jurong Group
SMEC AUSTRALIA PTY LTD
© ABN 47 065 475 149
SUITE 2, LEVEL 1, 243 NORTHBOURNE AVENUE
LYNEHAM ACT 2602 AUSTRALIA
SMEC PROJECT No 3002809

CLIENT

PROJECT TITLE
SULWOOD DR - MANNHEIM ST INTERSECTION, WANNIASSA
INTERSECTION UPGRADE - FEASIB LITY STUDY
COMBINED OPTIONS
GENERAL ARRANGEMENT PLAN
SHEET 4 OF 5

SCALE	PHASE	PROJECT / DRAWING No.	REVISION
AS SHOWN	FEASIB LITY	3002809-2364	A

[redacted]



NO OR CONS RUC ION

DRAWING FILE LOCATION / NAME
N:_Vault\Projects\3882\3882809\V10_CAD\CAD\Info_Docs\20210303_OPTIONS_COMBINED\3882809-20210325-COMBINED-OPTIONS-CO_IDO.dwg

U D R M N M N R N N
N R UP D UD

B D P

P R D R PA P 3 A PA KA D P R

R A D

0 28 92 2 32 B D P D D

SMEC

local people
global experience

SMEC is recognised for providing technical excellence and consultancy expertise in urban, infrastructure and management advisory. From concept to completion, our core service offering covers the life-cycle of a project and maximises value to our clients and communities. We align global expertise with local knowledge and state-of-the-art processes and systems to deliver innovative solutions to a range of industry sectors.

www.smec.com