

## Villawood Sunbury ICP

### Infrastructure Costings Report Witness Report

19/10/2020	0	Final	R. Howard			
<b>Date</b>	<b>Rev.</b>	<b>Status</b>	<b>Prepared By</b>	<b>Checked By</b>	<b>Approved By</b>	<b>Approved By</b>
<b>HATCH</b>						<b>Client</b>

## Table of Contents

<b>1. Qualifications of Expert .....</b>	<b>1</b>
1.1 Name and Address .....	1
1.2 Area of Expertise .....	1
1.3 Expertise to Make Report .....	1
1.4 Engagement.....	2
1.4.1 Relationship .....	2
1.4.2 Instructions.....	2
1.5 Assistance in Preparing the Report.....	2
<b>2. Background.....</b>	<b>3</b>
<b>3. The Land.....</b>	<b>3</b>
<b>4. Scope of Works.....</b>	<b>6</b>
<b>5. Design Options .....</b>	<b>6</b>
5.1 Lancefield Road Jacksons Creek Crossing (LR-BR-01) .....	6
5.1.1 Option A .....	6
5.1.2 Option B .....	6
5.2 Sunbury South Jacksons Creek Crossing (SS-BR-01) .....	7
5.2.1 Option A .....	7
5.2.2 Option B .....	7
<b>6. Opinion of Probable Costs (OPC).....</b>	<b>7</b>
6.1 Lancefield Road Jacksons Creek Crossing (LR-BR-01) .....	8
6.2 Sunbury South Jacksons Creek Crossing (SS-BR-01) .....	8
<b>7. Quantities and Rates .....</b>	<b>9</b>
7.1 Siteworks and Earthworks .....	9
7.2 Structure .....	9
7.3 On-Bridge Works .....	11
7.4 Off-Bridge Works .....	11
7.5 Miscellaneous .....	11
7.6 Rail Related Items.....	11
7.7 Services .....	11
7.8 Delivery .....	12
7.9 Not used.....	12
7.10 Roadworks and associated infrastructure .....	12
<b>8. Statement of Opinion .....</b>	<b>13</b>

## **1. Qualifications of Expert**

### **1.1 Name and Address**

Rob Howard  
183 Stewart Street, Brunswick East

Post Nominals  
BEng (Civil) (Hons), BSc , CPEng, NER, RBP

### **1.2 Area of Expertise**

I hold a Bachelor of Engineering (Civil) with Honours from the University of Melbourne. I have achieved the status of Chartered Professional Engineer (Structural Engineering) from Engineers Australia and I am registered on the National Engineering Register. I am also a registered building practitioner.

I have over 10 years' of experience in structural engineering. This experience is predominantly in the infrastructure sector and my entire career has been in consulting in Melbourne. I am now the lead engineer of the Construction Services department of Hatch where we support construction in the form of construction methodologies, staging designs and temporary works.

I have provided clients with project management and engineering advice through all phases of projects, from preliminary planning and feasibility, through design approval to construction management and completion of works.

### **1.3 Expertise to Make Report**

I have 10 years' of experience in construction methodologies and structural engineering. I have led a consulting structural team in a \$600M road project tender design (Monash Freeway Upgrade Stage 2). This project had 9 road bridges. As part of the design process we explored options and weighed different concepts to develop the most cost effective option for our client. I have consulted to many small and large clients on concept designs for bridge infrastructure. I have extensive experience in bridge form selection in Melbourne's infrastructure market.

## **1.4 Engagement**

### **1.4.1 Relationship**

I have been engaged by Norton Rose Fulbright on behalf of Villawood to provide this report. Both my employer (Hatch) and I are independent of both parties.

### **1.4.2 Instructions**

I have been provided with the following instructions:

- (1) review the exhibited documents and background materials and accompanying documents;
- (2) confer with instructing solicitors and counsel where necessary;
- (3) prepare an expert witness statement which:
  - (a) adopts your costings schedule (prepared in conjunction with Spiire);
  - (b) sets out the methodology used to prepare the costings schedule; and
  - (c) includes your opinion concerning the feasibility of the proposed bridge designs; and
- (4) if necessary, present your expert evidence at the hearing before Planning Panels Victoria.

My area of expertise is in relation to the bridge structural elements within the ICP.

I have been provided with the following documents:

Exhibition Documents

3.6 Sunbury South and Lancefield Road Infrastructure Contributions Plan – April 2020

6.16 Expert witness statement prepared by Mark Breuer, Spiire – 8 October 2020

Victorian Planning Authority – Sunbury Sth Lancefield Road ICP Design and Costings – November 2019 - GHD

I have received a copy of the Expert witness code of conduct. I acknowledge that I have read and agree to be bound by this code of conduct.

## **1.5 Assistance in Preparing the Report**

I have engaged with three people from outside Hatch to assist in the preparation of the Sunbury ICP Cost Schedules used to inform this report.

- Mark Breuer, Managing Director, Spiire

- David Cameron, Principal Civil Engineer, Spiire
- Cornelius von Oppen, Construction Manager, Winslow

Mark Breuer provided information on earthworks and fencing rates from previous projects tendered by Spiire.

David Cameron developed the road alignment options on which the structural concepts I developed were based on. The road alignment drawings were prepared using a 3-D model which was then used to determine the quantities for the civil components including the bulk earthworks, pavement areas, retaining walls and more. Where quantities were determined from David Cameron's model this has been noted in the appropriate section below.

Cornelius von Oppen reviewed the rates for the cost schedule. He has recent relevant experience tendering similar projects.

Notwithstanding the above assistance, all conclusions and opinions detailed in this report are my own.

## **2. Background**

2.1 Villawood has a significant interest in land within the Sunbury South and Lancefield Road PSP growth areas, with aspirations to develop approximately 5,300 residential lots.

2.2 The Amendment has been prepared by the Victorian Planning Authority, who is the planning authority for this amendment.

2.3 The Amendment proposes to replace the existing interim Infrastructure Contributions Plan that applies to the land in the Sunbury South and Lancefield Road PSP areas with the ICP, which will also include a supplementary levy relating to, among other things, large infrastructure projects.

2.4 The Amendment was placed on exhibition between April and June 2020.

2.5 On 8 June 2020, Mesh Planning, on behalf of Villawood, lodged a submission to the VPA regarding the Amendment.

2.6 A directions hearing was held on 7 August 2020 and the hearing will be held before Planning Panels Victoria on 4 – 20 November 2020. The Panel Chair is Tim Hellsten, and he will be sitting with Michael Ballock and Nicola Ward, both town planners.

## **3. The Land**

3.1 Villawood has interests in a number of parcels of the land in the PSP areas, including the following:

- (1) In relation to the Sunbury South PSP area:
  - (a) 40-80 Redstone Hill Road;

(b) 50 Redstone Hill Road; and

(c) 675 Sunbury Road,

as shown in Figure 1 below:

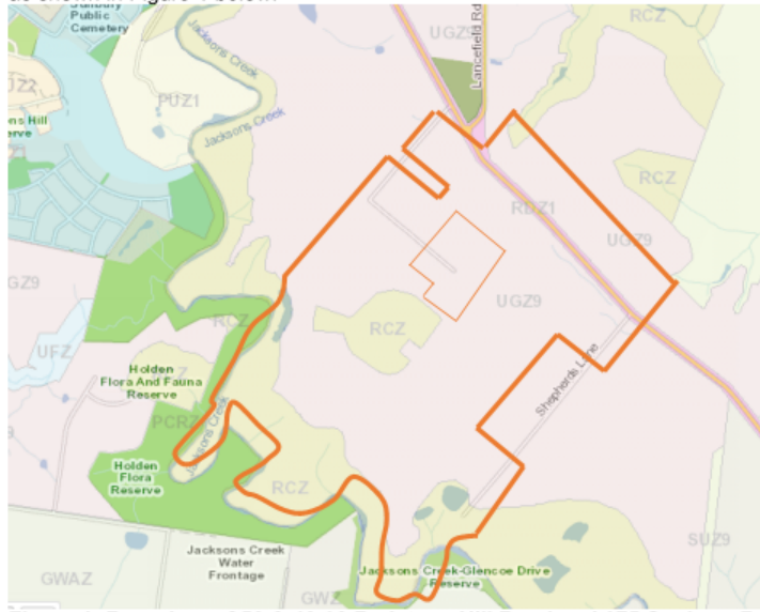


Figure 1: Boundary of 50 & 40-80 Redstone Hill Road and 675 Sunbury Road

(2) In relation to the Lancefield Road PSP area, 3-5 Macedon Street (as shown in Figure 2 below).

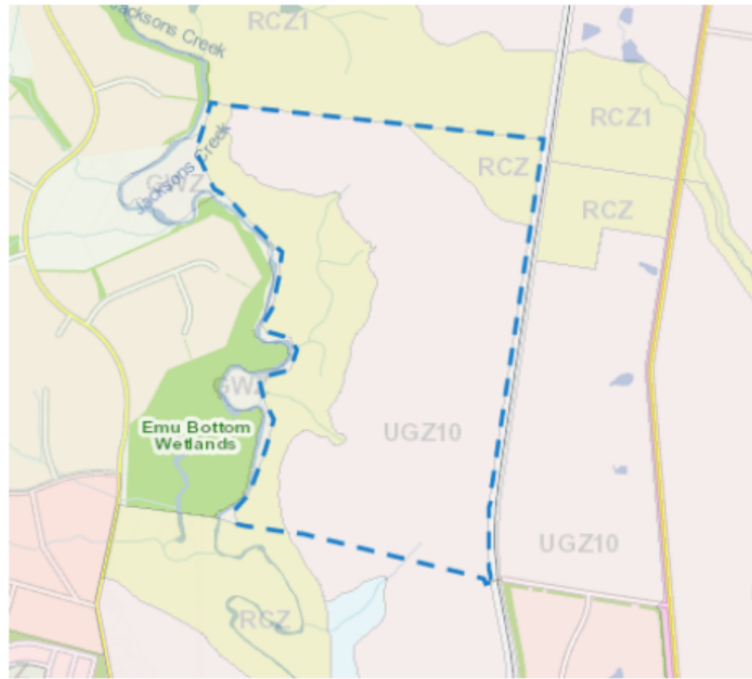


Figure 2: 3-5 Macedon Street boundary

3.2 The land in the Sunbury South PSP area is:

(1) in the following zones:

- (a) Urban Growth Zone (Schedule 9); and
- (b) Rural Conservation Zone.

(2) subject to the following overlays:

- (a) Heritage Overlay (HO358);
- (b) Incorporated Plan Overlay (Schedules 3 and 4);
- (c) Infrastructure Contributions Overlay (Schedule 1);
- (d) Specific Controls Overlay (Schedules 1 and 10); and
- (e) Environmental Significance Overlay (Schedule 10).

3.3 The land in the Lancefield Road PSP area is:

(1) in the following zones:

- (a) Rural Conservation Zone (Schedule); and
- (b) Urban Growth Zone (Schedule 10).

(2) subject to the following overlays:

- (a) Environmental Significance Overlay (Schedule 10);
- (b) Incorporated Plan Overlay (Schedules 3 and 4);
- (c) Infrastructure Contributions Overlay (Schedule 1); and
- (d) Land Subject to Inundation Overlay (Schedule).

#### **4. Scope of Works**

The scope of work is to express an opinion of probable cost of the civil engineering concept designs determined as alternatives and alignment options for the Jackson's Creek bridges that are cost effective for a connector road.

Assessment of the impact of bridge options on ecology and cultural heritage is not part of Hatch's scope.

#### **5. Design Options**

Design options have been prepared as part of Mark Breuer's Expert Witness Report and details of the parameters, assumptions and outcomes can be found in that report. In summary, four concepts were developed for which Opinion of Probable Costs (OPCs) were provided. Concept drawings of the below structures can be found in Mark Breuer's Expert Witness Report. It is my opinion that the structural options presented in Mark Breuer's Expert Witness Report that are the subject of my opinion of probably cost are feasible structural options for the project.

##### **5.1 Lancefield Road Jacksons Creek Crossing (LR-BR-01)**

###### **5.1.1 Option A**

Option A maintains the same horizontal alignment as the GHD report but with different vertical geometry to push down into the Jacksons Creek valley. The new vertical alignment presented in option A significantly reduces the height of the piers from 35.5m to 16m. This reduction allowed Hatch to adopt the cheaper concrete super-T option, utilise a simpler pier shape and change the bored piles to driven piles.

###### **5.1.2 Option B**

Option B pursues an alternative horizontal alignment which "chases" the contours down into the Jacksons Creek Valley floor. Due to the significantly reduced scale of the bridge, the structure will consist of super T beams with a span of 30 Lm each (3 No spans), again a consistent solution with the type adopted in other locations in the GHD report.



## **5.2 Sunbury South Jacksons Creek Crossing (SS-BR-01)**

### **5.2.1 Option A**

Option A maintains the same horizontal alignment as the Victorian Planning Authority – Sunbury Sth Lancefield Road ICP Design and Costings – November 2019 (GHD Report) but with different vertical geometry to push down into the Jacksons Creek environs. I have proposed a 245m structure consisting of 7 super T spans @ 35Lm each. The structural solution differs from the solution adopted in GHD report which was a steel box girder. The use of super T's are considered a more cost effective and constructible solution and is consistent with other bridge types adopted in the interim ICP.

### **5.2.2 Option B**

Option B is considered a refinement of the horizontal alignment adopted in the GHD report. Option B is a minor departure of the horizontal alignment to locate a more optimal solution reducing the bridge size and bulk earthworks.

This option has similar pier height considerations to option A. However, with option B the valley reduces in depth away from the central span. I consider a steel launched span is appropriate for the 26m high central span. The approach spans on either side, 2 on the South and 4 on the North, are the lower cost concrete super-T structure.

## **6. Opinion of Probable Costs (OPC)**

Spiire, Hatch and Winslow Infrastructure have prepared opinions of probable costs for each of the alternate options. A summary of the OPC's included in sections 6.1 and 6.2 and appendix D and E contain the detailed schedules using the same format and content as the GHD report. I have prepared the bridge structure costs. The civil costs were prepared by David Cameron (Spiire) and the construction methodology costs have been provided by Cornelius von Oppen (Winslow). I have reviewed the methodology and results of the entire OPC and it forms the basis of information from which I have formed my opinion.

Where possible we have adopted the same cost basis for each item as the GHD report, however where this assessment departs, items are highlighted in yellow. One major item is excavation. Spiire have recently tendered bulk earthworks in the Sunbury region and consider the rates used in the GHD Report to be too high. We have adopted a rate of \$43.20 per cubic meter which includes rock (Winslow Infrastructure have confirmed this rate is appropriate for solid rock excavation in that area). GHD used a rate of \$43.20 per cubic meter for bulk excavation and a separate rate of \$140 per cubic meter for rock excavation.

Habitat Compensation Fees have been excluded from the OPC's for all options as this falls outside my scope and expertise. It should be noted that these costs are considered

to be minor when considered in the context of the overall costs as demonstrated in the GHD report.

**6.1 Lancefield Road Jacksons Creek Crossing (LR-BR-01)**

Table 6-1 below provides a summary of the Lancefield Road Jacksons Creek crossing. Both options achieve a significant reduction in cost as well as improving constructability of the bridge structure. Given the road has a connector road status, option B is the preferred solution from a constructability and cost basis.

**Table 6-1: OPC summary LR-BR-01**

	GHD Report / Interim ICP solution	Option A	Option B
Total	\$103,867,741	\$47,914,254	\$30,527,193
% difference from ICP	0%	-54%	-71%

**6.2 Sunbury South Jacksons Creek Crossing (SS-BR-01)**

Table 6-2 below provides a summary of the Sunbury South Jacksons Creek crossing. Option A cost is greater than the GHD report as Hatch have adopted a steel girder structure. I do not believe the GHD report SS-BR-01 solution is constructible using craned construction techniques. The height of the piers mean that an extremely large crane would be required to lift the beams onto the piers. I am unsure if such a crane would be available. A launching gantry may be a feasible option to construct the beams at this height or launching steel spans. It is my opinion that steel spans will be a more economical solution due to the larger span and associated reduction in the very high piers.

Option B is the preferred solution given it is only a minor departure from the ICP horizontal alignment, costs are reduced and constructability improved.

**Table 6-2: OPC summary SS-BR-01**

	GHD Report / Interim ICP solution	Option A	Option B
Total	\$41,735,843	\$43,553,373	\$36,391,021
% difference from ICP	0%	+4%	-13%

## **7. Quantities and Rates**

To develop cost estimates for road and infrastructure projects we must first consider the quantities required for each component, then determine the applicable rates for each item, resulting in the total estimated cost of each project.

Using the files provided to me, I have produced a set of quantities for each option. The principle of determining rates was to adopt the GHD values where they were applicable.

### **7.1 Siteworks and Earthworks**

The site preparation quantity and rate remains the same as the GHD OPS.

Earthwork rates of \$43.20/cum have been based on recently tendered bulk earthworks in the Sunbury region and includes rock excavation. Winslow has reviewed and confirmed this rate. I agree with the use of this rate in lieu of the rate adopted by GHD. The quantities of the earthworks were determined by David Cameron as part of his alignment design. I have reviewed the quantity and agree with the value used.

The site set-out and marking quantity and rate remains the same as the GHD OPS.

### **7.2 Structure**

The bridge structure quantities were determined based on sq.m of the deck. In all four options the deck width is 13.5m. So the quantity of bridge structure was calculated as the length of the structure multiplied by 13.5m. This approach is the same as the GHD method. The rates used were \$2,450/sqm for super T bridge structure and \$4,450/sqm for steel box girder. This is an installed bridge structure cost including transportation and deck. The steel girders adopted in my concepts are 60m span rather than 50m by GHD. These larger beams can still be transported in 3 sections and will require the similar craneage. It is my opinion that the rate adopted of \$4,450/sqm is suitable for 60m steel box girder spans.

For bridge columns the GHD method used sq.m for one pier type and a cu.m rate of \$1,100 for the other pier type. It is industry practice to use cu.m rate for bridge columns so that is what I have adopted. I also found that the rate of \$1,100 to be too low and have adopted a higher rate of \$1,800/cu.m which will be more typical for these piers which are in some cases very high off the ground. The quantity was calculated based on the vertical alignment information provided by David Cameron and the pier forms adopted were the forms adopted by GHD for the same bridge type.

I have adopted driven piles for the piers for all four options. GHD adopted driven piles for one location and bored piles for the other. At these locations, it is my opinion that driven

piles would be the more economical option and that bored piles were used due to high bending moments caused by very high piers. The alternatives we have proposed have shorter piers so driven piles are appropriate. I have adopted a rate of \$6,500 per item rather than the rate of \$3,584.70 adopted by GHD as I believe it is more appropriate.

The pile cap rate remains the same as the GHD OPS with the quantity changed to reflect the reduction in the number of piers where appropriate.

The constructability cost is difficult to quantify due to the inability to perform a site visit at this time. Covid-19 restrictions prevent site visit activities. I have reviewed the constructability values alongside Winslow and feel that they generally reflect the challenges associated with haul roads and crane pads in these valley areas as well as challenges associated with craneage and construction methodology including launching. Launching is a method of construction where a bridge span is pushed into place rather than lifted by crane.

A summary of the constructability costs can be found in Table 7-1 below.

**Table 7-1: Constructability Rates**

	Lancefield Road Jacksons Creek Crossing		Sunbury South Jacksons Creek Crossing	
	Option A	Option B	Option A	Option B
GHD	\$7,624,177.50	\$7,624,177.50	\$2,691,649.26	\$2,691,649.26
Hatch	\$4,750,000	\$1,500,000	\$2,500,000	\$3,000,000

The reduction in constructability costs are commensurate with the reduction in overall length, height and complexity of the associated options.

The abutment and crosshead beam rate remains the same as the GHD OPS with the quantity changed to reflect the reduction in the number of piers where appropriate.

The anti-sliding block rate remains the same as the GHD OPS with the quantity change to reflect the number of super T spans requiring anti-sliding blocks. An anti-sliding block is a reinforced concrete plinth that provides horizontal restraint to the super-T girders. Note that steel box girders do not require anti-sliding blocks.

A rate of \$1,800/cu.m has been adopted for abutment walls. The quantities were based on an abutment wall 13.5 wide x 0.5 thick and the height was calculated based on the vertical alignment provided by David Cameron.

Bored piles were provided at all locations. The rate remains the same as the GHD OPS with a consistent number (8 piles) adopted for each bridge.

The bridge containment barrier rate remains the same as the GHD OPS with the quantity changed to reflect the modified bridge length.

### **7.3 On-Bridge Works**

The asphalt pavement rate remains the same as the GHD OPS with the quantity changed to reflect the modified bridge length.

The kerb and channel rate remains the same as the GHD OPS with the quantity changed to reflect the modified bridge length.

The footpath rate remains the same as the GHD OPS with the quantity changed to reflect the modified bridge length.

The lighting rate remains the same as the GHD OPS with the quantity changed to reflect the modified bridge length.

### **7.4 Off-Bridge Works**

The approach slab rate and quantity remains the same as the GHD OPS.

The guard rail rate and quantity remains the same as the GHD OPS.

### **7.5 Miscellaneous**

The architectural screens rate remains the same as the GHD OPS with the quantity changed to reflect the modified bridge length.

The anti-throw screens rate remains the same as the GHD OPS with the quantity changed to reflect the modified bridge length.

The line marking screens rate remains the same as the GHD OPS with the quantity changed to reflect the modified bridge length.

The habitat compensation rate and quantity remains the same as the GHD OPS

### **7.6 Rail Related Items**

There are no rail related costs associated with the project.

### **7.7 Services**

The increase in head contractor preliminaries percentage remains the same as the GHD OPS

## **7.8 Delivery**

Council fees percentage remains the same as the GHD OPS

Traffic Management fees percentage remains the same as the GHD OPS

Environmental Management percentage remains the same as the GHD OPS

Survey and Design percentage remains the same as the GHD OPS

A 12% rate for supervision and project management has been used for all options. This is opposed to 15% Lancefield Road Jacksons Creek Crossing in the GHD OPS. The size and complexity of the options have been reduced and therefore a reduction in the project management and supervision costs is appropriate.

Site establishment percentage remains the same as the GHD OPS.

Contingency percentage remains the same as the GHD OPS.

## **7.9 Not used**

## **7.10 Roadworks and associated infrastructure**

There are associated roadworks costs to support shorter span bridge.

There are additional retaining walls associated with the increase earthworks. The details we propose match those in the GHD concept designs. That is a shotcrete wall with soil nails. The rates for these items are based on recently tendered Spiire projects that I have reviewed. The quantities for the wall is based on the vertical alignment model with the spacing of the nails the same as the GHD concept design.

For Lancefield Road Option B the road traverses along the valley rather than cutting through. For this option a guard rail has been allowed for along the unprotected edge. The rate I have adopted is suitable. The quantity is based on the length of the road with an unprotected edge.

Safety fencing has been allowed for above all shotcrete retaining walls. The quantity is based on the length of retaining walls as per the above item and the rate is suitable for safety fencing.

The road rate of \$5,000 is higher than the VPA rate due to expected additional costs for longitudinal drainage due to the steep grades. The quantity is based on the 3-D road alignment model produced by David Cameron.

## 8. Statement of Opinion

I have been asked to provide my expert opinion on the road infrastructure costings relevant to the Sunbury ICP.

The cost estimates that I have set out above have been based on sound principles and industry practice having regard to, and using, the GHD OPC as a base analysis.

### Declaration

I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld.



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**HATCH**