



SHRIMPTONS CREEK BRIDGE IVANHOE ESTATE

Development Application Stage 1
Frasers Property Australia



Project Client: Frasers Property Australia
Project Name: Bridge over Shrimptons Creek
Project Number: 0647SYD IVANHOE ESTATE

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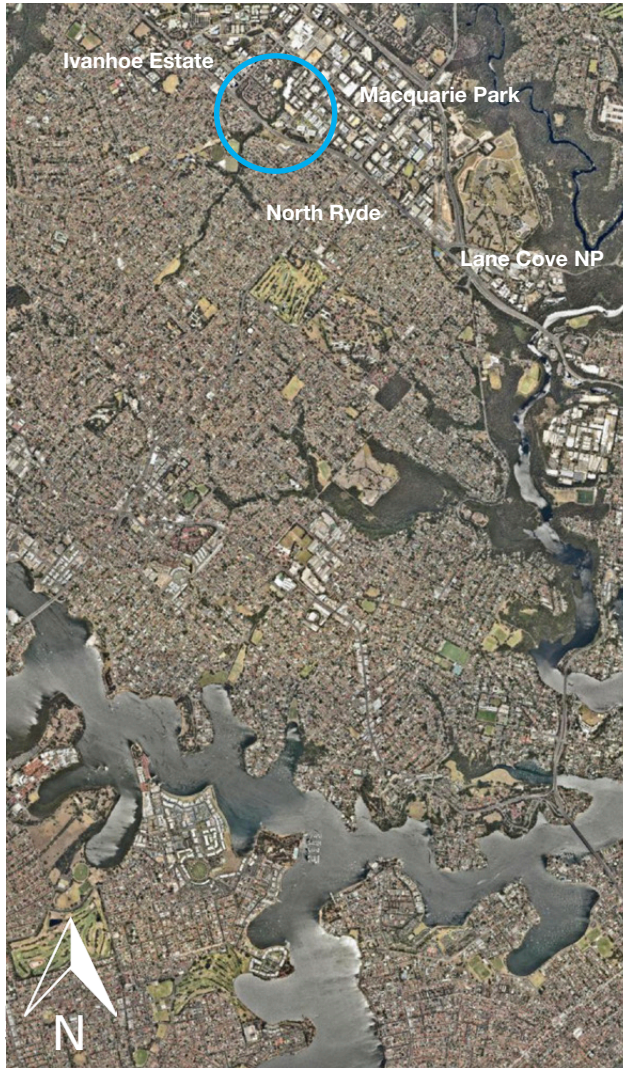


Figure 1. Location of the the Shrimptons Creek Bridge at the Ivanhoe Estate redevelopment site at Macquarie Park

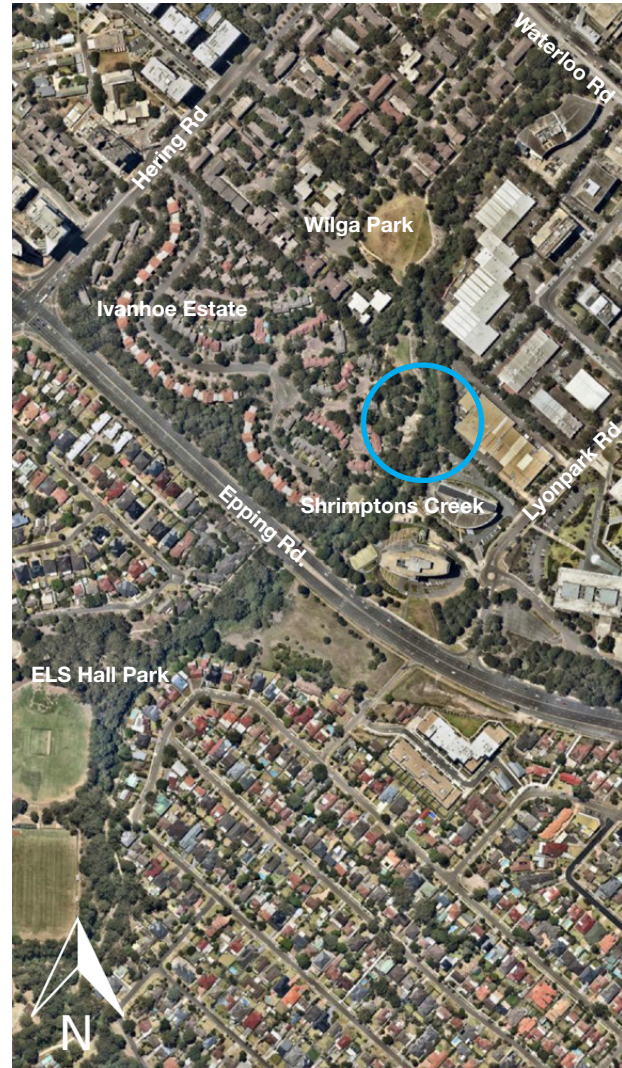


Figure 3 - Ivanhoe Estate redevelopment site, with the bridge crossing the Shrimptons Creek in the south-east.

1. Introduction



Figure 4. Ivanhoe Estate Masterplan with the Bridge crossing the Shrimptons Creek in the south-east.

1.1 Background

This Development Application report for The Shrimpton Creek Bridge has been prepared by McGregor Coxall on behalf of Frasers Property Australia.

This report supports a Development Application for Stage 1 of the Ivanhoe Estate redevelopment, a State Significant Development (SSD) submitted to the Department of Planning and Environment (DPE) pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

This report covers the bridge architecture (McGregor Coxall), engineering (SMEC), lighting (WEBB), stormwater and drainage assessment and flooding (ADW Johnson, BMT) for the bridge design.

As part of the Voluntary Planning Agreement (VPA), which will be negotiated between DPE/City of Ryde Council and Frasers Property, is likely to include the design and construction of Shrimptons Creek Bridge.

1.2 Site context

The Ivanhoe Estate site is located in Macquarie Park near the corner of Epping Road and Herring Road within the Ryde Local Government Area [LGA] [Figure 1 - 3].

Shrimptons Creek runs south to north through the site, flowing through Lane Cove National Park and onwards to Lane Cover River. A portion of the existing parklands is classified as a natural area, although the majority of the vegetation along Shrimptons Creek and the adjacent parks have been highly disturbed. There are, however, high quality stands of remnant plant communities situated within the corridor, including three endangered ecological communities along Shrimptons Creek—Blue Gum High Forest, Sydney Turpentine Ironbark Forest and Sydney Sandstone Gully Forest.

The proposed Shrimptons Creek Bridge will provide a pedestrian and vehicular connection between the new Ivanhoe Estate and Lyonpark Rd to the south-east.

2. Bridge Architecture

2.1 Vision

Shrimptons Creek parklands acts as an important ecological and recreational corridor for the surrounding community. This landscape and its existing natural assets form a welcome natural contrast to the increasingly dense urban environment.

The proposed Shrimptons Creek Bridge is imagined as a sensitively designed curved, elevated structure, that floats through the existing high quality remnant Eucalyptus forest. The design provides an opportunity to connect the public to the natural beauty of the site and uses a building palet that naturally blends into its setting, whilst providing a robust, honest composition.

2.2 Design

The bridge deck spans between two abutments faced with gabion wall cladding [Figure 6]. The gabion walls will be filled with recycled building rubble from the original social housing buildings on site, connecting the sites past with its future and establishing a cultural landmark.

Running through the tree canopy, the deck forms a clear and solid line between the two abutments. This outer bridge parapet presents as a clean, solid surface — whereas the inner parapet is more highly textured, with the object of minimising the impact of vandalism (graffiti) and offering opportunities for animating the ballustrade at night, through the use of lighting. [Figure 5].

The bridge span is supported by a number of angled pole like structures, that reference the trunks of the Eucalyptus forest. It is proposed that the soffit of the bridge will consist of a reflective material, that draws the landscape into the bridge and provided opportunity for illumination at night. A secondary lower, more intimate creek crossing for pedestrians may be integrated beneath the bridge and through the pylons.

2.3 Materials

Robust and durable materials will be selected to complement the natural look and feel of the creek area, and will be consistent with the materials used for the wider Ivanhoe Estate redevelopment site. Materials are chosen that require minimal maintenance, reducing the life time costs. A few examples of possible materials are displayed on the next page.

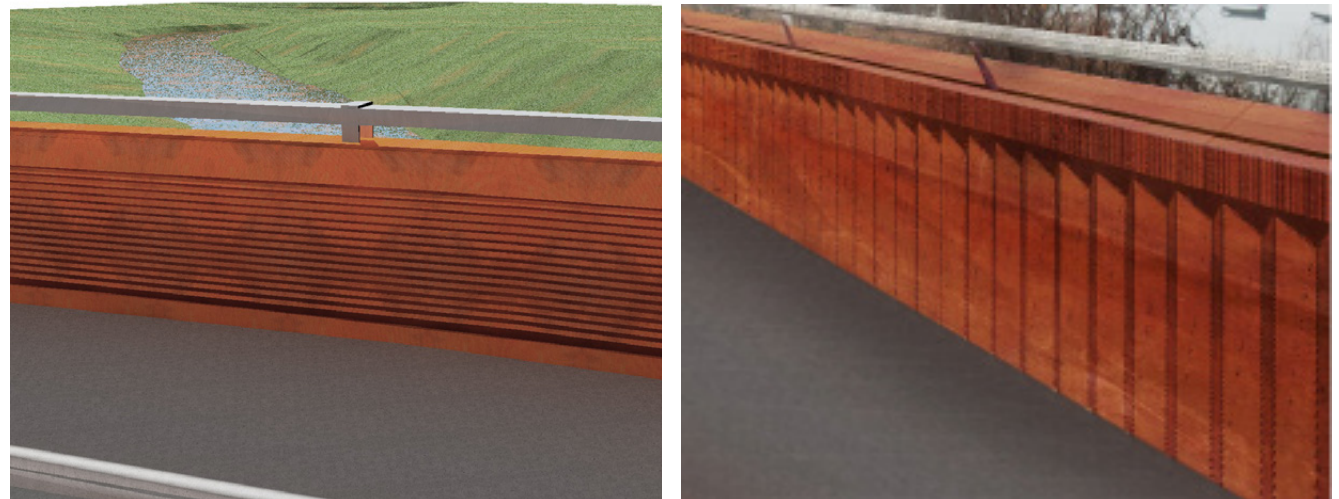


Figure 5. Two alternative options for the inner side of the barrier that will be further developed.



Figure 6. The bridge deck span (51m) between two abutments faced with gabion wall cladding and is supported by pylons placed at various angles as a reference to the trunks of the Eucalyptus forest



Site rubble



Steel (weathered)



Concrete



Asphalt

2.4 Barrier & balustrade

The Shrimptons Creek Bridge design meets all requirements concerning road barriers and balustrades (Australian Standards) for vehicles, pedestrians and cyclists. The envisioned speed limit will be 40km/h. The bridge will have a road profile as illustrated in the cross-section [Figure. 6].

The south side of the bridge will be a 3.5m wide shared path and the north side will be a 1.5m wide pedestrian path. The road will be 7m wide with 2 x 3.5m lanes.

To maintain visibility from the bridge onto the creek a balustrade is placed on the barrier.

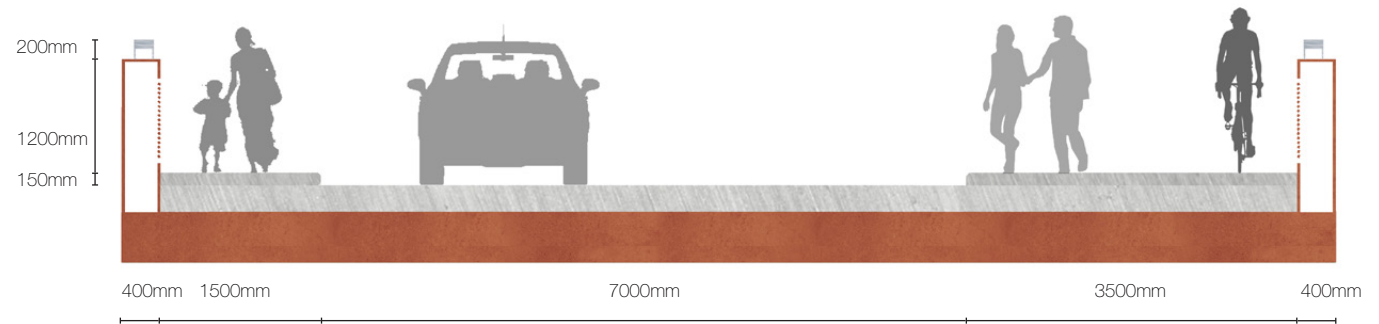


Figure 6. Cross section of the Shrimptons Creek Bridge



Figure 7: Front elevation: Total outer parapet height is 2015mm + 200mm balustrade (single line)

2.5 Precedents



Robust bridge deck running through the tree canopy



Reflective material as proposed for the soffit of the bridge



Robust bridge deck running through the tree canopy

3. Structural design

The proposed bridge has been designed in accordance with AS5100 Bridge Design Code with reference to relevant Roads and Maritime technical directions where applicable.

The following engineering standards are applicable to the structural design:

- Relevant Roads and Maritime Technical Directions
- AS 5100 Bridge Design Code 2017
- AS 2159 Piling Design and Installation – Australian Standards 2009.
- Building Code of Australia (BCA)

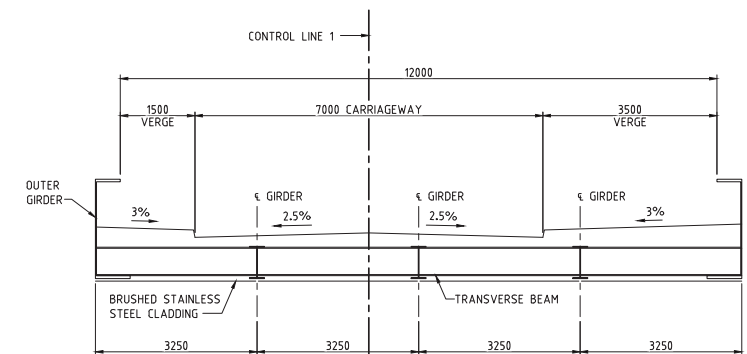
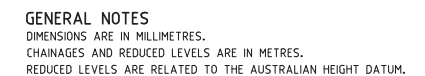
The design comprises of an overall bridge length of 51 m crossing Shrimptons Creek. The superstructure comprises steel half through girders with a ladder deck, topped with a 180 mm thick reinforced concrete deck slab. The superstructure is to be made integral at the abutments. The span length is variable due to the support arrangement beneath the structure.

The substructure comprises of a number of raking columns of 400 mm approximate diameter, these will be cast into concrete bay at deck level. The abutments will comprise a concrete headstock that will provide support for the beams before creating the encastre connection. The headstocks are founded on 4 No. bored reinforced concrete piles which are founded in high strength rock.

It is proposed that Corten Steel or similar be used for the superstructure. This steel requires no maintenance over the life of the structure. In conjunction with the integral abutments the structure will require minimal maintenance in comparison to a traditional simply supported bridge as there are no bearings, joints and steelwork painting required.

The resultant deck width has been based on road geometry and the traffic lane configuration including shoulders, which has been agreed with the Client. The overall width is approximately 12 m which comprises two standard 3.5 m wide traffic lanes, 1.5 m wide side walk and a 3.5 m shared path. A 1.4 m high barrier is provided on both sides of the bridge.

TO LYONPARK ROAD

SECTION 1

CITY OF RYDE

GENERAL ARRANGEMENT

ISSUE STATUS	BRIDGE No	ISSUE	SHEET No
CONCEPT DESIGN	BR01		005

CONTRACTOR		
CHECK PRINT PRELIM <input type="checkbox"/> FINAL <input type="checkbox"/>		
PLOT BY RILEY PHILLIS		
	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

4. Lighting

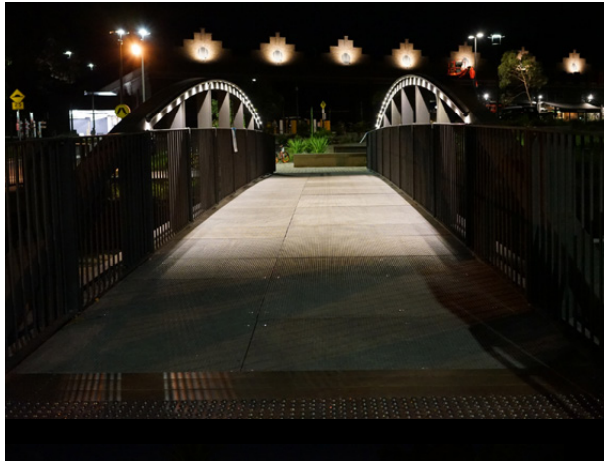
Lighting for the bridge can be separated into two categories—lighting for the upper deck and uplighting of the bridge soffits.

On the deck, the integrated lighting design will achieve a soft, warm, and interior glow, aiding in pedestrian and cyclist wayfinding and the reduction of vehicle speeds while providing an animated night experience for users. Light poles on either side of the bridge will provide sufficient illumination for drivers.

The road and pedestrian lighting will be designed in accordance with the Australian Standards AS/NZS 1158 and in consultation with Council, nominating Subcategory V5 for the road and Subcategory P2 for the shared pedestrian footpath and cycleways.

The bridge soffit uplighting aims to highlight the underside form and structure of the bridge at night, showcasing the soffit's textures and materiality and marking the bridge as a glowing lantern in the landscape at night.

Given the site context and the bridges location within an established riparian corridor habitat, illumination levels and distribution must be taken into consideration and uplighting shielded, to minimise impacts upon fauna.



Upper deck lighting character



Soffit uplighting character

5. Stormwater, drainage and flooding

Stormwater and drainage

Ryde Council's DCP 2014 requires the development to comply with requirements for onsite detention, water sensitive urban design and flooding. ADW Johson has been commissioned to consider both the onsite detention and water quality aspects and ensuring the bridge design complies with all requirements.

The Ivanhoe Estate is located within the Shrimptons Creek catchment which has a contributing upstream area of approximately 600 ha. The Shrimptons creek catchment includes the suburbs of Ryde, North Ryde, Marsfield and Macquarie Park.

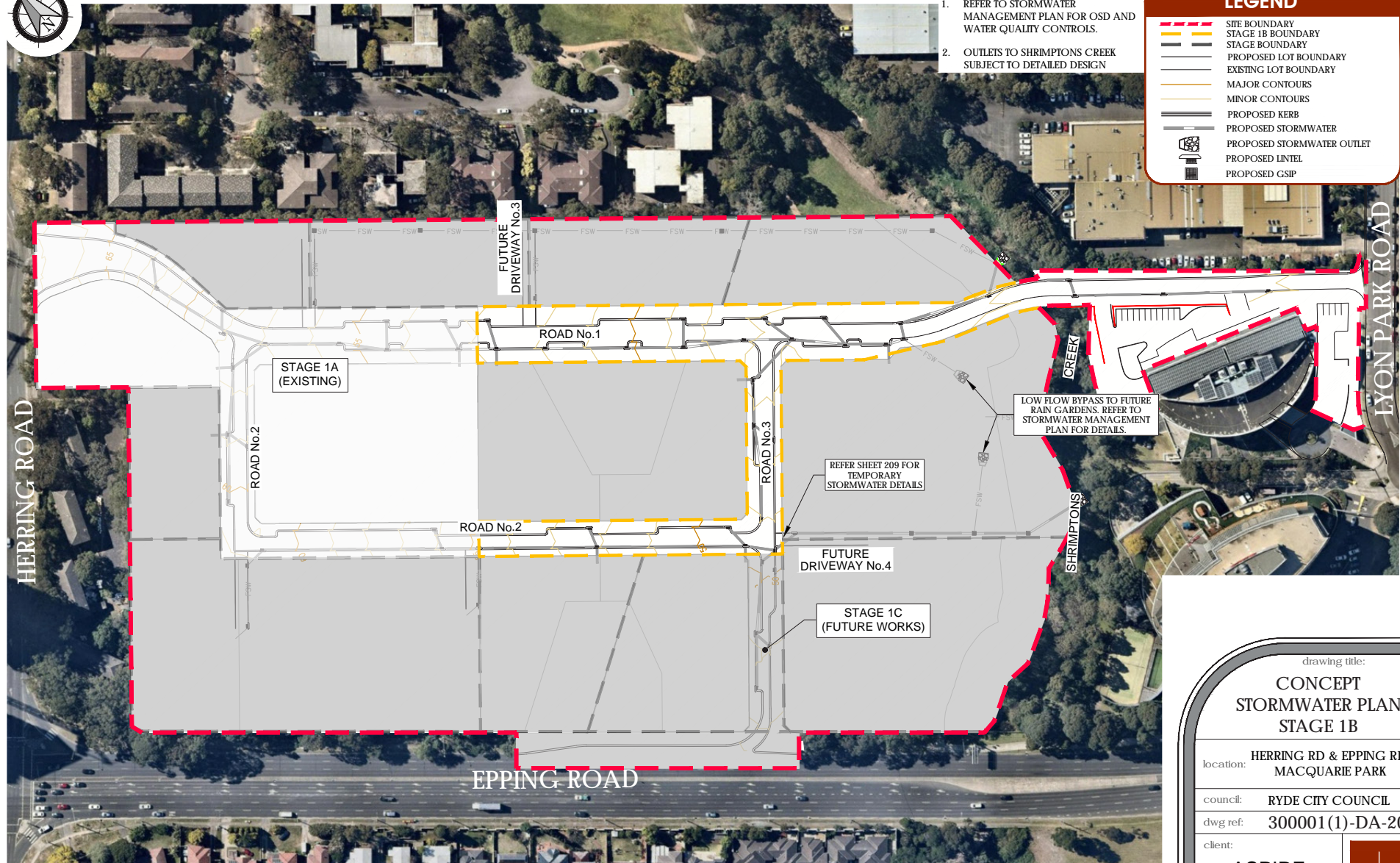
Stormwater from the Shrimptons Creek bridge is collected and flows towards the Ivanhoe Estate, where it is collected in rain gardens. In the gardens the water will be purified, before it ultimately flows back into the creek.

The Stormwater and Drainage Assessment, Stage 1 Development Application Ivanhoe Estate (Ref: 300001PM) by ADW Johsson, shows that from a stormwater management perspective, the proposed development can adequately meet the requirements set out by both Ryde City Council and the SEAR's and as such, should be approved.

Flooding

BMT WBM have been commissioned by Frasers Property Group to undertake a flood impact assessment for the proposed Shrimptons Creek bridge.

For the conducted research, please refer to report *L.S20319.005.00.Shrimptons Creek Bridge Assessment.docx*, attached to the DA submission.



- NOTE:
1. REFER TO STORMWATER MANAGEMENT PLAN FOR OSD AND WATER QUALITY CONTROLS.
 2. OUTLETS TO SHRIMPTON'S CREEK SUBJECT TO DETAILED DESIGN

LEGEND

- SITE BOUNDARY
- STAGE 1B BOUNDARY
- STAGE BOUNDARY
- PROPOSED LOT BOUNDARY
- EXISTING LOT BOUNDARY
- MAJOR CONTOURS
- MINOR CONTOURS
- PROPOSED KERB
- PROPOSED STORMWATER
- PROPOSED STORMWATER OUTLET
- PROPOSED LINTEL
- PROPOSED GSP

STORMWATER PLAN

SCALE 1:1500

ver.	date	comment	drawn	pm	level information	scale (A3 original size)	notes
C	19.03.18	ISSUED FOR APPROVAL	KT	BM	DATUM: N/A CONTOUR INTERVAL: 1.0m	0 30 60 75m SCALE: 1:1500 (FULL)	

• project management • civil engineering • infrastructure • superintendency • economic analysis • social impact • town planning • surveying • development feasibility • visualisation • urban design

drawing title:

CONCEPT STORMWATER PLAN STAGE 1B

location: HERRING RD & EPPING RD,
MACQUARIE PARK

council: RYDE CITY COUNCIL

dwg ref: 300001(1)-DA-208

client:

ASPIRE



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