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Dear Atul & Georg,

98 & 93 Hambledon Road Rezoning Application – Trunk stormwater drainage proposals

This letter supports the Rezoning Application (RA) for the proposed developments at 93 and 98 Hambledon Road, Schofields, NSW. It provides a summary of the engineering requirements for stormwater drainage within these development sites. The RA proposes a change of land use from SP2 (drainage) zoning to R2 (low density residential) zoning for the two development sites.

The two sites are currently designated as SP2 (drainage) because they are situated in relatively low lying ground and are a logical location for overland drainage. In 2013, Arup prepared a concept design for the precinct-wide stormwater strategy on behalf of Urban Growth for The Ponds Stage 4 subdivision development. This involved draining water from the East to the West side of Hambledon Road as illustrated below:

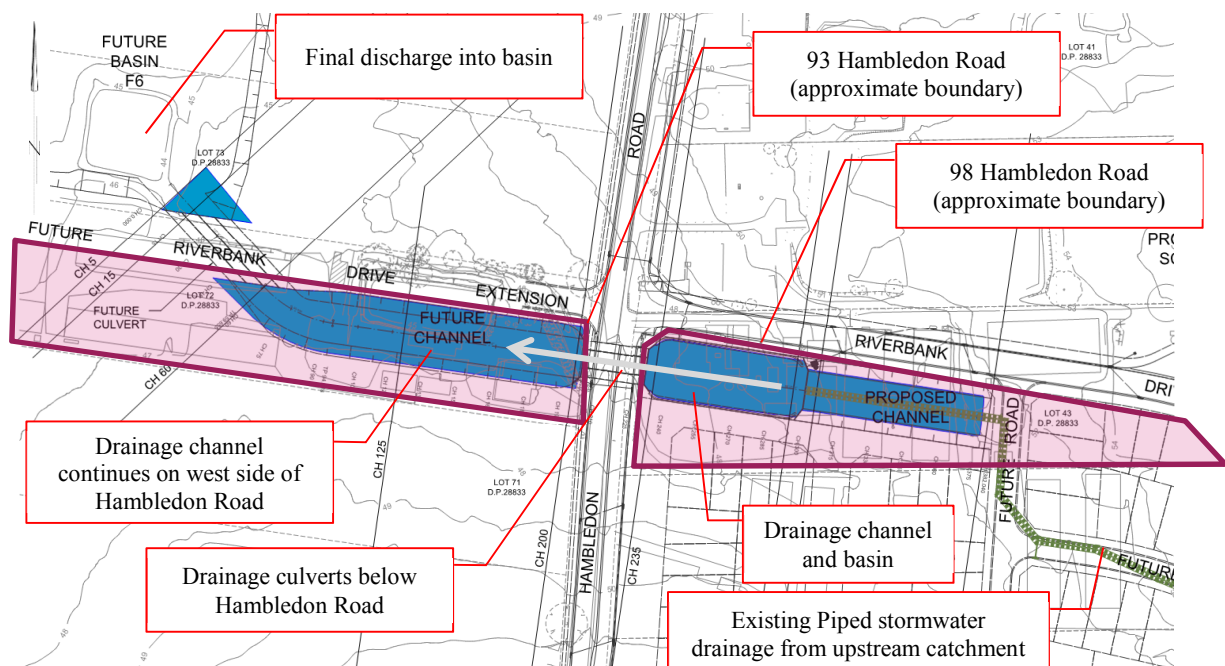


Figure 1. Original concept design proposals for stormwater management prepared by Arup, 2013

The 2013 drainage strategy conveys water from these development sites as well as the wider subdivision located south and east of the 93 & 98 Hambledon Road occupying an area of approximately 36ha. The approach was to drain stormwater runoff from these developments in a pit and pipe network to a drainage channel and basin located immediately east of Hambledon Road.

From this basin, water would be piped below Hambledon Road in a number of parallel underground culverts into a channel on the west side of Hambledon Road. The channel was intended to convey water to the west and northwest into a future basin before discharging to the north via the Blacktown Council stormwater system. This conveyance strategy is illustrated in Figure 1.

Since the preparation of the 2013 drainage strategy, Blacktown City Council's engineers have indicated a preference to replace the basin and channel with a continuous below ground drainage culvert. Similarly, these modifications permit the land owners of 93 and 98 Hambledon Road the opportunity to subdivide and develop these sites.

To facilitate this approach, Arup has been engaged by Universal Properties Group and Signature Properties No.7; the developers of 98 and 93 Hambledon Road respectively, to develop an alternative drainage strategy. This approach seeks to replace the above ground channel and basin with below ground drainage infrastructure predominantly situated below the proposed road corridors, but retains a culvert under Hambledon Road which are works that are funded by the SIC Levy.

In approaching the design of a below ground culverted drainage system, Arup has liaised with Blacktown City Council's engineers to determine the critical design criteria for this trunk drainage which are as follows:

1. Trunk drainage designed for the 1 in 100 year storm flows with 25% pipe blockage
2. Trunk drainage designed for the 1 in 100 year storm flows with 15% climate change

A concept design has been prepared for the trunk drainage infrastructure as illustrated in Figure 2. The design considers the criteria above as well as related requirements described in Blacktown City Council's *Engineering Guide for Development 2005*.

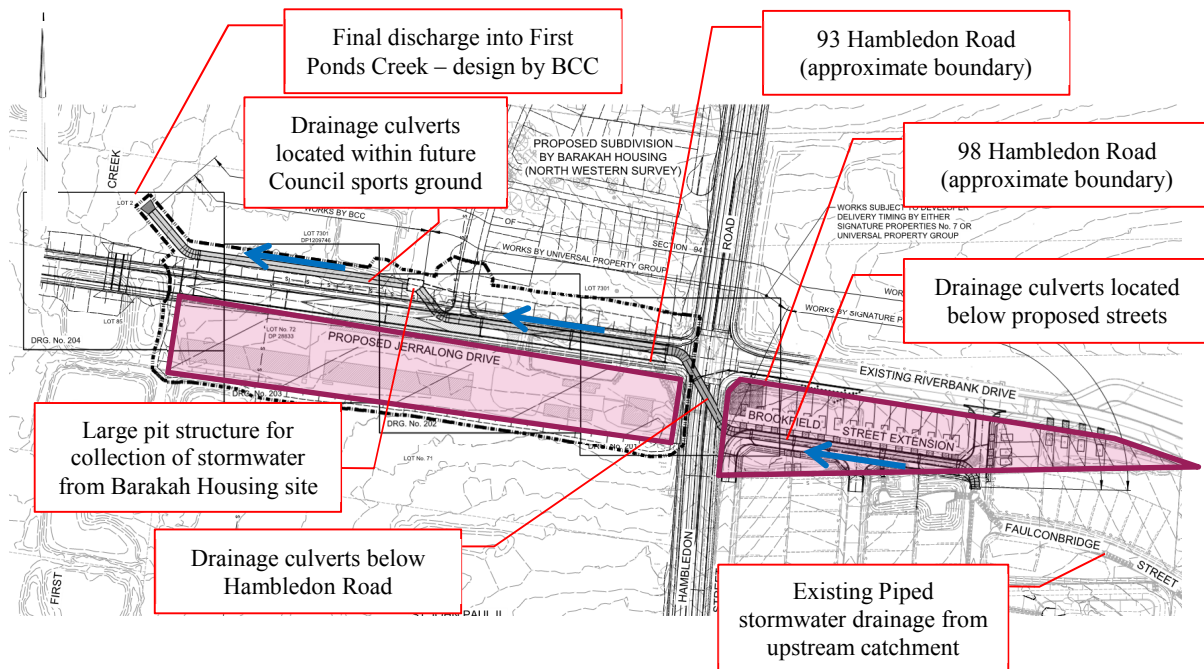


Figure 2. Proposed concept design trunk drainage infrastructure for 98 and 93 Hambledon Road

The trunk drainage infrastructure consists of twin parallel box culvert drains which convey water from the East side of Hambledon Road to the West in the same manner as the original drainage strategy. Stormwater will be ultimately conveyed into First Ponds Creek, a drainage channel designed by Blacktown City Council. This channel is understood to have sufficient capacity to accept both the volume and rate of discharge conveyed by the proposed trunk infrastructure for a 1 in 100 year storm event.

The box culverts have large internal dimensions sufficient to allow maintenance staff access for periodic inspection and maintenance activities. Access pits and surface inlets provide a means of draining stormwater runoff from roads and external areas as well as entry into the below ground system. Hydraulic analysis demonstrates surface water runoff is contained in the road corridors with minor flows in the gutter channels.

The provision and location of pits in road corridors has been designed so as to mitigate a risk of flooding the future subdivisions. Additionally, a suitable freeboard (i.e. an elevation above peak water levels) has been provided to the proposed dwellings to offer enhanced flood protection. Similarly, an adequate provision of pits in Brookfield Street shall mitigate the risk of surface water runoff spilling into Hambledon Road.

This below ground trunk drainage infrastructure ultimately replaces the original proposal for an above ground channel and basin. In turn this facilitates a Rezoning Application of the land within the 98 and 93 Hambledon Road sites so as to make it available for subdivisional development.

Summary:

Concept design proposals have been prepared for trunk drainage infrastructure to be located through the development sites at 98 and 93 Hambledon Road. This trunk drainage is required to drain surface water from these development sites as well as a larger upstream catchment.

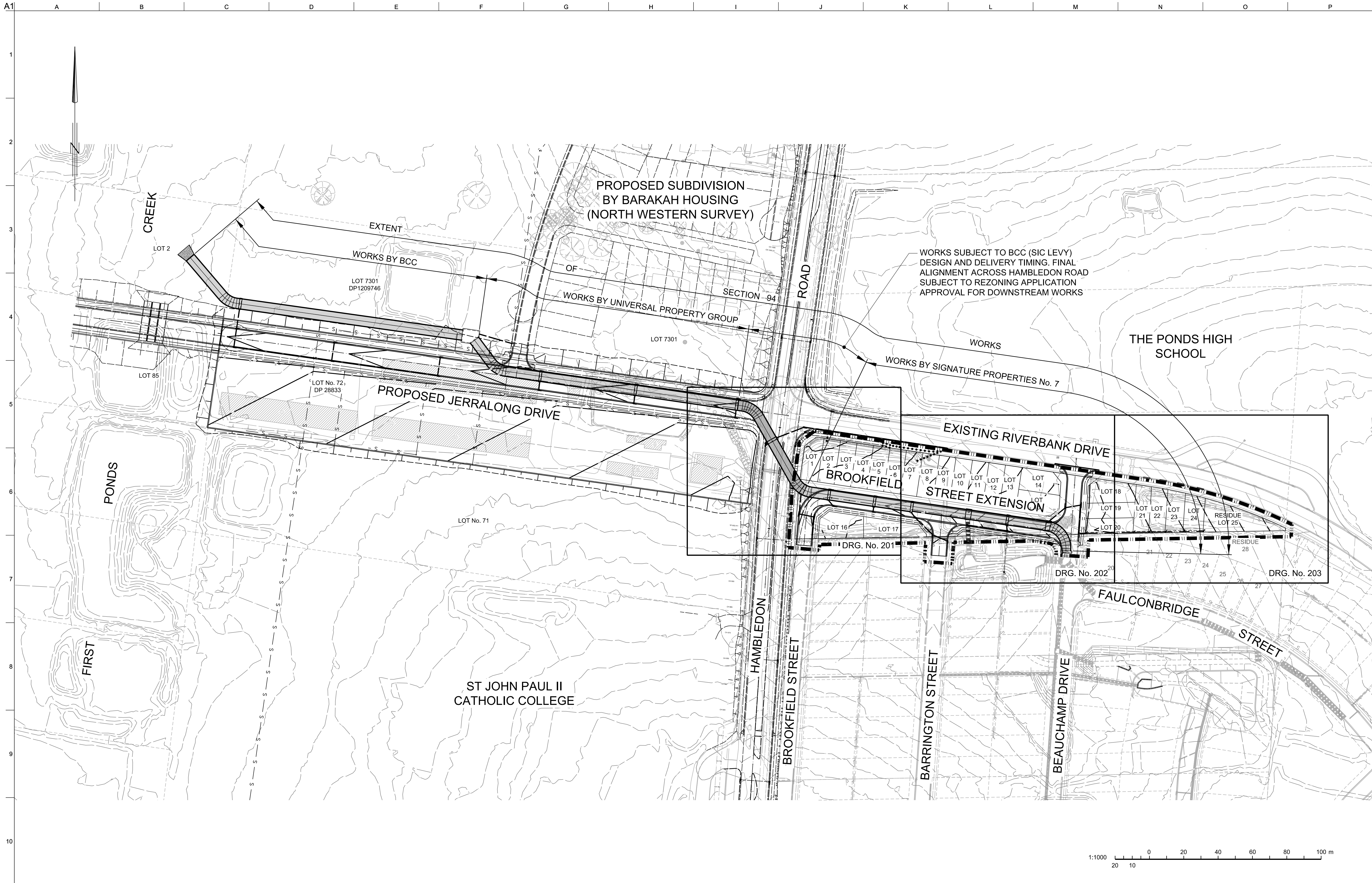
The drainage infrastructure shall consist of below ground twin box culverts designed to Blacktown City Council's technical requirements. The box culverts are of a large size sufficient to allow maintenance staff entry.

This below ground trunk drainage infrastructure ultimately replaces previous proposals for an above ground channel and basin. In turn this facilitates a Rezoning Application of the land within the 98 and 93 Hambledon Road sites for subdivisional development.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'M B Knight'.

Malcolm B Knight
Associate



P03	16/05/17	CPL	MBK	MBK
ISSUED FOR REVIEW				
P02	18/07/16	CPL	DC	MBK
ISSUED FOR REVIEW				
P01	- / - / -	-	-	-
NOT ISSUED				
Issue	Date	By	Chkd	Appd

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Consultant

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Member Firm
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Project

98 HAMBLEDON ROAD

Client

SIGNATURE PROPERTIES
No. 7 Pty. Ltd.

Job Title

98 HAMBLEDON ROAD
SUBDIVISION

PLAN OF SECTION 94 WORKS

Scale at A1 AS SHOWN

Discipline CIVIL

Drawing Status

FOR REVIEW

Project No 249274/00

Drawing No P98-C01-200

Issue P03