WOOD & GRIEVE ENGINEERS

ENQUIRIES: IAN HARRIS
PROJECT NO: 29212-SYD-C

25 October 2016

RE: 23-33 & 35-39 BRIDGE STREET, SYDNEY 2000, NSW - STORMWATER MANAGEMENT PLA

Introduction

This report has been prepared to address the stormwater management associated with the development of 23-33 and 35-39 Bridge Street, Sydney 2000, NSW

Existing Site Characteristics

Address:	23-33 Bridge Street, Sydney 2000, NSW
Real Property Description:	Lots 1877 on DP877000
Total Site Area:	3,325m² (0.3325Ha)

Address:	35-39 Bridge Street, Sydney 2000, NSW
Real Property Description:	Lots 56 on DP729620
Total Site Area:	2,738m² (0.2738Ha)

As can be seen in the site location aerial photo below, the sites are bounded by Bridge Street to the north, Gresham Street to the west, Young Street to the east and Bent Street to the south. Loftus Street runs north-south between the two sites.

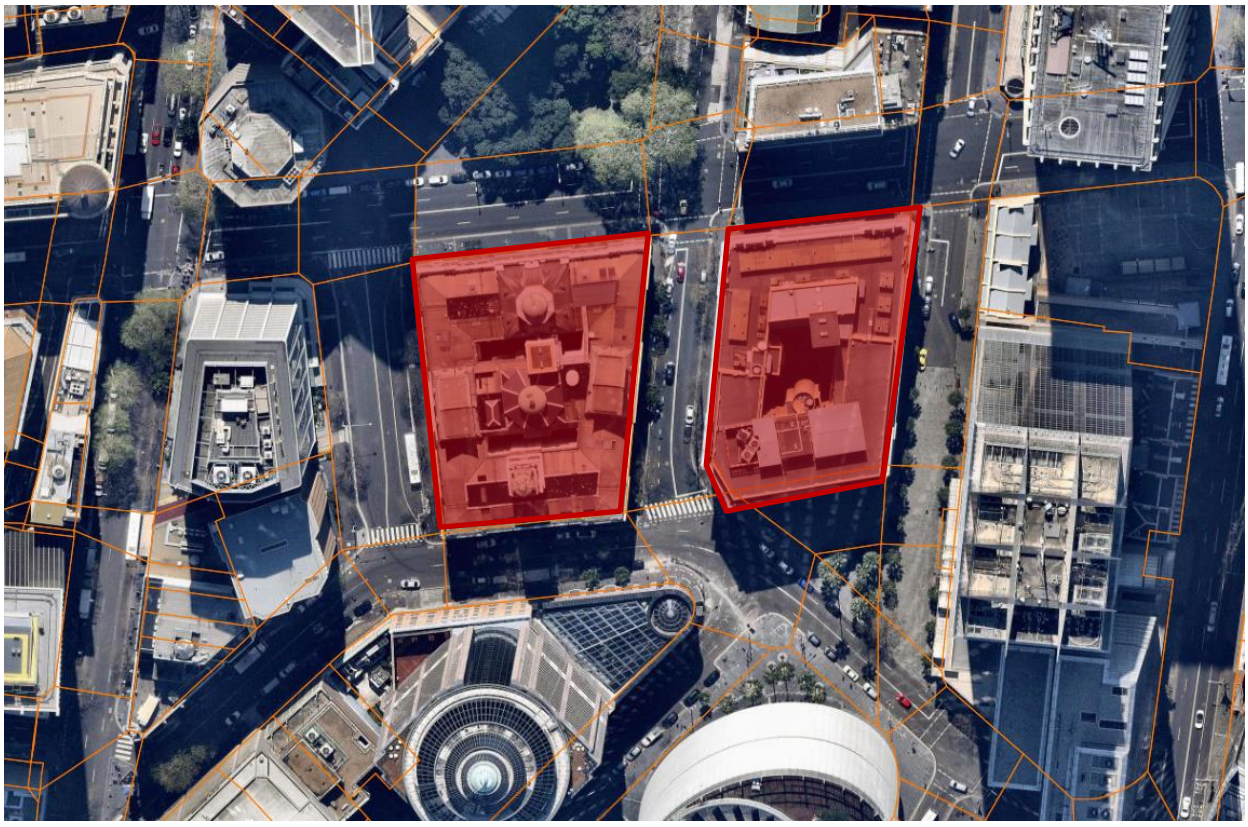
The site is currently fully developed.

The existing site topography surrounding the site falls from south to north and east to west.

Existing Stormwater Drainage

The site is currently fully developed and there is evidence that all roof drainage discharge directly to the kerb and gutter in the surrounding roads.

There is currently an in ground drainage system is located on Bridge Street at the north of the site.



Site Location Aerial (Source: Near Maps)

Proposed Development

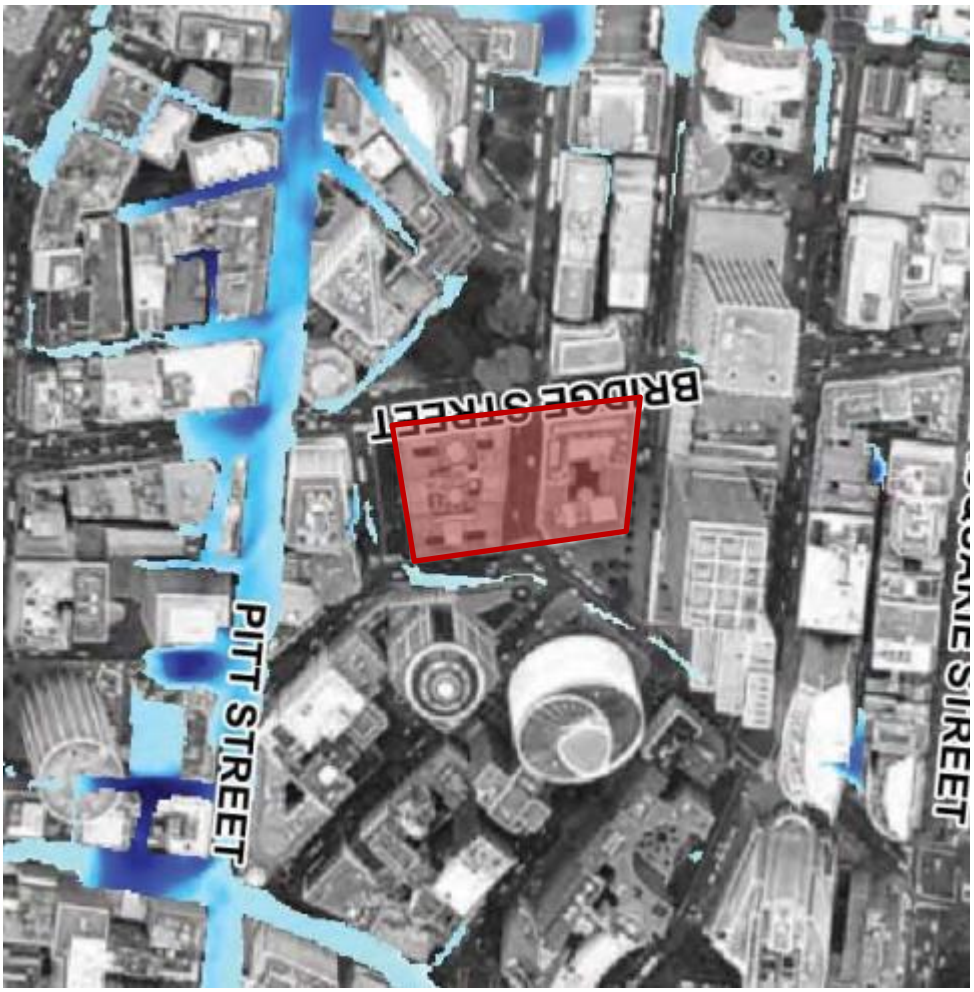
It is proposed that the existing buildings will be redeveloped and converted into a hotel. Works include new basements works and a tunnel below Loftus Street.

Flood Impact Assessment

When considering a new development it is important to assess the impact of existing flooding on the proposed development and also the impact of the proposed development on existing or potential flooding both upstream and downstream of the development.

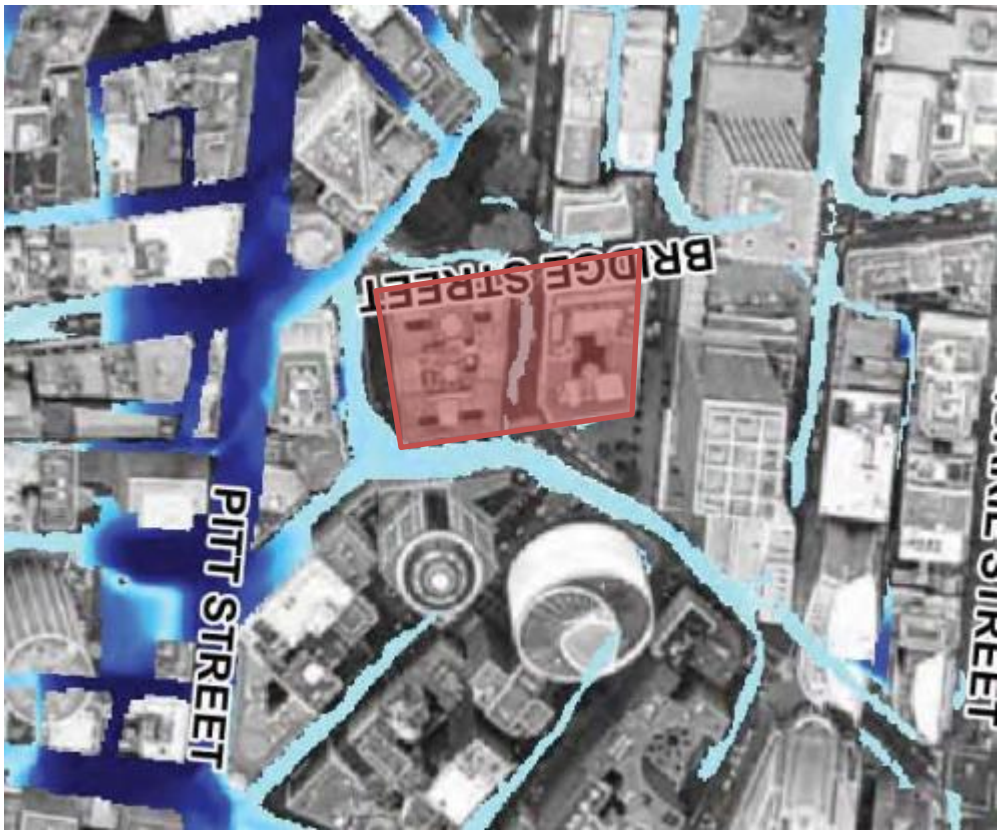
The City Area Catchment Flood Study prepared by BMT WBM indicates that the site is not flood affected during the 100 year design flood event. An extract from the report is shown below.

Flooding does occur on Pitt Street east of the site. This is the major flood route through the catchment.



100 Year Flood Extent(Source: City Area Catchment Flood Study prepared by BMT WBM)

The PMF flood extent does impact on the sites as can be seen in the extract below. Bents, Grisham, Loftus and Bridge Streets are all impacted by the PMF flood. The flood modelling indicates that during a PMF flood event the flood depths would range between 0.1 to 0.25m on all street frontages.



PMF Flood Extent (Source: City Area Catchment Flood Study prepared by BMT WBM)

Flood Planning Levels

City of Sydney Council currently set flood planning levels in their "Interim Floodplain Management Policy, May 2014". This document tabulates the minimum flood planning levels required for various types of development.

Key elements of the development and their flood planning requirements have been listed in the table below:

Development Type		Type of Flooding	Flood Planning Level
Commercial	Retail Floor Levels	Mainstream or local drainage flooding	1% AEP flood level + 0.5m
	Residential floors with tourist establishments	Mainstream or local drainage flooding	Merits approach presented by the applicant with a minimum of the 1% AEP flood. The proposal must demonstrate a reasonable balance between flood protection and urban design outcomes for street level activation.
Below-ground garage/car park		Mainstream or local drainage flooding	1% AEP flood level + 0.5 m or the PMF (whichever is the higher)
Critical Facilities	Floor Level	Mainstream or local drainage flooding	1% AEP flood level + 0.5m or the PMF (whichever is higher)
	Access to and from critical facility within development site	Mainstream or local drainage flooding	1% AEP flood level

Commercial floor levels: As the site is not currently impacted by the 100 year flood extent then there will be no flood planning level requirement for the commercial floors of the development.

Loading Dock: Access to a new loading dock is currently proposed on Loftus Street. This area is not affected by the 100 year flood level but is affected by the PMF. The flood study indicates that the maximum flood depth in the PMF on Loftus Street would be 0.25m. In accordance with council's draft flood management guidelines the crest of the access driveway should be set at 0.25m above the adjacent gutter level to mitigate the risk of PMF flood waters entering the loading dock.

Critical Facilities: In the case of this development the only facility which could be deemed critical would be a substation. Currently it is proposed that the electrical supply for the development will be located off site and as such there will be no flood planning requirements which fall under the critical facilities section of the policy.

Flood Hazard Management

As the site is currently not impacted by the 100 year flood extents the site would be classed as low flood risk hazard.

During a 100 year flood event occupants of the development could leave the site without the risk of being impacted by the flood waters.

During a PMF flood event it would still be possible for occupants to leave the site and travel towards nearby areas which were not flood affected. Should egress from the site be made impossible due to unforeseen circumstances the floors above ground floor level of the development are positioned above the PMF flood levels surrounding the site. Patrons can remain on the site and be unaffected by the flood waters.

Stormwater Management

Stormwater Conveyance

Council's Sydney Streets Technical Specifications states that the following design storm Average Recurrence Intervals ARI's should be allowed for when designing the Stormwater runoff conveyance systems for the development.

Design Parameter	Design Storm ARI (Years)	Conveyance Method
Minor Drainage System (Sag)	20	In Ground (Piped)
Major Drainage System	100	Overland

Table 1: Stormwater Drainage Serviceability

Stormwater Detention

Council's on line mapping confirms that no OSD will be required for the development of the site.

Stormwater Disposal

It is proposed that two new connections will be made as part of the development, one for each of the sites.

The connection for the 23-33 Bridge Street site will be made to an existing Sydney Water stormwater kerb inlet pit on the corner of Bridge Street and Grisham Street. The connection will be a 375mm diameter RC pipe connection.

The connection for the 35-39 Bridge Street site will be made by constructing a new stormwater kerb inlet pit on Loftus Street breaking into the existing Sydney Water stormwater line running under the kerb and gutter. This connection will also be a 375mm diameter RC pipe connection.

Stormwater Quality Treatment

The City of Sydney DCP 2012 states for stormwater quality:

Stormwater quality
(1) Development of a site greater than 1,000sqm must undertake a stormwater quality assessment to demonstrate that the development will achieve the post-development pollutant load standards indicated below:
(a) reduce the baseline annual pollutant load for litter and vegetation larger than 5mm by 90%;
(b) reduce the baseline annual pollutant load for total suspended solids by 85%;
(c) reduce the baseline annual pollutant load for total phosphorous by 65%; and
(d) reduce the baseline annual pollutant load for total nitrogen by 45%.

(2) The stormwater quality assessment is to be prepared by a suitably qualified engineer with experience in water sensitive urban design (WSUD) and include:
(a) modelling of pollutant load standards with an industry standard water quality model;
(b) the design of WSUD measures used to achieve the post-development pollutant load standards; and
(c) maintenance schedules of any proposed WSUD measure that requires maintenance or full replacement including the likely recycling or disposal location of any wastes that may be generated.

As the site has a total plan area of 6,063m2 WSUD will be provided for the development. As there are two connections being made to council infrastructure then a water quality device will be supplied for each building. It is proposed that Stormwater 360 Stormfilter systems will be installed directly upstream of the proposed connection points with a view of achieving the council stormwater quality targets as discussed above.

We trust that this information is sufficient for your purposes, however should you have any queries in regards to this report please feel free to contact me.

Yours faithfully

Ian Harris
for **Wood & Grieve Engineers**

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