

To: [Department of Planning, Industry and Environment](#)

Produced: Michele Zornitta (Associate Water Resources Engineer -WSP)

Reviewed: John Pickering (Associate Engineer - WSP)

Subject: **Waterloo Metro Quarter OSD**
SSD-10437 Southern Precinct – Response to submission comments

Date: 15 February 2021

Introduction

This note has been prepared to respond to the comments dated 25 November 2020 raised by the Environment, Energy and Science Group (EES) to the Department of Planning, Industry and Environment (DPIE) public exhibition period for Waterloo Metro Quarter Over Station Development (OSD).

Specifically, this note responds to the comments for the Southern Precinct detailed SSD DA (SSD-10437). Figure 1 below represents a schematisation of Waterloo Metro Quarter OSD - areas in red identify the proposed Southern Precinct (SSD-10437).

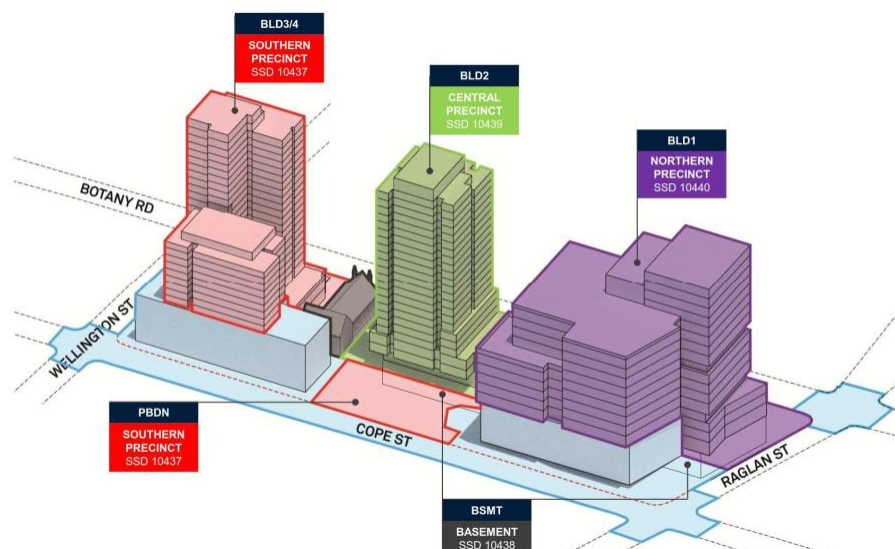
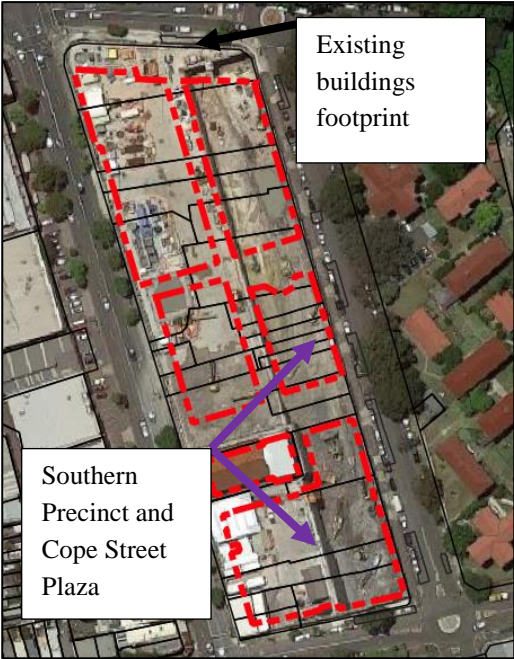


Figure 1: Waterloo Metro Quarter site, with sub-precincts identified

Comment	Response
Floodplain risk management	
<p>1 The reports have not included flood level mapping for any scenarios, except the 1% AEP flood event plus climate change. This is a significant omission. This mapping, including water level contours at appropriate intervals, must be provided as a minimum for the 5% and 1% AEP flood events and the PMF event. It is not possible to verify any of the flood level information quoted in the report without this mapping. A proper review of the submission cannot be completed until this has been provided. The frequency of typographical and grammatical errors does not give the reader any confidence that the appropriate degree of checking and verification has been completed in general.</p>	<p>Maximum flood levels for the 1%AEP, 1% AEP + Climate Change (CC) and PMF flood events are included in <i>Table 4: Design flood planning levels – Building Floor Levels of the Stormwater Management Strategy and Flood Impact Assessment – SSD-10437 Southern Precinct report</i>; flood levels included in Table 4 represent the maximum water levels for the 1%AEP, 1% AEP+CC and PMF flood events in correspondence to relevant building areas.</p> <p>Flood levels for the 5% AEP flood event was not originally included in the flood impact assessment report as not relevant in the determination of flood planning levels; flood planning levels have been informed by the 1% AEP, 1% AEP+CC and PMF maximum flood levels.</p> <p>Water level contour maps (with a 50mm contour interval) for the 5%AEP, 1% AEP and PMF flood events have been prepared and attached to this response as requested by the EES reviewer.</p> <p>The report and technical work developed for Waterloo Metro Quarter OSD has been reviewed and approved by the appropriate WSP flood engineers; the Flood Impact Assessment report has also been reviewed and approved by Waterloo OSD representatives.</p>
Flood impacts of the proposed development	
<p>2 The individual buildings of the over station development are not expected to cause any flood impacts; however, the ancillary road works are predicted to cause unacceptable impacts.</p>	<p>As noted by the EES reviewer the individual buildings of the OSD are not expected to cause any negative flood impacts.</p> <p>This is due to the footprint occupied by the proposed buildings and Cope Street plaza that is less than the existing buildings as shown in figure below.</p>

		 <p>Existing buildings footprint</p> <p>Southern Precinct and Cope Street Plaza</p> <p>Southern Precinct development and Cope Street Plaza (SSD-10437 – BLD3/4 and PBDN) do not affect topography levels outside the existing buildings footprint (i.e. pre-development conditions prior to any work associated with the metro station construction).</p> <p>As such, it is not possible for the Southern Precinct and Cope Street Plaza to negatively affect flood conditions to the adjacent land because the building footprint is less than the pre-development footprint.</p> <p>Flood impacts observed in the Stormwater Management Strategy and Flood Impact Assessment – SSD-10437 Southern Precinct report are caused by the proposed road works along Cope Street that forms part of the metro station Critical State Significant Infrastructure (CSSI) application scope.</p> <p>The road works along Cope Street are not part of this development application (SSD-10437).</p>
3	<p>The report notes that the Council of the City of Sydney was consulted and noted that an acceptable tolerance for flood level increase would be 10mm. This is considered reasonable and within the level of accuracy of current best practice flood modelling. The Concept</p>	<p>Noted.</p> <p>We advise that further consultations on flood impacts (i.e. in September and October 2020) have been held with the CoS as part of the metro station Critical State Significant Infrastructure (CSSI) application.</p>

	<p>Water Quality, Flooding and Stormwater Report of 2018 showed flood level increases that were within the limit of 10mm. It appears that road works were not included in the concept stage modelling.</p>	<p>We anticipate that CoS would accept the flood impact generated by metro station Critical State Significant Infrastructure (CSSI) application; this has not yet been issued by CoS.</p>
4	<p>The current report documents flood level increases that are well in excess of the 10mm tolerance. Increases of up to 100mm are documented for both the 1% and 5% AEP flood events. It appears that an attempt has been made to justify allowing the increase in levels on the premise that these occur for a short period of time, which is not appropriate.</p> <p>Limited detail has been provided on the topographical changes that would cause the predicted increase. A reduced carriageway width and reconfiguration of two intersections are changes noted in the flood report. Reference is made to the “civil design report for a detailed discussion on the proposed development topography” however, no such discussion is available in that report</p> <p>The report states that mitigation measures to ameliorate the flood impacts are under development. This work would need to be finalised and submitted for review by EES before a recommendation could be given supporting the project.</p> <p>If impacts cannot be reduced to a tolerable level, a detailed investigation of the affected properties, including at least three residential buildings on the other side of Cope St, including floor level survey would allow proper assessment of the impacts.</p>	<p>As indicated in response 2 above the Southern Precinct development is not expected to generate negative flood impacts to the adjacent land.</p>

	Flood risk for the development – Flood Planning Levels	
5	<p>The Concept Water Quality, Flooding and Stormwater Report of 2018 recommended Flood Planning Levels (FPLs) of either the 1% AEP flood level plus 500mm freeboard or the PMF level. This present 2020 report has adopted lower FPLs for retail areas of the 1% AEP flood level (without freeboard). The apparent justification for this change in strategy is that this is consistent with City of Sydney policy, which is not unreasonable.</p>	<p>All relevant floor levels are proposed at the 1%AEP + 500mm freeboard flood level as a minimum except for Area 6 (substation). Area 9 (previously fire control room). Note the fire control room has been relocated to Area 8 in this RtS submission). Area 9 is now fire stair egress and pedestrian access to the loading dock.</p> <p>The FFL at the ground level entry (Area 2) is 16.38, which is 706mm above 1% (RL 16.174). The FFL of the ground level is limited by the length of the accessible ramp connecting ground level with the footpath, and the minor non-compliance in ground level FFL in relation to PMF is considered acceptable in the interests of achieving a superior urban design.</p> <p>We confirm that the following guidelines and policies have been reviewed to inform the FPLs:</p> <ol style="list-style-type: none"> 1) Interim Floodplain Management Policy, City of Sydney; and, 2) Waterloo Metro Quarter (WMQ)– Design and Amenity Guidelines, 2020 New South Wales Government – Sydney Metro. <p>Consultation with Council flood engineer has also been held to confirm project requirements.</p>
6	<p>It appears that most of the floor levels meet the requirements. The exception is Area 6, which is below the 1% AEP flood level and houses substations. The report notes that this level has been discussed with Ausgrid, however no indication is given that Ausgrid accepted this lesser level of flood protection or what the predicted flood frequency would be. Without any such assurance, EES recommends that the floor level be raised to comply with the requirements. Areas 1-4, 7 and 8 are above the 1% AEP flood level plus 0.5m freeboard, but approximately 100mm below the PMF level. Area 5 rises above the PMF level beyond a lower</p>	<p>As indicated in the report floor level for Area 6 has been discussed and accepted in principle by Ausgrid.</p> <p>We believe that Ausgrid's acceptance of the proposed floor level for Area 6 is a sufficient justification for the EES reviewer. Relevant correspondence with Ausgrid is attached to this response.</p> <p>Furthermore, the location of the Wellington St substation was the subject of considerable discussion with the Design Review Panel. Numerous options for the location of the substation were assessed by the design team,</p>

	entry area. Area 9 is above the 1% AEP flood level.	and in after consultation with the DRP, the DA design was endorsed (item 8.06)
	Flood risk for the development – Residual Risk and Emergency Management	
7	<p>While it has been asserted, that “Safe refuge can be provided within the proposed development”, this has not been demonstrated. There are several issues regarding residual risk that have not been addressed and require amendments to the design. It is recommended that the proponent engage a suitably qualified and experienced professional to develop an appropriate strategy for flood emergency management. The Alexandra Canal Floodplain Risk Management Study and Plan should be considered along with all relevant emergency management documents by the SES.</p> <p>The discussion regarding timing of flooding in relation to evacuation has not demonstrated an understanding of the principles involved and is not consistent with current available guidelines. Before the proposal moves to the next stage, a proper assessment of the flood behaviour as it relates to emergency management is required, together with the development of a strategy for flood emergency management. Detailed information on the timing/duration of extreme events should be considered and presented. Shorter and longer durations should be considered for emergency planning, not only the duration that generates the peak flood level.</p>	<p>Floor levels proposed for the Southern Precinct provide flood protection in a flood emergency; no evacuation from the building would be required as safe refuge is provided within the development.</p> <p>The following arguments should be considered in the determination of the flood risk and residual risk for the development:</p> <p>Area 1 (community use): area 1 is designed to be at 1%AEP + 706 mm freeboard flood level.</p> <p>In an extreme flood event (i.e. PMF) water depth is expected to be up to 18 cm. As such, flood risk in a PMF event is considered low. According to ARR 2019 guidelines flood hazard in Area 1 in a PMF event is classified as H1 – generally safe for people, vehicles and buildings.</p> <p>No evacuation is deemed necessary for occupants of Area 1 as sufficient flood protection (i.e. 1%AEP+706 mm freeboard) is provided within the area.</p> <p>It is not possible for Area 1 to have floor levels above the PMF without compromising street activation.</p> <p>In a PMF event occupants of area 1 are safe and not in danger.</p> <p>Area 2 (student accommodation lobby): area 2 is designed to be at 1% AEP + 706 mm freeboard flood level. In an extreme flood event (i.e. PMF) water depth is expected to be up to 18 cm. Access to higher floors is also possible within Area 2. Flood risk is considered low. As per ARR 2019 guidelines flood hazard in Area 2 during a PMF flood event is classified as H1</p>

	<p>– generally safe for people, vehicles and buildings.</p> <p>No evacuation is necessary for occupants of Area 2 as sufficient flood protection is provided within the area.</p> <p>Area 3 (Gym Lobby): area 3 is designed to be at 1%AEP + 612 mm freeboard flood level. In an extreme flood event (i.e. PMF) water depth is expected to be up to 13 cm within Area 3. Access to higher floor is also possible within Area 3.</p> <p>Flood risk is therefore considered low.</p> <p>No evacuation is necessary for occupants of Area 3 as sufficient flood protection is provided within the area.</p> <p>Area 4 (loading dock): area 4 is designed to be at 1%AEP + 657 mm freeboard flood level. In an extreme flood event (i.e. PMF) water depth is expected to be up to 14 cm.</p> <p>Flood risk in Area 4 is therefore considered low.</p> <p>No evacuation is necessary for occupants of Area 4 as sufficient flood protection is provided within the area.</p> <p>Area 5 (lobby): Lobby entry is designed to be at street level with a stepped in area at PMF flood level.</p> <p>As such, no evacuation is necessary for occupants of Area 5 as flood protection is provided within the area.</p> <p>Area 6 (substation): refer to response 6.</p> <p>Area 7 (bike room / waste room): area 7 is designed to be at 1%AEP + 657 mm freeboard flood level. In an extreme flood event (i.e.</p>
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		<p>PMF) water depth is expected to be up to 14 cm.</p> <p>Flood risk is considered low.</p> <p>No evacuation is deemed necessary for occupants of Area 7 (<u>bike room and waste room</u>) as sufficient flood protection is provided within the area.</p> <p>Area 8 (switch room and fire control room): area 8 is designed to be at 1%AEP + 700 mm freeboard flood level. In an extreme flood event (i.e. PMF) water depth is expected to be up to 18 cm.</p> <p>Flood risk is considered low. Occupants of area 8 can also access area 2.</p> <p>Except for area 6 FPLs are above the 1% AEP + 500 mm freeboard flood level as a minimum.</p> <p>The site area is located at the top of the catchment and only the events with short duration and high intensity rainfall are relevant in terms of flood protection.</p> <p>Different storm durations have been considered for the 1% AEP, 1%AEP+CC and PMF events to determine the critical storm durations that were used to define appropriate floor levels. This is as per accepted standard industry approach.</p> <p>As indicated within the flood study report storm durations tested are the same as what was considered in the Alexandra Canal Catchment flood model which is currently adopted by CoS; an additional storm duration of 90 minutes was also considered for the 1% AEP flood event.</p> <p>A flood emergency management plan will be provided at a later stage prior to occupation of the building.</p>
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8	<p>An attempt has been made to identify areas where occupants could shelter in place. However, no consideration has been given to the number of persons at risk and whether there is enough space for these individuals in the nominated shelter areas. Any persons in external licenced seating areas, must be accounted for in emergency planning.</p>	<p>All areas in the southern building are provided with sufficient freeboard above the maximum 1% AEP flood level.</p> <p>Refer to response 7 above for further details in FPLs.</p> <p>There are no external licenced areas in the Southern Precinct.</p> <p>A flood emergency management plan will be provided at a later stage prior to occupation of the building.</p>
9	<p>Lifts and escalators may not be operational during extreme floods. It is not considered acceptable for persons coming from the basement to exit onto the street in extreme floods. Direct stair access must be provided to refuge internal to the building.</p>	<p>There are no accesses to/from the basement within the Southern Precinct.</p>
10	<p>Emergency response planning must consider human behaviour. It is not considered appropriate to expect a worker to remain alone inside a small meter room or similar until an extreme flood event passes.</p>	<p>There is no isolated <u>small</u> meter room in the Southern Precinct. Refer to response 7 for further detail.</p> <p>Emergency management procedures are not included in the flood study.</p>
11	<p>Consideration should be given to possible medical evacuations necessary during an extreme flood event.</p> <p>The City of Sydney policy requires a raised area to be provided above the PMF level for shelter in place purposes. The reports have demonstrated cases where the raised area would only be above the 1% AEP flood level. In this case, alternative provisions must be in place for evacuation during extreme</p>	<p>As indicated in response 7 floor levels are proposed to be above the 1% AEP flood level + freeboard.</p> <p>In a PMF event maximum water depth is expected to be 18 cm in area 1; this represents the relevant maximum water depth in a PMF event; flood hazard is classified as H1- generally safe for people, vehicles and buildings.</p> <p>Evacuation is not necessary in an extreme flood event as the level of flood protection</p>

	floods, specifically internal access to a shelter.	achieved within the building is sufficient to protect occupants of the building.
12	<p>All areas except Area 5 are below the PMF level and require consideration of residual risks per above comments. Areas 2 and 3 have stair access to upper floors and areas 4 and 7 have access to Area 2.</p> <p>The emergency response section of the report has not demonstrated suitable consideration of the issues. It is not acceptable to consider the 1% AEP flood event only and state that occupants can 'remain safe' in extreme flood events. The full range of floods must be considered.</p>	Refer to response 7 above.



APPENDIX A – FLOOD LEVEL MAPS

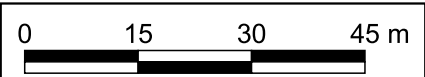


KEY:

- Station Building
- Northern Precinct
- Central Precinct
- Southern Precinct
- Waterloo Congregational Church
- Contour Level (m AHD)

Water Level (m AHD)

- <= 1
- 1 - 15.75
- 15.75 - 16
- 16 - 16.5
- 16.5 - 16.75
- 16.75 - 17
- 17 - 20



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Rev.	Date	ISSUE	Prepare	Approve
B	03/02/21	SECOND ISSUE	MZ	AV



WSP Australia Pty Limited
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Waterloo - OSD

Proposed Scenario - 5% AEP

Water Level

Scale: 1:1000

03/02/21

Project Number: PS119449



KEY:

Station Building

Northern Precinct

Central Precinct

Southern Precinct

Waterloo Congregational Church

Contour Level (m AHD)

Water Level (m AHD)

<= 1

1 - 15.75

15.75 - 16

16 - 16.5

16.5 - 16.75

16.75 - 17

17 - 20

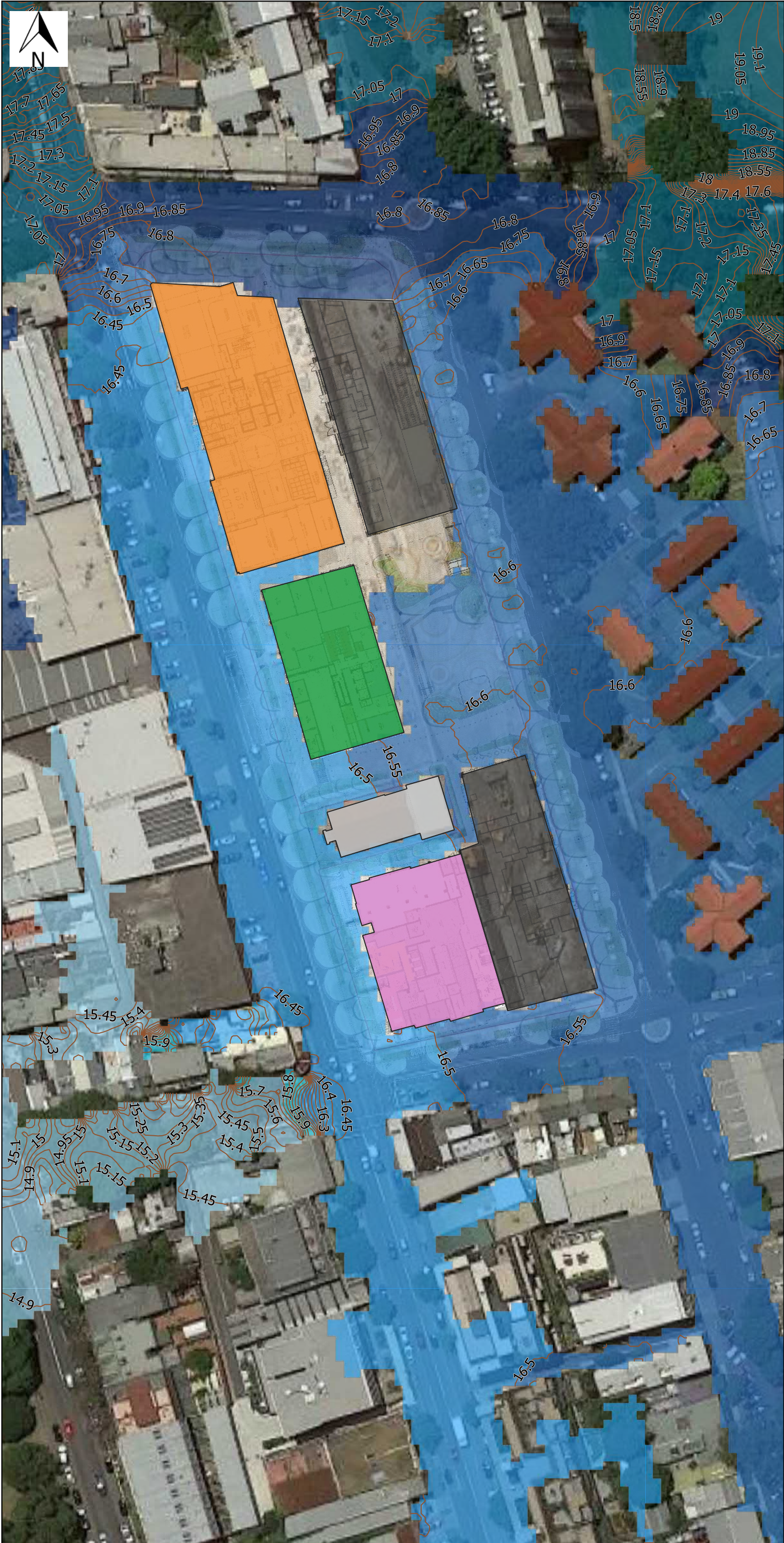


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Rev.	Date	ISSUE	Prepare	Approve
B	03/02/21	SECOND ISSUE	MZ	AV



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Waterloo - OSD	
Proposed Scenario - 1% AEP	
Water Level	
Scale: 1:1000	03/02/21
Project Number: PS119449	

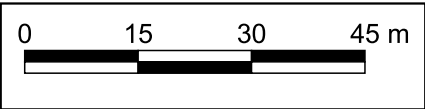


KEY:

- Station Building
- Northern Precinct
- Central Precinct
- Southern Precinct
- Waterloo Congregational Church
- Contour Level (m AHD)

Water Level (m AHD)

- <= 1
- 1 - 15.75
- 15.75 - 16
- 16 - 16.5
- 16.5 - 16.75
- 16.75 - 17
- 17 - 20



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Rev.	Date	ISSUE	Prepare	Approve
B	04/02/21	SECOND ISSUE	MZ	AV



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Waterloo - OSD

Proposed Scenario - PMF

Water Level

Scale: 1:1000

04/02/21

Project Number: PS119449



APPENDIX B – AUSGRID RESPONSE

Zornitta, Michele

From: Lingasen Pather <LPather@ausgrid.com.au>
Sent: Friday, July 10, 2020 1:02 PM
To: Saliba, Richard
Cc: Beck, Rob; Patrick Garland; Simon Joseph
Subject: RE: AN-21263 - WMQ_Mini Substations

Hi Richard,

Engineering has advised that the substation floors to maintain 120mm - 190mm step and not raised to suit the 1:100 year flood.

Regards,

Lingasen Pather

Contestable Project Coordinator / Contestable Connections Sydney East & CBD



02 9663 9209 / 0408610829
Level 1, 130 Joynton Avenue, Zetland NSW 2017
lpather@ausgrid.com.au

Please consider the environment before printing this email.

From: Saliba, Richard <Richard.Saliba@wsp.com>
Sent: Thursday, 9 July 2020 2:12 PM
To: Lingasen Pather <LPather@ausgrid.com.au>
Cc: Beck, Rob <Rob.Beck@wsp.com>; Patrick Garland <patrick.garland@mirvac.com>; Simon Joseph <Simon.Joseph@jhg.com.au>
Subject: AN-21263 - WMQ_Mini Substations

Hi Lingasen,

Thank you for your time today further to our discussion, we are in the planning phase of the 2x1000kVA mini surface chambers substations (side by side) and we are faced with 2 options that we are dealing with to drive our building design;

- 1- Having the two mini surface chambers on the 1:100yr flood level with one 310mm step-up.
- 2- OR lower the subs floors to maintain the 190mm step-up, however have the subs 120mm below the 1:100yr flood level.

We understand option 1 is a deviation from the network standard and would require a dispensation, however an early advise from is much appreciated.

We can do either options, as we do have an ability to lift the Mini Chamber substations to lower the step up from footpath level but we would like some guidance for Ausgrid's preference.

I have attached the elevations for your review and comment.

Richard Saliba

Associate Electrical Engineer



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