

SSDA - Flood and Stormwater Report

338 Pitt Street, Sydney

Prepared for Hans Sydney Pty Ltd / 06 April 2020

181034 CAAA – Rev A

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1.0 Introduction

This report has been prepared by Taylor Thomson Whitting (TTW) to support a Stage Significant Development Application (SSDA) for the mixed use redevelopment of 338 Pitt Street, Sydney, which is submitted to the City of Sydney pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). China Centre Development Pty Ltd is the proponent of the SSDA.

The site is located at the corner of Pitt Street and Liverpool Street, within the 'Mid Town' precinct of Sydney's Central Business District (CBD), refer to Fig 1. The site is approximately 150m west of Museum Station and Hyde Park, and approximately 350m from Town Hall Station. The site includes several allotments and constitutes nearly one third of the city block between Bathurst Street, Pitt Street and Liverpool Street. The site is an irregular shape and has a combined area of approximately 5,900m².

The proposed development comprises of hotel, residential, commercial and retail uses and will include:

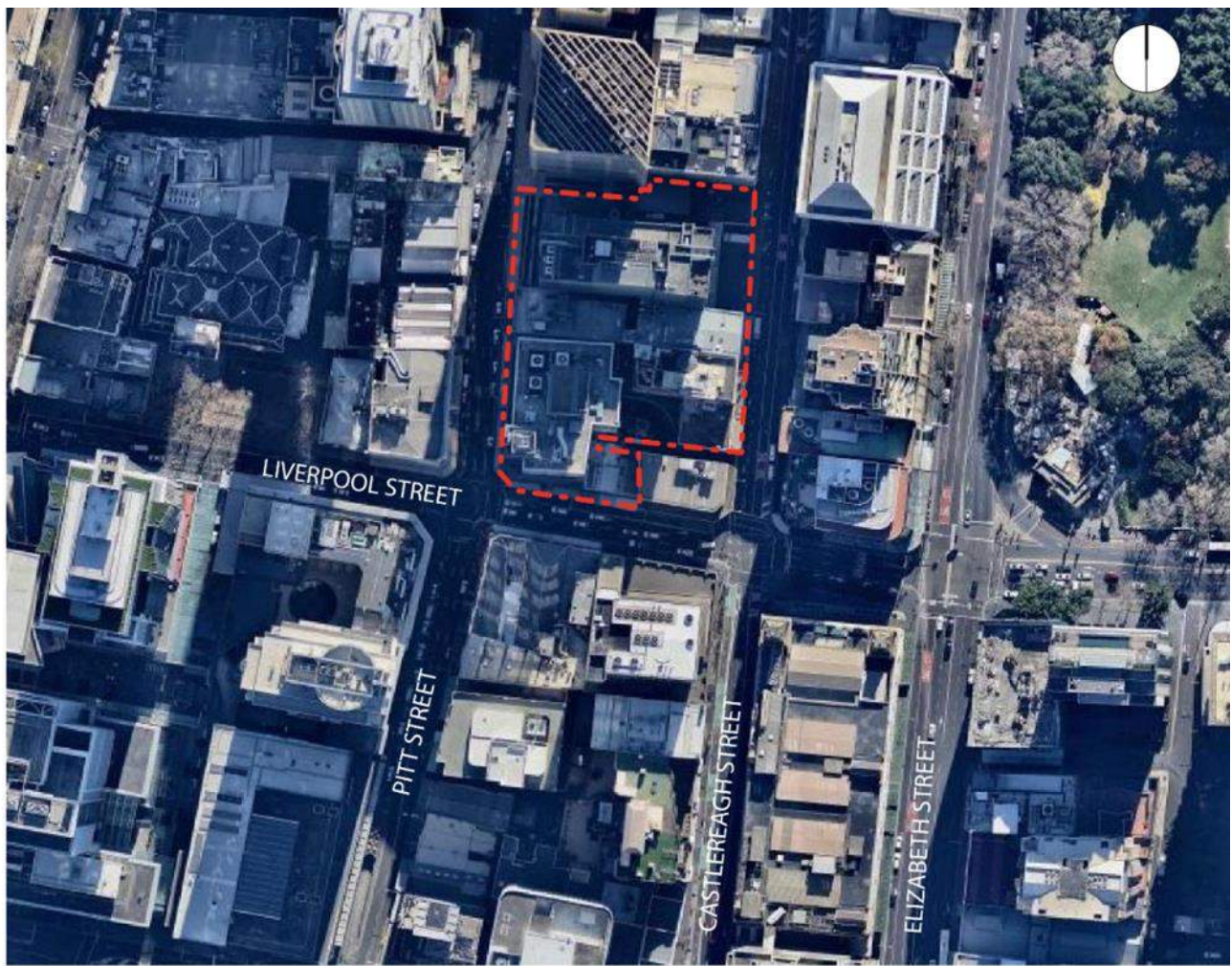
- demolition of all existing structures;
- excavation and site preparation, including any required remediation;
- construction and use of a mixed-use development, with an iconic 258m two-tower built form above a podium and internal courtyard;
- four (4) basement levels and a lower ground level accommodating residential, retail and hotel car parking, motorcycle parking, bicycle parking, loading dock, storage and relevant building services;
- improvements to the public domain, including landscaping, pedestrian thoroughfares/connections, and landscaping; and
- augmentation and extension of utilities and services.

A detailed description of development is provided by Ethos Urban within the EIS.

The subsequent sections of this report cover the following civil works, which respond to the Corresponding Secretary's Environmental Assessment Requirements (SEARs):

Sears Reference:	Civil Requirements:
11. Water, drainage and stormwater	Flood Impact Assessment (Refer to Section 4)
	Proposed Stormwater Management Plan (Refer to Section 5)
	Music Water Quality Assessment (Refer to Section 6)
10. Construction management	Construction Erosion and Sediment Control (Refer to Section 7)

The Stage 1 Concept Development Application (D/2016/1509) for the development has been approved by City of Sydney Council.



 The Site

Figure 1: Site Location

2.0 Existing Site

The site comprises of an existing block of commercial/mixed-use properties located between Pitt Street to the west, Liverpool Street to the south and Castlereagh Street to the east. The existing Dungate Lane provides service access from Castlereagh Street to the back of the house and existing basement carparking (ref Figure 2). The development will consolidate the existing lots into a single lot.

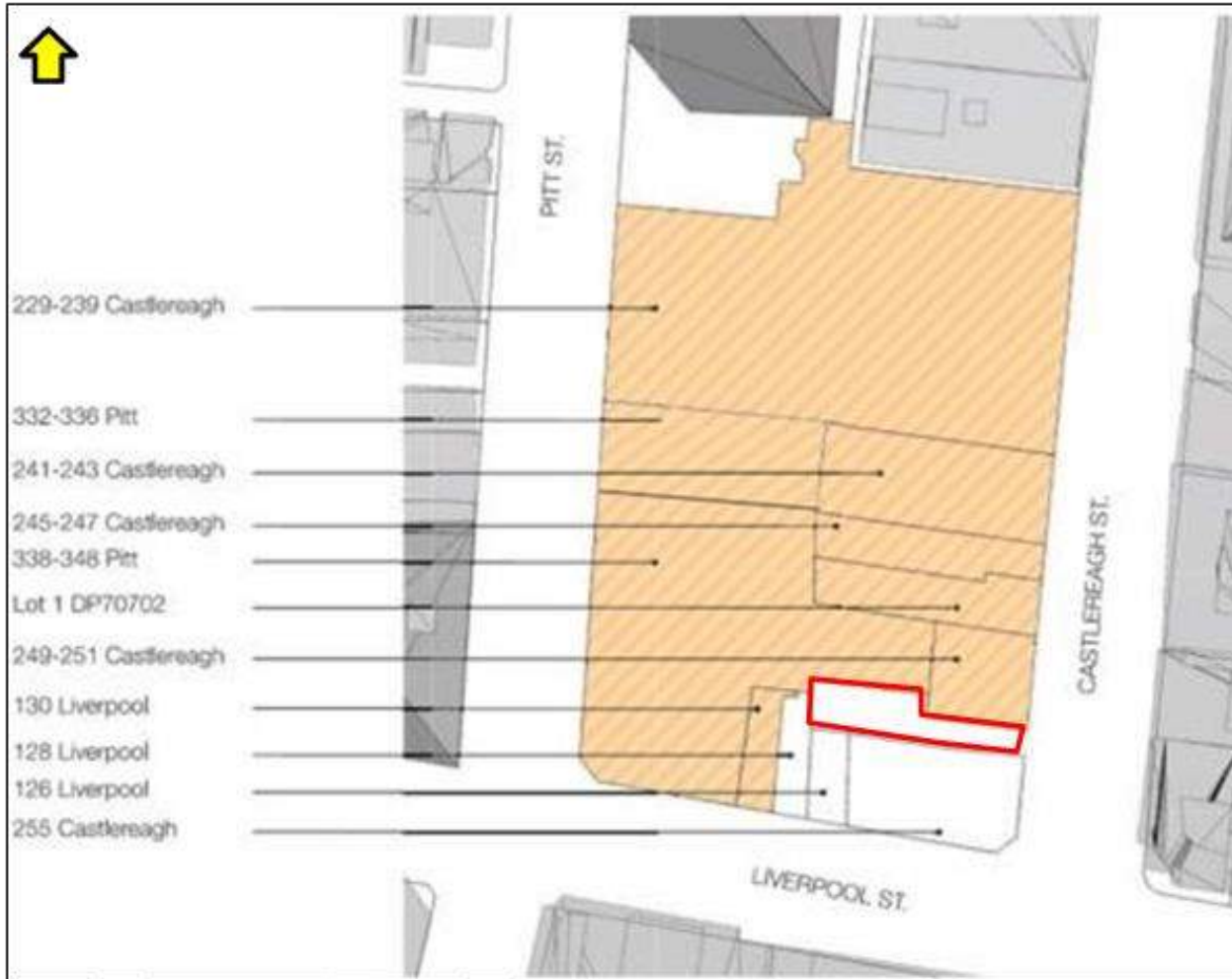


Figure 2: Existing Site

The existing site area is approximately 5900m² and is currently 100% impervious. The site falls from the northeast (RL 24.00m) to the south-west (RL 18.00m), refer to figure 3. Existing services are located around the site and detailed investigation is required to confirm the type, size, location and level of the existing services. A topographical survey of the site is included as drawing C17 in Appendix C.



Figure 3: Existing Services and Site Levels Approximate)

The proposed development will consist of 4 basement levels beneath a mix of mid and high rise residential and commercial buildings. The proposed ground floor plan is shown in figure 4 and included in Appendix A

Vehicle ramp to basement

Through-Site Links

Development Extent

PITT STREET

LIVERPOOL STREET

CASTLE REACH STREET

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4.0 Flood Impact Assessment

The SEARS requires a flood impact assessment in accordance with the City of Sydney Interim Floodplain Management Policy.

In addition, Condition 14 of the Stage 1 DA Consent (D/2016/1509) requires:

- A site specific flood impact assessment that provides an accurate assessment of the impact of flooding on the site.
- Establish flood planning levels and flood protection measures in accordance with City of Sydney Interim Floodplain Management Policy.
- Thresholds to entrances to below ground basement levels to be at or above the Probable Maximum Flood (PMF)

The purpose of the City of Sydney Interim Floodplain Management Policy is to provide controls that management flood risk within the City of Sydney's LGA. These controls aim to minimise the risk to human life, minimise flood risk to property damage and ensures that existing development is not adversely affected by new development.

4.1 Existing Flood Behaviour

The site is located within the Darling Harbour Catchment and Council have completed the Darling Harbour Flood Study, October 2014 which. The flood model has been provided to TTW for review and analysis. The flood study is based on a dynamic 1d/2d TUFLOW model. All existing assumptions and parameters of the flood model remain unchanged, except for the changes stated below.

Changes to the existing flood model include:

- Buildings extents updated to reflect more accurate survey data. (Note that the Council model removes buildings from the active model which prevents flow through buildings).
- DEM updated to include detailed topographical survey levels.

Changes to the proposed flood model include:

- Buildings extents updated to reflect the proposed development.
- DEM updated to reflect the proposed site levels and through-site links.
- Stormwater pit and pipe capacity increased at the low point in Dungate Lane

The site is located towards the eastern boundary of the Darling Harbour catchment, refer to figure 5. The catchment is highly developed with an area of 307ha and drains into Sydney Harbour via Sydney Water's main trunk drainage system. The trunk drainage system is connected to the Council's minor pit and pipe stormwater drainage system.

Due to the location within the upper reaches of the catchment, flooding at the site is caused by overland flow along with the road system when rainfall exceeds the capacity of the stormwater drainage system.

The existing 1% AEP flooding is shown in figure 6, and the PMF is shown in figure 7. All flood results are also included in Appendix B.

Overland flow from upstream areas flows the north along Elizabeth Street, Castlereagh Street and Pitt street. These flows converge on Liverpool Street and continue to flow South along Pitt Street and a George Street toward Darling Harbour.

The flood levels and flood depths vary around the site due to the levels of the local topography. The existing flood model shows that overland flow enters Dungate Lane and gets trapped within the vehicle ramp to the basement. There is also a trapped low point in Dungate Lane.

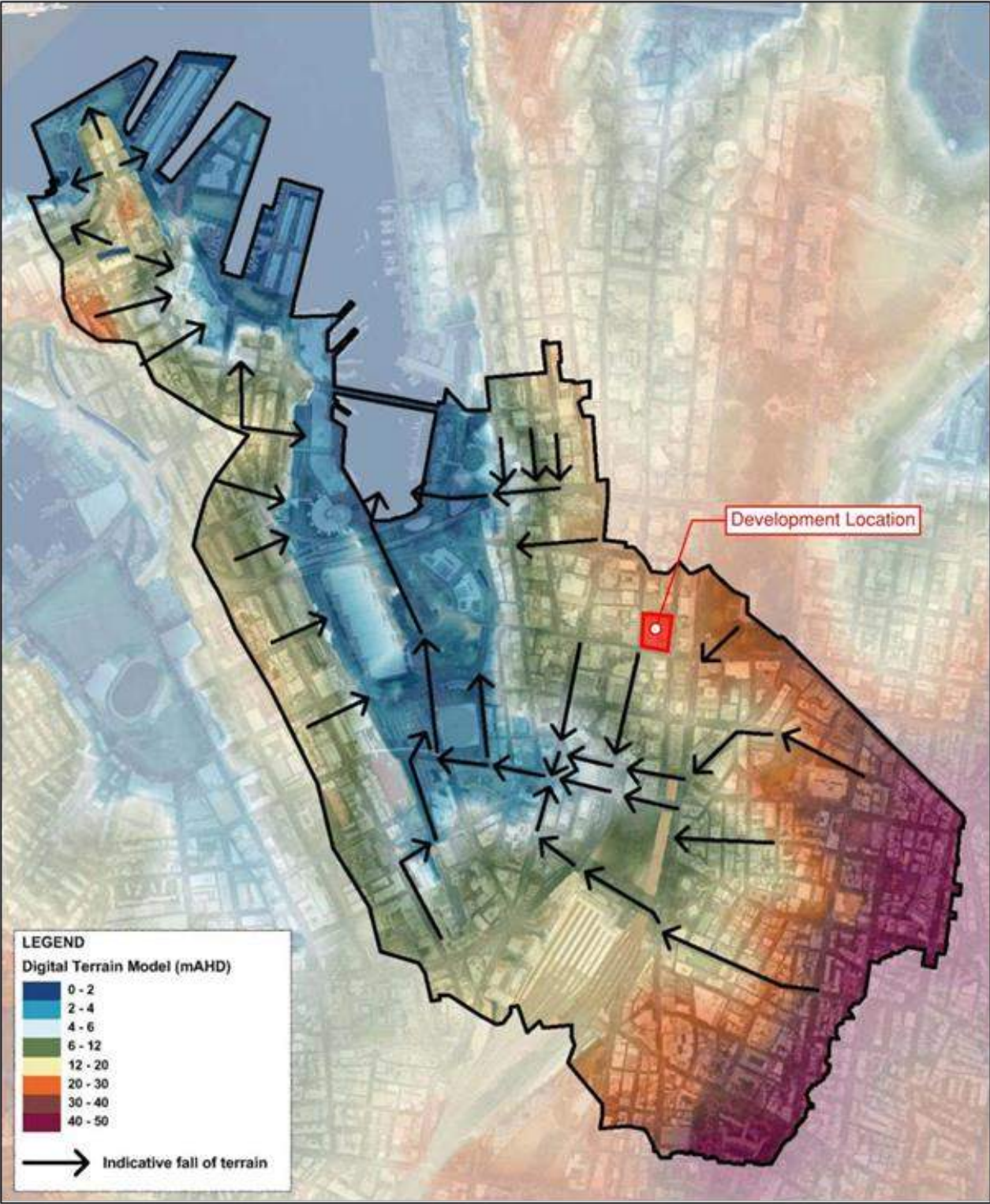


Figure 5: Site location within Darling Harbour Catchment (extract from Council's flood study)

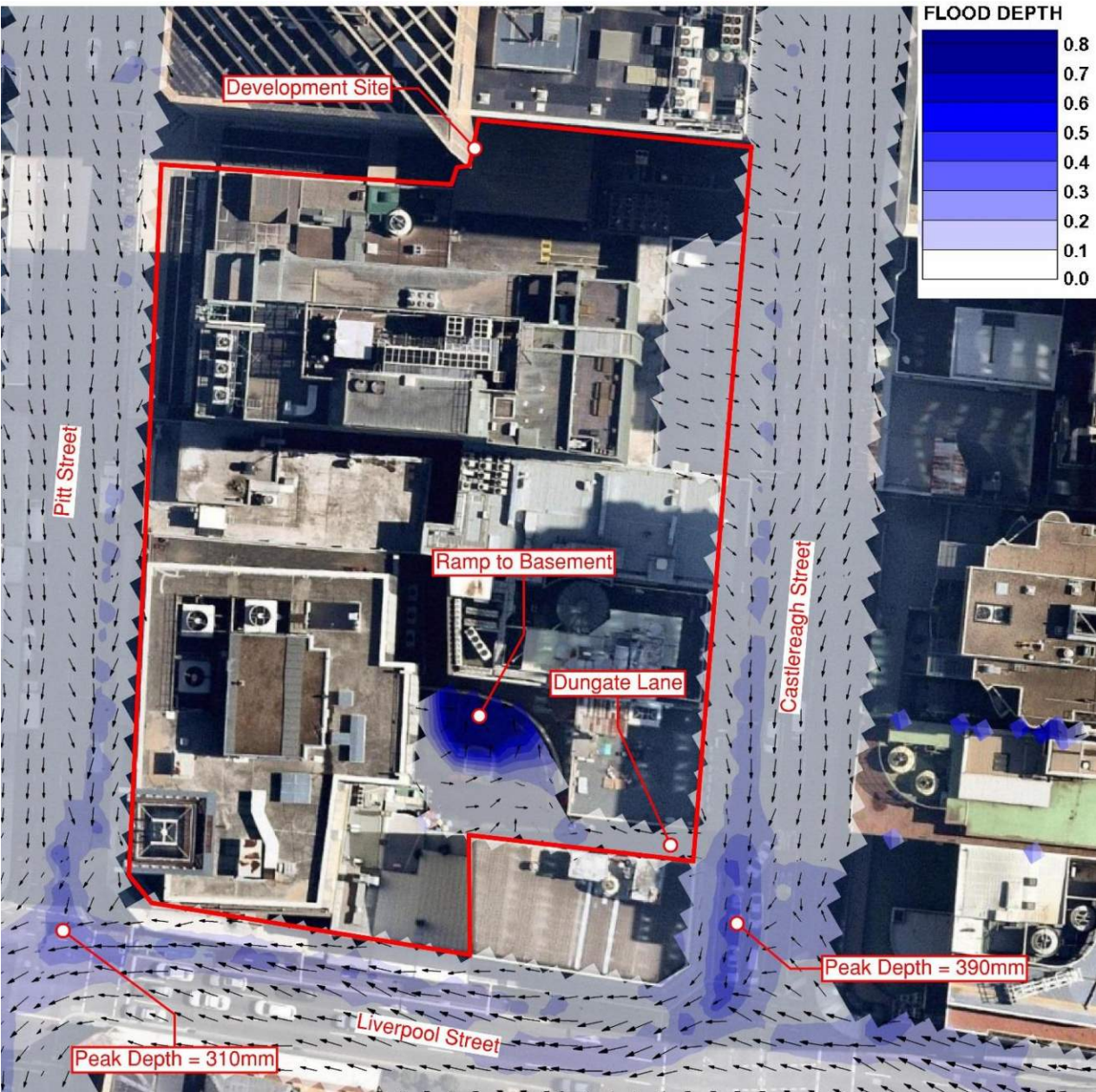


Figure 6: Existing 1% AEP Flood Depth

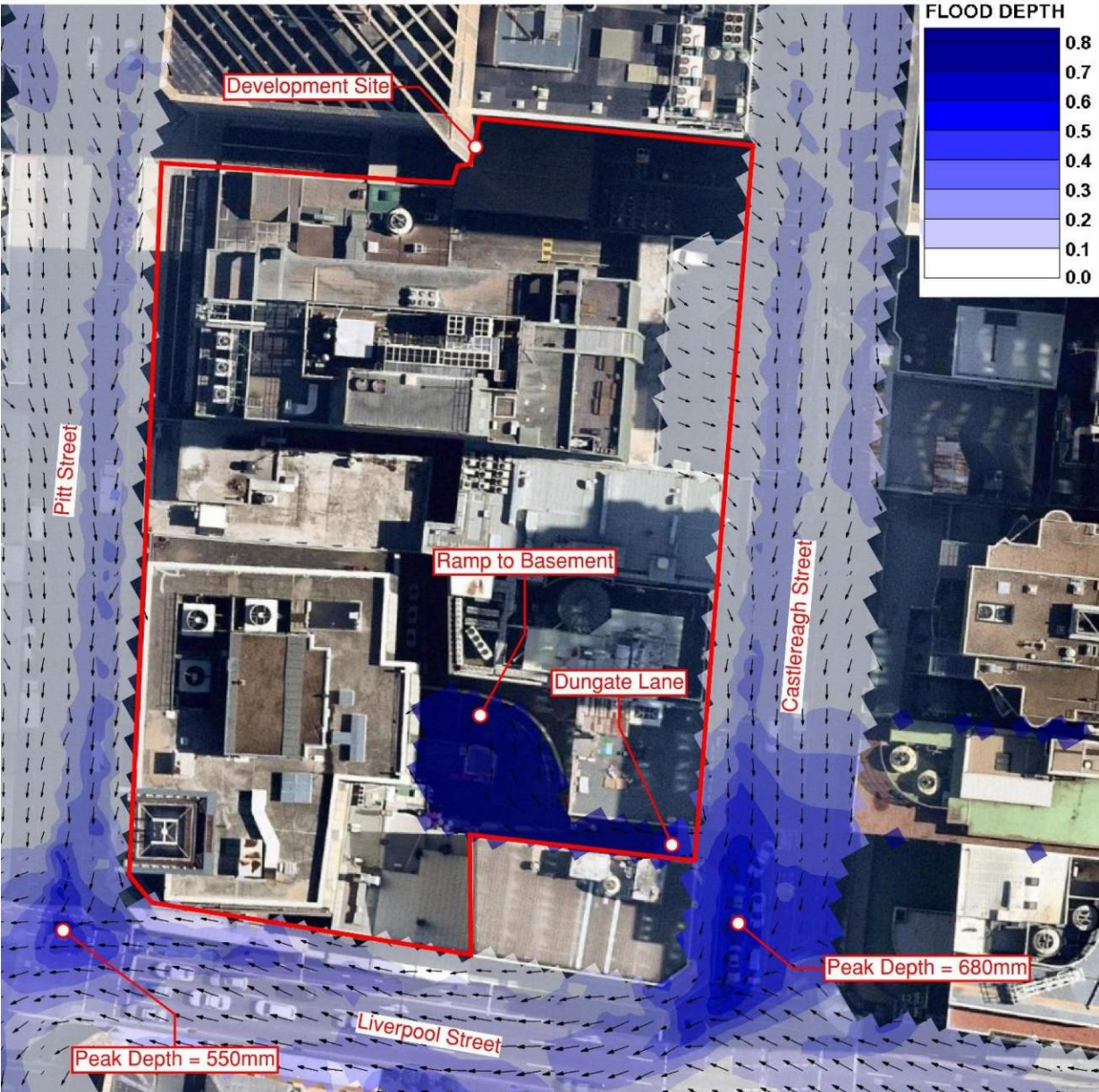


Figure 7: Existing PMF Flood Depth

4.2 Proposed Flood Behaviour

The proposed development provides new through-site links between Castlereagh Street, Pitt Street and Liverpool Street, as required by the Concept DA consent conditions. These through-site links allow the existing overland flow entering Dungate Lane to flow through the site towards Pitt Street. The proposed development levels are included on drawing C20 in Appendix C

The other through site links from Castlereagh Street have been designed with a crest above the PMF level that prevents overland flow from entering the site. Proposed levels have been designed to convey flow away from the new buildings.

The proposed 1% AEP flood results are shown in figure 8 and the proposed PMF results are shown in figure 9, and Appendix B.

Note that the proposed stormwater network within the development site has not been modelled, and therefore the flood results within the development site are considered to be conservative.

The proposed results show that the flood hazard (based on the NSW Floodplain Management Manual 2005) following development is low throughout the site, refer to fig 10.

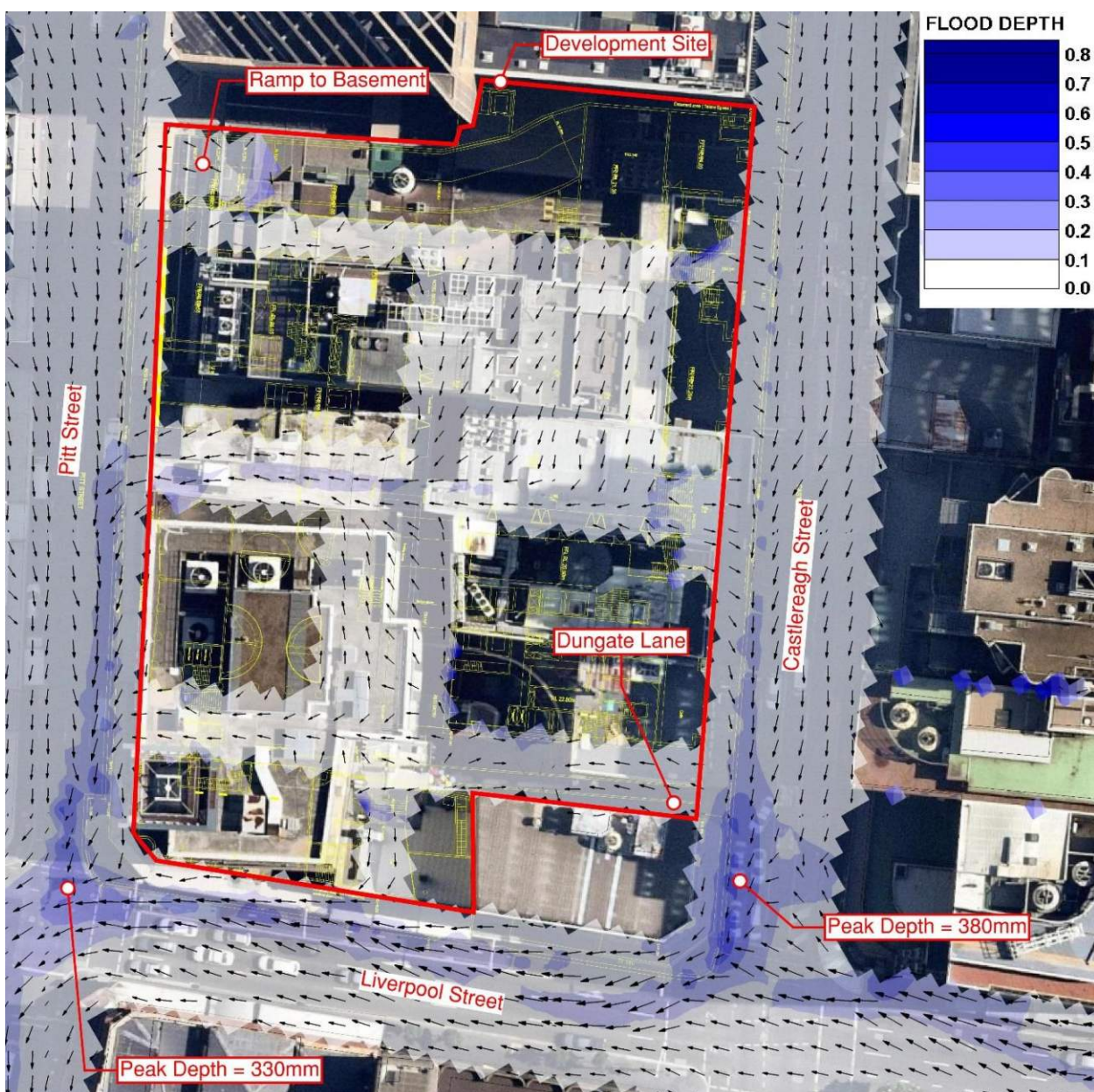


Figure 8: Proposed 1% AEP Flood Depth



Figure 9: Proposed PMF Flood Depth



Figure 10: Proposed 1% AEP Flood Hazard

4.3 Proposed Flood Impact

Due to proposed through-site links, as required by the City of Sydney, the trapped overland from Dungate Lane can flow freely through the site toward Pitt Street. The proposed flood results show a slight increase in flood level (up to 60mm) during the 1% AEP on the eastern side of Pitt Street where the overland flow from Dungate Lane flows along the through-site links. This increase only occurs adjacent to the development frontage which meets the required flood planning levels. There is a reduction in flood level within Dungate Lane adjacent to the rear of 255 Castlereagh Street, due to increased pit capacity and pipe outlet.

There is no adverse impact on any existing properties, refer to figure 11.

For extreme events up to the PMF, the development will adopt a 'shelter on-site' policy with safe refuge provided at ground floor and upper levels above the PMF level.

The proposed development minimises the risk to human life, minimise flood risk to property damage and ensures that existing development is not adversely affected by new development, in accordance with the City of Sydney Interim Floodplain Management Policy.

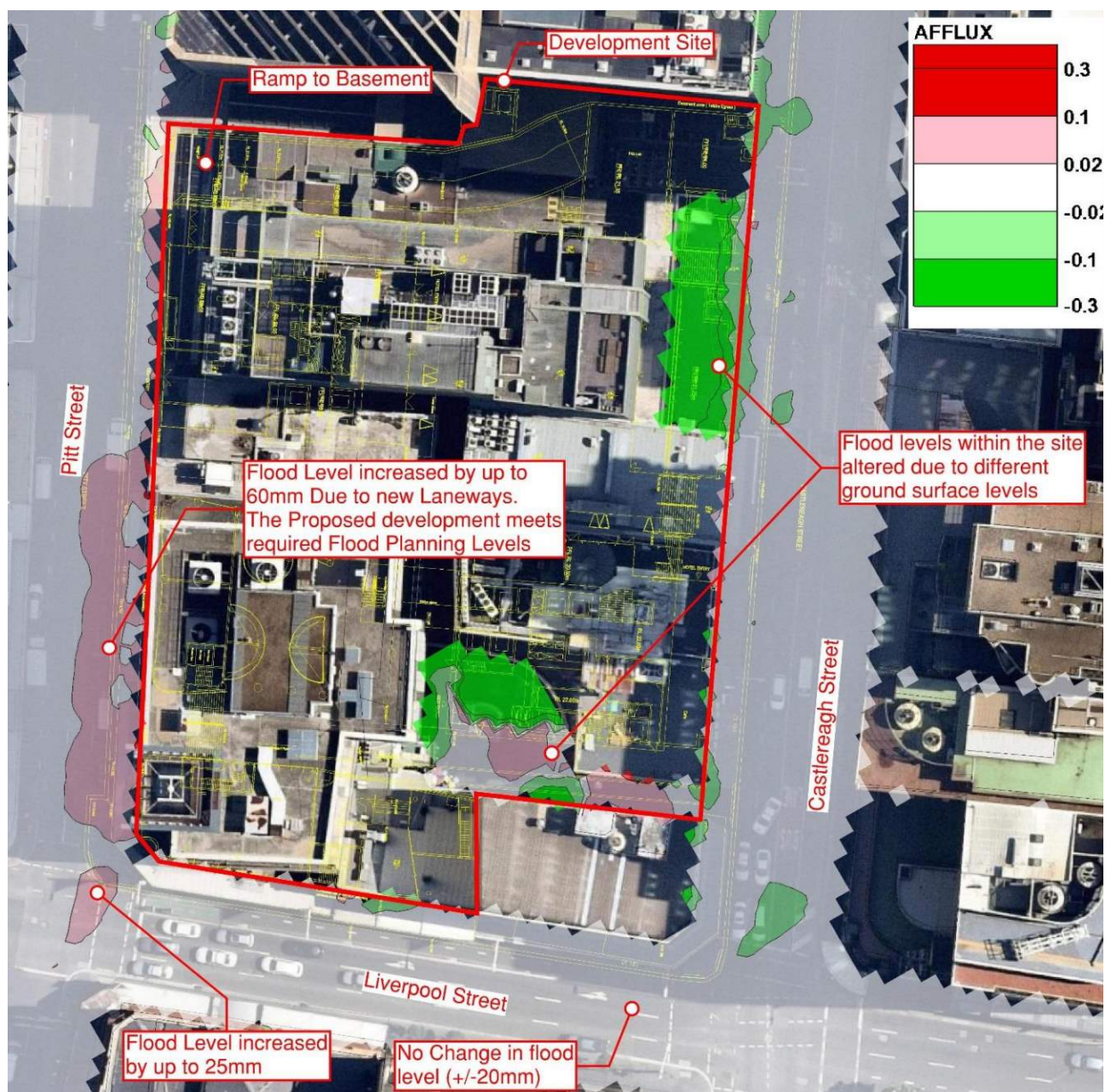


Figure 11: 1% AEP Change in Flood Level (compared to existing)

4.4 Proposed Flood Planning Levels

The following table shows the Flood Planning Levels as stated in the City of Sydney Interim Floodplain Management Policy:

Flood Planning Level	Floor Type
PMF	▪ <i>Below ground basement levels*</i>
Higher of 1% AEP+ 500mm or PMF	▪ Below Ground Parking ▪ Critical Facilities
1% AEP + 500mm	▪ Residential – Habitable Rooms
1% AEP	▪ Residential – Non-habitable rooms ▪ Business and retail floors ▪ Above ground parking (enclosed)

* Requirement from Concept DA Consent Condition 14 (D/2016/1509)

The proposed development will meet the required flood planning levels as follows.

- All ground floor business and retail floors will be above the 1% AEP flood levels.
- The access ramp to the basement car park will be above the PMF and above the 1% AEP +500mm flood level.
- All accesses to basement levels will be above the PMF
- All residential floors will be above the ground floor and above the 1% AEP +500mm level.

4.5 Climate Change

Council's Darling Harbour Catchment Flood Study included sensitivity analysis for climate change in accordance with *The NSW Sea Level Rise Policy Statement (DECCW, 2009)*. The sensitivity allows for a projected rise in sea level, relative to the 1990 mean sea level, of 0.4 metres by 2050 and 0.9 metres by 2100, which is also in accordance with Council's DCP.

The flood modelling confirms that there is no impact on flood levels at the development site location due to the location in the upper catchment and relative level above sea level (minimum site RL of 18.00m)

In addition to sea level rise, a sensitivity analysis was also undertaken for increased rainfall intensity, incorporating 10%, 20% and 30% increases in design rainfall. The 10% rainfall increase scenario is closest to the regional estimate of future rainfall intensity increases for the Sydney region. The flood modelling confirms a 10% increase in rainfall intensity typically results in flood level increases of less than 0.10m.

5.0 Stormwater Management

The existing site area of approximately 5900m² is 100% impervious. The existing site is split between a number of lots each, with each lot discharging directly to kerb outlets or to Council's stormwater system. The existing Stormwater around the site is shown in figure 13.

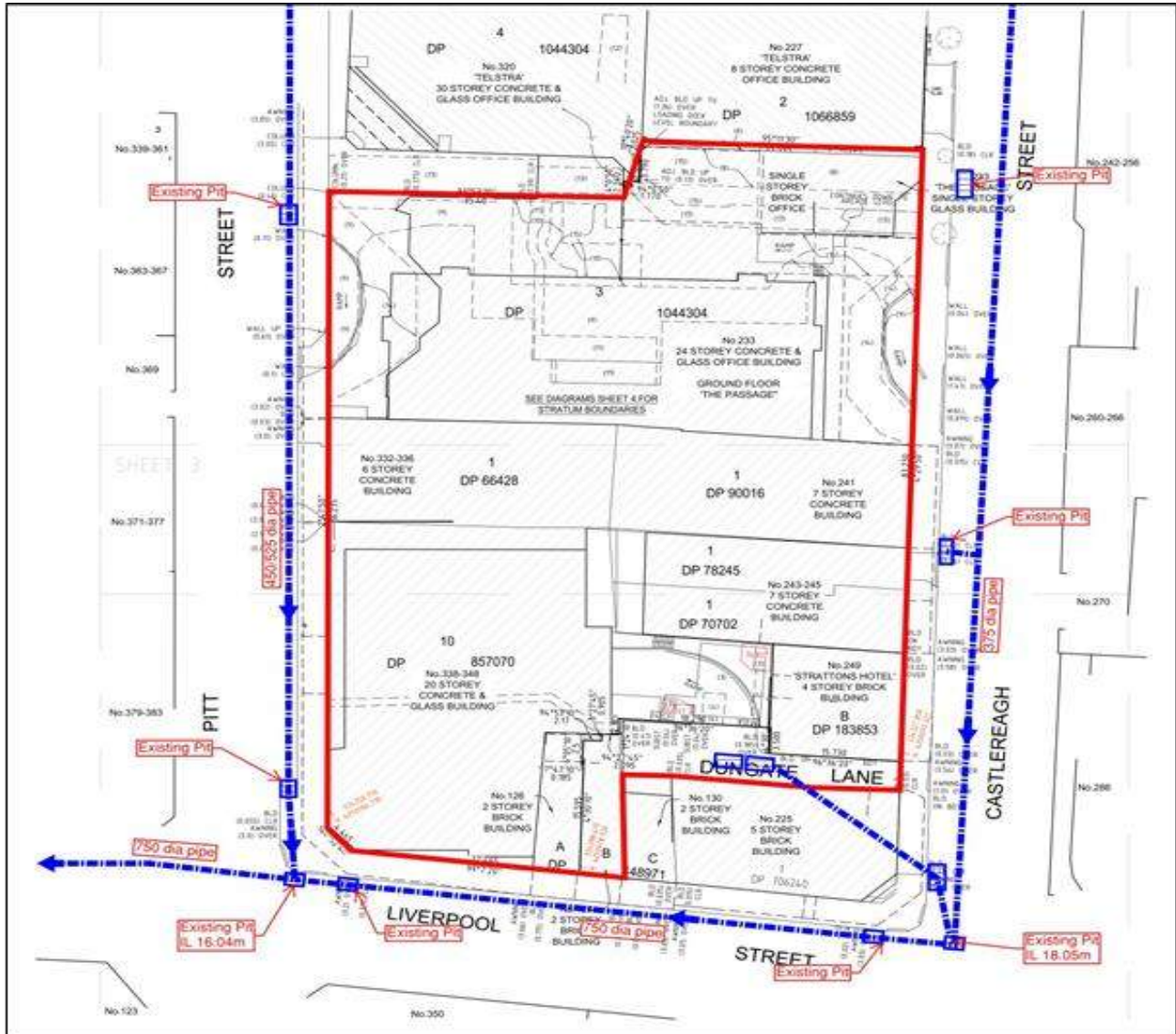


Figure 13: Existing Stormwater

The proposed stormwater within the site will be collecting rainfall runoff in a series of pits and pipes that drain towards the south-west corner of the site into an on-site detention tank (OSD). The proposed stormwater system will be part of the building infrastructure, as it will be located above/within basement levels. Details of the stormwater system will be specified by the hydraulic engineer.

Sydney Water has confirmed the following OSD requirements, refer to Appendix D. The final tank location details and discharge connection point will require coordination with the Architectural and services design during the detailed design stage.

OSD Volume	Permissible Site Discharge
101 cu.m	241 l/s

The proposed OSD tank will be located at the south-west corner of the development at the lowest part of the site. The tank will be located within the basement 1 level and discharge to an existing pit on the corner of Pitt Street and Liverpool Street

The exact invert levels of the stormwater system are subject to variation as the existing services adjacent to the site need to be further investigated. There are numerous services that need to be identified, located with depths investigated prior to any detailed proposed levels being provided.

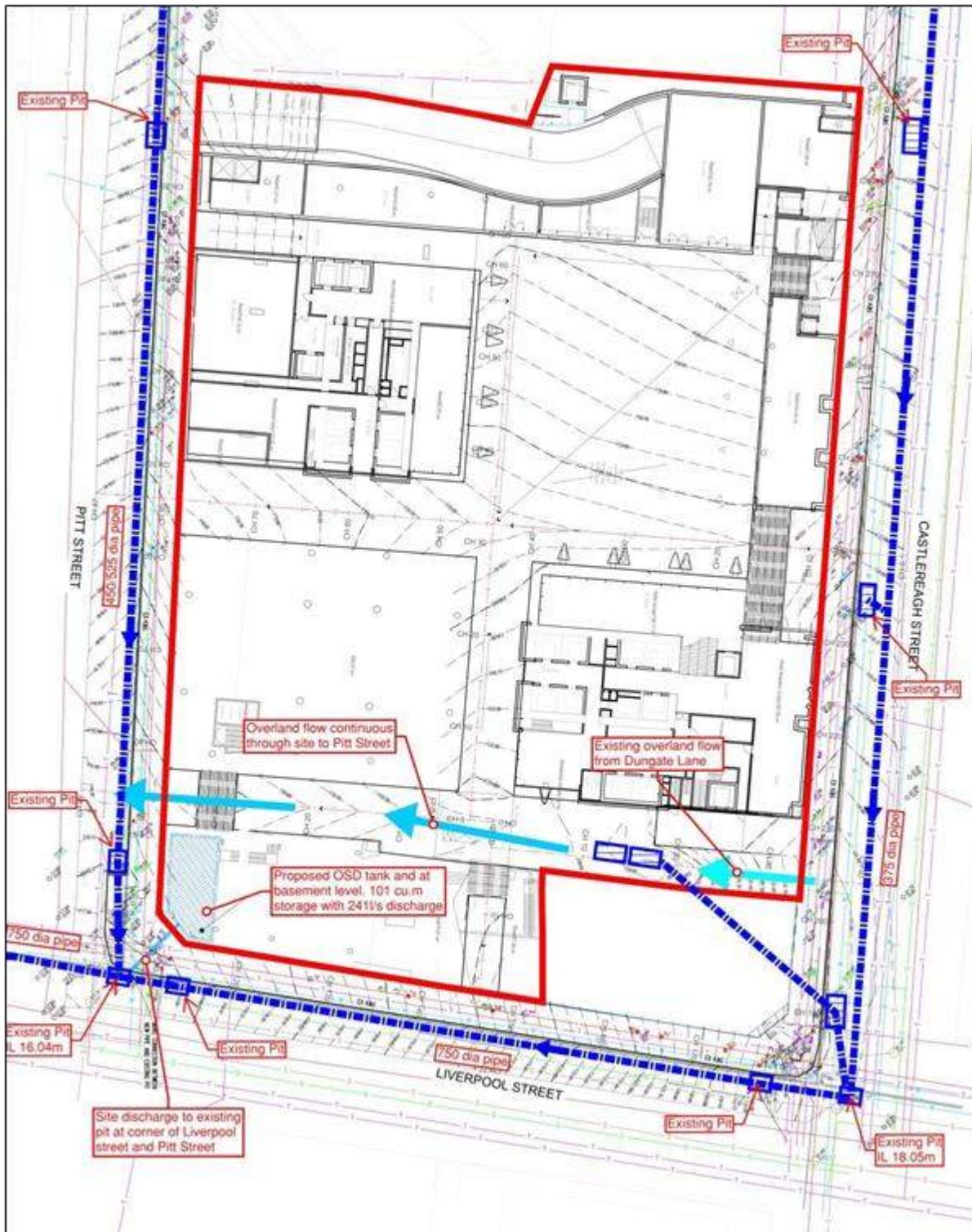


Figure 14: Proposed Stormwater Plan

6.0 Stormwater Quality

Stormwater quality analysis has been completed in accordance with; City of Sydney Development Control Plan, Section 3.7.3: Stormwater Quality.

The proposed site has been modelled in MUSIC to demonstrate that the proposed stormwater treatment devices achieve the required stormwater treatment targets outlined in the policy:

The stormwater treatment train for the proposed development includes the following and will be incorporated into the OSD tank in the basement 1 level. In addition, a 150m³ rainwater tank will also be included as detailed by the Hydraulic Engineer:

- 1x SPEL Storm sacks (or equivalent)
- 9 x SPEL Filter (or equivalent)

The proposed treatment devices meet the required targets as shown in the table below.

Pollutant (Loads Are In Kg/Year)	Load	Residual Load	Load Reduction (%)	Reduction Target
Gross Pollutants	168	0	100	90%
Total Suspended Solids	1300	191	85.40	85%
Total Phosphorus	2.06	0.694	66.1	65%
Total Nitrogen	15.30	6.93	54.10	45%

7.0 Construction Phase Stormwater Management

Construction works are to be carried out in accordance with the “Blue Book” erosion and sediment control requirements. The exact controls will vary depending on construction methodology and staging, but will typically consist of:

- Sediment fences;
- A sediment basin;
- Sediment trap;
- Vehicle shaker grid and wash down; and
- Sandbags to protect existing pits.
- Overland flow diversion at the upstream boundary of the site

A conceptual erosion and sediment control plan is included as drawing C15 in the civil drawing set in Appendix C.

8.0 Conclusion

The proposed development meets the SEAR's Requirements as well as the City of Sydney LEP 2012, and the Interim Floodplain Management Policy.

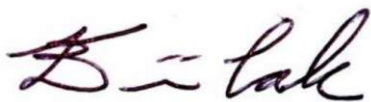
Flood modelling has been completed for the existing and the proposed development scenarios, based on the Council's adopted Darling Harbour Catchment Flood Study. The flood modelling confirms that;

- The development is within a low flood hazard precinct,
- The development does not significantly change existing flood behaviour,
- The development will not result in significant increases in the potential flood affectation of existing development or properties
- The development will incorporate appropriate measures to manage risk to life from flooding
- The development will meet the required Flood Planning Levels.

The design of the proposed stormwater system will be in accordance with City of Sydney Stormwater Drainage Manual and Sydney Water OSD requirements:

- On-Site Detention tank provided with a volume of 101 m³ and a permissible site discharge of 241 l/s.
- The OSD will connect to the existing pit at the corner of Liverpool Street and Pitt Street
- 1xSPEL Storm sack, 9xSPEL Filter (or equivalent) and a rainwater tank will form the water quality treatment train that meets Council's required treatment targets.

Prepared by
TAYLOR THOMSON WHITTING (NSW) PTY LTD in its capacity as trustee for the
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Eirian Crabbe
Associate Director

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TAYLOR THOMSON WHITTING NSW TRUST



Stephen Brain
Technical Director

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Appendix A

Proposed Ground Floor Plan

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GENERAL NOTES

ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY THE CONTRACTOR BEFORE PROCEEDING WITH THE WORK.

ALL LEVELS RELATIVE TO AUSTRALIAN HEIGHT DATUM.

DO NOT SCALE DRAWINGS.

USE FIGURED DIMENSIONS ONLY.

legend



1 Bed Apartment

2 Bed Apartment

3 Bed Apartment

Residential Amenities

Parking

Hotel Amenities

Hotel

Hotel Spa

Hotel BOH

Circulation

Food and Beverage

Retail

Lift, Fire stair, Services

Plant

Boundary

07	12/3/20	For Approval	TS	
06	24/1/20	For Approval	KIK	
05	14/1/20	For Development Application	KIK	
04	13/12/19	For information	KIK	
03	6/12/19	For Coordination	TS	
02	2/12/19	For Coordination	PN	
01	8/11/19	For Coordination	KIK	
rev	date	name	by	chk

fjmt studio architecture interiors landscape urban community

sydney melbourne uk

Level 5, 70 King Street t +61 2 9251 7077 w fjmtstudio.com

project

338 Pitt Street

338 Pitt Street

Sydney NSW 2000

title

General Arrangement Plans

Ground Floor - Hotel Lobby+Residential Lobby+Retail

scale

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first issued

8/11/19

project code

sheet no.

revision

H338

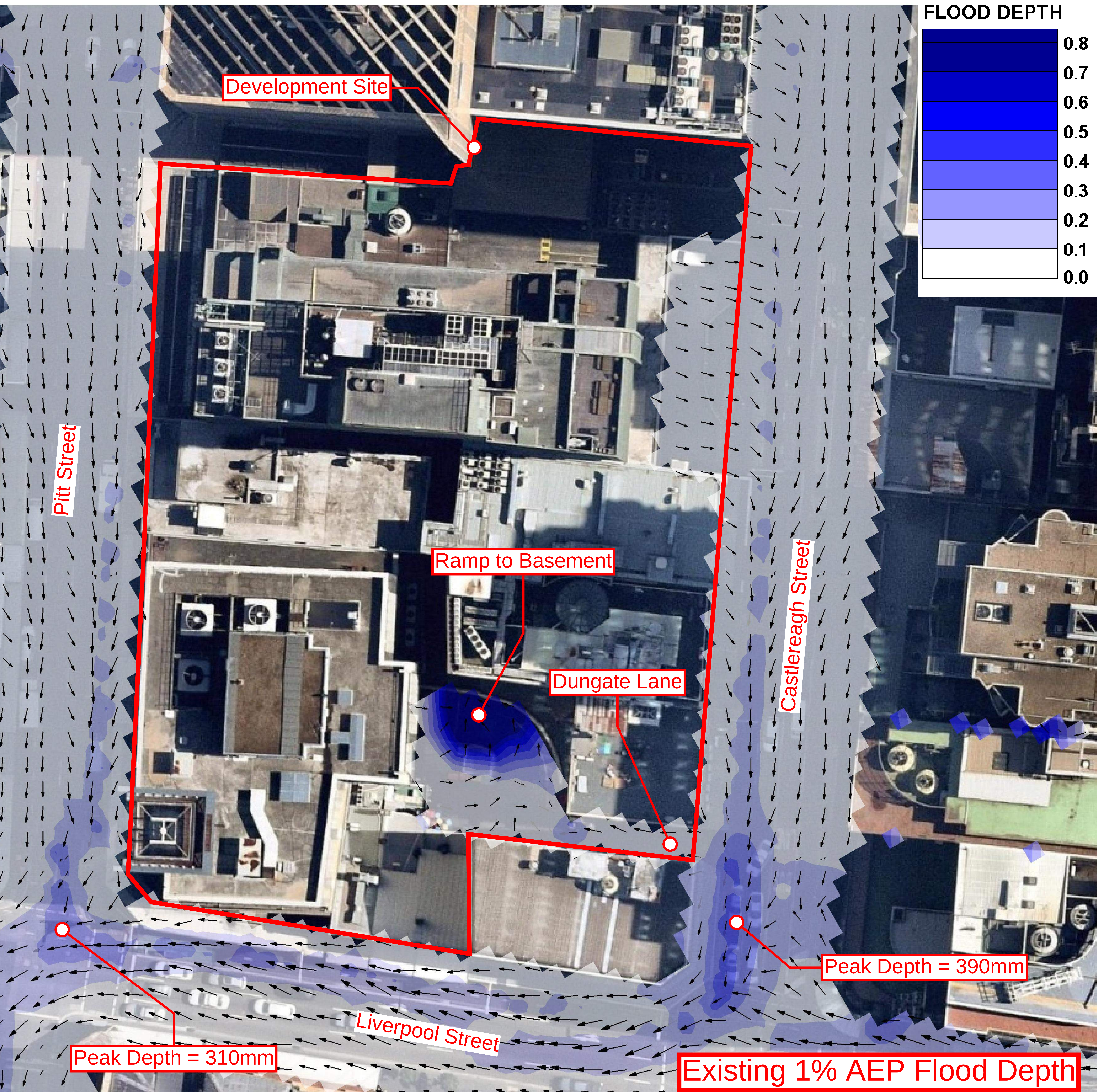
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For Approval

Appendix B

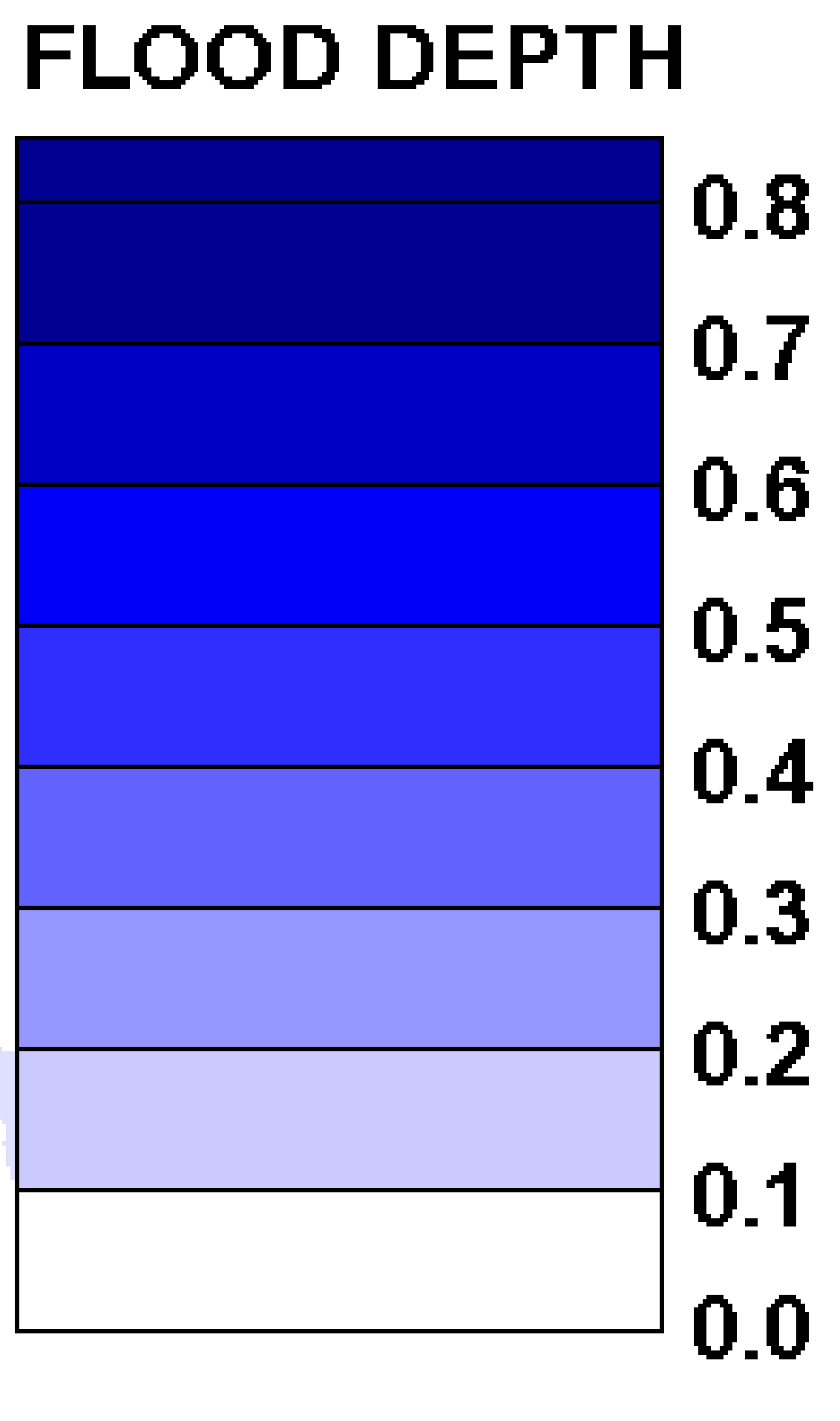
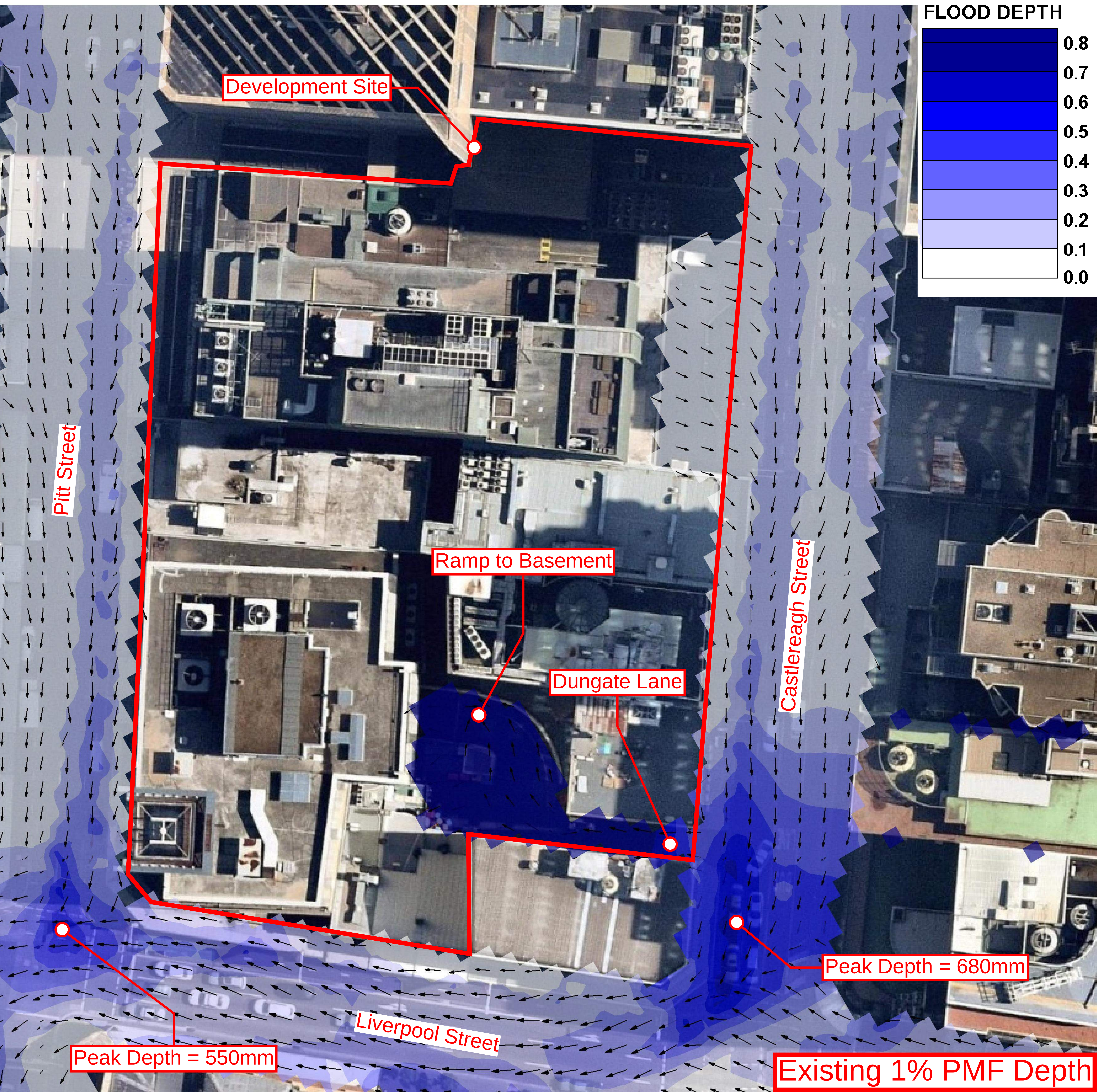
Flood Results











Development Site

Pitt Street

Ramp to Basement

Dungate Lane

Castlereagh Street

Peak Depth = 680mm

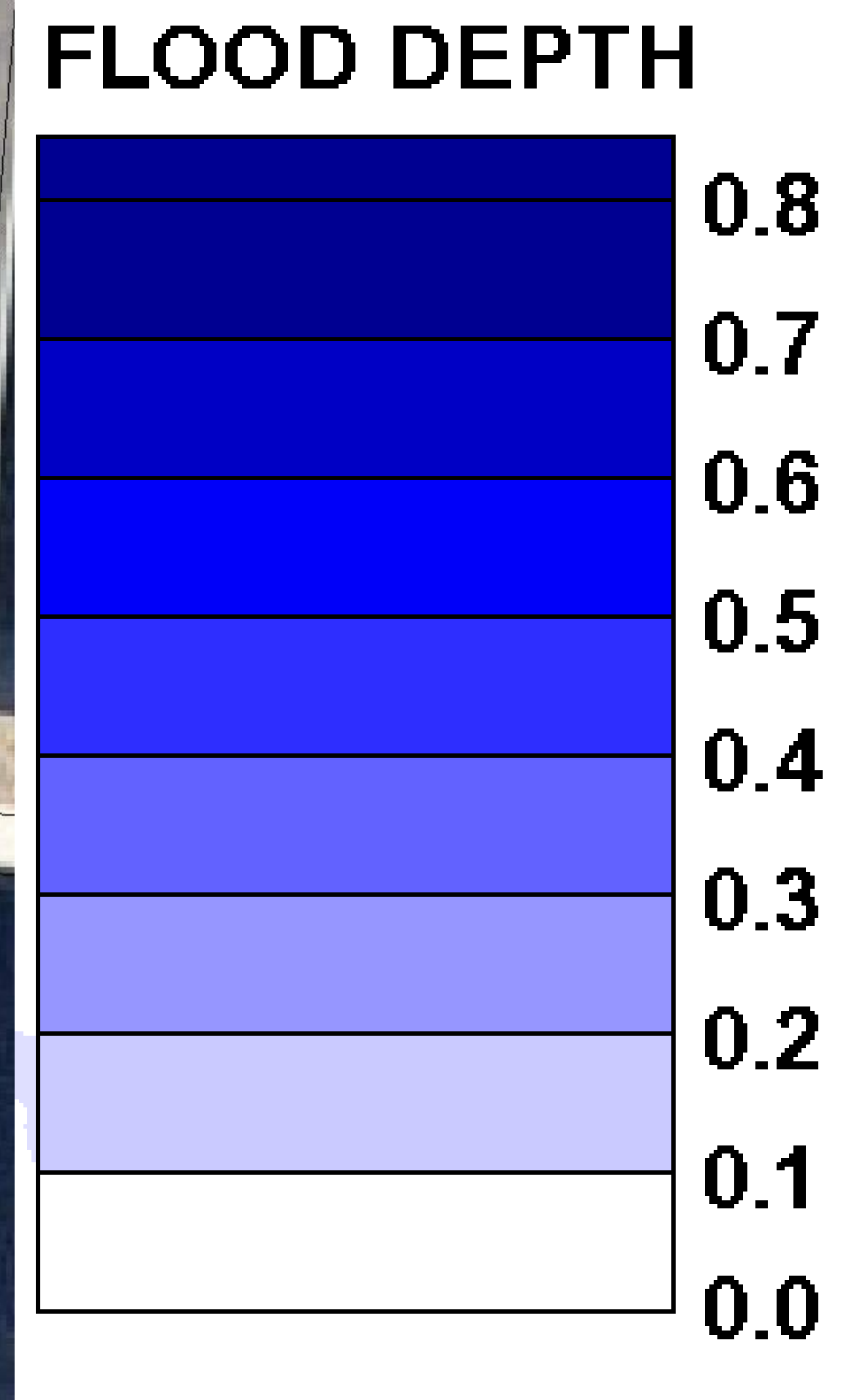
Peak Depth = 550mm

Liverpool Street

Existing 1% PMF Depth

Crest of Basement Ramp (above PMF and 1% AEP+500mm)

Development Site



Top of steps above PMF level along Castlereagh Street

Dungate Lane

Peak Depth = 610mm

Liverpool Street

Peak Depth = 560mm

Proposed PMF Depth

Pitt Street

Castlereagh Street



Appendix C

Proposed Civil Plans

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A1

EROSION AND SEDIMENT CONTROL NOTES

1. All work shall be generally carried out in accordance with
 - (A) Local authority requirements,
 - (B) EPA – Pollution control manual for urban stormwater,
 - (C) LANDCOM NSW – Managing Urban Stormwater: Soils and Construction (“Blue Book”).
2. Erosion and sediment control drawings and notes are provided for the whole of the works. Should the Contractor stage these works then the design may be required to be modified. Variation to these details may require approval by the relevant authorities.

The erosion and sediment control plan shall be implemented and adopted to meet the varying situations as work on site progresses.
3. Maintain all erosion and sediment control devices to the satisfaction of the superintendent and the local authority.
4. When stormwater pits are constructed prevent site runoff entering the pits unless silt fences are erected around pits.
5. Minimise the area of site being disturbed at any one time.
6. Protect all stockpiles of materials from scour and erosion. Do not stockpile loose material in roadways, near drainage pits or in watercourses.
7. All soil and water control measures are to be put back in place at the end of each working day, and modified to best suit site conditions.
8. Control water from upstream of the site such that it does not enter the disturbed site.
9. All construction vehicles shall enter and exit the site via the temporary construction entry/exit.
10. All vehicles leaving the site shall be cleaned and inspected before leaving.
11. Maintain all stormwater pipes and pits clear of debris and sediment. Inspect stormwater system and clean out after each storm event.
12. Clean out all erosion and sediment control devices after each storm event.

Sequence Of Works

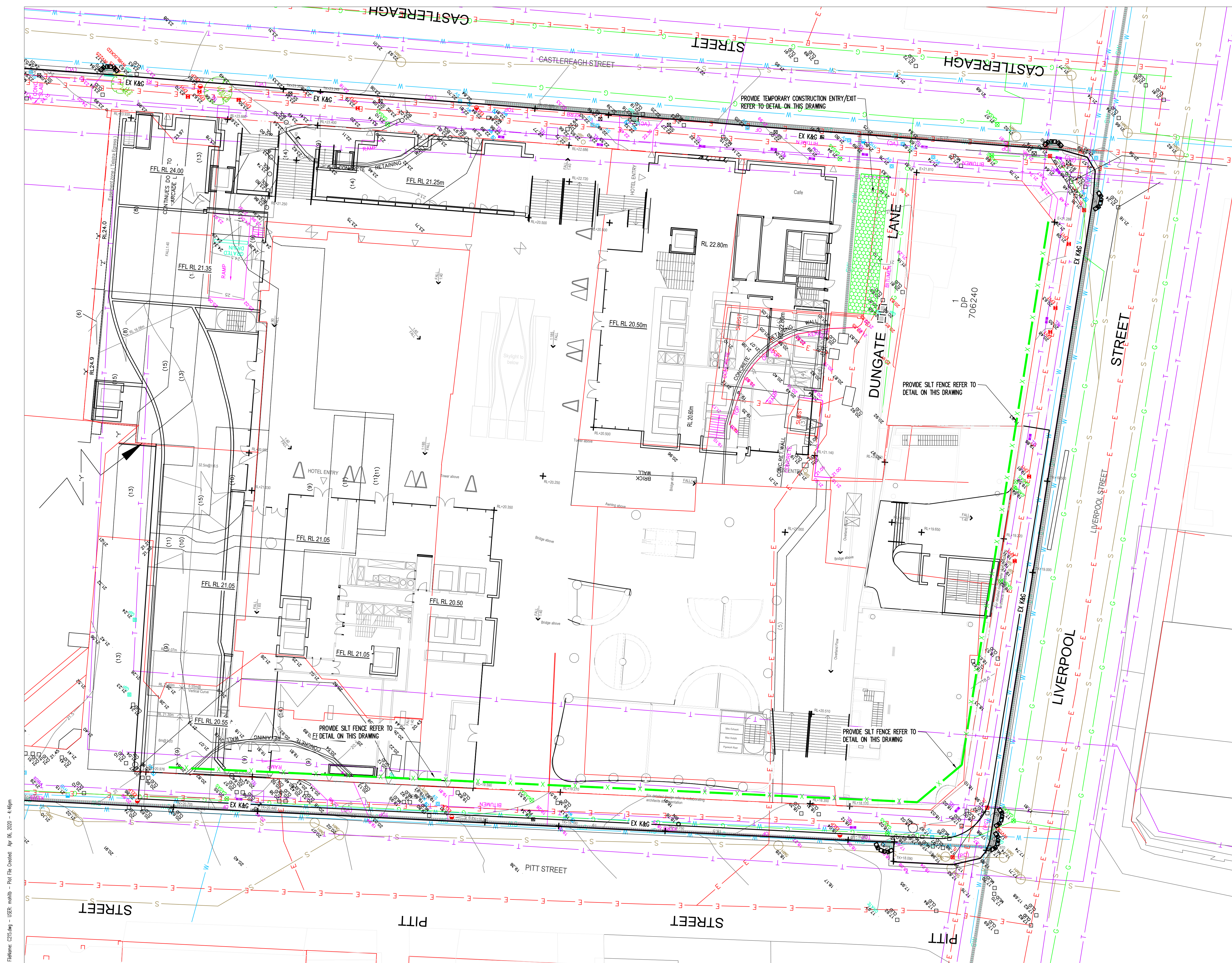
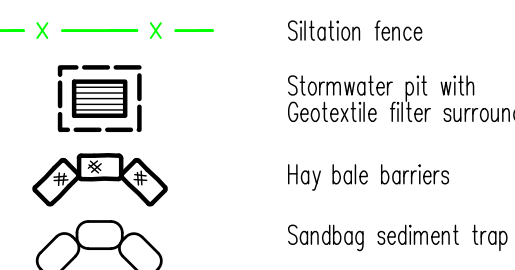
1. Prior to commencement of excavation the following soil management devices must be installed.
- 1.1. Construct silt fences below the site and across all potential runoff sites.
- 1.2. Construct temporary construction entry/exit and divert runoff to suitable control systems.
- 1.3. Construct measures to divert upstream flows into existing stormwater system.
- 1.4. Construct sedimentation traps/basin including outlet control and overflow.
- 1.5. Construct turf lined swales.
- 1.6. Provide sandbag sediment traps upstream of existing pits.
2. Construct geotextile filter pit surround around all proposed pits as they are constructed.
3. On completion of pavement provide sand bag kerb inlet sediment traps around pits.
4. Provide and maintain a strip of turf on both sides of all roads after the construction of kerbs.

WATER QUALITY TESTING REQUIREMENTS

Prior to discharge of site stormwater, groundwater and seepage water into council's stormwater system, contractors must undertake water quality tests in conjunction with a suitably qualified environment consultant outlining the following:

- Compliance with the criteria of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)
- If required subject to the environmental consultants advice, provide remedial measures to improve the quality of water that is to be discharged into Councils storm water drainage system. This should include comments from a suitably qualified environmental consultant confirming the suitability of these remedial measures to manage the water discharged from the site into Councils storm water drainage system. Outlining the proposed, ongoing monitoring, contingency plans and validation program that will be in place to continually monitor the quality of water discharged from this site. This should outline the frequency of water quality testing that will be undertaken by a suitably qualified environmental consultant.

EROSION AND SEDIMENT CONTROL LEGEND



P1 PRELIMINARY ISSUE					EC	MB	06.04.20							
Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date

Architect
**FRANCIS-JONES MOREHEN
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Civil Engineer

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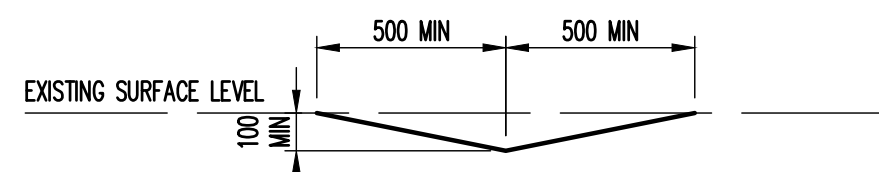
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Project	338 PITT STREET SYDNEY
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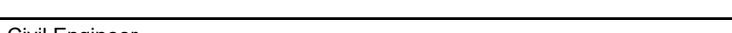
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**EROSION AND SEDIMENT
CONTROL PLAN**

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TEMPORARY CONSTRUCTION VEHICLE EXIT

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								Architect	
				FRANCIS-JONES MOREHEN				Civil Engineer	
				THORP PTY LTD					
P1 PRELIMINARY ISSUE								Project	
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 S Existing sewer
 E Existing electrical
 W Existing water
 T Existing communication
 G Existing gas
 Existing stormwater

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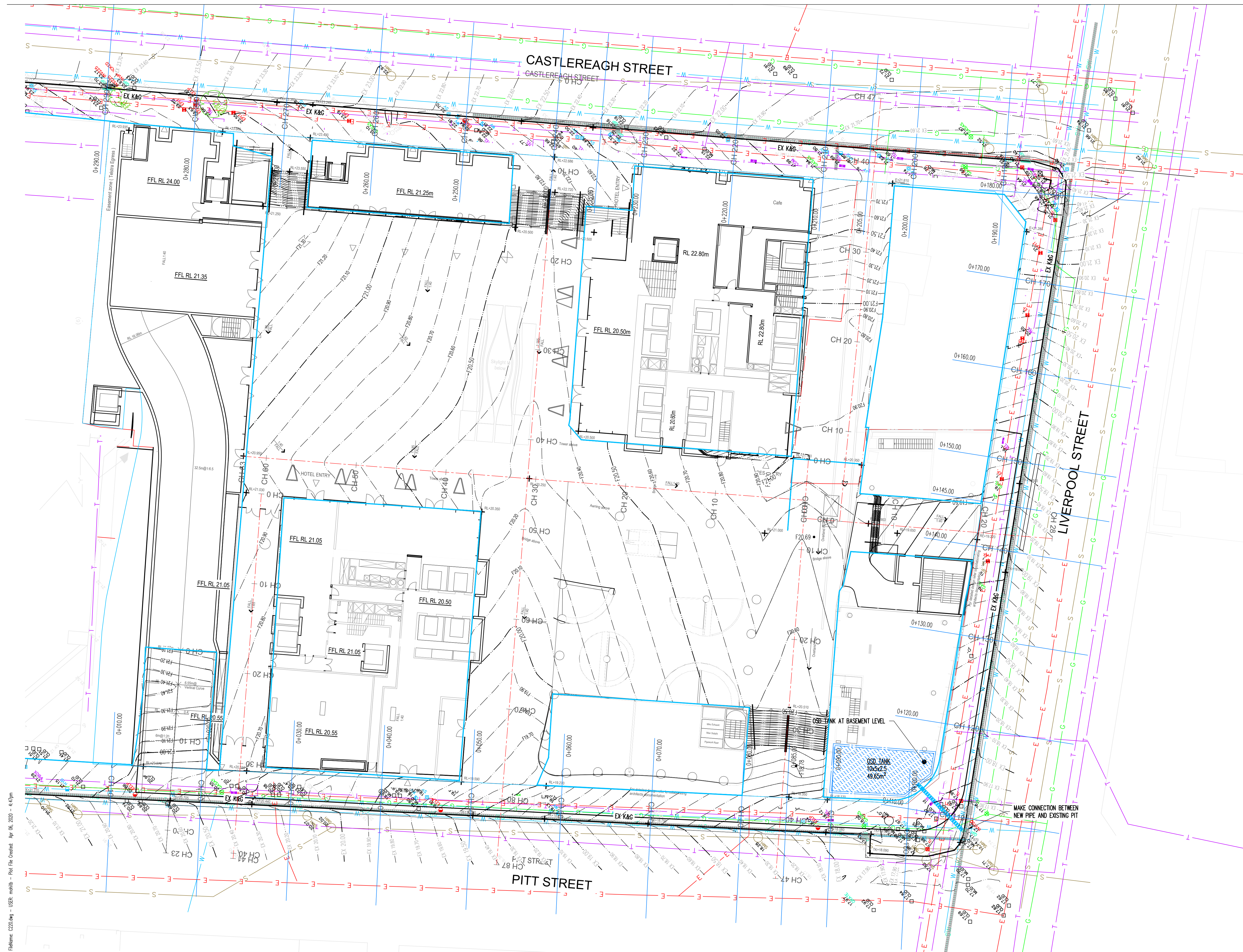
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612 9439 7288 | 48 Chandos Street St Leonards NSW 2065

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	EX K&G	Kerb and gutter
		New Stormwater line
		Existing Stormwater line



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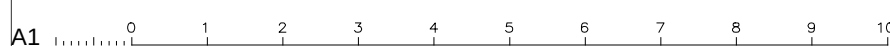
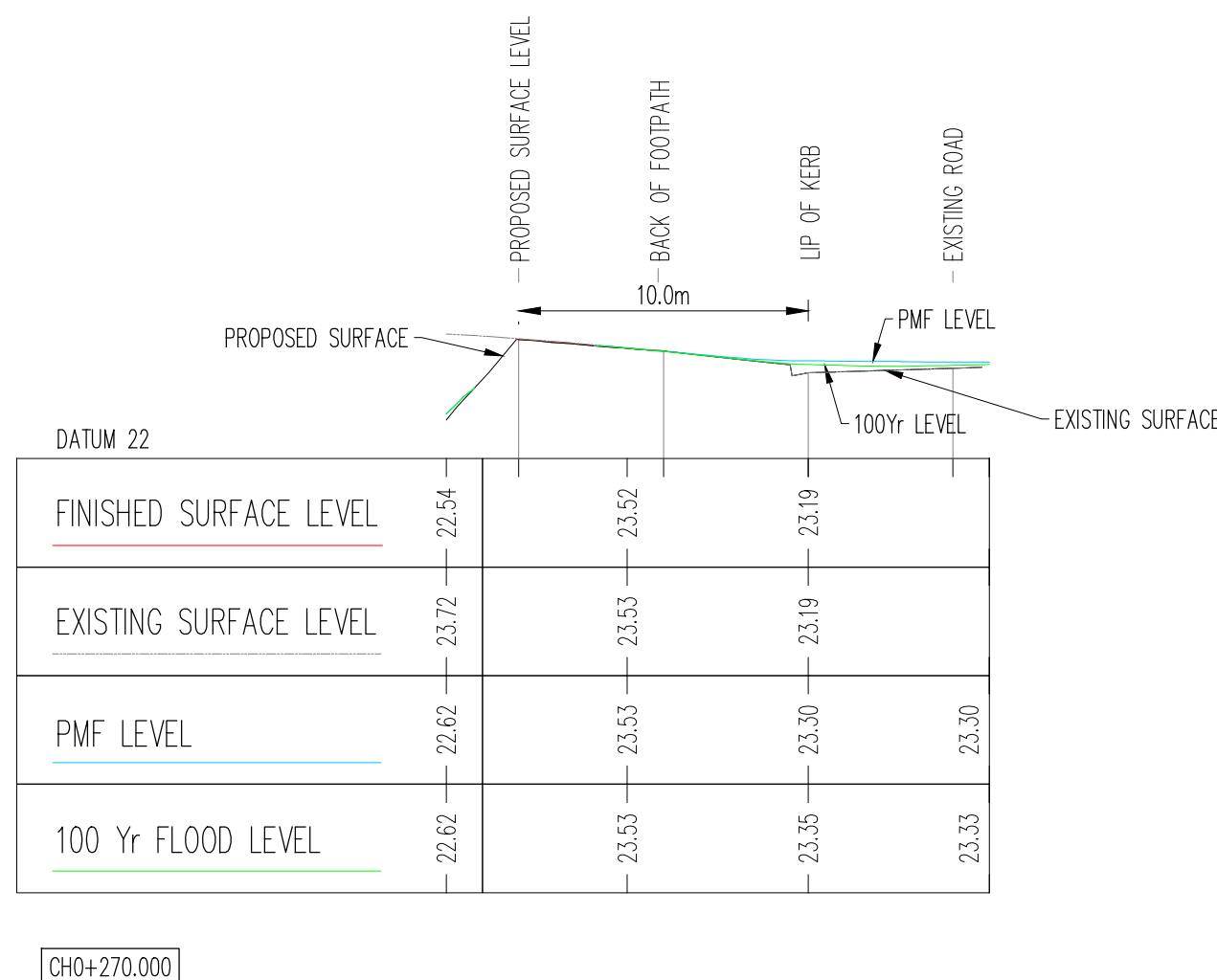
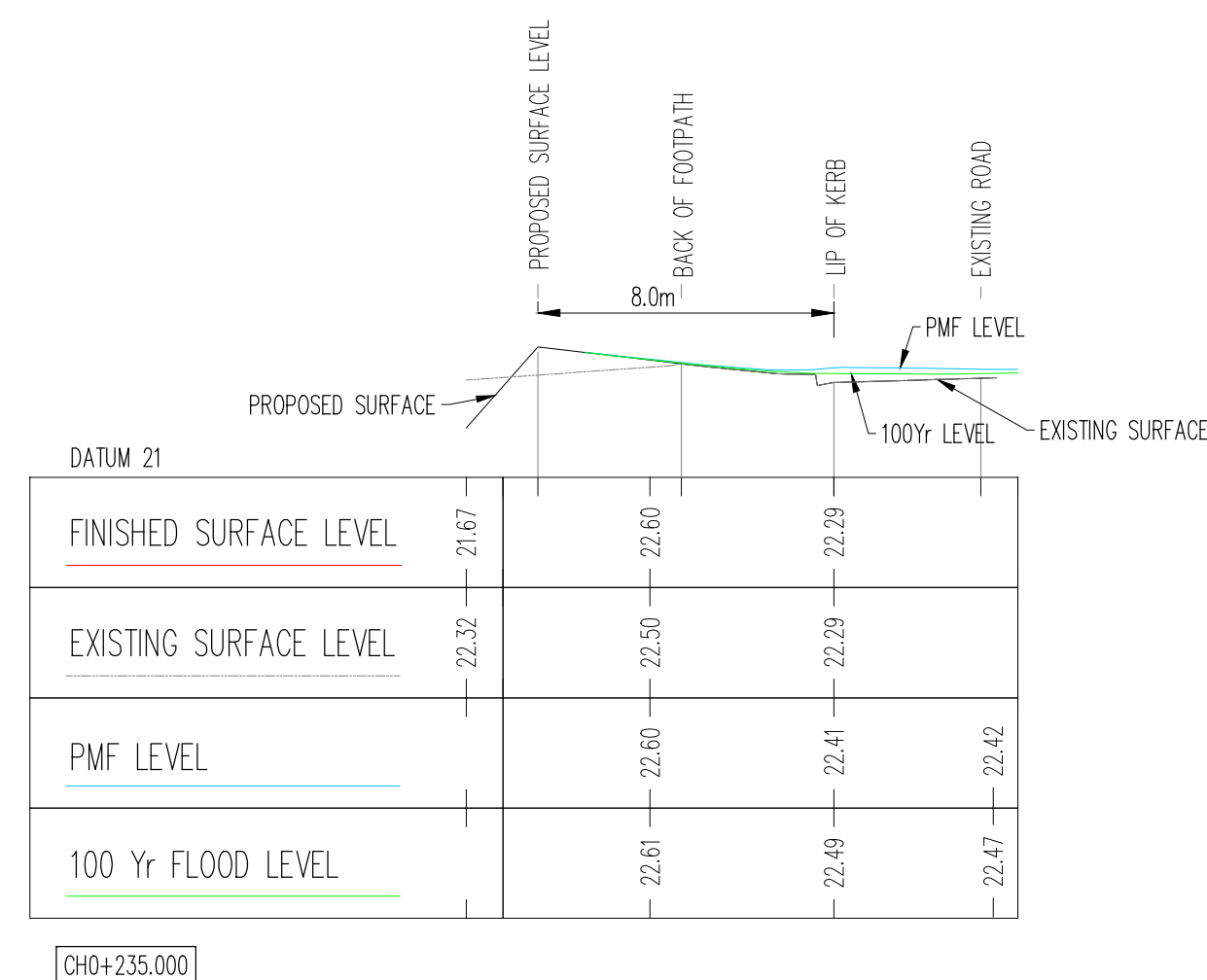
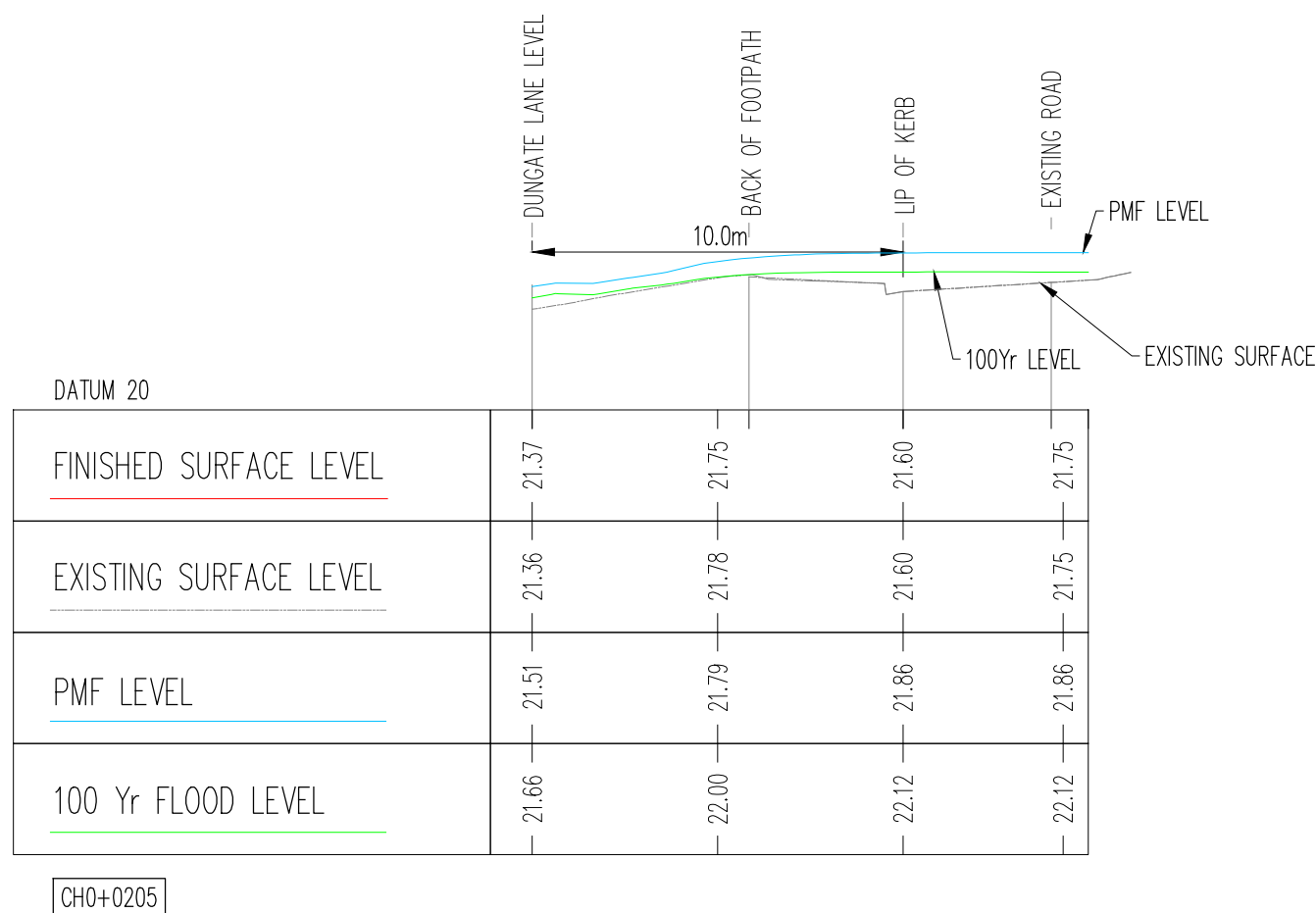
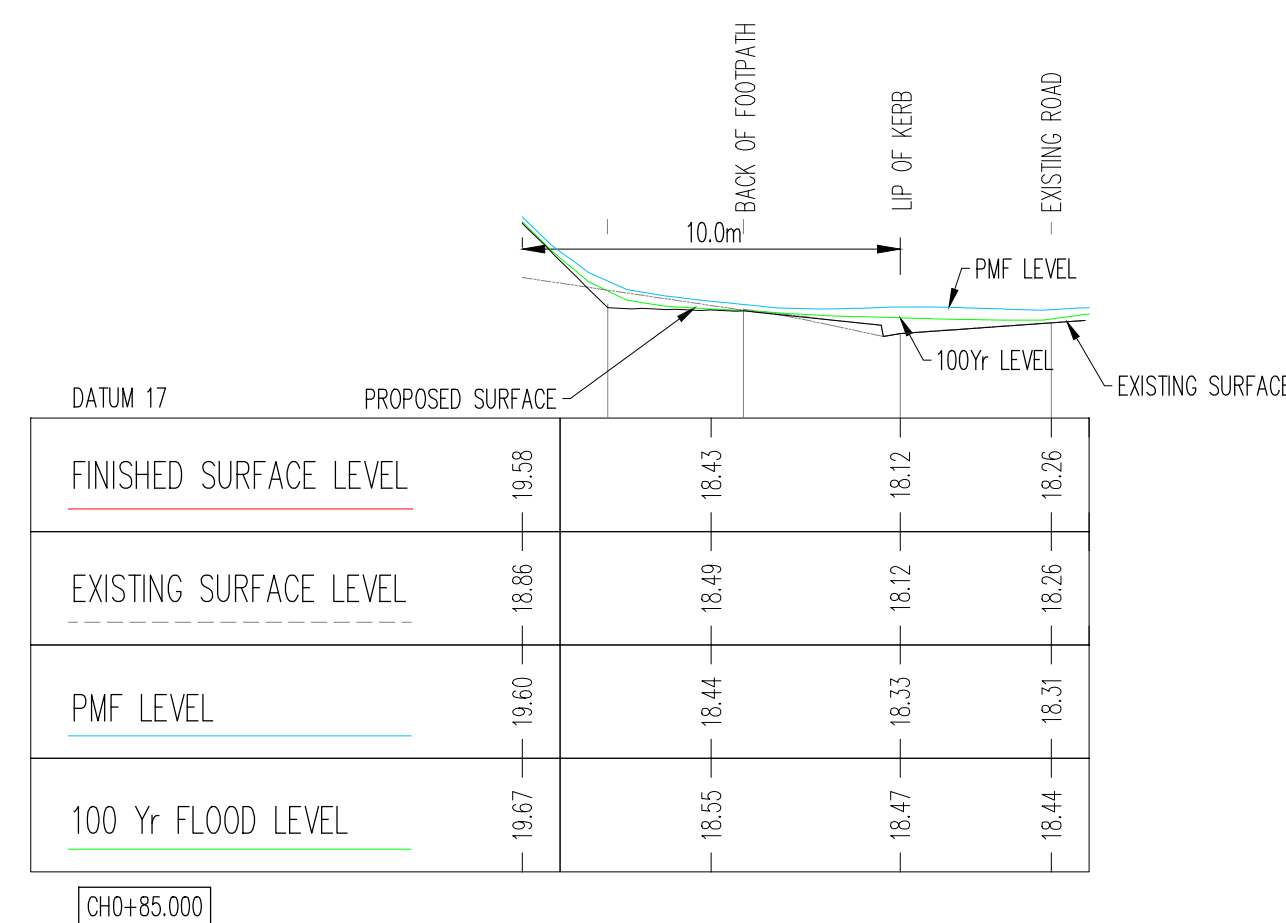
Civil Engineer

TTW **Taylor
Thomson
Whitting**

612 9439 7288 | 48 Chandos Street St Leonards NSW 2060

Sheet Subject	SITEWORKS AND STORMWATER PLAN
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Scale : A1	Drawn	Authorised
1:200	MB	
Job No	Drawing No	Revision
181034	C220	P1
Plot File Created: Apr 06, 2020 - 4:47pm		

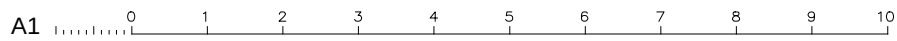


Scale : A1	Drawn	Authorised
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Job No	Drawing No	Revision
181034	C240	P1
Plot File Created: Jan 02, 2020 - 2:39pm		



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FileName: C41.dwg - USER: eiranc - Plot File Created: Jan 02, 2020 - 3:44pm



P1	PRELIMINARY ISSUE				EC	MB	06.04.20										
Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date			

Architect

FRANCIS-JONES MOREHEN
THORP PTY LTD

Civil Engineer

TTW **Taylor
Thomson
Whitting**

612 9439 7288 | 48 Chandos Street St Leonards NSW 2065

Project
338 PITT STREET SYDNEY

Sheet Subject

LONG SECTIONS

Scale : A1	Drawn	Authorised
1:200	MB	
Job No	Drawing No	Revision
181034	C241	P1
Plot File Created: Jan 02, 2020 - 3:44pm		



P1 PRELIMINARY ISSUE				EC	MB	06.04.20								
Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date

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338 PITT STREET SYDNEY

	1:200	MB
Job No	Drawing No	Revision
181034	C250	P1
Plot File Created: Dec 10, 2019 - 9:09am		

Appendix D

Sydney Water OSD Requirements

Eirian Crabbe

From: Stormwater <Stormwater@sydneywater.com.au>
Sent: Wednesday, 20 November 2019 1:29 PM
To: Eirian Crabbe
Subject: RE: 338 Pitt Street, Sydney - OSD requirements

Eirian,

The On Site Detention requirements for the 6,500 square meters site at 338, Pitt Street, Sydney, are as follows:

- On Site Detention 101 cubic meter
- Permissible Site Discharge 241 L/s

The approval for the On Site Detention would only be given as part of the Section 73 application for this development. The On Site Detention is to be designed according to the above values and submitted to Sydney Water for approval with the Section 73 application. The following details are to be included in your submission for On Site Detention approval:

- Location of the On Site Detention in relation to the development
- Location of the On Site Detention in relation to overall stormwater network of the property
- Plan and Elevation of the On Site Detention tank with all dimensions
- Orifice plate calculation

Best Regards

Jeya Jeyadevan
Senior Capability Assessor

Liveable City Solutions
Sydney Water, Level 7, 1 Smith Street, Parramatta NSW 2150

Sydney
WATER

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Mob 0409 318 827
jeya.jeyadevan@sydneywater.com.au

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Visit lovewater.sydney/tips



Reminder: Level 1 water restrictions are in place across Greater Sydney

From: Eirian Crabbe <Eirian.Crabbe@ttw.com.au>
Sent: Wednesday, 20 November 2019 10:27 AM
To: Stormwater <Stormwater@sydneywater.com.au>
Subject: 338 Pitt Street, Sydney - OSD requirements
Importance: High

Hi There,

I am looking at the development of 338 Pitt Street, location attached. The concept proposal DA has been approved (D/2016/1509), and we are now looking at the detailed design.

Please can you confirm the OSD requirements, allowable points of discharge for the site and their respective permissible discharge rates.

The site area is approximately 6500sq.m and is currently 100% impermeable.

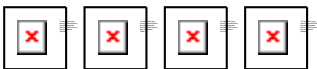
Many thanks.

Eirian

Eirian Crabbe | Associate Director

+61 2 9439 7288 | | ttw.com.au |  

Level 3, 48 Chandos Street, St Leonards NSW 2065



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