

Attachment A7

Flood Advice Report



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232 – 240 Elizabeth Street, Surry Hills

Flood Advice Report

18 January 2024

Project No. 22_261



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Revision 03:
Flood Impact and Risk Management Report updated to reflect revised Architectural Plans by
Candalepas Associates, Job No. 5968, Issue P10.



232 – 240 Elizabeth Street, Surry Hills FLOOD LEVEL ADVICE.

IGS has been engaged to provide flood advice for the proposed development at 232 – 240 Elizabeth Street, Surry Hills. The purpose of this assessment is to identify the predicted flood levels around the study site and provide advice on Flood Planning Levels (FPL) based on the requirements of the City of Sydney. The report also assesses the compliance or otherwise of the proposed finish floor levels for future development at the study site.

Design flood information has been taken from the TUFLOW model established in the Darling Harbour Catchment FRMP report.



1 Development Site

The proposed development at 232 – 240 Elizabeth Street, Surry Hills, is a mixed-use commercial development. This site has access from Elizabeth Street along the western wall, Reservoir Street along the southern side, and Foster Lane along the eastern side (Refer to the locality map below).

The development consists of commercial and retail spaces with three below-ground levels. **Figure 1-1** shows the location of the study site.

The assessment is based on the following drawings and flood models:

- Ground Floor Architectural plans by Candalepas Associates, Job no. 5968, Issue P10 - Attached.
- Survey Plan by ERIC SCERRI & ASSOCIATES PTY LTD, reference no. 2332/14 Rev A dated 13 January 2014.
- Flood Map During 1% AEP and PMF by IGS.
- City of Sydney Interim Floodplain Management Policy, May 2014.

(Refer to the Attachment for more details)

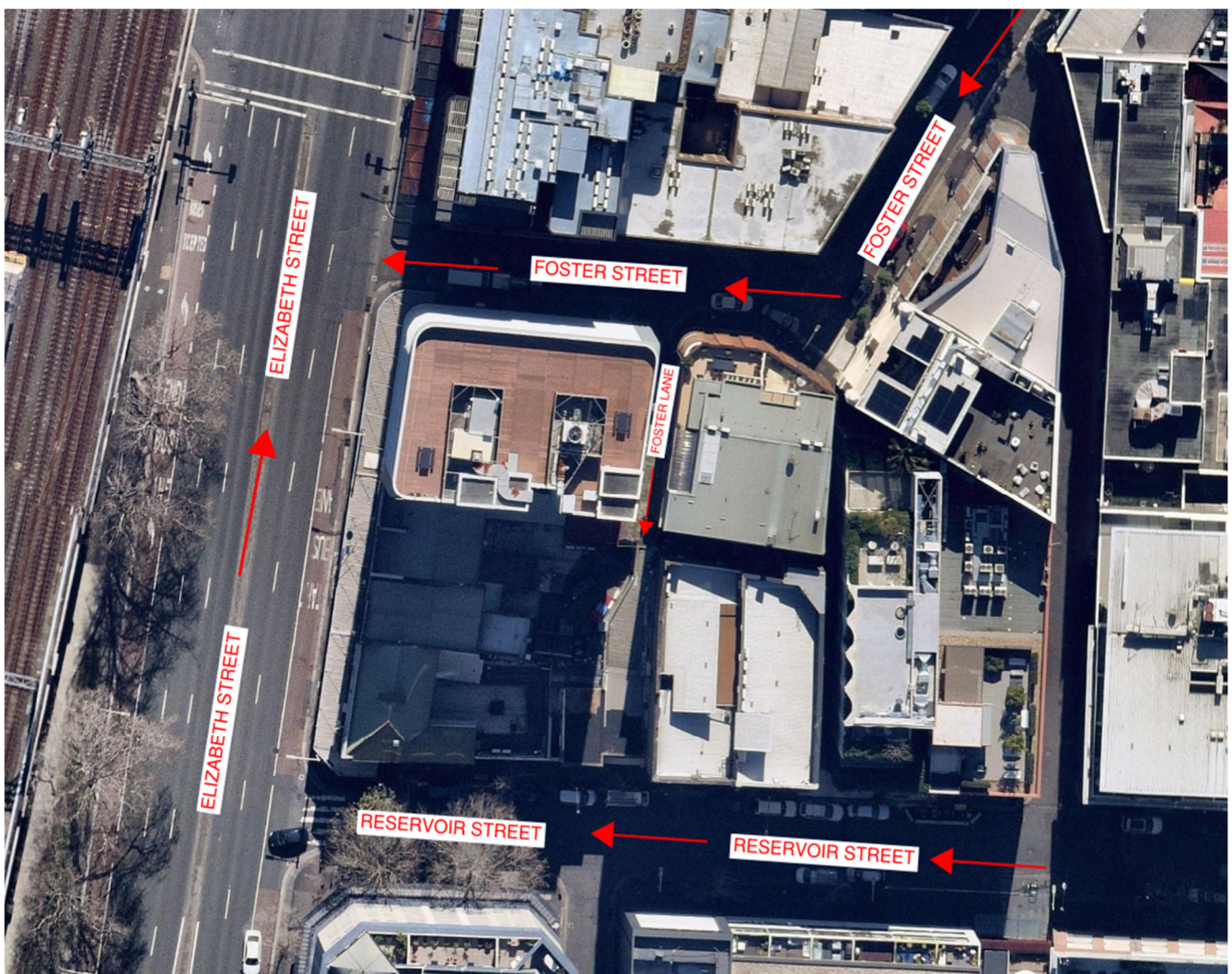


Figure 1 Site Location.



2 Existing Flood Behaviour

This site is bounded by Elizabeth Street on the West, Reservoir Street on the South, and Foster Lane on the Eastern side. The existing flood levels during 1% Annual Exceedance Probability (AEP) and Probable Maximum Flood (PMF) around the study site are adopted from the Darling Harbour Catchment TUFLOW model results from the City of Sydney Council.

As per the council's flood model, this site is affected by overland flows flowing from the eastern side along Foster Lane and Reservoir Street and towards Elizabeth Street before leaving through the railway corridor along the western side of Elizabeth Street. Elizabeth Street along the west side of the site is very flat, and an approximate flood depth of approximately 350mm can be seen along Elizabeth Street during 1% AEP storm events. (Refer to Attachments for more details).

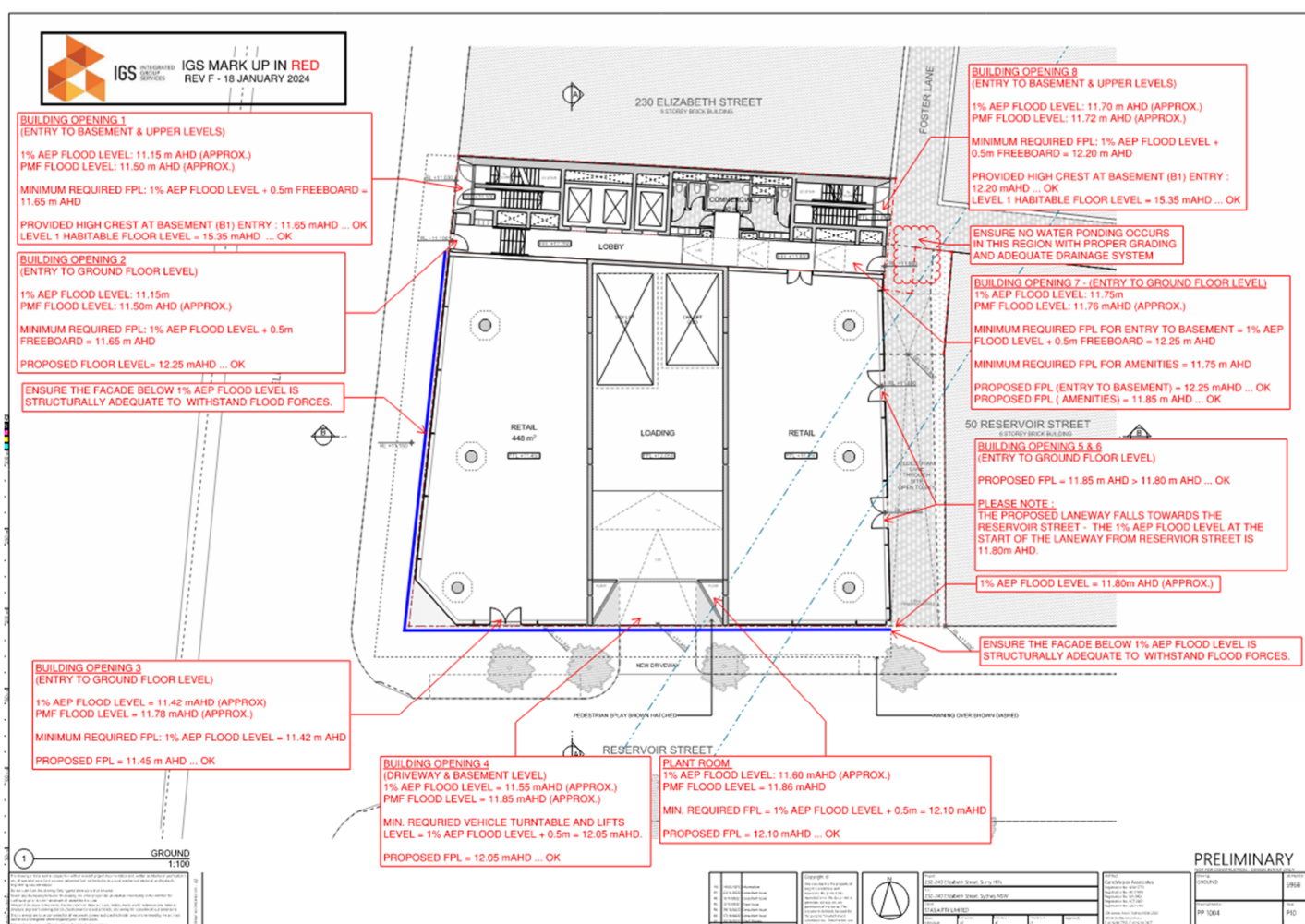


Figure 2. Key Locations & FPL Markup. (Refer to Attachment 1 for details.)



The 1% AEP and PMF flood levels at these locations are presented in **Table 1**. Flood levels have been rounded up to the nearest 0.01m.

Description	1% AEP Flood Level (m AHD)	PMF Flood Level (m AHD)
Building Opening 1 (Entry to Basement & Upper Levels)	11.15	11.50
Building Opening 2 (Entry to Ground Floor Level)	11.15	11.50
Building Opening 3 (Entry to Ground Floor Level)	11.42	11.78
Building Opening 4 (Driveway & Basement Level)	11.55	11.85
Building Opening to Plant Room	11.60	11.86
Building Opening 5 & 6 (Entry to Ground Floor Level)	11.80	N/A
Building Opening 7 (Entry to Ground Floor Level)	11.75	11.76
Building Opening 8 (Entry to Basement and Upper Levels)	11.70	11.70

Table 1: 1% AEP and PMF Water Levels at Key Locations



3 Flooding and the Proposed Development

In accordance with the Sydney Development Control Plan 2012 (City of Sydney, 2012) and the Interim Floodplain Management Policy (City of Sydney, 2014), the development will need to comply with a series of controls as outlined in the following sections.

3.1 Flood Planning Requirements

The requirements for Flood Planning Levels are given in **Table 2**, as per the City of Sydney's Interim Floodplain Management Policy (2014).

Development	Flood Planning Level (FPL)
Residential – Habitable Rooms	Local drainage flooding: 1% AEP flood level + 0.5 m or Two times the depth of flow with a minimum of 0.3 m above the surrounding surface if the depth of flow in the 1% AEP flood is less than 0.25 m.
Industrial or Commercial - Business	Merits approach with a minimum of 1% AEP flood level
Industrial or Commercial – Retail Floor Levels	Merits approach with a minimum of 1% AEP flood level. Must demonstrate a reasonable balance between flood protection and urban design outcomes for street-level activation.
Below-ground car park / Basement	1% AEP flood level + 0.5m or the PMF (Whichever is higher)

Table 2, Flood Planning Level Requirements per the Interim Floodplain Management Policy

Notes (as per City of Sydney Interim Floodplain Management Policy):

1. Local drainage flooding occurs where:
 - a. The maximum cross-sectional depth of flooding in the local overland flow path through and upstream of the site is less than 0.25m for the 1% AEP flood; and
 - b. The development is at least 0.5m above the 1% AEP flood level at the nearest downstream trapped low point; and
 - c. The development does not adjoin the nearest upstream trapped low point; and
 - d. Blockage of an upstream trapped low point is unlikely to increase the depth of flow past the property to greater than 0.25m in the 1% AEP flood.
2. Mainstream flooding occurs where the local drainage flooding criteria cannot be satisfied.
3. A property is considered to be outside the floodplain where it is above the mainstream and local drainage flood planning levels including freeboard.

The predicted flooding depths around the site vary from 50 – 20mm during 1% AEP storm events, and there is no downstream trapped low point. As flood depths are low, even during PMF events, expecting the finished floor levels to be set 500 mm above the 1% AEP level is unreasonable. Adopting the FPL standard for commercial premises outside the floodplain, a flood planning level at or above the 1% AEP would protect the ground floor ingress points and allows more reasonable finished floor levels to be adopted.



3.2 Flood Planning Levels

A comparison of floor levels at key entrances and required FPLs is provided below in **Table 3**.

Description	1% AEP Flood Level (m AHD)	Proposed Finished Floor Level (m AHD)	Freeboard Provided (mm)	Compliance with Council Requirements?
Building Opening 1 (Entry to Basement & Upper Levels)	11.15	To Basement = 11.65	500	YES
	11.15	Level 1 = 15.35	4200	
Building Opening 2 (Entry to Ground Floor Level)	11.15	12.25	1100	YES
Building Opening 3 (Entry to Ground Floor Level)	11.42	11.45	N/A	YES
Building Opening 4 (Driveway & Basement Level)	11.55	12.05	500	YES
Building Opening to Plant Room	11.60	12.10	500	YES
Building Opening 5 & 6 (Entry to Ground Floor Level)	11.80	11.85	50	YES
Building Opening 7 (Entry to Amenities) (Entry to Basement)	11.75	11.85	100	YES
	171.75	12.25	500	YES
Building Opening 8 (Entry to Basement and Upper Levels)	11.70	12.20	500	YES

Table 3, Proposed Finished Floor Levels and Minimum FPLs

The proposed finished floor level (m AHD) was taken from the Architectural plans by Candalepas Associates, Job no. 5968, Issue P10. The minimum FPL required was based on the Darling Harbour Catchment Model obtained from the City of Sydney Council.



3.3 Proposed Flood Mitigation Measures

The following flood mitigation is recommended to ensure the proposed development is well protected from overland flows:

- No water pondage should occur along the site's northeast corner – ensure that the section falls towards Foster Lane with proper grading and an adequate drainage system.
- Ensure the proposed laneway falls towards Reservoir Street per the proposed architectural plans.
- Ensure the façade below 1% AEP Flood Level is structurally adequate to withstand flood forces. Refer to the flood-compatible materials table from the City of Sydney attached – Materials not listed may be accepted by the council subject to certification- of the suitability of the material of the manufacturer.
- All flood levels proposed on the architectural plans must be maintained to protect from the overland flows.

We believe the revised architectural plans, Job No. 5968, Issue P10, have incorporated all recommended flood mitigation measures and flood planning requirements per the City of Sydney Council's requirements. For more details, refer to the attached architectural plans (Attachment 5) and Flood Planning level Markups (Attachment 1).

3.4 Possible Changes in Flood Extent

The overland flows flowing towards the site have a shallow depth varying from 20 – 50mm during 1% AEP storm events. The Council's Drainage system will cater to the shallow sheet flows within the vicinity. However, flood mitigation measures are recommended to protect the proposed development from overland flows. There is no significant change in the building footprint; hence, the flood extent will not change.



4 Summary

IGS has completed a Site-Specific Flood Assessment for the proposed development of 232 – 240 Elizabeth Street, Surry Hills.

Predicted flood levels were extracted from the Darling Harbour Catchment Flood Model obtained from the City of Sydney Council and used to determine Flood Planning Levels for the proposed development as per the City of Sydney Interim Floodplain Management Policy. The finished ground floor of the proposed development was compared to the Flood Planning Levels to determine compliance with the policy.

The review demonstrates that the proposed development floor levels meet the minimum required Flood planning levels per the City of Sydney's Interim Flood plain management policy.

5 Attachments:

- Attachment 1 - Flood Markups with proposed Flood Planning Levels.
- Attachment 2 - Water surface elevation map during 1% AEP storm events.
- Attachment 3 - Water Surface elevation map during PMF Storm events.
- Attachment 4 - List of Flood-Compatible Materials from the City of Sydney – Interim Floodplain Management Policy.
- Attachment 5 - Ground Floor Architectural plans by Candalepas Associates, Job no. 5968, Issue P10.
- Attachment 6 - Survey Plan by ERIC SCERRI & ASSOCIATES PTY LTD, reference no. 2332/14 Rev A dated 13 January 2014.

BUILDING OPENING 1
 (ENTRY TO BASEMENT & UPPER LEVELS)

1% AEP FLOOD LEVEL: 11.15 m AHD (APPROX.)
 PMF FLOOD LEVEL: 11.50 m AHD (APPROX.)

MINIMUM REQUIRED FPL: 1% AEP FLOOD LEVEL + 0.5m FREEBOARD = 11.65 m AHD

PROVIDED HIGH CREST AT BASEMENT (B1) ENTRY : 11.65 m AHD ... OK
 LEVEL 1 HABITABLE FLOOR LEVEL = 15.35 m AHD ... OK

BUILDING OPENING 2
 (ENTRY TO GROUND FLOOR LEVEL)

1% AEP FLOOD LEVEL: 11.15m
 PMF FLOOD LEVEL: 11.50m AHD (APPROX.)

MINIMUM REQUIRED FPL: 1% AEP FLOOD LEVEL + 0.5m FREEBOARD = 11.65 m AHD

PROPOSED FLOOR LEVEL = 12.25 m AHD ... OK

ENSURE THE FACADE BELOW 1% AEP FLOOD LEVEL IS STRUCTURALLY ADEQUATE TO WITHSTAND FLOOD FORCES.

BUILDING OPENING 3
 (ENTRY TO GROUND FLOOR LEVEL)

1% AEP FLOOD LEVEL = 11.42 m AHD (APPROX)
 PMF FLOOD LEVEL = 11.78 m AHD (APPROX.)

MINIMUM REQUIRED FPL: 1% AEP FLOOD LEVEL = 11.42 m AHD

PROPOSED FPL = 11.45 m AHD ... OK

BUILDING OPENING 4
 (DRIVEWAY & BASEMENT LEVEL)

1% AEP FLOOD LEVEL = 11.55 m AHD (APPROX.)
 PMF FLOOD LEVEL = 11.85 m AHD (APPROX.)

MIN. REQUIRED VEHICLE TURNTABLE AND LIFTS LEVEL = 1% AEP FLOOD LEVEL + 0.5m = 12.05 m AHD.

PROPOSED FPL = 12.05 m AHD ... OK

PLANT ROOM

1% AEP FLOOD LEVEL: 11.60 m AHD (APPROX.)
 PMF FLOOD LEVEL = 11.86 m AHD

MIN. REQUIRED FPL = 1% AEP FLOOD LEVEL + 0.5m = 12.10 m AHD

PROPOSED FPL = 12.10 m AHD ... OK

BUILDING OPENING 8
 (ENTRY TO BASEMENT & UPPER LEVELS)

1% AEP FLOOD LEVEL: 11.70 m AHD (APPROX.)
 PMF FLOOD LEVEL: 11.72 m AHD (APPROX.)

MINIMUM REQUIRED FPL: 1% AEP FLOOD LEVEL + 0.5m FREEBOARD = 12.20 m AHD

PROVIDED HIGH CREST AT BASEMENT (B1) ENTRY : 12.20 m AHD ... OK
 LEVEL 1 HABITABLE FLOOR LEVEL = 15.35 m AHD ... OK

ENSURE NO WATER PONDING OCCURS IN THIS REGION WITH PROPER GRADING AND ADEQUATE DRAINAGE SYSTEM

BUILDING OPENING 7 - (ENTRY TO GROUND FLOOR LEVEL)

1% AEP FLOOD LEVEL: 11.75m
 PMF FLOOD LEVEL: 11.76 m AHD (APPROX.)

MINIMUM REQUIRED FPL FOR ENTRY TO BASEMENT = 1% AEP FLOOD LEVEL + 0.5m FREEBOARD = 12.25 m AHD

MINIMUM REQUIRED FPL FOR AMENITIES = 11.75 m AHD

PROPOSED FPL (ENTRY TO BASEMENT) = 12.25 m AHD ... OK
 PROPOSED FPL (AMENITIES) = 11.85 m AHD ... OK

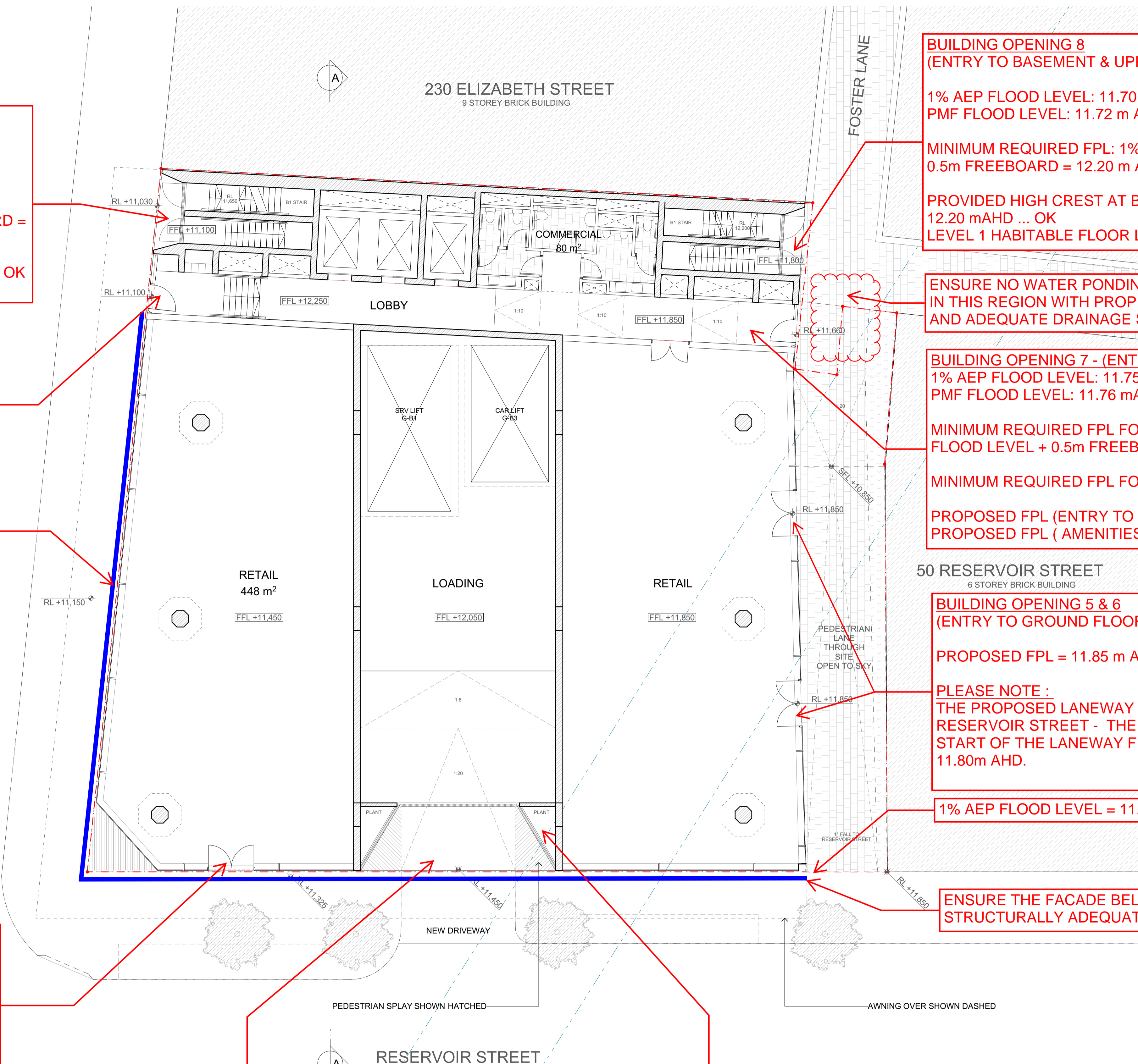
BUILDING OPENING 5 & 6
 (ENTRY TO GROUND FLOOR LEVEL)

PROPOSED FPL = 11.85 m AHD > 11.80 m AHD ... OK

PLEASE NOTE :
 THE PROPOSED LANEWAY FALLS TOWARDS THE RESERVOIR STREET - THE 1% AEP FLOOD LEVEL AT THE START OF THE LANEWAY FROM RESERVOIR STREET IS 11.80m AHD.

1% AEP FLOOD LEVEL = 11.80m AHD (APPROX.)

ENSURE THE FACADE BELOW 1% AEP FLOOD LEVEL IS STRUCTURALLY ADEQUATE TO WITHSTAND FLOOD FORCES.






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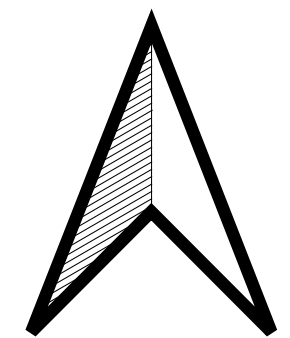
232 - 240 ELIZABETH STREET, SURRY HILLS

FLOOD MAP DURING 1% AEP
STORM EVENTS

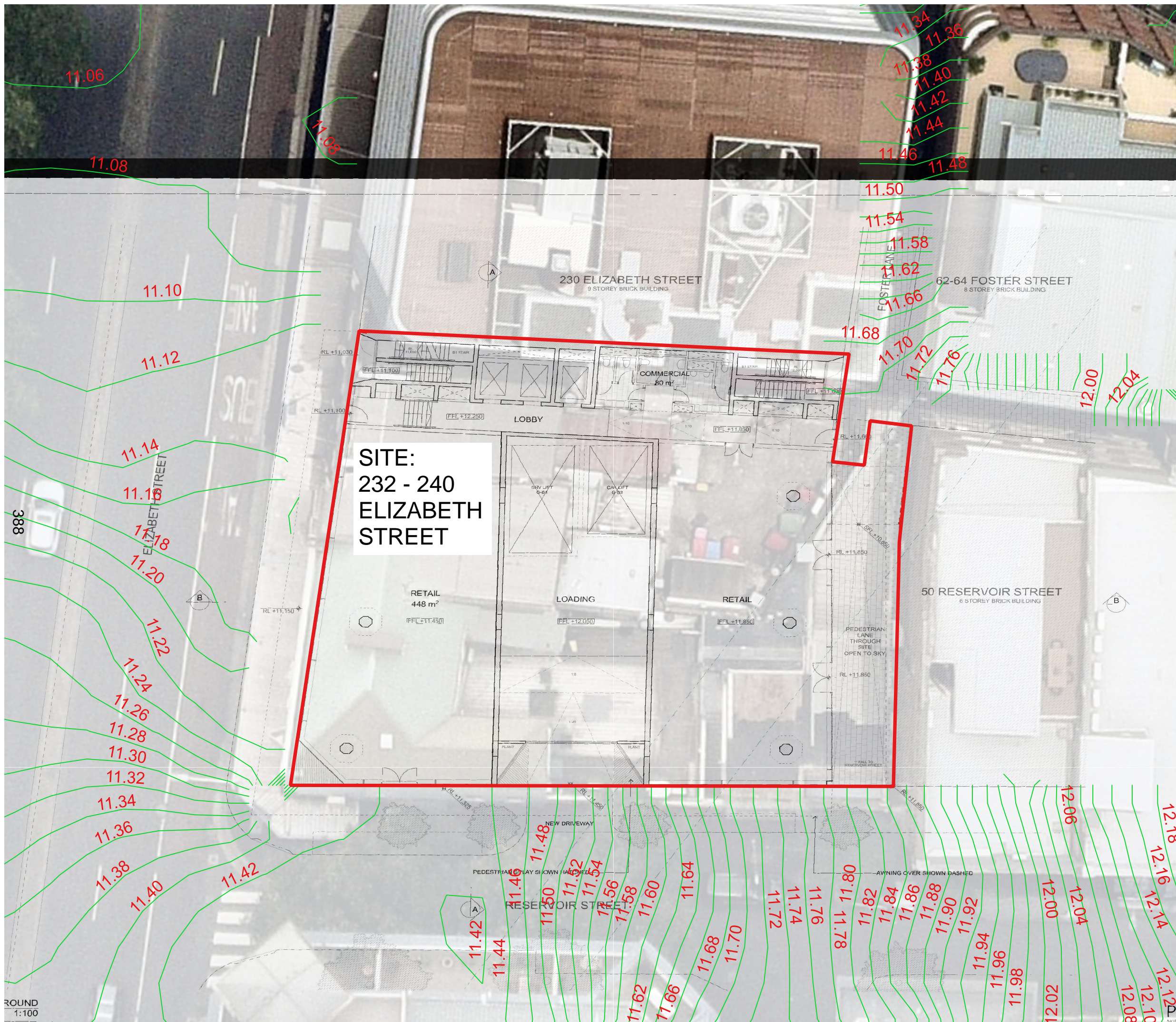
DATE: 18 JANUARY 2024

LEGEND

-  20mm INTERVAL
CONTOUR DURING
1% AEP STORM
EVENT
-  11.00
WATER SURFACE
LEVEL DURING 1% AEP
STORM EVENTS
-  PROPERTY BOUNDARY



SCALE: 1:200 @ A3






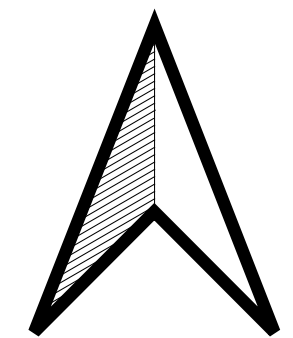
232 - 240 ELIZABETH STREET, SURRY HILLS

FLOOD MAP DURING PMF
STORM EVENTS

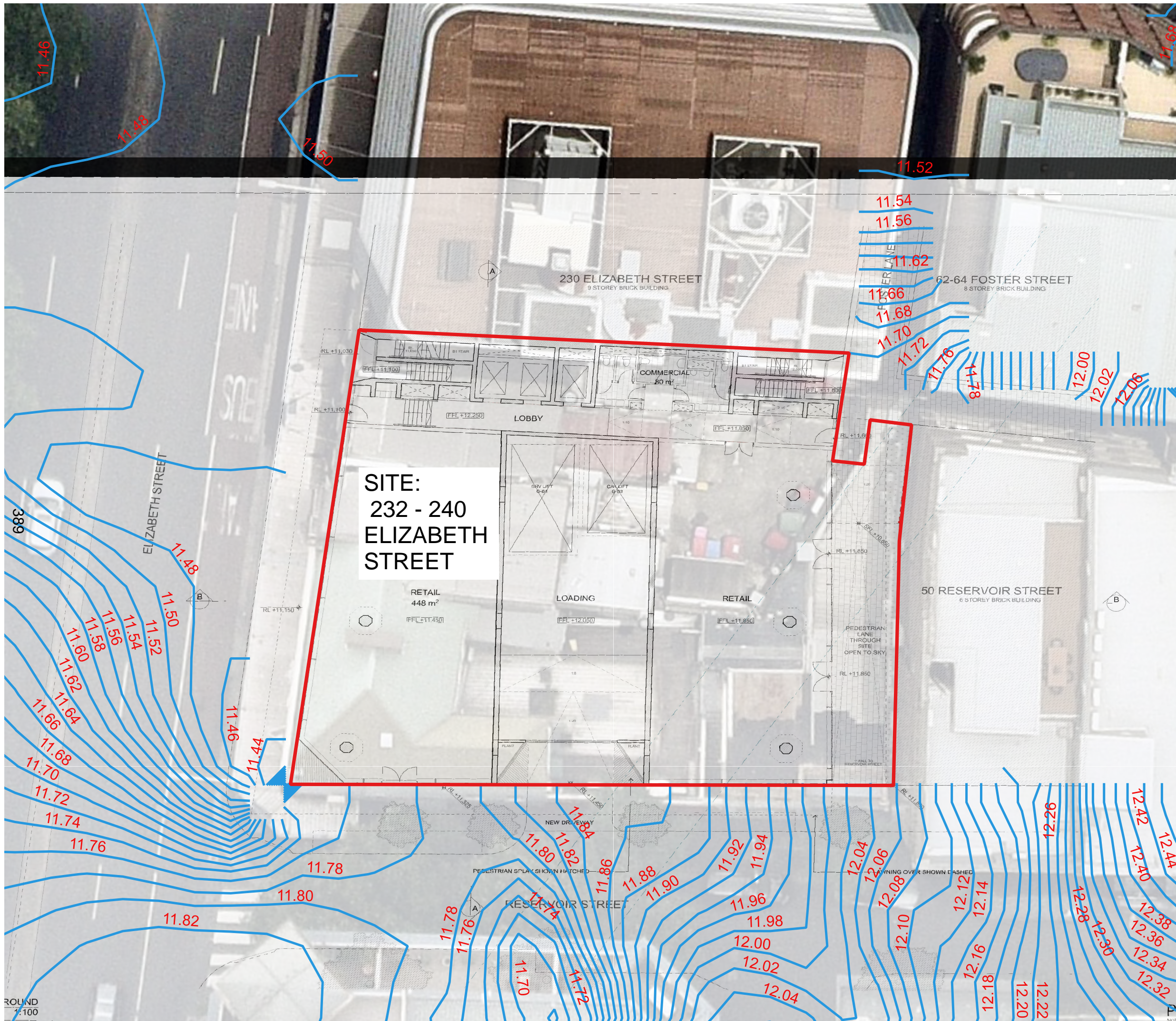
DATE: 18 JANUARY 2024

LEGEND

-  20mm INTERVAL
CONTOUR DURING
1% AEP STORM
EVENT
-  11.00
WATER SURFACE
LEVEL DURING 1% AEP
STORM EVENTS
-  PROPERTY BOUNDARY



SCALE: 1:200 @ A3



6 Flood Compatible Materials

Where required for development, the following materials are to be applied. Materials not listed may be accepted by Council subject to certification of the suitability of the material of the manufacturer.

Component	Flood Compatible Material
Flooring and Sub-floor	<ul style="list-style-type: none"> Concrete slab-on-ground monolith construction Suspended reinforced concrete slab
Wall Structure	<ul style="list-style-type: none"> Solid brickwork, blockwork, reinforced concrete or mass concrete
Wall and Ceiling Linings	<ul style="list-style-type: none"> Fibro-cement board Brick, face or glazed Clay tile glazed in waterproof mortar Concrete Concrete block Steel with waterproof applications Stone, natural solid or veneer, waterproof grout Glass blocks Glass Plastic sheeting or wall with waterproof adhesive
Roof Structure	<ul style="list-style-type: none"> Reinforced concrete construction Galvanised metal construction
Doors	<ul style="list-style-type: none"> Solid panel with water proof adhesives Flush door with marine ply filled with closed cell foam Painted metal construction Aluminium or galvanised steel frame
Insulation	<ul style="list-style-type: none"> Closed cell solid insulation Plastic/polystyrene boards
Windows	<ul style="list-style-type: none"> Aluminium frame with stainless steel rollers or similar corrosion and water resistant material.
Nails, Bolts, Hinges and Fittings	<ul style="list-style-type: none"> Brass, nylon or stainless steel Removable pin hinges Hot dipped galvanised steel wire nails or similar
Main Power Supply	<ul style="list-style-type: none"> Subject to the approval of the relevant authority the incoming main commercial power service equipment, including all metering equipment, shall be located above the designated flood planning level. Means shall be available to easily disconnect the dwelling from the main power supply.
Wiring	<ul style="list-style-type: none"> All wiring, power outlets, switches, etc., should be located above the designated flood planning level. All electrical wiring installed below this level should be suitable for continuous underwater immersion and should contain no fibrous components. This will not be applicable for below-ground car parks where the car park complies with flood planning level requirements. Earth leakage circuit-breakers (core balance relays) or Residual Current Devices (RCD) must be installed. Only submersible type splices should be used below maximum flood level. All conduits located below the relevant designated flood level should be so installed that they will be self-draining if subjected to flooding.
Electrical Equipment	<ul style="list-style-type: none"> All equipment installed below or partially below the designated flood planning level should be capable of disconnection by a single plug and socket assembly.

Component	Flood Compatible Material
Heating and Air Conditioning Systems	<ul style="list-style-type: none"> ▪ Heating and air conditioning systems should be installed in areas and spaces of the house above the designated flood planning level.
Fuel storage for heating purposes	<ul style="list-style-type: none"> ▪ Heating systems using gas or oil as a fuel should have a manually operated valve located in the fuel supply line to enable fuel cut-off. ▪ The heating equipment and related fuel storage tanks should be mounted on and securely anchored to a foundation pad of sufficient mass to overcome buoyancy and prevent movement that could damage the fuel supply line. The tanks should be vented above the flood planning level.
Ducting for heating/cooling purposes	<ul style="list-style-type: none"> ▪ All ductwork located below the relevant flood level should be provided with openings for drainage and cleaning. Self-draining may be achieved by constructing the ductwork on a suitable grade. Where ductwork must pass through a water-tight wall or floor below the relevant flood level, a closure assembly operated from above relevant flood level should protect the ductwork.

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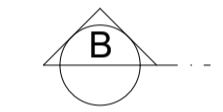
1

GROUND
1:100

This drawing is to be read in conjunction with all relevant project documentation (incl. written architectural specifications) and all specialist consultant documentation incl. but not limited to structural, mechanical, electrical, and hydraulic engineering documentation.
Do not scale from this drawing. Only figured dimensions shall be used.
Report any discrepancy between this drawing and other project documentation immediately to the architect for clarification prior to commencement of related work on site.
All sizes of structural components that are shown on these architectural documents are for reference only. Refer to structural engineer's drawings for structural dimensions and architectural drawings for concrete set out dimensions.
Shop drawings are to be completed for all metalwork, joinery and specified trade items and reviewed by the architect (and structural engineer where required) prior to fabrication.
Refer to the 'Architectural Drawing Notes Page' for further notation.

DRAWING ORIGINAL SIZE A1

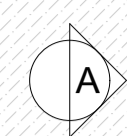
ELIZABETH STREET



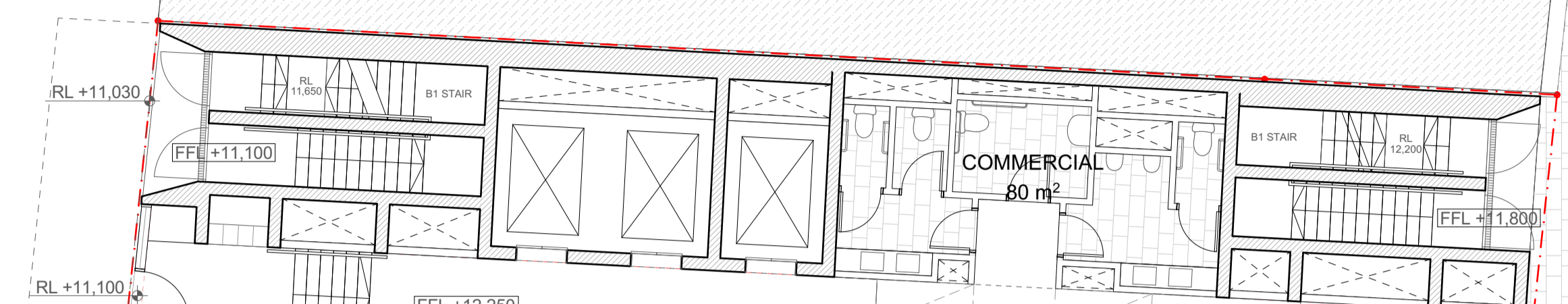
RL +11,150

RL +11,030

RL +11,100



230 ELIZABETH STREET
9 STOREY BRICK BUILDING



LOBBY

COMMERCIAL
80 m²

RETAIL
448 m²

LOADING

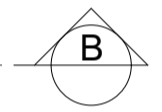
RETAIL

SRV LIFT
G-B1

CAR LIFT
G-B3

PEDESTRIAN LANE
THROUGH SITE
OPEN TO SKY

50 RESERVOIR STREET
6 STOREY BRICK BUILDING



RL +11,325

RL +11,450

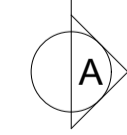
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RL +11,650

NEW DRIVEWAY

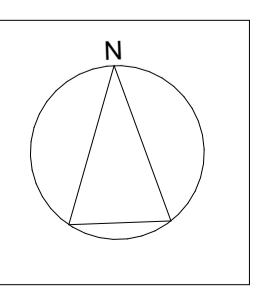
PEDESTRIAN SPLAY SHOWN HATCHED

AWNING OVER SHOWN DASHED



RESERVOIR STREET

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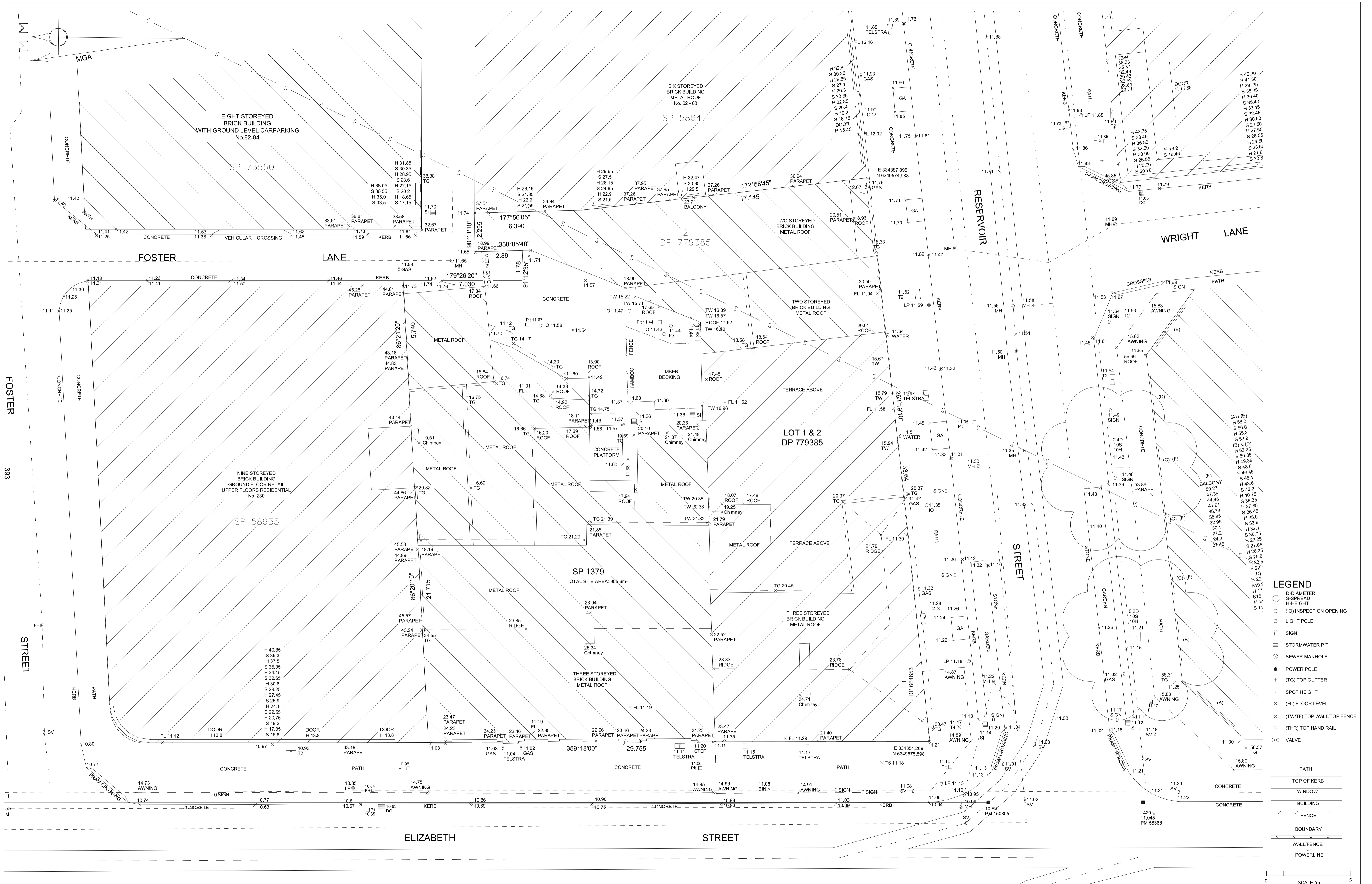
Project:	232-240 Elizabeth Street, Surry Hills				
Site:	232-240 Elizabeth Street, Sydney NSW				
Client:	STASIA PTY LIMITED				
Scale:	1:100 @ A1	Drawn By:	AF	Checked 1:	AF
		Checked 2:	LE	Approved:	

Architect:
Candalepas Associates
Registration No. NSW 5773
Registration No. VIC 17978
Registration No. WA 2495
Registration No. ACT 2693
Registration No. QLD 5463
309 Sussex Street, Sydney NSW 2000
info@candalepas.com.au
T: 02 9283 7755 F: 02 9283 7477

PRELIMINARY
NOT FOR CONSTRUCTION - DESIGN INTENT ONLY

Drawing:	GROUND	Job Number:	5968
Drawing Number:	PP 1004	Issue:	P10

Print Date: Thursday, 20 July 2023 15:56:48



LEGEND

- D-DIAMETER
- S-SPREAD
- H-HEIGHT
- (IO) INSPECTION OPENING
- LIGHT POLE
- SIGN
- STORMWATER PIT
- SEWER MANHOLE
- POWER POLE
- (TG) TOP GUTTER
- × SPOT HEIGHT
- × (FL) FLOOR LEVEL
- × (TWTF) TOP WALL/TOP FENCE
- × (THR) TOP HAND RAIL
- ⊗ VALVE
- PATH
- TOP OF KERB
- WINDOW
- BUILDING
- FENCE
- BOUNDARY
- WALL/FENCE
- POWERLINE

AMENDMENTS:

MGA COORDINATES ADDED TO 2 CORNERS ALONG RESERVOIR ST FRONTAGE 26 MAR 2014

POSITION OF IMPROVEMENTS RELATIVE TO BOUNDARIES ARE SHOWN DIAGRAMMATICALLY AND HAVE BEEN SURVEYED FOR DA PURPOSES ONLY. ALL BOUNDARY DIMENSIONS & AREA HAVE BEEN COMPILED FROM TITLE INFORMATION ONLY AND ARE SUBJECT TO FINAL SURVEY. THE POSITION AND LEVELS OF ADJOINING BUILDINGS, WINDOWS, RIDGE, GUTTERS AND TREES HAVE BEEN SURVEYED REMOTELY. NO INVESTIGATION OF UNDERGROUND SERVICES HAS BEEN MADE. RELEVANT AUTHORITIES ARE TO BE NOTIFIED PRIOR TO ANY DEVELOPMENT. SERVICES SHOWN HEREON HAVE BEEN DETERMINED FROM VISUAL EVIDENCE ONLY. AUSTRALIAN HEIGHT DATUM WAS ESTABLISHED FROM PM 150305 (RL 10,888) AHD. IT IS ADVISED, FOR CONSTRUCTION WORKS NEAR BOUNDARIES, THAT BOUNDARIES BE MARKED ON THE GROUND PRIOR TO CONSTRUCTION. THE BOUNDARY DIMENSIONS ON THIS PLAN HAVE BEEN COMPILED FROM LAND TITLES OFFICE PLAN SP1379 AND DP779385.

ERIC SCERRI & ASSOCIATES PTY LTD
 LAND SURVEY CONSULTANTS
 P.O. BOX 3018 TAMARAMA 2026
 Ph (02) 9386 4161 Mob: 0417 452 852 Fax: (02) 9386 4171
 email: scerrif56@tpg.com.au

CLIENT: ROLAND BLOCH C/- TRIBE STUDIO
PLAN SHOWING: DETAIL & LEVEL SURVEY
PROPERTY: 232 - 240 ELIZABETH STREET SURRY HILLS
LGA: SYDNEY

SURVEYED: SH/MB
SCALE: A1@1:100
DRAWN: MB
PLAN REFERENCE: 2332/14
DATUM: AHD
DATE OF SURVEY: 13/01/14
TOTAL SITE AREA: 905.6m²
SHEET 1 OF 1 **COPYRIGHT**