

now



Our Ref: 59919086- L03A: BCP/bcp  
Contact: Dr Brett C. Phillips

2<sup>nd</sup> September 2022

The Assistant Development Director,  
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Dear Rosemary,

**RESPONSES TO NORTHERN BEACHES COUNCIL UNRESOLVED ISSUES FOR  
DEVELOPMENT APPLICATION NO: DA2021/1912, 2-4 LAKESIDE CRESCENT &  
389 PITTWATER ROAD, NORTH MANLY, NSW**

On 16 August 2022 Northern Beaches Council provided comments on Development Application No: DA2021/1912 for Alterations and additions to an existing building for a mixed use development including seniors housing and boarding house at 2- 4 Lakeside Crescent and 8 Palm Avenue and 389 Pittwater Road, North Manly.

Council's letter advised, in part:

*This letter supplements and updates (where necessary) Council's letter dated 28 March 2022 and discussions at our recent meeting held on 2 August 2022.*

*Upon assessment of the application and the additional information previously submitted, Council's concerns remain unresolved.*

These comments include issues raised by Council's Flood Engineer with the proposed development in its current form. These comments are discussed below.

## **1. BACKGROUND**

### **1.1 Flood Risk Assessment**

A detailed Flood Risk Assessment report was prepared by Cardno in September 2021<sup>1</sup>.

The report details the assessment of the flooding extent and behaviour to inform the adaptive reuse of 8 Palm Avenue and 2-4 Lakeside Crescent, North Manly.

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<sup>1</sup> Cardno (2021) "Flood Risk Assessment, 8 Palm Avenue and 2-4 Lakeside Crescent, North Manly", *Final Report*, Version 2, prepared for Landcom, 30 September

As stated, in part, by Cardno, 2021:

*This development application is located over proposed Lot 1, to be created under a separate subdivision development application lodged by Landcom with Northern Beaches Council. It is proposed that the existing building located in the new Lot 1 be repurposed through adaptive re-use for residential accommodation.*

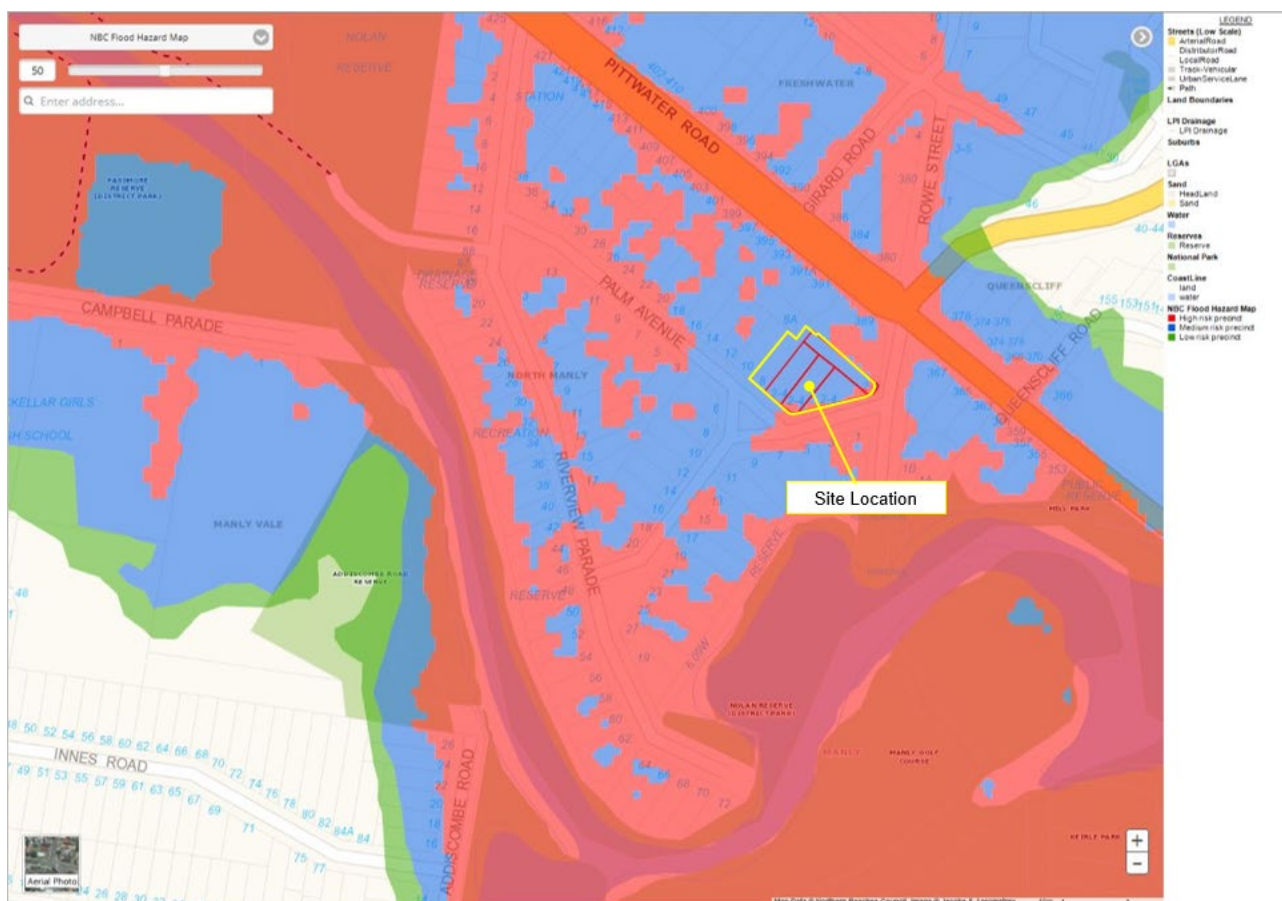
*The property is flood-prone and the proposed adaptive re-use of the existing building needs to respond to flooding and its associated risk.*

*The objective of the study is to address the following considerations for planned the adaptive reuse of 8 Palm Avenue and 2-4 Lakeside Crescent, North Manly:*

- Flood risks on and near the site;
- The impact of the planned adaptive re-use;
- Flood emergency response;
- Flood warning and evacuation;
- Compliance with requirements of Warringah DCP 2011

#### Flood Risk Precinct

The High, Medium and Low Flood Risk precincts mapped by Council in the vicinity of the subject site are The High, Medium and Low Flood Risk precincts mapped by Council in the vicinity of the subject site are plotted in Figure 1. The existing building is located in a Medium Risk Precinct.



Sourced from Northern Beaches Council Mapping Portal on 12 December 2018

**Figure 1 Flood Risk Precincts**

## 1.2 Flood Emergency Response Plan (FERP)

A Flood Emergency Response Plan (FERP) has been also prepared for the mixed-use development at 8 Palm Avenue and 2-4 Lakeside Crescent, North Manly<sup>2</sup>.

The FERP describes:

- Flood behaviour at the site in floods up to the Probable Maximum Flood (PMF),
- A Flood Emergency Response Plan for the development, including:
  - A Flood Warning System;
  - Evacuation strategy, measures, procedures and plan; and
  - A FloodSafe Plan

The FERP responds to the hazard categories and associated consequences identified by WMAwater, 2018 and described by Cardno, 2021<sup>3</sup>.

## 1.3 Severity of March 2022 Flood

In May 2022, Cardno now Stantec assessed the severity of the March 2022 rainfall and flood within the Manly Lagoon catchment where Manly Dam spilled. Landcom was interested to know the severity of the recent rainfall and the subsequent flooding experienced on the project site to provide context to the flood measures incorporated into the proposed redevelopment.

As concluded by Cardno now Stantec, 2022<sup>4</sup>:

*The 2013 Manly Lagoon Flood Study states, in part:*

*The critical storm duration event required to produce the maximum peak water levels in Manly Lagoon was found to be the 9 hour duration event ....*

*Rainfall and water level data was obtained from Manly Hydraulics Laboratory (MHL) for the period 20 February 2022 - 16 March 2022 at:*

- Station 213412 (Manly Dam) – rainfall at 5 mins intervals
- Station 213414 (Queenscliff) – rainfall at 5 mins intervals
- Station 213413 Riverview Parade – water levels at 15 mins intervals

*It is noted from **Figures 5 and 6** that at Station 213412 Manly Dam:*

- *The most severe storm bursts were between 6 hours and 9 hours duration; and*
- *The severity of the burst depths was between 1% AEP and 0.5% AEP;*

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<sup>2</sup> Cardno now Stantec (2022) "Flood Emergency Response Plan, 8 Palm Avenue and 2-4 Lakeside Crescent, North Manly", *Final Report*, Version 2, prepared for Landcom, 15 May.

<sup>3</sup> WMAwater (2018) "Manly Lagoon Floodplain Risk Management Study and Plan", *Final Report*, prepared for Northern Beaches Council, October, 86 pp + Apps.

<sup>4</sup> Cardno now Stantec (2022) "Severity of March 2022 Flood, 2-4 Lakeside Crescent & 389 Pittwater Road, North Manly, NSW", *Letter Report*, prepared for Landcom, 3 May.

It is noted also from **Figures 8 and 9** that at Station 213414 Queenscliff:

- The most severe storm bursts were between 6 hours and 9 hours duration; and
- The severity of the burst depths was almost 1% AEP.

It is noted from **Figure 12** that based on the design flood levels tabulated in Table 1 for the 2013 reference location “Riverview Parade (Manly Lagoon)” the:

- assessed severity of the maximum water level recorded at Station 213413 River Parade is around 10% AEP; while the
- assessed severity of the maximum flood mark surveyed on the subject property is around 5% AEP;
- observed flood levels in the vicinity of 2-4 Lakeside Crescent were below the ground floor FFL (0.38 m – 0.26 m lower) and were far below the FPL (1.06 m – 0.94 m lower).

It is concluded that notwithstanding the severity of the recorded rainfall, at the assessed critical storm burst duration for Manly Lagoon, of 1% AEP to 0.5% AEP; the severity of the resulting flooding that was experienced in the vicinity of the subject property was only 10% AEP - 5% AEP.

## 2. OFFICER COMMENTS

*The response (dated 15 May 2022) to the flood referral comments has been assessed. The ground floor of the former Queenscliff Community Health Centre has considerable flood risk.*

It is unclear how Council has defined “considerable flood risk”. The existing building which is to undergo adaptive re-use is located in a Medium Risk Precinct (based on Council’s own mapping of Flood Risk Precincts which considers the severity and likelihood of flooding experienced across the floodplain).

The detailed FERP responds to the hazard categories and associated consequences identified by WMAwater, 2018 and described by Cardno, 2021.

*The measures are deemed insufficient to warrant the increased risk to the community.*

The strategy which is proposed to meet the intent of Council’s flood planning level is to protect the ground floor of the existing building up to the flood planning level by a combination of:

- installing flood walls within the landscape areas with openings for access as needed. These walls to be tied into existing walls which do not have any openings which would permit the ingress of floodwaters up to the flood planning level; and
- installing flood barriers across access openings as appropriate; and
- installing flood doors on any external doors which are not otherwise protected.

The proposed flood doors are external doors. These doors open outwards so that when floodwaters reach these doors the external water pressure presses the doors into the door seals to provide a watertight barrier. These doors are self-closing and would be closed. These doors would be opened only by residents or staff when entering or leaving the building.

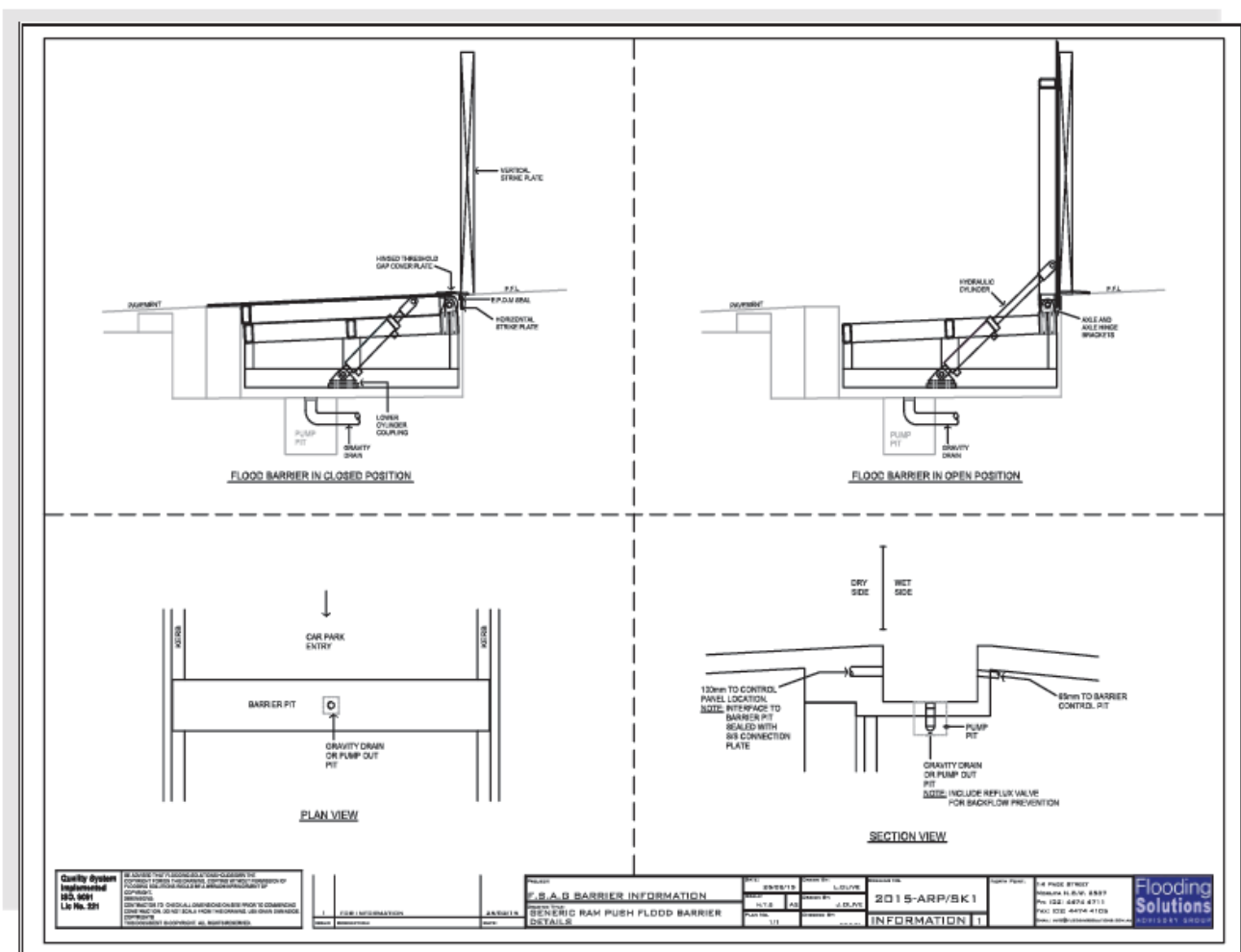
There are three doors which are identified as flood doors, but also identified as requiring “automatic door openers to meet AS 1428.1 requirements”. One available approach is to operate these doors via push to open buttons on the doors. In the event of an electrical failure the intent is these doors automatically close and do not get stuck open. A further consideration would be installing a sensor such that when floodwaters reach the flood doors that any system for electrically opening the doors is disabled so that the flood doors achieve their intended purpose.

An alternative to flood doors might be for flood barriers to be installed to exclude flood waters entering the ground floor.

If the doors are outward opening (for fire), then any flood barriers would need to be located just inside the doorways. The most suitable barrier would likely be a reverse ramp push-up barrier. Examples of this barrier are given in **Figures 2, 3 and 4**.

It is noted that a 0.7 m high flood barrier would protect any entries up to and including the Flood Planning Level.

A further consideration is the floor type at each external doorway and the feasibility of incorporating the flood barrier system into the floor.



**Figure 2 Ram Push-Up Flood Barrier Details – Courtesy Flooding Solutions Pty Ltd**





**Figure 3 Self Closing Ram Push Flood Barrier Closed Position - Courtesy of Flooding Solutions Pty Ltd**



**Figure 4 Self Closing Ram Push Flood Barrier Open Position - Courtesy of Flooding Solutions Pty Ltd**

In relation to evacuation of residents from the Ground Floor to the refuge area on Level 1 at the time of major floods, there is a hierarchy of evacuation methods which will be implemented.

- (i) Evacuate by internal lift (vulnerable residents would be given priority)
- (ii) If the lifts cease to operate then:
  - (a) Able bodied residents walk up the stairs
  - (b) vulnerable people for the ground floor to the flood refuge on Level 1 using the installed stair lift
- (iii) If the stair lift ceases to operate then flood wardens would manually assist any vulnerable persons on the ground floor up the stairs to Level 1.

The lifts may cease to operate during a major flood for two reasons as follows:

- (i) The lifts rely solely on mains power and the mains power supply may cut-off due to damage to overhead electricity wires during a major storm and/or inundation of electricity assets; or
- (ii) Floodwaters penetrate the liftwell and sensors prevent the lift from descending into floodwaters and/or shuts the lift down.

In relation to the first scenario, it is our understanding that consideration is being given to installing solar panels as part of the development and that this system would likely include battery storage. This would provide a back-up source of power to operate the lift in the event the mains power supply is disrupted. This would allow vulnerable people on the ground floor to use the lift to access the refuge.

In relation to the second scenario there are two approaches:

- the first approach is to install a stair lift to convey vulnerable people for the ground floor to the flood refuge on Level 1. This system could be battery operated with a trickle charge from the mains power supply. Even if the mains power was cut then the battery would power the stair lift;
- the second approach is that the flood wardens would manually assist any vulnerable persons on the ground floor up the stairs to Level 1.

It is also proposed when an evacuation is triggered in accordance with the FERP that vulnerable persons on the Ground Floor be evacuated first to Level 1. This will reduce the likelihood of the second scenario impacting on the evacuation of vulnerable persons from the ground floor.

As stated in the FERP:

*If the water level at the gauge reach:*

- (i) 2.0 m (AHD) then it is unsafe for small vehicles to attempt to drive through the flooded low point in Lakeside Crescent (Location L4 – Figure 7);
- (ii) 2.1 m (AHD) then it is unsafe for large 4WD vehicles to attempt to drive through the flooded low point in Lakeside Crescent (Location L4 – Figure 7);
- (iii) 2.2 m (AHD) on the gauges then it is unsafe for small vehicles on Pittwater Road (Locations P1 and P2 – Figure 7);
- (iv) 2.4 m (AHD) on the gauges then it is unsafe for large 4WD vehicles on Pittwater Road (Locations P1 and P2 – Figure 7);

- (v) When the water level at the gauge reach 2.4 m (AHD) then residents and any visitors on the ground floor are to be warned that they may need to evacuate to Level 1;
- (vi) If the water level at the gauge reaches 3.0 m (AHD) then evacuation of residents and any visitors on the ground floor to Level 1 is to commence;
- (vii) The indicative time available to evacuate residents and any visitors on the ground floor to Level 1 is expected to be around the same time it takes for water levels at the gauges to rise from 2.4 m to 3.0 m.

*It should be noted that if the gauge level reaches 2.4 m this may be an indicator of a 10% AEP flood only and the water levels at the gauges may not reach 3.0 m. If the water level continues to rise at the gauges and reaches 3.0 m AHD, then this is the trigger for evacuation. If this increase occurs over 10 mins – 20 mins then this is an indicator of an extreme flood and there is a need for prompt action.*

*It should be also noted that floodwaters could rise above 3.0 m AHD but not overtop the flood protection measures at a level of 3.66 m AHD. While under these circumstances residents and visitors on the Ground Floor would be protected it remains safer to retreat to the flood refuge on Level 1 until floodwaters drop below the ground floor level.*

In major floods the time for floodwaters to rise from 2.4 m to 3.0 m could be 60 mins to 120 mins. Consequently, the time available to evacuate residents and any visitors on the ground floor to Level 1 would be around these times. In extreme floods approaching the PMF the time for floodwaters to rise from 2.4 m to 3.0 m could be 10 mins to 20 mins.

*For senior housing, as a minimum there must be a ramp accessible from the ground floor to the shelter in place refuge. Battery powered stair lifts and flood wardens are supported, however they would be needed along with a ramp. If a ramp is not possible, then seniors living is not deemed an appropriate development use*

The feasibility of providing a ramp either external to the building or internal to the building has been assessed.

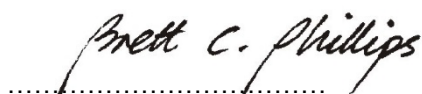
Conceptual layouts of an external ramp and an internal ramp have been formulated by Integrated Design Group and are given in **Figures 5 and 6**.

### 3. CONCLUSIONS

It is concluded that neither an internal ramp nor an external ramp is feasible based on appearance, cost and impact.

It is further concluded that an internal ramp or an external ramp is unwarranted given the building is located in a Medium flood risk precinct and the hierarchy of evacuation methods which will be implemented to evacuate residents from the Ground Floor to the refuge area on Level 1 at the time of major floods.

Yours faithfully



Dr Brett C. Phillips  
Senior Principal  
for Cardno now Stantec



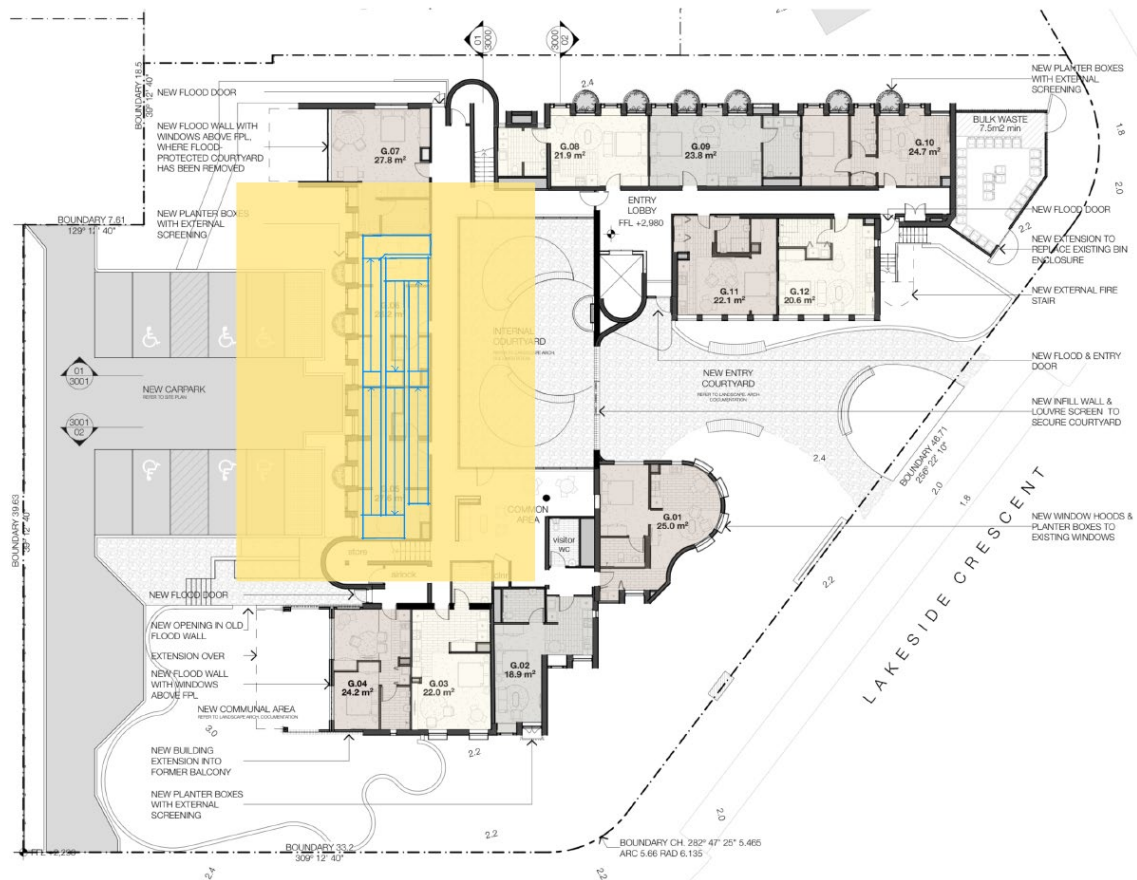


Figure 5 Concept Internal Ramp

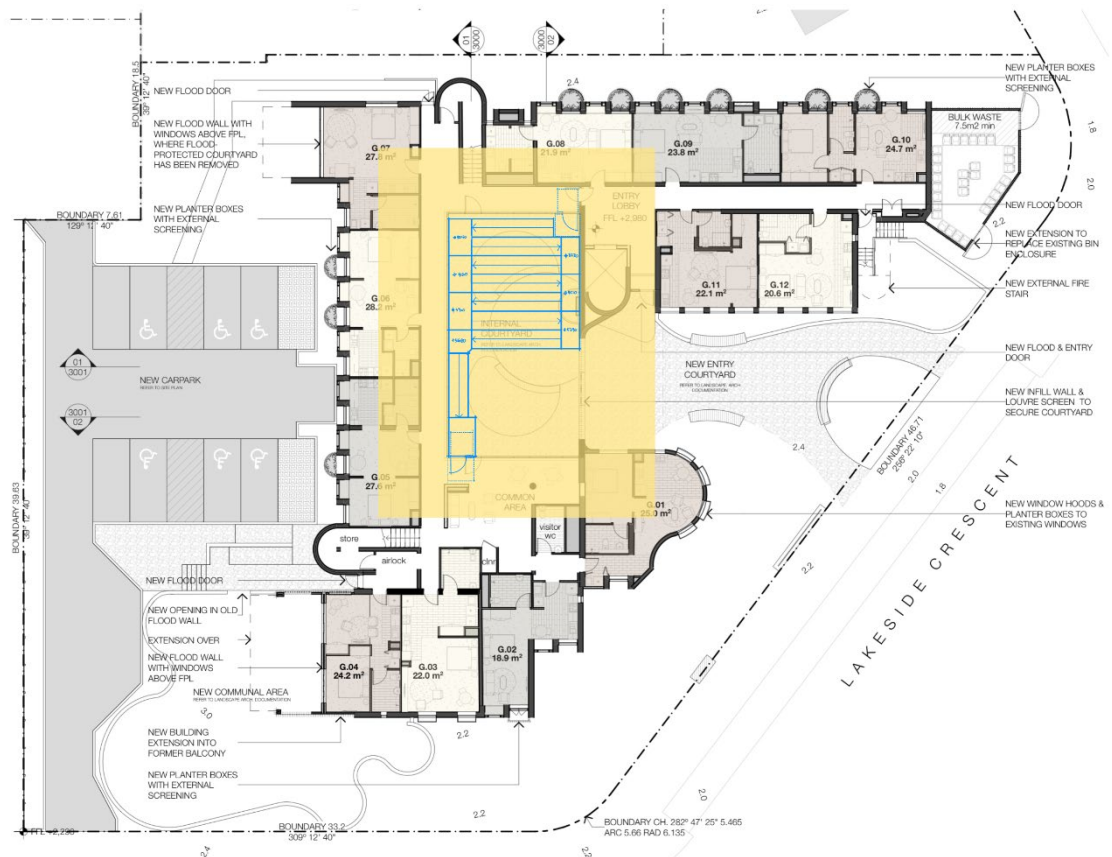


Figure 6 Concept External Ramp