Water Engineering Partners Pty Ltd

492 Vulture Street and 85 Linton Street, Kangaroo Point
Flooding Considerations

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Disclaimer

The flood modelling presented in this report is based and relies on survey data and other data obtained from third parties. While all reasonable steps have been taken to verify the data, Water Engineering Partners does not guarantee the data obtained or supplied for the investigation

Rainfall is variable in nature. The modelling presented in this report is based on available rainfall data sourced from government agencies, with appropriate factors added to account for climate change estimates in accordance with guidance from local and state government bodies relevant to the study location in their planning schemes. Actual rainfall patterns and totals in the future could vary from those adopted for this report.

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1 Introduction

A 22-level residential development is proposed at 492 Vulture Street and 85 Linton Street, Kangaroo Point (the **Site**). The Site has a total area of 1,416 m^2.

The location of the Site is shown on Figure 1-1.

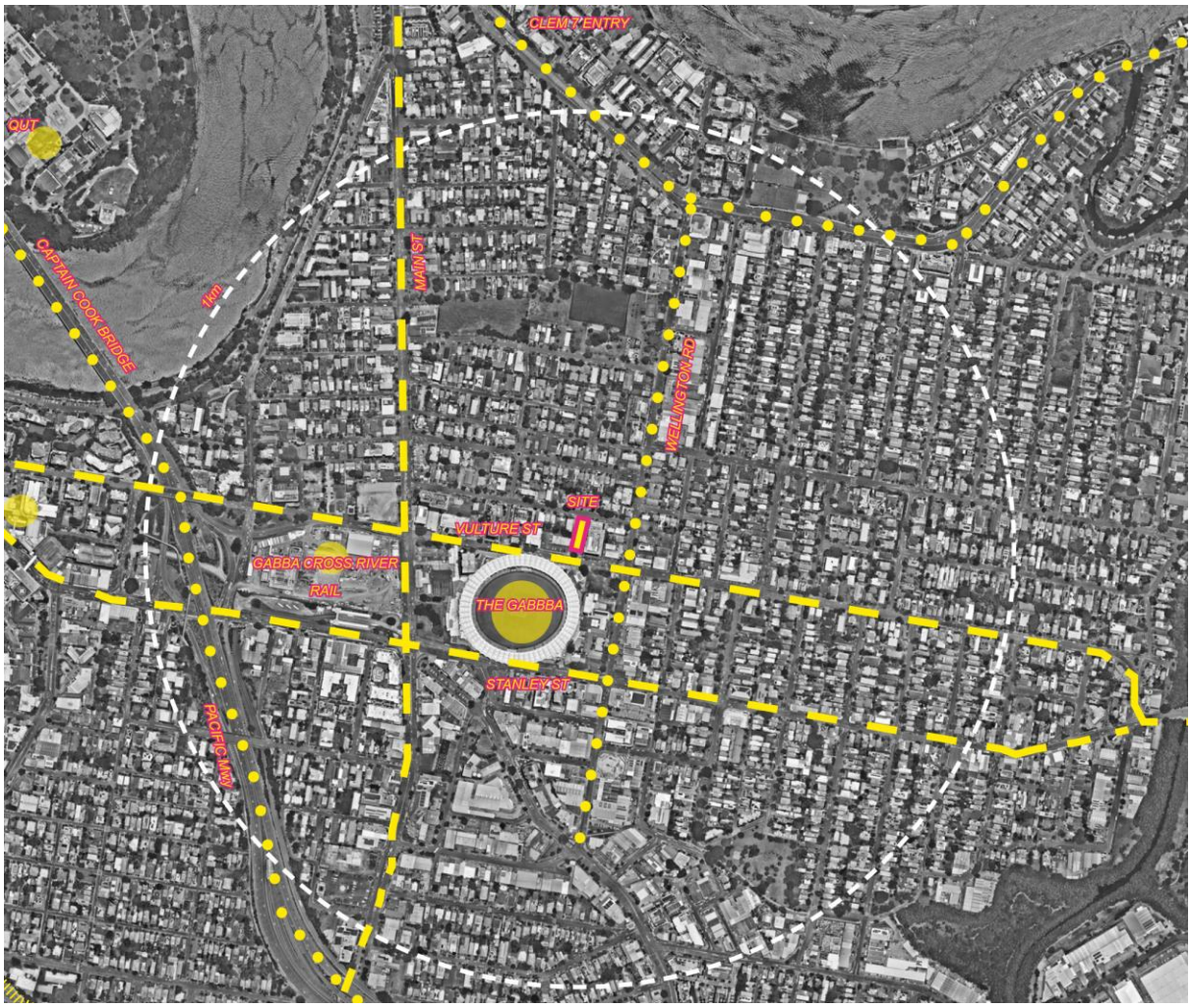


Figure 1-1 Site Location

The proposed development includes:

- 106 units;
- 72 parking spaces; and
- 220 bicycle parks.

The development drawings are presented in Appendix A, with Figure 1-2 presenting an excerpt from Drawing A-00-22 Issue B which shows a typical cross section indicating the proposed development.

Figure 1-2 Proposed Development Section

This report gives consideration to the following flood related aspects of development:

- Sources of flooding, flood levels and need for flood modelling; and
- Flood risk and need for development to operate under a flood risk management plan.

Although located within a Priority Development Area, the report considers the compliance of the development with respect to the planning scheme of the LGA in which the PDA is located (i.e. *City Plan 2014* of Brisbane City Council) to provide guidance in relation to flooding.

2 Sources of Flooding

2.1 Overview

The potential for the Site to be affected by flooding from the following sources of inundation was reviewed:

- Brisbane River;
- Creek (backwater from Norman Creek);
- Overland flow; and
- Storm tide.

It is noted that Council's FloodWise database indicates no inundation with respect to river or creek flooding for the Site, indicating that the Site is subject to overland flow. The database does not nominate flood levels with respect to overland flow.

2.2 Brisbane River

Figure 2-1 presents the Council planning scheme mapping with respect to flooding in the Brisbane River.

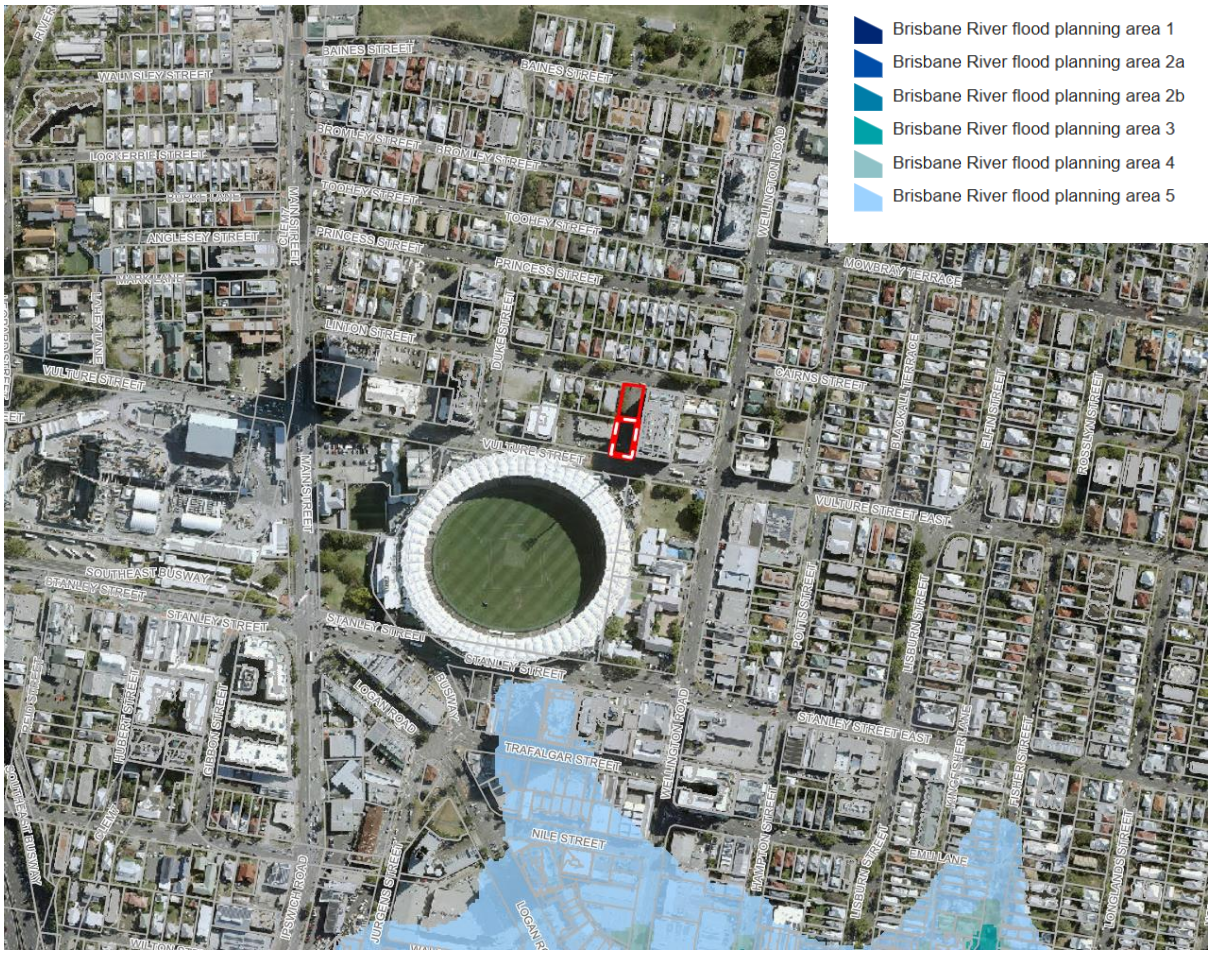


Figure 2-1 Council Planning Scheme Mapping, Brisbane River Flooding

With reference to the figure, the Site is not mapped as being within any defined river flood planning area. The closest mapped flooding is nominated as being within flood planning area 5.

According to Table 1 of the *Flood planning scheme policy of City Plan 2014*, flood planning area 5 is free from flooding in the 1% AEP (100-year ARI), being located between the 1% AEP (100-year ARI) flood extent and the 0.2% AEP (500-year ARI) flood extent.

In comparison, for residential development, levels relevant to Brisbane River flooding are expressed in relation to the 1% AEP event. Consequently, Brisbane River flooding is not relevant to the nomination of development levels for the Site.

2.3 Creek Flooding

The Site drains to Norman Creek, located to the south, via Kingfisher Creek. Figure 2-2 presents the Council planning scheme mapping with respect to flooding in Norman Creek.

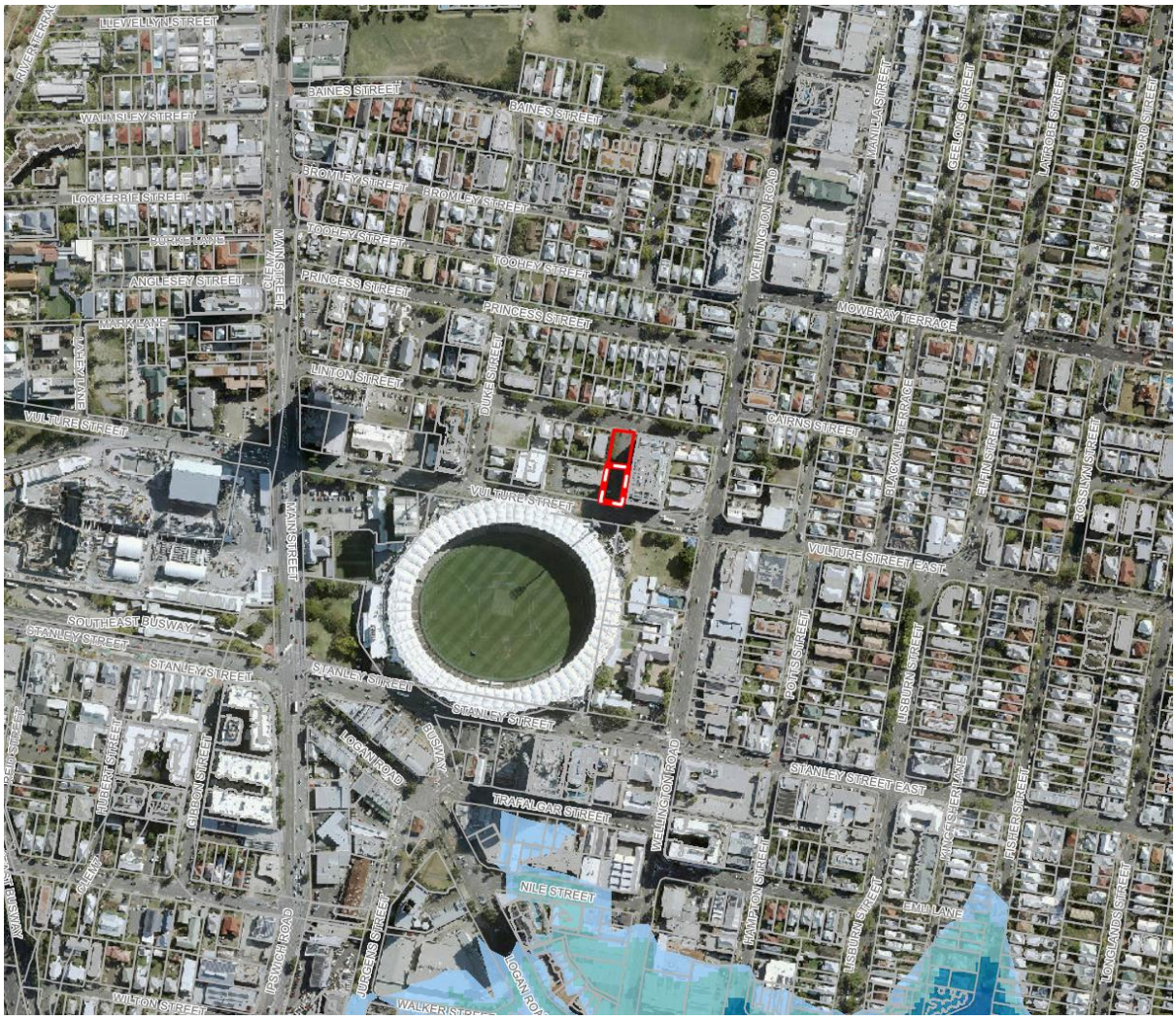


Figure 2-2 Council Planning Scheme Mapping, Norman Creek Flooding

Similar to Brisbane River flooding, the Site is not mapped as being affected by flooding in Norman Creek.

To confirm this, the Brisbane City Council *Norman Creek Flood Study 2014*, which reflects the most recent comprehensive modelling of the creek system, was reviewed.

Similar to the case with regard to Brisbane River flooding, development levels relative to flooding in creeks are set based on the 1% AEP flood event.

The Appendix G of the *Norman Creek Flood Study 2014* identifies a 1% AEP flood level of 4.32 mAHD at the upstream end of the modelled tributary for the conservative (Scenario 3) case of revegetation of the minimum riparian corridor and filling to the waterway corridor. In comparison, the minimum ground level on the Site is 5.39 mAHD. Consequently, Norman Creek flooding is not relevant to the nomination of development levels for the Site.

2.4 Overland Flow

The Site is subject to inundation due to overland flow caused by runoff from the local catchment. Figure 2-3 presents the Council planning scheme mapping with respect to overland flow in Norman Creek.

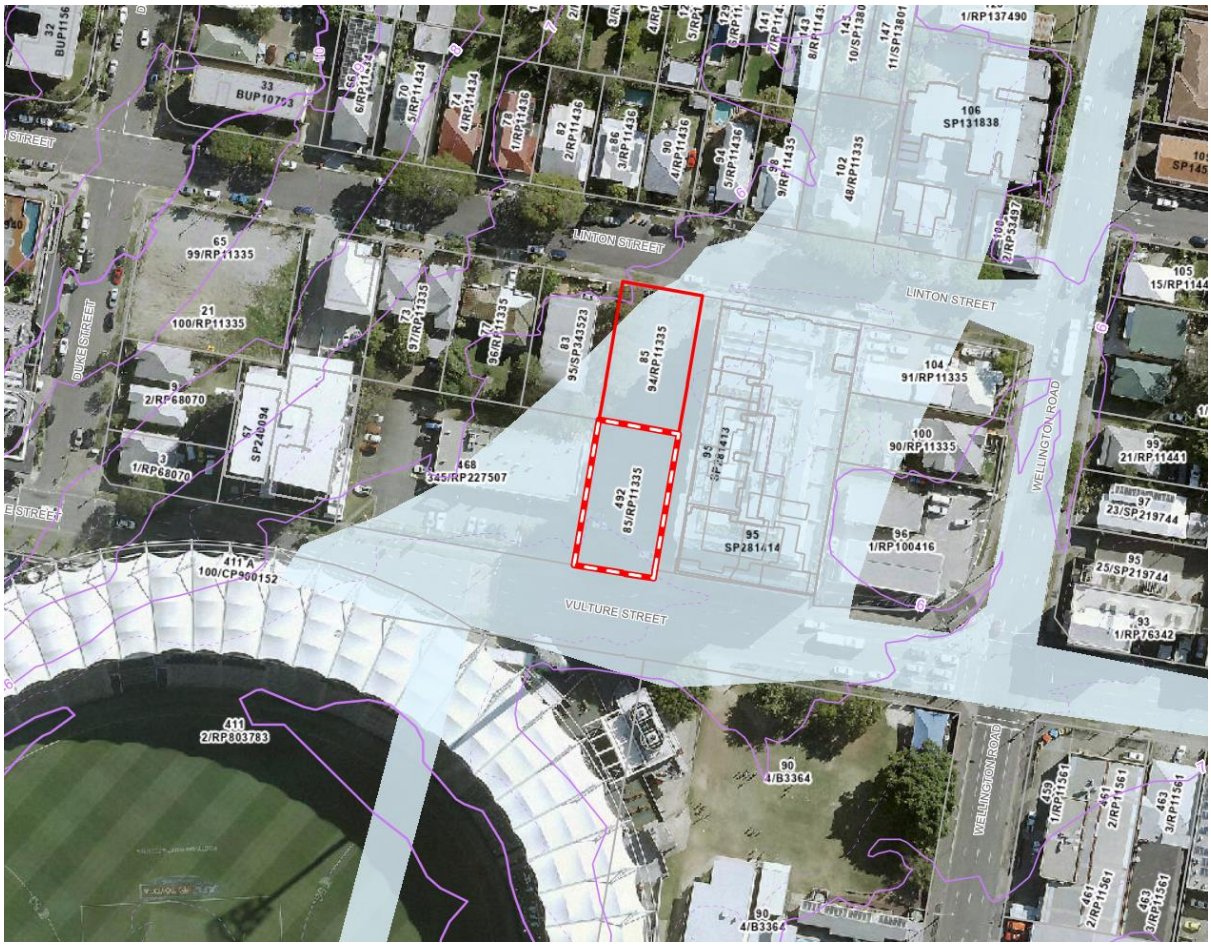


Figure 2-3 Council Planning Scheme Mapping, Overland Flow Flooding

As the origin and accuracy of the overland flow mapping is uncertain, Water Engineering Partners (WEP) undertook detailed flood modelling of the overland flow path in support of the development application for the neighbouring property to the west.

The outcomes of the modelling were documented in the report *Multi-storey Residential Apartment Development at 73 to 83 Linton Street, Kangaroo Point – Flood Impact Assessment Report* (Issue 2, 29 April 2024, the **Linton Street Flood Report**). The results obtained from the Linton Street Flood Report are detailed in this section of the report.

It is noted that the Linton Street Flood Report reflects rainfall data adopted by Council at the time of the study. It is understood that Council has recently adopted alternate rainfall data and that development levels will also need to consider the latest advice in relation to climate change detailed in updates to *Australian Rainfall and Runoff* in late 2024.

While it is noted that the design flood event for the PDA is the 1% AEP event, under the *Flood overlay code* and *Stormwater management code* of *City Plan 2014*, the relevant design event for the nomination of development levels with respect to overland flow is the 2% AEP event. Figure 2-4 presents the flood levels calculated for the 2% AEP event. The 2% AEP flood level nominated in the Linton Street Flood Report that would be of relevance to the Site is 6.91 mAHD.

Figure 2-4 Overland Flow Flood Levels, 2% AEP Event

It is relevant to note that the overland flow in the area comprises two components:

- The main flow path which governs flood levels at and in the immediate vicinity of the Site; and
- Flow from a more localised flow path to the west that drains to the main flow path via Linton Street.

The latter component of flow is associated with relatively shallow flow in Linton Street that is not associated with the deeper flow in the main flow path.

This is evident in the depth mapping from the Linton Street Flood Report, which is shown in:

- Figure 2-5: 39% AEP Event;
- Figure 2-6: 20% AEP Event;
- Figure 2-7: 10% AEP Event;
- Figure 2-8: 5% AEP Event; and
- Figure 2-9: 2% AEP Event.

Figure 2-5 Depth of Overland Flow, 39% AEP Event

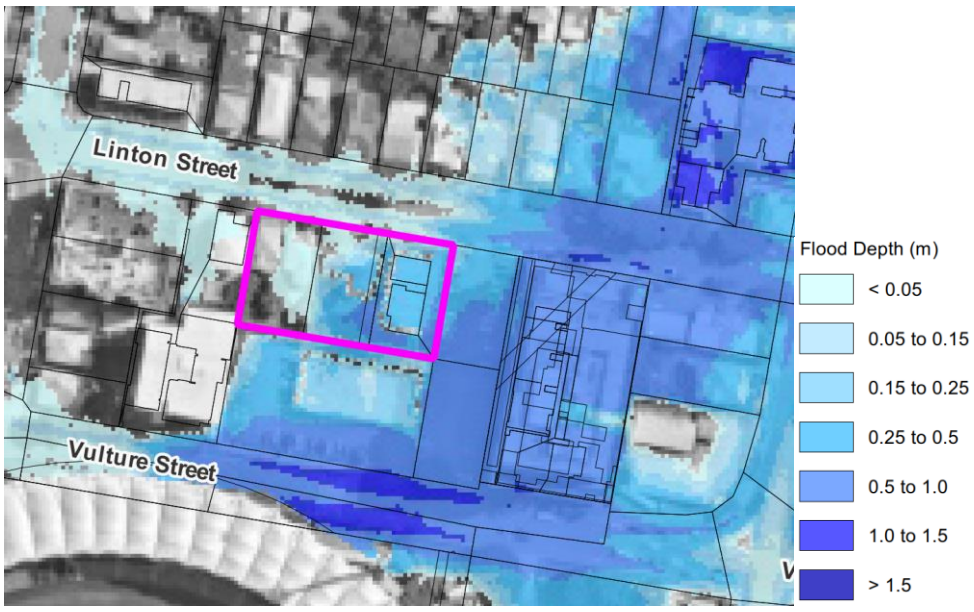


Figure 2-6 Depth of Overland Flow, 20% AEP Event

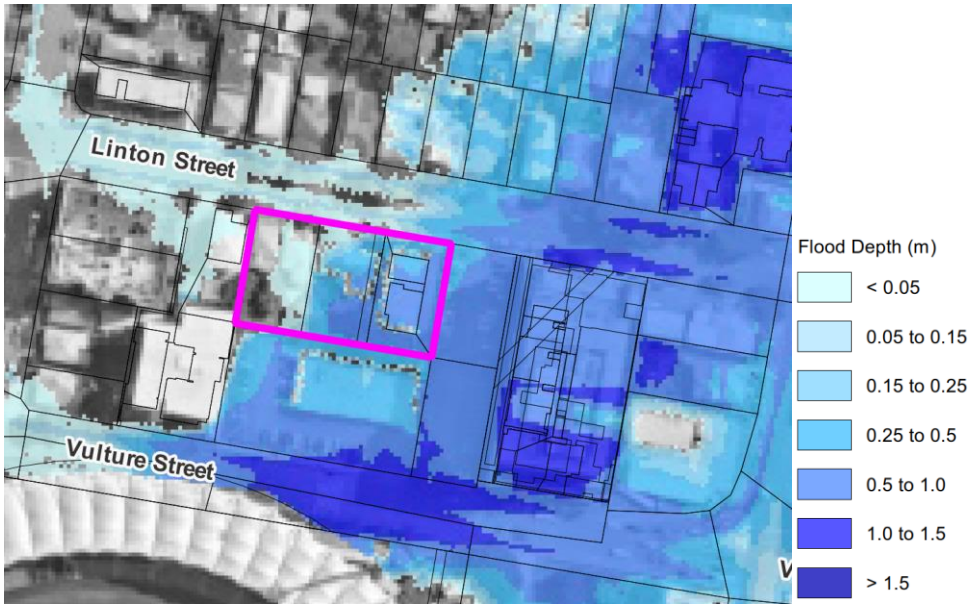


Figure 2-7 Depth of Overland Flow, 10% AEP Event

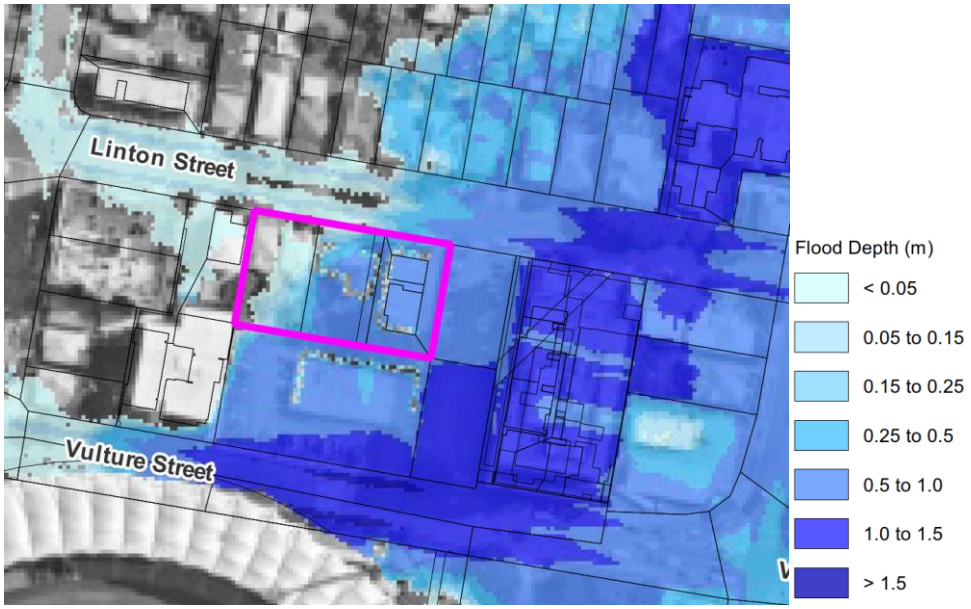


Figure 2-8 Depth of Overland Flow, 5% AEP Event

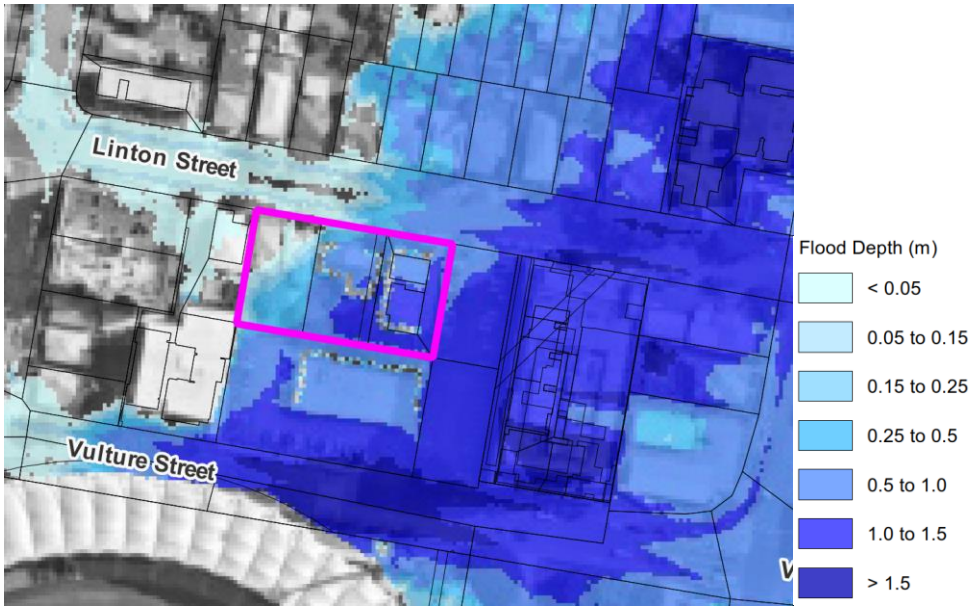


Figure 2-9 Depth of Overland Flow, 2% AEP Event

2.5 Storm Tide

According to the Coastal Hazard Overlay Code, the 1% AEP storm tide level including climate change to 2100 is 3.1 mAHD.

As this level is well below the minimum ground level at the Site, storm tide is not relevant to the nomination of development levels for the Site.

3 Site Development Considerations

3.1 Overview

Based on the consideration of potential inundation sources in Section 2, the Site was considered with respect to the *Flood overlay code* of *City Plan 2014*.

3.2 Compatibility of Development to Flood Risk

With reference to Table 8.2.11.3.C (Land use capability with flood hazard) of the *Flood overlay code of City Plan 2014*, multiple dwellings (more than 4 storeys) are compatible with the flood hazard associated with overland flow subject to meeting other relevant requirements.

3.3 Development Levels

Table 8.2.11.3.D of the *Flood Overlay Code* of *City Plan 2014* nominates the category for flood planning uses for a number of building classifications and development types. Table 8.2.11.3.L nominates the minimum design level for each category with respect to a range of flooding sources.

Table 3-1 lists the minimum development levels, obtained from the Linton Street Flood Report, for the various uses associated with the proposed development. It is noted that the development does not include a basement, with car parking to occur via a podium.

Table 3-1 Minimum Development Levels

Level	Category	Level	
		Standard	Level (mAHD)
Residential			
Habitable floors	A	2% AEP+0.5m	7.41
Non-habitable floors	B	2% AEP+0.3m	7.21
Essential electrical services	A	2% AEP+0.5m	7.41
Vehicle manoeuvring area	D	2% AEP	6.91
Podium parking	B	2% AEP+0.3m	7.21
Commercial			
Non-habitable floors	C	2% AEP	6.91
Essential electrical services	A	2% AEP+0.5m	7.41
Vehicle manoeuvring area	D	2% AEP	6.91

It is noted that the development will need to comply with the minimum development level standards defined in the table. The flood study to be completed with respect to the Site will confirm flood levels and therefore minimum development levels, including the consideration of the 1% AEP event required for the PDA.

Further, noting that it will be necessary to allow overland flow to drain beneath the building, it will be necessary to set the floor level sufficiently above the flood level to provide for the thickness of the ground floor slab and any significant services.

However, it is expected that the freeboard necessary for non-habitable floors will provide the necessary clearance.

3.4 Undercroft

As the Site is affected by overland flow, it will be necessary to suspend the ground floor above the existing ground level to provide for the passage of flow.

With this approach, the works will minimise the impact on conveyance and flood storage. It is noted that this approach was adopted for both the existing building to the east and the approved building to the west.

Existing ground levels across the Site vary from about 5.39 mAHD to 6.1 mAHD. Allowing a 200mm thick ground floor slab and a ground floor level of 7.21 mAHD, the underside of the ground floor slab will be 7.01 mAHD.

This will provide a clearance of between 910mm (although ground trimming will be expected to increase this clearance) and 1.6 metres.

Table 8.2.11.3.E of the *Flood Overlay Code* considers undercroft clearances relative to floor level rather than the soffit level of the slab. Given this, the slab thickness of 0.2 m needs to be added to the above clearances when considering the table.

As the depth of flooding in the undercroft is in excess of 600 mm for the 2% AEP event (refer Figure 2-4), to satisfy the table it is desirable for the lowest floor level to be 2.5 m above the highest ground level. Based on the above levels, it will not be possible to satisfy the table. Further, such clearances are not typically achieved across Brisbane and recourse is typically required to the clearance required to allow maintenance to occur.

For the development immediately to the west of the Site that was relatively recently approved by Council (application A006350800), the available clearance was between 0.76 m and 1.6 m. It is considered that the reasoning provided in support of the neighbouring approved undercroft are applicable to the proposed development:

- Given the screening adopted on the perimeter of the undercroft, it is considered that the need for access will be infrequent;
- Due to the urban nature of the catchment and the screening adopted, it is considered that there will be no need for machinery to access the undercroft (maintenance can be undertaken by hand); and
- The undercroft will be maintained by the Body Corporate rather than Council and the clearance is considered sufficient for periodic maintenance access by contractors.

Consequently, the undercroft clearance available with respect to the proposed development is considered to be acceptable.

3.5 Access

It is recognised that access to the Site is affected by overland flow flooding in Linton Street and Vulture Street.

It is also relevant to note that some inundation of roads is a standard part of road design. Noting that velocities in the vicinity of the Site will be very low as the area predominantly acts as a storage area due to the limited capacity of the drainage system downstream, the *Queensland Urban Drainage Manual* (2017) would allow flow depths up to 300mm as part of the design of new roads.

Consequently, it is only flooding beyond this level that requires consideration.

Based on the results of the Linton Street Flood Report, the depth of flooding in the kerb invert at the driveway entrance to the Site is:

- 0.37 m in the 39% AEP event;
- 0.76 m in the 10% AEP event; and
- 1.19 m in the 2% AEP event.

As the depth of water at the point of entry to the Site is in excess of 300 mm for the 39% AEP event, it is necessary to consider the ability to access the Site.

To provide guidance in relation to this matter, Section 6.2 of the *Flood planning scheme policy* of *City Plan 2014* discusses the serviceability of an existing road network external to a development, noting the following trafficability criteria:

a. *The time of closure for the 2% AEP flood event from all the nominated flooding sources with the exception of Brisbane River, is not to exceed 6 hours.*

b. *The average annual time of closure from all the nominated flooding sources, with the exception of Brisbane River, is not to exceed 2 hours.*

The depth hydrographs for the 39%, 10% and 2% AEP events derived by the Linton Street Flood Report at the point of access to the Site from Linton Street are shown on Figure 3-1. It is noted that the hydrographs reflect conditions for the critical storm duration (the storm duration causing peak flood levels) and will be revised as part of the updated flood investigation for the Site.

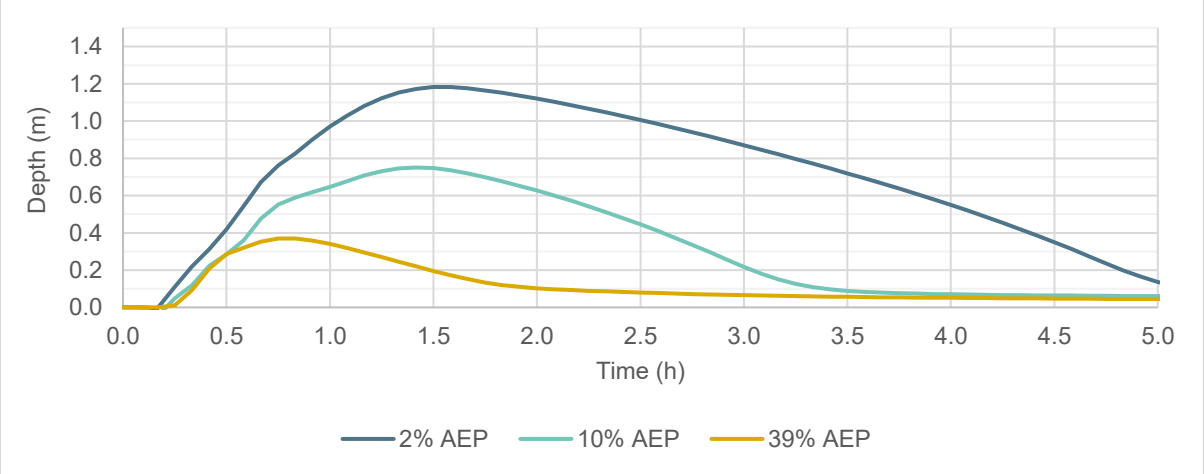


Figure 3-1 Stage Hydrographs, Linton Street

The model results suggest a time of closure for the 2% AEP event of 4.25 hours and a calculated annual average time of closure of 1.3 hours.

This would suggest that Linton Street provides trafficable access to the Site.

Not withstanding this, it is recognised that it is necessary to consider the management of flood risk due to the inundation of Linton Street beyond a depth of 300 mm.

3.6 Flood Impact Assessment

It is recognised that it will need to be demonstrated that development can proceed without causing unacceptable impacts on flood levels.

Based on the findings of the Linton Street Flood Report, it is considered that the capacity of the drainage system downstream of the Site is limited (due to the Gabba). This results in flow ponding until it can drain via the existing drainage system.

While the depth of ponding is significant, the associated velocity of flow is minimal.

Consequently, management of overland flow is primarily achieved by the maintenance of flood storage, coupled with the provision of sufficient conveyance capacity that water can flow and replicate the existing flow condition.

In the case of the proposed development, this will be achieved by suspending the ground floor above the existing surface, thereby minimising the impact on flood storage. Similarly, sufficient openings will be provided around the perimeter of the building to provide for the passage of flow.

4 Flood Management

Significant development is occurring in the West End area. WEP has been involved in multiple recent applications for multi-level developments in West End.

These developments have had the following common elements in relation to flood risk and are considered to be relevant to the management of flooding at the Site:

- ***Local Catchment Flooding***

  The key local roads in the West End area are subject to short duration inundation due to local runoff. This effectively results in the isolation of sites for short periods although the access to the local road immediately adjacent to sites is not affected.

  It is also noted that, to varying degrees, the local catchment inundation will be resolved by future drainage upgrades.

- ***Brisbane River Flooding***

  The West End area is subject to inundation during major flood events in the Brisbane River. Current Council direction is to require immunity to at least the 1% AEP flood level. For greater floods, Council recognises that sites will be isolated for prolonged periods (with a period of 8 days nominated for longer floods).

  To allow people to shelter in place during major Brisbane River events, Council is nominating a requirement for emergency power to be provided together with sufficient food and water to sustain people.

  It is also noted that sufficient warning time is available in advance of river flooding for people to collect provisions and for those not able to shelter for prolonged periods to evacuate.

In summary, Council is moving to an approach requiring the adoption of adequate immunity and giving adequate provision for people sheltering in place for prolonged periods on an infrequent basis. New developments are being managed through Flood Emergency Management Plans (FEMPs) that detail the management of sites during flood events.

In comparison, the Linton Street Flood Report suggests that local catchment flooding will isolate the Site for frequent flood events for limited periods. During such periods, it would not be possible to enter or leave the Site. However, it is expected that the isolation would not be accompanied by a loss of power or water or be of sufficient duration that people would run short of provisions. Further, the maximum depth of flooding associated with overland flow is limited, allowing people to shelter in place.

In the case of the Site, the difference between the two scenarios can be summarised as:

- The proposed development would be associated with relatively frequent isolation due to flooding for limited periods with no effective warning time that would result in limited inconvenience during periods of isolation; and

- While development that is proceeding in West End is associated with relatively infrequent isolation (and ample warning time), the isolation is for prolonged periods (days) and there remain concerns in relation to power supply and provisions.

Overall, given the ability to shelter in place, it is considered that the isolation of the Site caused by flooding in Linton Street can be managed by a FEMP.

The management of the Site would comprise physical and operational management measures.

- ***Physical Management Measures***

  To avoid the risk associated with ponded water, a number of physical measures would be adopted, including:

  - Automatic boom gate to prevent access to or from the Site in the event of the water depth exceeding 300 mm in Linton Street; and
  - Signage at the points of entry to the Site noting the potential for local flooding to cause inundation of Linton Street and Vulture Street for short periods of time and directing people to not enter flood waters.

- ***Operational Measures***

  The Site would be operated under a FEMP. The FEMP would include the following elements:

  - Description of potential for flooding and isolation;
  - Confirmation that habitable floors will be above flood level and that therefore people can shelter in place;
  - Notification that access to the Site will be blocked during flood events to prevent people entering or leaving the Site;
  - Requirement for prospective residents and tenants to be advised of the potential for isolation to occur and the need to shelter in place during flood events; and
  - Requirement for the FEMP to be regularly reviewed and, where appropriate, updated in response to actual experience and any changes in flood modelling.

5 Flood Overlay Code

5.1 Response to Code

While the Site is located within a PDA, EDQ typically considers proposed development in the context of the planning scheme of the LGA in which the PDA is located.

To assist in the consideration of the proposed development, Appendix B provides a response to the *Flood overlay code* of *City Plan 2014.*

The following points are noted with respect to the nominated Performance Objectives in the code.

- ***PO5 Flood risk, damage and disruption***

  It is considered that the development will comply with AO5.1 and AO5.2 b)(i).

  AO5.2 b)(ii) requires that the risk to people is managed to an acceptable level.

  This requirement will be satisfied by the operation of the Site in accordance with a FEMP and the inclusion of design measures to preclude people from leaving the Site when it is isolated.

- ***PO7 Material Impacts***

  A flood study will be provided confirming that development will not result in a material impact on flood levels external to the Site, thereby satisfying the Acceptable Outcomes. It is noted that this will be achieved by suspending the ground floor of the building above ground level to minimise impacts on flood storage and providing for the conveyance of flow beneath the building.

- ***PO9 Undercroft***

  With reference to Section 3.4, it is considered that the undercroft formed by the development will be acceptable.

- ***PO11 Access***

  Performance Outcome PO11 of the Flood overly code of City Plan 2014 relates to the access a Site. PO11 requires that, having regard to hydraulic hazard, a development provides for safe vehicular and pedestrian access to adjoining roads.

  The nominated Acceptable Outcome AO11.1 to PO11 includes the following requirements for access points in overland flow paths:

  a) trafficable during the defined flood event;

  c) not located in the Overland flow flood planning area sub-category if the hydraulic hazard is unsafe in the defined flood event; and

  d) the access or driveway is not inundated by a 10% AEP flood.

  For an access to be trafficable, the depth needs to be less than 300 mm. The access therefore does not comply with part a).

  Under Section 3.4 of the *Flood planning scheme policy* of *City Plan 2014*, for public roads unacceptable hydraulic hazard is defined as:

  - >0.6 m^2/s velocity-depth product; and
  - >600 mm flood depth at any velocity.

While the access would meet the velocity depth criterion (due to the very low flow velocities), the depth will be in excess of the limiting hydraulic hazard. Consequently, the access does not comply with part c) of AO11.1.

Similarly, as the access is inundated in the 10% AEP, the access does not comply with part d) of AO11.1.

With reference to Section 3.5, while the access to the Site is not trafficable during local flood events, isolation of the Site is for a relatively short period and people can remain in their units (shelter in place) for the period of isolation.

It is therefore proposed to manage the isolation of the Site via a FEMP.

5.2 Commentary by EDQ

A meeting was held with EDQ to discuss the proposed development. A subsequent communication provided a summary of the matters identified by EDQ.

The summary referred to a number of Performance Outcomes from the *Flood Overlay Code.* Based on the response provided in the preceding section, the following is provided in response to the identified elements.

- ***Risk to people: PO 1 a, PO 3 b***

  As the development is assessable and does not relate to a dwelling house, PO1 and PO3 are not relevant to the application.

- ***Disruption to residents: PO 3 e***

  As noted above, as the development is assessable and does not relate to a dwelling house, PO3 is not relevant to the application.

- ***Adverse Impact due to development: PO 7***

  It is acknowledged and agreed that flood modelling will be required to demonstrate that the development does not give rise to unacceptable flood impacts. Given the quiescent conditions in the vicinity of the Site and the suspension of the development above the overland flow path, it is considered that an acceptable outcome will be achieved.

- ***Vehicular access and efficient evacuation/Pedestrian movement/Pedestrian & cyclist paths: POs 10, 11, 13***

  PO10 is not relevant as it relates to vulnerable uses, difficult to evacuate uses and assembly uses. These uses are not proposed for the development.

  PO11 relates to access and is discussed in Section 3.4 and Section 5.1. It is proposed to control access via physical measures and a FEMP.

  PO13 is not relevant as it relates to pedestrian and cyclist paths. In this case, the existing paths associated with the verges of Linton Street and Vulture Street will be retained (and rebuilt where appropriate). The paths will be set at the existing level of the verge to match the paths on either side of the Site.

- ***Table 8.2.11.3.K—Flood planning levels for existing road providing access to or fronting a development***

  Table 8.2.11.3.K is not relevant to the Site. It is referred to in relation to the Acceptable Outcome to PO18 which is only relevant to lot reconfigurations (effectively subdivisions). As the application does not include a reconfiguration of a lot, PO18 and therefore the table are not of relevance.

Table 8.2.11.3.K is also referred to in the Acceptable Outcomes to PO13. However, as noted above, PO13 only relates to pedestrian and cycle paths.

EDQ also nominated a number of items in relation to flooding. A response to the items is provided below.

- ***'Access –** The access arrangements for the project will involve exposure to potentially unacceptable depth and / or velocity and hazard of flooding. For the access to be able to be considered, the applicant will need to demonstrate how the proposal complies with Performance Outcomes of the Flood Code of the City Plan 2014, particularly POs 10, 11 and 13, and the criteria in Table 8.2.11.3.K—Flood planning levels for existing road providing access to or fronting a development.'*

  The compliance of the proposed development is discussed in Section 5.1 and Appendix B.

  As noted above, PO10, PO13 and Table 8.2.11.3.K of the Flood Overlay Code are not relevant to the development.

  In relation to PO11, the depth of flooding in Linton Street is such that it is not trafficable in local catchment flood events. It is noted that the velocity of flow is minimal as the depth of ponding is due to the limited capacity of the downstream system.

  As the inundation is associated with local catchment flooding, the period of isolation is relatively short. Further, even for extreme flood events, habitable floor areas will be above flood level (as the first habitable floor is on Level 5. Consequently, the opportunity exists to adopt a shelter in place approach.

  It is proposed to include a boom gate to prevent access to Linton Street during local flood events and for a FEMP to manage the operation of the Site.

- ***'Emergency management impacts –** The submitted document makes reference to sheltering in place as the primary strategy. The development involves significantly increasing the number of people exposed to risk. It is recommended that the applicant seek the advice of a suitably qualified professional in flood risk management to address whether the increased risk is tolerable.'*

  Based on the flood emergency management situations previously considered by WEP, it is considered that the increased risk is tolerable, for the reasons detailed below.

  Developments being approved and constructed in the nearby area of West End are subject to isolation during significant flood events in the Brisbane River and inundation during extreme river flood events:

  - The period of isolation will last for days;
  - At best emergency power will be available;
  - Specific provision will need to be made for food and water.

  In comparison, local flooding in the vicinity of the Site will:

  - Result in isolation for limited periods;
  - During the period, there is no expectation that power would be disconnected or that there would be a loss of water supply; and
  - The period of isolation is sufficiently limited that it is reasonable to expect that existing provisions will suffice.

  It is noted that the warning time available with respect to river flooding is significant while there will essentially be no warning time available with respect to local flooding. However, the lack of warning time is considered to be tolerable in this case due to the limited duration of isolation.

- ***'Flow management to minimise adverse impact on surrounding area –*** *The development will be required to demonstrate no adverse flooding impact to adjoining properties to an unacceptable level for both the overland and creek/riverine flooding for current and climate change scenarios.'*

  Modelling will be undertaken to confirm flood levels associated with overland flow and to demonstrate that the development will not give rise to unacceptable impacts.

  Based on the consideration of flood levels in Norman Creek and the Brisbane River (refer Section 2.3 and Section 2.2 respectively), as the Site is above the 1% AEP flood level associated with either source of flooding, modelling of Norman Creek or the Brisbane River in relation to flood impacts is not considered to be necessary.

- ***'Modelling –*** *The information submitted considers flooding of up to 2% AEP. As per the Woolloongabba PDA Development Scheme, consideration is required to be given to the 1% AEP event. Additionally, climate change scenarios are to be included in the modelling. The flood modelling for both the overland and creek/riverine floods is expected to influence how the development addresses the above-mentioned issues.'*

  Modelling will be undertaken to confirm flood levels associated with overland flow. This modelling will include the 1% AEP event and relevant climate change scenarios. The modelling will also include extreme events to confirm the known outcome that sheltering in place is acceptable for even the most extreme local catchment event.

  As demonstrated in Section 2, creek and river flooding is not of relevance to the specification of development levels. While extreme events in Norman Creek and the Brisbane River will be reviewed, it is noted that developments above the 1% AEP flood level do not typically require the consideration of extreme events. Consequently, the consideration of extreme events in the creek and river can be limited to confirming the expected outcome that the shelter in place approach will be maintained regardless of the source of inundation.

6 Conclusion

A 22-level residential tower development is proposed at 492 Vulture Street and 85 Linton Street, Kangaroo Point. The plans of development are provided in Appendix A.

Consideration was given to the following flood related aspects of development:

- Sources of flooding, flood levels and need for flood modelling; and
- Flood risk and need for development to operate under a flood risk management plan.

The outcome of the investigation cane be summarised as follows.

- ***Sources of Flooding***

  The review of sources of flooding determined that the Site is well above the 1% AEP flood level associated with flooding in Norman Creek and the Brisbane River and the 1% AEP storm tide level.

  The Site is affected by overland flow flooding, with the extent of flooding for a range of flood events detailed based on flood modelling of the adjacent site.

- ***Flood Modelling***

  Flood modelling will be completed to confirm that the development can proceed without causing unacceptable impacts external to the Site.

  It is noted that this modelling will need to be updated to reflect current rainfall and climate change guidance and to consider the 1% AEP event.

  The development levels adopted for the Site will be adjusted as required to ensure compliance with relevant planning requirements.

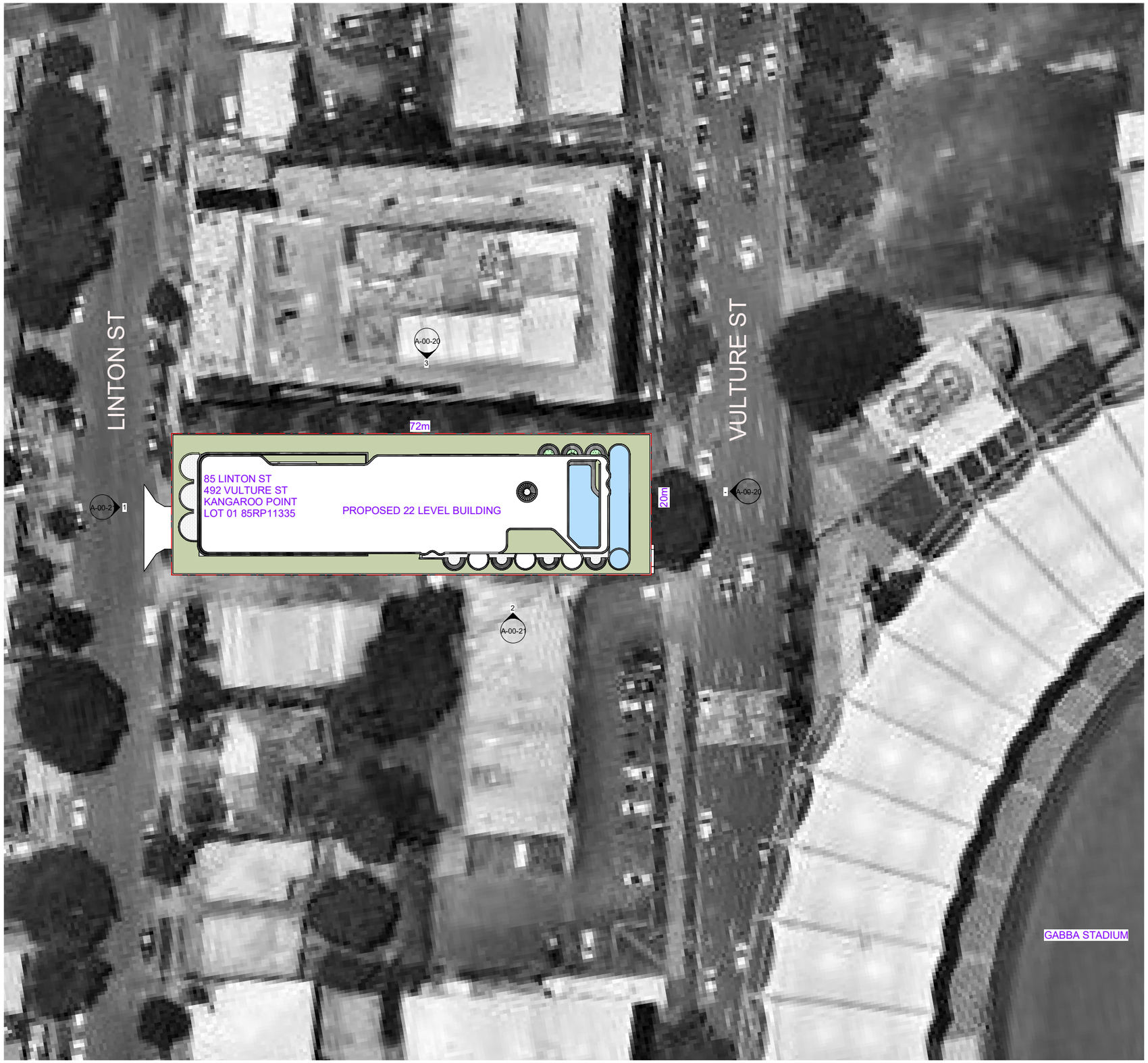
  In addition, events in excess of the 1% AEP event will be considered to confirm the immunity of habitable areas to even extreme flood events, confirming that a shelter in place strategy is acceptable.

- ***Flood Risk Management***

  A review of the results of previous flood modelling indicate that the Site will be isolated for limited periods by local catchment flooding. As the period of isolation is limited and even extreme events will not affect habitable floor levels, it is possible to shelter in place during local catchment flood events.

  It is therefore considered acceptable to manage local flooding via a combination of physical measures to preclude access to Linton Street when it is inundated and a FEMP to guide the operation of the development.

Appendix A Plans of Development



SITE DEVELOPMENT

SITE	AREA
492 VULTURE ST	708m²
85 LINTON ST	708m²
LOT 1 - 85RP11335	
SUBJECT TO FINAL SURVEY	
TOTAL SITE AREA	1,416m²
TOWER SITE COVER	855m²
TOWER SITE COVER %	60%

GFA	
PODIUM	2,400m²
TOWER 01	7,500m²
TOTAL GFA	9,900m²

COMMUNAL / LANDSCAPE AREA

L00 LANDSCAPE	30m²
L01 LANDSCAPE	30m²
L02 LANDSCAPE	30m²
L03 LANDSCAPE	30m²
L04 PODIUM COMMUNAL	850m²
L05-19 ON FLOOR COMMUNAL	900m²
L20 ROOFTOP COMMUNAL	460m²
TOTAL AREA	2,330m²
% TO SITE AREA	164%

PARKING PROVISION
PODIUM AUTOMATED STACKING SYSTEM

TOTAL PARKS	72

SERVICE VEHICLES

L00 GROUND LEVEL	
MRV PARKING	2 SPACES
VAN PARKING	2 SPACES

END OF TRIP FACILITIES
L01 PODIUM (VULTURE ST PEDESTRIAN ACCESS)
220 SECURE BICYCLE PARK CENTRE

RESIDENTIAL UNITS

2 BED	105 UNITS
PENTHOUSE	1 UNIT
TOTAL	106 UNITS TOTAL

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B	04/02/2025	SFD SUBMISSION
C	10/10/2025	DRAFT FOR REVIEW
D	17/10/2025	DRAFT FOR REVIEW

PROJECT NUMBER
250207
492 VULTURE ST KANGAROO POINT

FOR DEVELOPMENT APPLICATION ONLY
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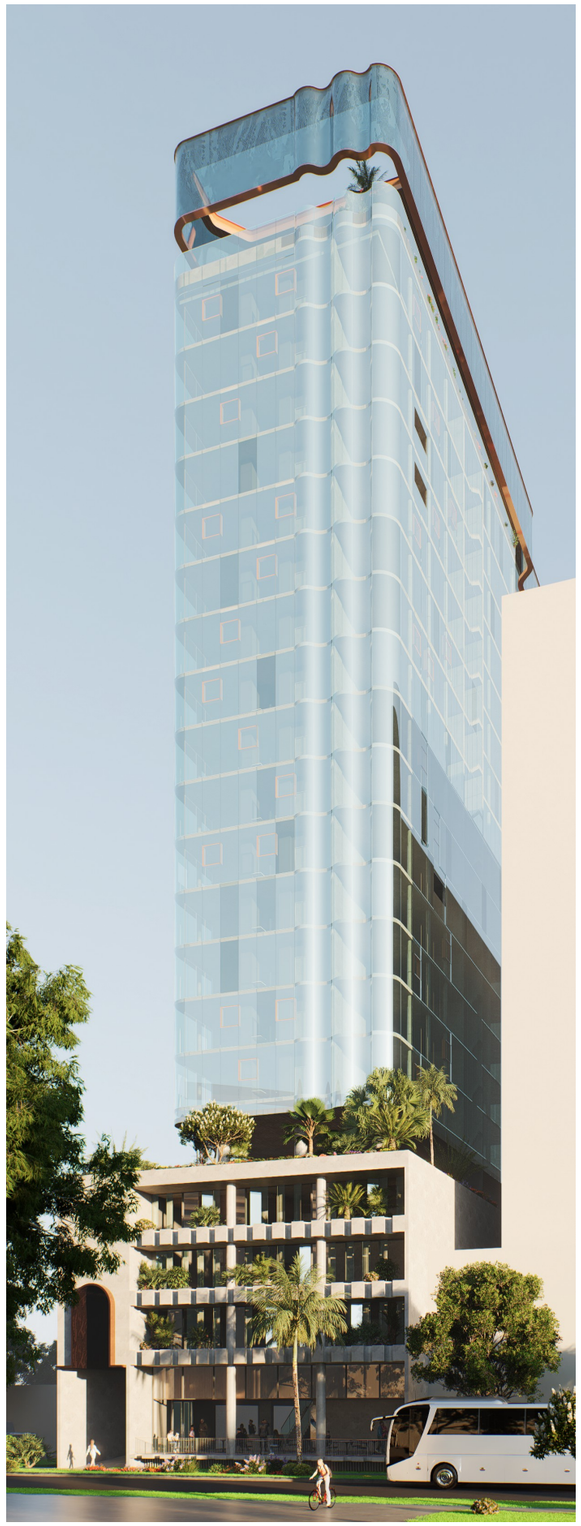
DRAWING NUMBER
A-00-00
NAME
SITE PLAN

SCALE(A1)
1 : 300

APPROVED
GB

CHECKED
GB
ISSUE
D

N



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492 VULTURE ST KANGAROO POINT

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DRAWING NUMBER
A-00-11

NAME
SITE CAMERA VIEWS

SCALE(A1)

APPROVED
GB

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GB

ISSUE
C

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C	17/10/2025	DRAFT FOR REVIEW

PROJECT NUMBER
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492 VULTURE ST KANGAROO POINT

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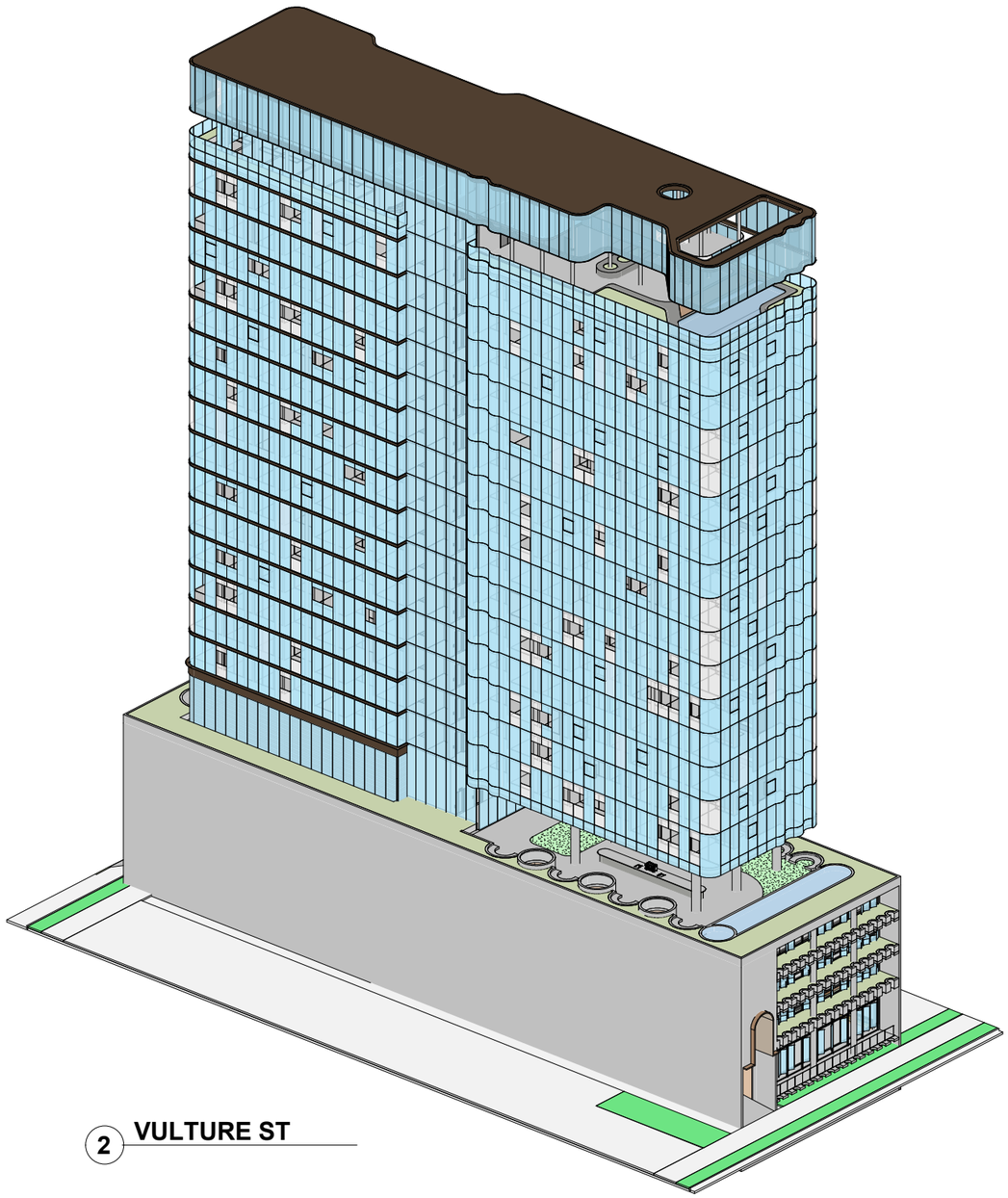
NOT FOR CONSTRUCTION

DRAWING NUMBER
A-00-13
NAME
SITE CAMERA VIEWS

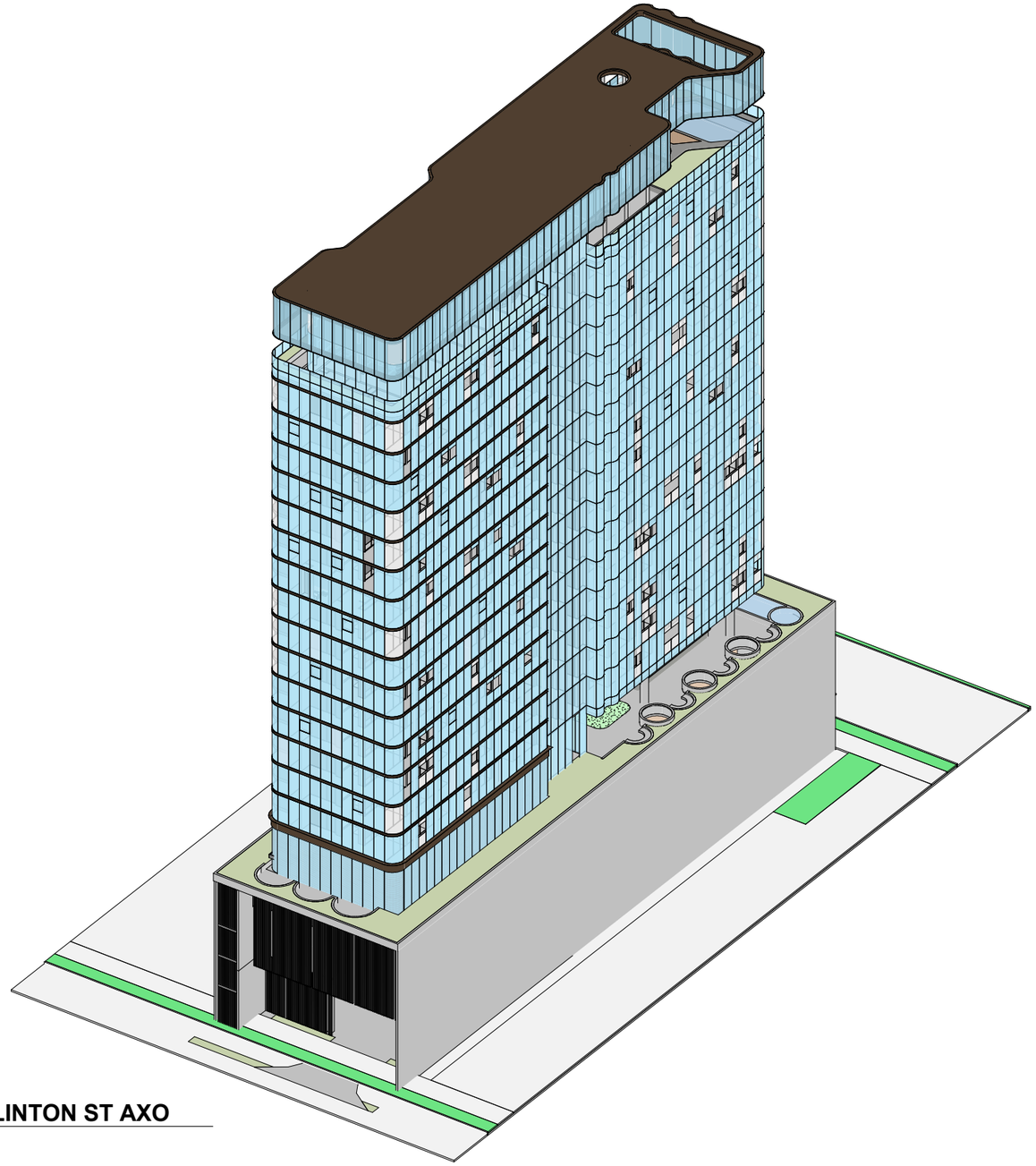
SCALE(A1)

APPROVED
GB

CHECKED
GB
ISSUE
C



2 VULTURE ST



1 LINTON ST AXO

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C	17/10/2025	DRAFT FOR REVIEW

PROJECT NUMBER
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492 VULTURE ST KANGAROO POINT

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DRAWING NUMBER
A-00-15

NAME
SITE AXONOMETRIC VIEWS

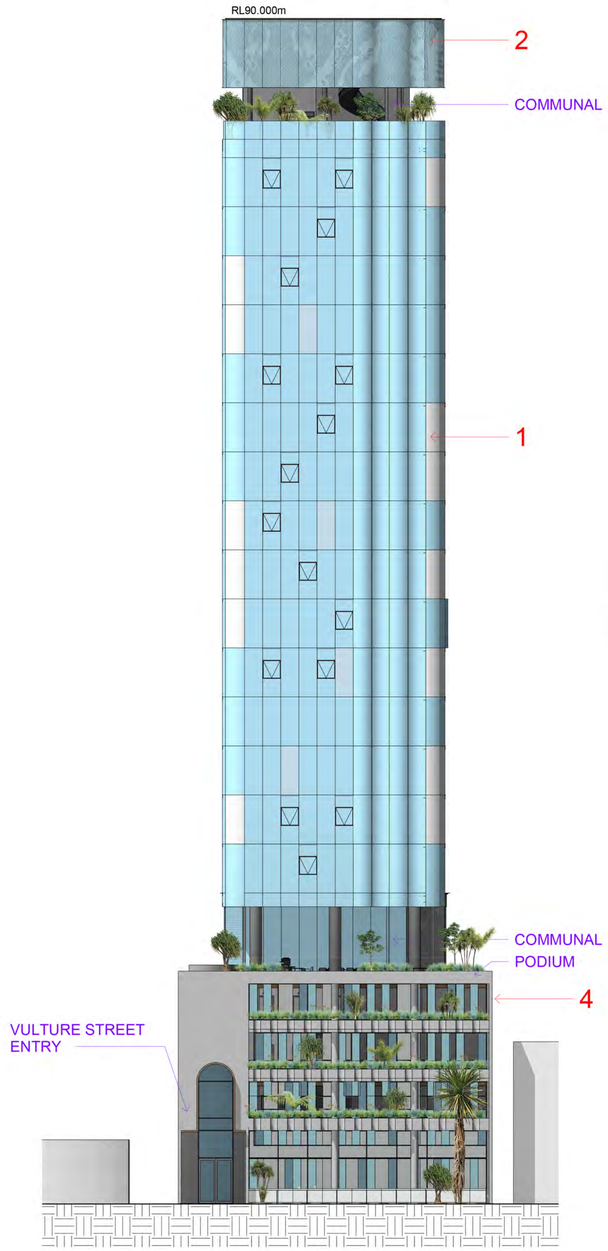
SCALE(A1)

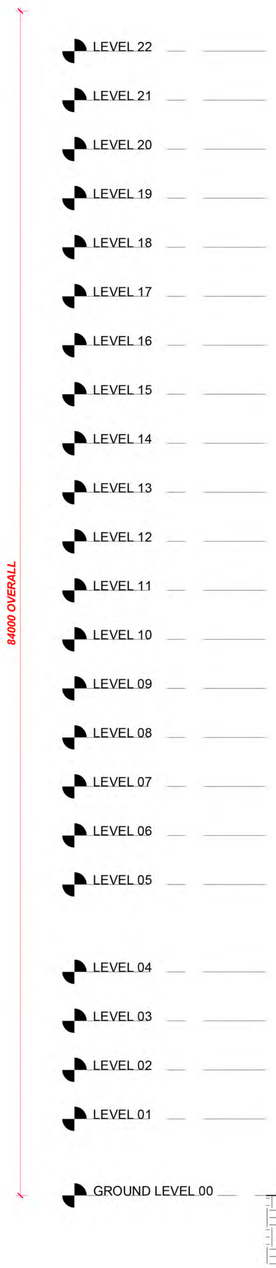
APPROVED
GB

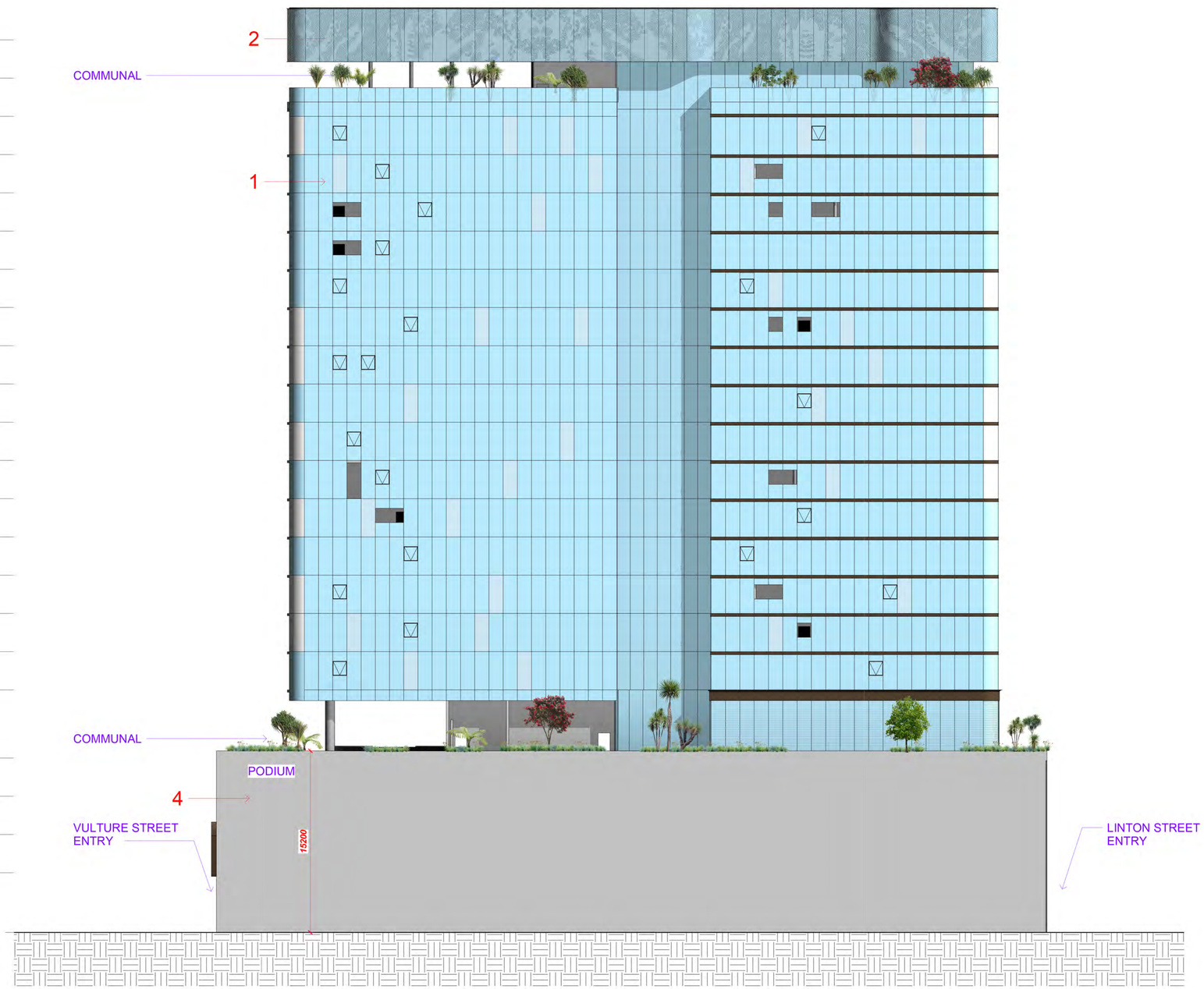
CHECKED
GB

ISSUE
C

MATERIAL LEGEND
1. GLASS CURTAIN WALL
2. GLASS FRIT ROOF TOP HALO
3. POWDERCOATED SCREEN BATTEN
4. CONCRETE WALL







1 SOUTH ELEVATION
1 : 200

3 EAST ELEVATION
1 : 200

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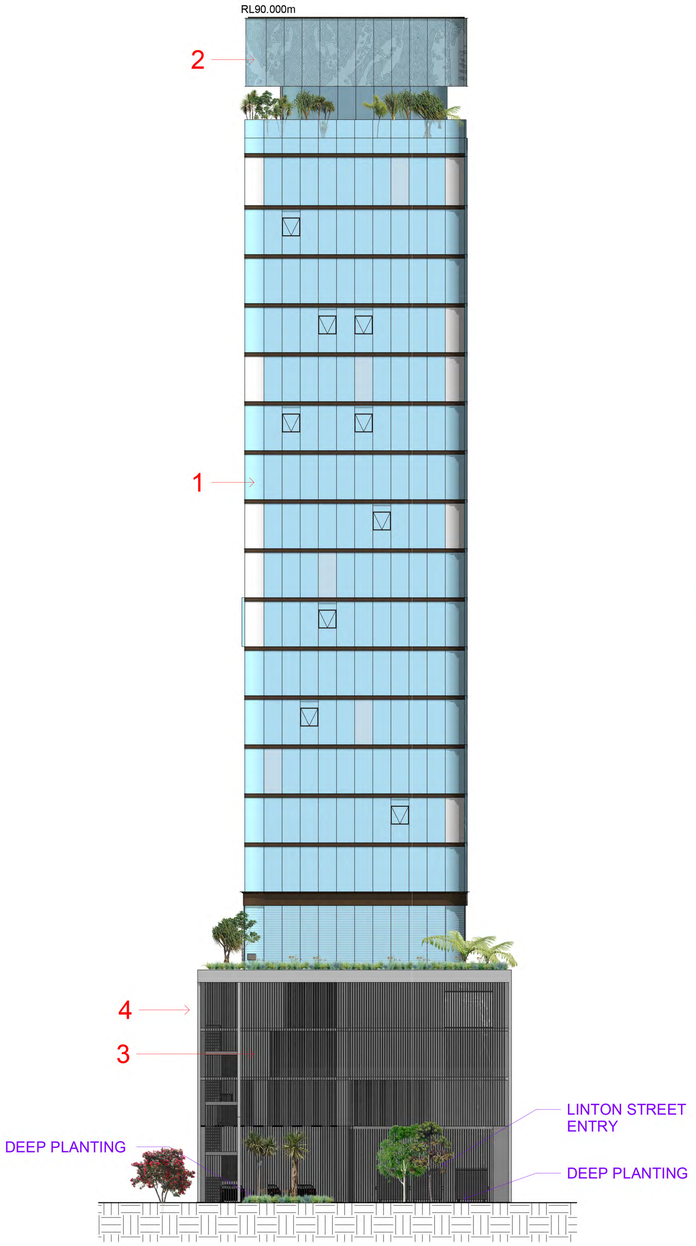
DRAWING NUMBER
A-00-20
NAME
SITE ELEVATIONS

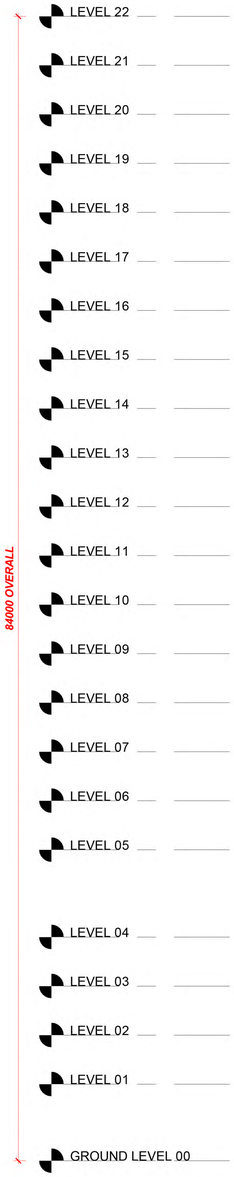
SCALE(A1)
As indicated

APPROVED
GB

CHECKED
GB
ISSUE
B

MATERIAL LEGEND
1. GLASS CURTAIN WALL
2. GLASS FRIT ROOF TOP HALO
3. POWDERCOATED SCREEN BATTEN
4. CONCRETE WALL





1 NORTH ELEVATION
1 : 200

2 WEST ELEVATION
1 : 200

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PROJECT NUMBER
250207
492 VULTURE ST KANGAROO POINT

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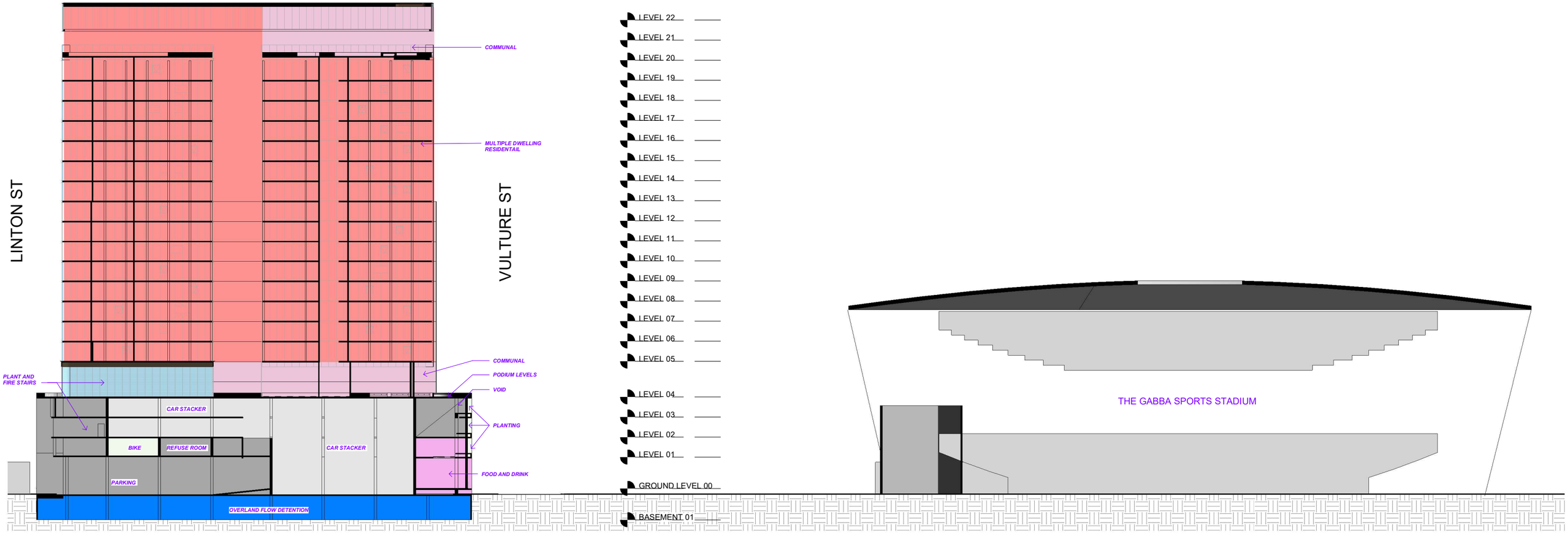
DRAWING NUMBER
A-00-21
NAME
SITE ELEVATIONS

SCALE(A1)
As indicated

APPROVED
GB

CHECKED
GB
ISSUE
B



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PROJECT NUMBER
250207
492 VULTURE ST KANGAROO POINT

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DRAWING NUMBER
A-00-22

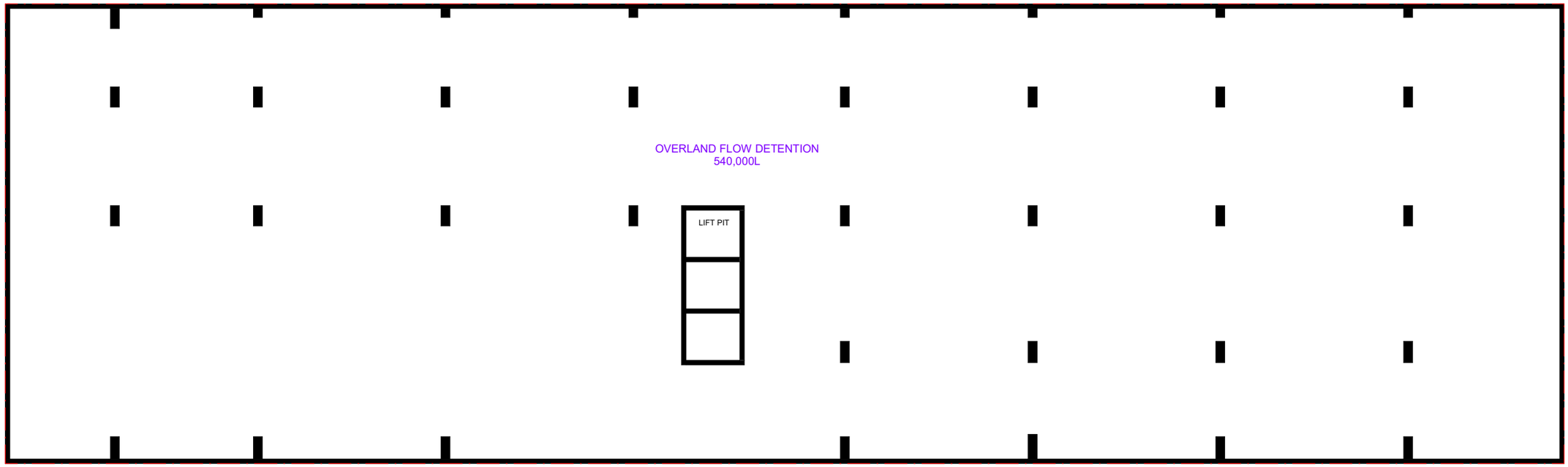
NAME
SITE LONG SECTION

SCALE(A1)
1 : 300

APPROVED
GB

CHECKED
GB

ISSUE
B



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DRAWING NUMBER

B-B01

NAME

BASEMENT 01 GENERAL ARRANGEMENT PLAN

SCALE(A1)

1 : 100

APPROVED

GB

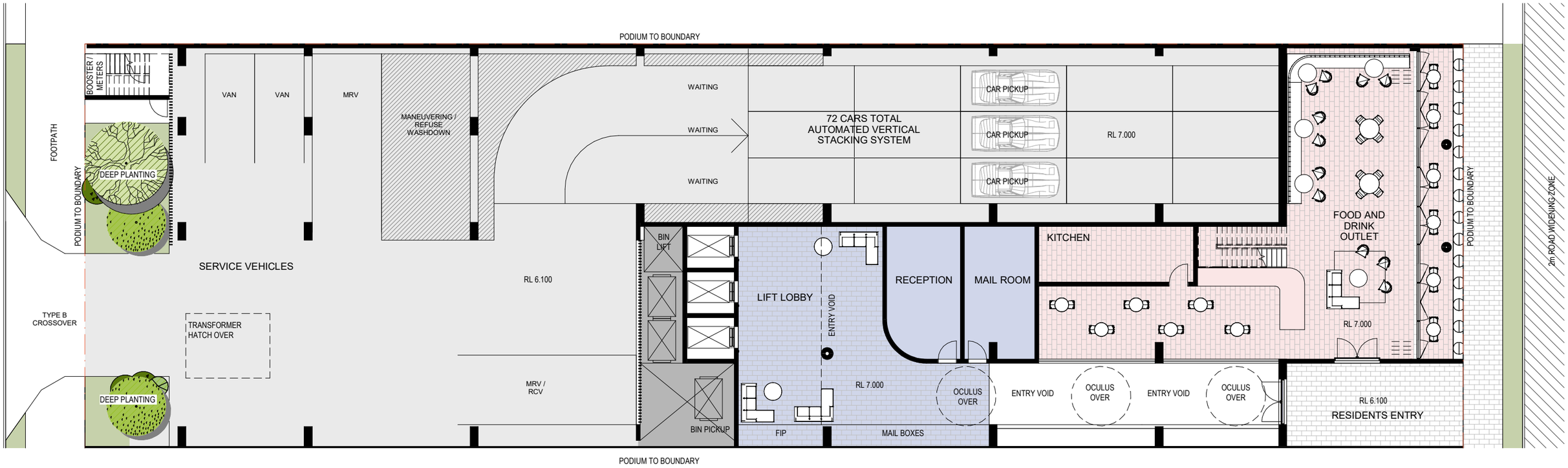
CHECKED

GB

ISSUE

B

N



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PROJECT NUMBER

250207

492 VULTURE ST KANGAROO POINT

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DRAWING NUMBER

B-L00

NAME

LEVEL 00 GROUND GENERAL ARRANGEMENT PLAN

SCALE(A1)

1 : 100

APPROVED

GB

CHECKED

GB

ISSUE

C

N

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PROJECT NUMBER
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492 VULTURE ST KANGAROO POINT

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DRAWING NUMBER
B-L01

NAME
LEVEL 01 GENERAL ARRANGEMENT PLAN

SCALE(A1)
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APPROVED
GB

CHECKED
GB

ISSUE
B

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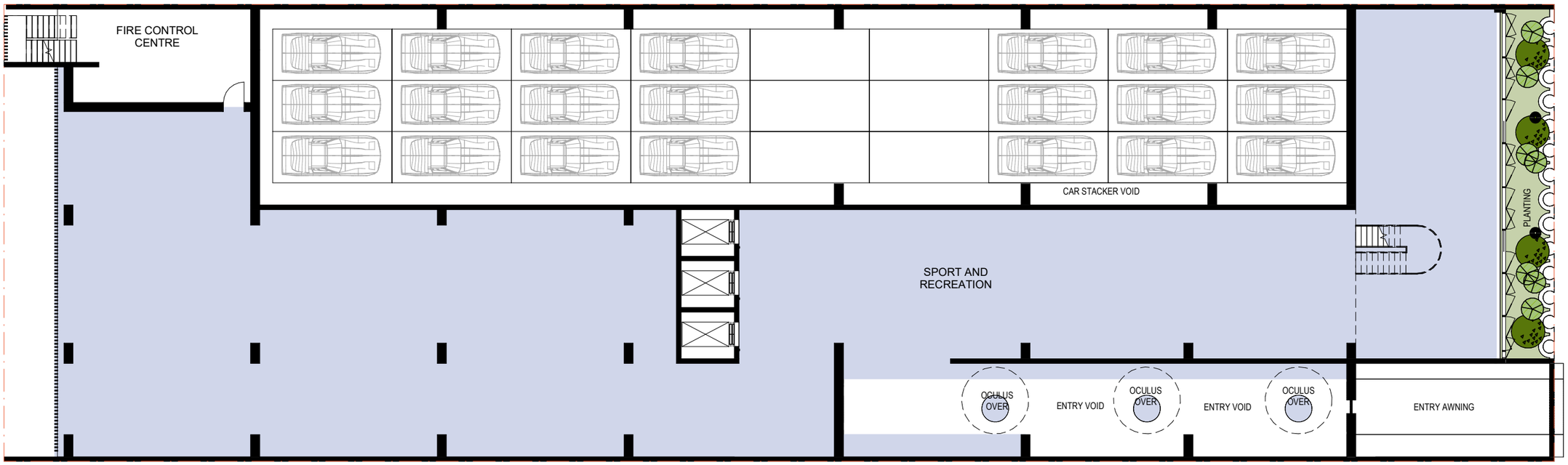

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No.	DTE	DES
A	10/10/2025	DRAFT FOR REVIEW
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PROJECT NUMBER

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492 VULTURE ST KANGAROO POINT

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DRAWING NUMBER
B-L02

NAME
LEVEL 02 GENERAL ARRANGEMENT PLAN

SCALE(A1)
1 : 100

APPROVED
GB

CHECKED
GB

ISSUE
B

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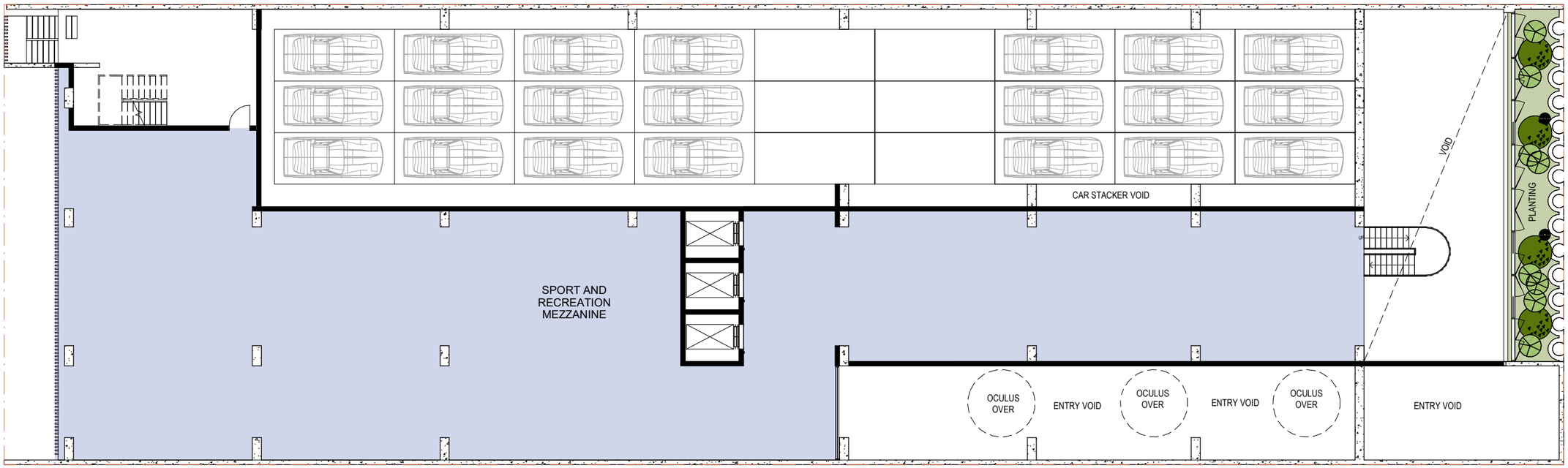

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DRAWING NUMBER
B-L03

NAME
LEVEL 03 GENERAL ARRANGEMENT PLAN

SCALE(A1)
1 : 100

APPROVED
GB

CHECKED
GB

ISSUE
B

N

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No.	DTE	DES
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PROJECT NUMBER

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492 VULTURE ST KANGAROO POINT

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DRAWING NUMBER
B-L04

NAME
LEVEL 04 GENERAL ARRANGEMENT PLAN

SCALE(A1)
1 : 100

APPROVED
GB

CHECKED
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ISSUE
B

N

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No.	DTE	DES
A	10/10/2025	DRAFT FOR REVIEW
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DRAWING NUMBER
B-L05-19

NAME
LEVEL 05-19 GENERAL ARRANGEMENT PLAN

SCALE(A1)
1 : 100

APPROVED
GB

CHECKED
GB

ISSUE
B

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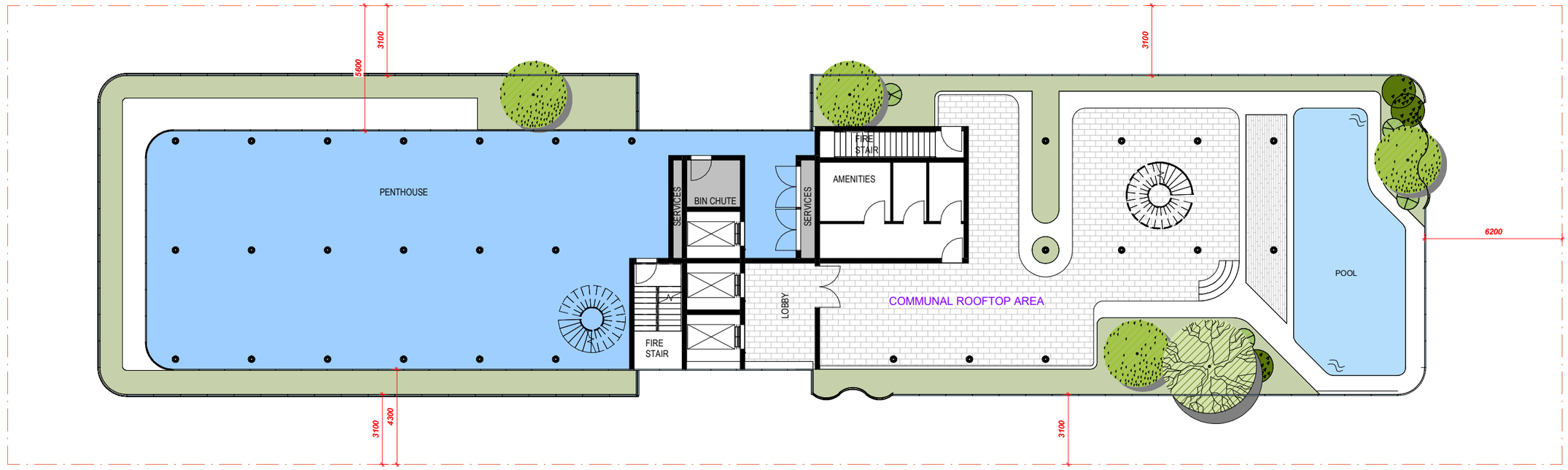

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No.	DTE	DES
A	10/10/2025	DRAFT FOR REVIEW
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PROJECT NUMBER
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492 VULTURE ST KANGAROO POINT

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NOT FOR CONSTRUCTION

DRAWING NUMBER
B-L20

NAME
LEVEL 20 GENERAL ARRANGMENT PLAN

SCALE(A1)
1 : 100

APPROVED
GB

CHECKED
GB

ISSUE
B

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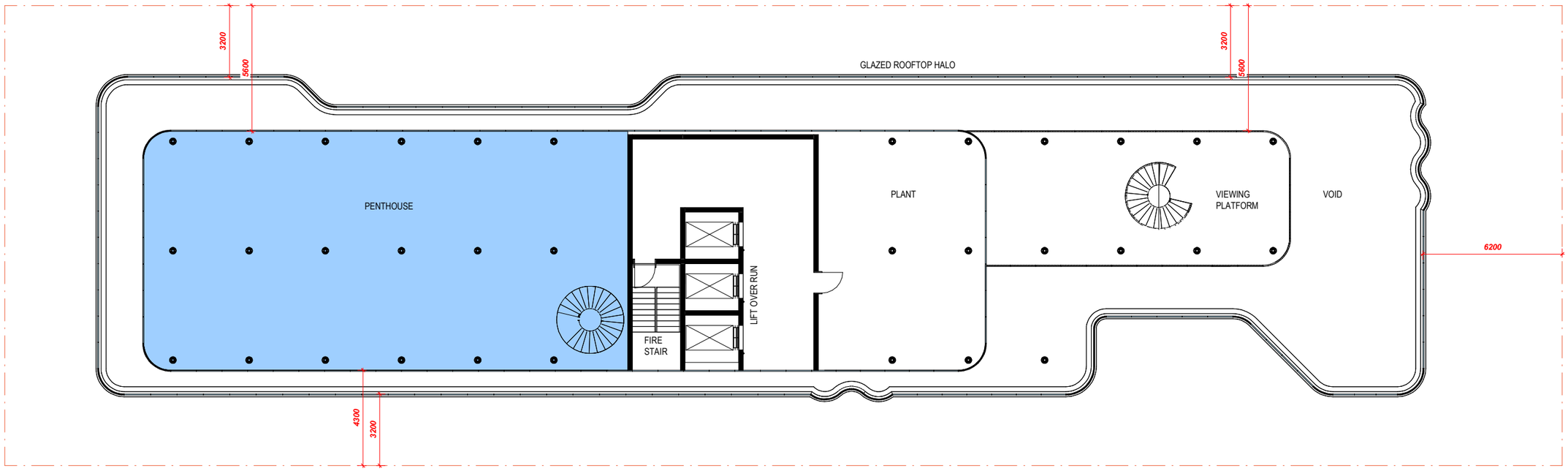

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PROJECT NUMBER

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492 VULTURE ST KANGAROO POINT

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NOT FOR CONSTRUCTION

DRAWING NUMBER

B-L21

NAME

LEVEL 21 GENERAL ARRANGMENT PLAN

SCALE(A1)

1 : 100

APPROVED

GB

CHECKED

GB

ISSUE

B

N

Appendix B Flood Overlay Code

Flood Overlay Code

Performance Outcome	Acceptable Outcome	Complies	Comments
Section A—If for accepted development subject to compliance with identified requirements (acceptable outcomes only) or assessable development for a dwelling house including any secondary dwelling Note—Development for a dwelling house does not require assessment against any other sections of this code.			
PO1 Development involving any habitable or non-habitable part of a dwelling house, including any secondary dwelling, is located and designed to: a) minimise the risk to people from flood hazard; b) achieve acceptable flood immunity; c) minimise property impacts from a flood event up to and including the defined flood event; d) minimise disruption to residents, recovery time and rebuilding or restoration costs after a flood event up to and including the defined flood event.	**AO1.1** Development for a dwelling house including any secondary dwelling: a) is not located in the Brisbane River flood planning area 1, 2a or 2b sub-categories or the Creek/waterway flood planning area 1 or 2 sub-categories; or b) is only located in these sub-categories, if a Registered Professional Engineer Queensland certifies that the dwelling house and any secondary dwelling are structurally designed to be able to resist hydrostatic and hydrodynamic loads associated with flooding up to and including the defined flood event.	**N/A**	Not a dwelling house.
	AO1.2 Development for a dwelling house and any secondary dwelling complies with the minimum flood planning levels in Table 8.2.11.3.B. Note—If located in an area that has no flood level information available from the Council such as an overland flow path, a Registered Professional Engineer of Queensland with expertise in undertaking flood studies is to certify that the flood level and development levels for the dwelling house and any secondary dwelling achieve the required flood planning levels in Table 8.2.11.3.B.	**N/A**	Not a dwelling house.

Performance Outcome	Acceptable Outcome	Complies	Comments
	AO1.3 Development involving a building undercroft complies with the minimum clearance requirements in Table 8.2.11.3.E. Editor's note—For creek/waterway, storm-tide and river flooding, applicable flood planning information is available from Council's FloodWise Property Report. Note—The Flood planning scheme policy provides guidance on undercroft design.	**N/A**	Not a dwelling house.
PO2 Development within the Creek/waterway flood planning area sub-categories or Overland flow flood planning area sub-category: maintains the conveyance of flood waters to allow flow and debris to pass predominantly unimpeded through the site; does not concentrate, intensify or divert floodwater onto upstream, downstream or adjacent properties; will not result in a material increase in flood levels or flood hazard on upstream, downstream or adjacent properties.	**AO2** Development: a) is not located within the Creek/waterway flood planning area 1, 2 or 3 sub-categories or the Overland flow flood planning area sub-category; or b) provides an open undercroft area from natural ground level to habitable floor level for any area inundated by the defined flood event; or Note—This undercroft area is not suitable for providing non-habitable rooms, secure storage of valuables, or future enclosing for storage or car parking. The clear area may include structural elements such as columns and floor substructure. The Flood planning scheme policy provides guidance on undercroft design. Editor's note—An open undercroft design may be achieved through a 'valance' treatment around the perimeter of an otherwise internally clear undercroft.	**N/A**	Not a dwelling house.

Performance Outcome	Acceptable Outcome	Complies	Comments
	Editor's note—For Creek/waterway, storm-tide and river flooding, applicable flood planning information is available from Council's FloodWise Property Report. c) a report from a Registered Professional Engineer Queensland certifies that the development in the Creek/waterway flood planning area or Overland flow flood planning area sub-categories will not result in a material increase in flood level or flood hazard on upstream, downstream or adjacent properties. Note—Flood studies demonstrate that the development and engineering design methods conform to the principles within the Flood planning scheme policy and the Infrastructure design planning scheme policy.		
Section B—If accepted development subject to compliance with identified requirements (acceptable outcomes only) or assessable development other than for a dwelling house or reconfiguring a lot Note—If development that is accepted development subject to compliance with identified requirements complies with the acceptable outcomes of this part, no further assessment against this code is required.			
PO3 Development: a) is compatible with flood hazard in a defined flood event; b) minimises the risk to people from flood hazard; c) does not reduce the ability of evacuation resources including emergency services to access and evacuate the site in a flood emergency, with consideration to the scale of the development; d) minimises impacts on property from flooding;	**AO3** Development for a material change of use is identified in Table 8.2.11.3.C as compatible with the flood hazard in the relevant flood planning area.	**Yes**	Development compatible with flood hazard.

Performance Outcome	Acceptable Outcome	Complies	Comments
e) minimises disruption to residents, business or site operations and recovery time due to flooding; f) minimises the need to rebuild structures after a flood event greater than the defined flood event. Note—Where Table 8.2.11.3.C identifies that a flood risk assessment is required, compliance with this performance outcome can be achieved by submitting a flood risk assessment, which may be included within a flood study, addressing the criteria within this performance solution. Preparing flood risk assessments and flood studies is required to be in accordance with the Flood planning scheme policy. Note—An emergency management plan prepared in accordance with the Flood planning scheme policy, which sets out procedures for evacuation due to flooding may be used to demonstrate compliance with this performance outcome.			
PO4 Development for a park ensures that the design of a park and location of structures and facilities responds to the flood hazard and balances the safety of intended users with: a) maintaining continuity of operations; b) impacts of flooding on asset life and ongoing maintenance costs; c) efficient recovery after flood events; d) recreational benefits to the city; e) availability of suitable land within the park.	**AO4.1** Development involving a building or structure in a park complies with the flood planning levels specified in Table 8.2.11.3.D.	**N/A**	Not a park.
	AO4.2 Development involving a building or structure in a park where Table 8.2.11.3.D does not apply: a) is not located within the 20% AEP flood extent of any creek/waterway or overland flow path; or b) is located above the 20% AEP flood level of any creek/waterway or overland flow path.	**N/A**	Not a park.

Performance Outcome	Acceptable Outcome	Complies	Comments
Section C—If for assessable development other than for a dwelling house			
PO5 Development is located and designed to: a) minimise the risk to people from flood hazard on the site; b) minimise flood damage to the development and contents of buildings up to the defined flood event; c) provide suitable amenity; d) minimise disruption to residents, recovery time and the need to rebuild structures after a flood event up to and including the defined flood event.	**AO5.1** Development complies with the flood planning levels specified in Table 8.2.11.3.D. Note—If located in an area with no Council-derived flood levels such as an overland flow path, a Registered Professional Engineer Queensland with expertise in undertaking flood studies is to derive the applicable flood level and certify that the development meets the required flood planning levels in Table 8.2.11.3.D. The study is to demonstrate that the development and engineering design methods conform to the principles within the Flood planning scheme policy and the Infrastructure design planning scheme policy.	**Yes**	Development levels will be set to comply with the flood planning levels specified in Table 8.2.11.3.D.
	AO5.2 Development is: a) not located in the: i. Brisbane River flood planning area 1, 2a, or 2b sub-categories; ii. Creek/waterway flood planning area 1 or 2 sub-categories; iii. Overland flow flood planning area sub-category; or b) only located in these sub-categories if a Registered Professional Engineer Queensland with expertise in undertaking flood studies certifies that: i. the development design, siting and any mitigation measures will ensure the development is structurally adequate to resist hydrostatic, hydrodynamic and debris impact	**Yes**	Development will comply with part b). i. Given the bulk of the building and the low flow velocities, structural design of the building to withstand hydraulic and debris loading will be straightforward. ii. People will be able to shelter above flood level in the building, with a FEMP (including flood barriers) adopted to avoid people accessing the Site when it is isolated by flooding.

Performance Outcome	Acceptable Outcome	Complies	Comments
	loads associated with flooding up to the defined flood event; and ii. the risk to people is managed to an acceptable level.		
PO6 Development involving essential electrical services or a basement storage area is suitably located and designed to ensure public safety and minimise flood recovery and economic consequences of damage during a flood.	**AO6.1** Development ensures that: a) all areas containing essential electrical services comply with the flood planning levels in Table 8.2.11.3.D; or b) if a basement contains essential electrical services or a private basement storage area, the basement is a waterproof structure with walls and floors impermeable to the passage of water with all entry points and services located at or above the relevant flood planning level in Table 8.2.11.3.D. Note—A basement storage area does not include a bike storage room, change room, building maintenance storage and non-critical electrical services.	**Yes**	Essential electrical services will be located at an appropriate level.
	AO6.2 Development involving a basement that relies on a pumping solution to manage floodwater ingress or for dewatering after a flood provides a secondary pump system with a backup power source for the pump.	**N/A**	No basement.
PO7 Development does not directly or indirectly create a material adverse impact on flood behaviour or drainage on properties that are upstream, downstream or adjacent to the development.	**AO7.1** Development: a) does not block, or divert floodwaters for any area affected by creek/waterway or overland flow flooding, excluding storm-tide	**Yes**	Will provide for the conveyance of overland flow beneath the building. A flood investigation will confirm that the development will not result in a material

Performance Outcome	Acceptable Outcome	Complies	Comments
	flooding and Brisbane River flooding sources; or b) does not result in a material increase in flood level or hydraulic hazard on upstream, downstream or adjacent properties. Note—Compliance with this acceptable solution can be demonstrated by the submission of a flood study by a Registered Professional Engineer of Queensland with expertise in undertaking flood studies demonstrating that the development and engineering design methods conform to the principles within the Flood planning scheme policy and the Infrastructure design planning scheme policy.		increase in flood level or hazard external to the Site.
	AO7.2 Development retains existing overland flow paths and does not rely wholly on piped solutions to manage major flows.	**Yes**	Development provides for the retention of the flow path beneath the building.
	AO7.3 Development which creates a new overland flow path or significantly modifies an existing overland flow path via earthworks does not materially worsen hydraulic hazard on the site from existing conditions. Note—Compliance with this acceptable solution can be demonstrated by the submission of a flood study by a Registered Professional Engineer of Queensland with expertise in undertaking flood studies demonstrating that the development and engineering design methods conform to the principles within the Flood planning scheme policy and the Infrastructure design planning scheme policy.	**Yes**	Development will provide for the continued drainage of flow beneath the building.

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PO8 Development for filling or excavation in an area affected by creek/waterway flooding does not directly, indirectly or cumulatively cause any material increase in flooding or hydraulic hazard or involve significant redistribution of flood storage from high to lower areas in the floodplain. Note—This can be demonstrated by undertaking earthworks in compliance with the Compensatory earthworks planning scheme policy. Note—This part of the code applies to all development other than a dwelling house and any secondary dwelling which involves filling or excavation, whether or not the development application comprises a separate development application for operational work involving filling or excavation.	**AO8** Development ensures that no filling or excavation greater than 100mm is located in the Creek/waterway flood planning area 1, 2 or 3 sub-categories if contained in the 5% AEP flood extent of any Creek/waterway flood planning area sub-category for which no waterway corridor has been mapped in the Waterway corridors overlay.	**N/A**	Not affected by creek flooding.
PO9 Development ensures that the building and site design: a) maintains the conveyance capacity of existing overland flow paths and creek/waterways; b) ensures floodwaters and flood debris can pass predominantly unimpeded under a structure or building to minimise property or building damage, including for a flood larger than the defined flood event; c) mitigates flood impacts by ensuring that filling, excavation and location of services are designed to allow for the conveyance of floodwater across the site. Note—The Flood planning scheme policy provides guidance on relevant considerations in determining minimum undercroft clearances and treatment of	**AO9.1** Development involving a building undercroft in the Creek/waterway flood planning area sub-categories or the Overland flow flood planning area sub-category: a) complies with the minimum building undercroft clearance requirements in Table 8.2.11.3.E; b) not located directly above any part of a waterway corridor as mapped in the Waterway corridors overlay.	**A/S**	It is considered that the proposed undercroft is consistent with that recently approved by Council for the adjacent site and will provide sufficient access for maintenance.
	AO9.2 Development involving a building undercroft in the Creek/waterway flood planning area sub-categories or the Overland flow flood planning area sub category:	**Yes**	While existing ground is expected to be trimmed to provide a uniform surface, it will be free draining.

Performance Outcome	Acceptable Outcome	Complies	Comments
ground level in undercroft areas where floodwater conveyance is required underneath development.	a) has a ground level within the undercroft area that is free draining; b) does not involve excavation below ground level of more than 300mm within the undercroft area.		
PO10 Development for vulnerable uses, difficult to evacuate uses or assembly uses optimises vehicular access and efficient evacuation from the development to parts of the road network unaffected by flood hazard, in order to: a) protect safety of users and emergency services personnel; b) support efficient emergency services access and site evacuation with consideration to the scale of development. Note—A flood risk assessment may be required to address the performance outcomes or acceptable solutions which deal with evacuation and isolation arrangements, and the ability to take refuge. The Flood planning scheme policy provides information for undertaking flood risk assessments.	**AO10** Development for vulnerable uses, difficult to evacuate uses or assembly uses: a) is not isolated in any event up to the relevant flood planning level specified in Table 8.2.11.3.L; or b) has direct vehicle access to a critical route or interim critical route in the Critical infrastructure and movement network overlay for evacuation in a flood; or c) can achieve vehicular evacuation to a suitable flood-free location. Note—A suitable flood-free location is of a size and nature sufficient to provide for the size and characteristics of the population likely to need evacuation to that area.	**N/A**	Development not for these purposes.
PO11 Development has access which, having regard to hydraulic hazard, provides for safe vehicular and pedestrian movement and emergency services access to adjoining roads.	**AO11.1** Development provides an access or driveway into the site which is: a) trafficable during the defined flood event; b) not located in the Creek/waterway flood planning area 1 sub-category; c) not located in the Overland flow flood planning area sub-category if the hydraulic hazard is unsafe in the defined flood event;	**A/S**	Access is not trafficable during defined flood event. Local flooding results in ponding of water to non-trafficable depths in Linton Street. During this period the Site will be isolated. However, as the flooding is associated with local catchment runoff, the duration of isolation will be relatively limited. Further, habitable areas will be above flood level, allowing people to shelter in place.

Performance Outcome	Acceptable Outcome	Complies	Comments
	d) the access or driveway is not inundated by a 10% AEP flood.		It is proposed to operate the Site in accordance with a FEMP. This will include physical measures to prevent access to Linton Street and the requirement for people to shelter in place during local flood events.
	AO11.2 Development located in the Creek/waterway flood planning area 1, 2, 3 or 4 sub-categories locates any disabled access in the highest part of the site. Note—explanation of hydraulic hazard provided in the Flood planning scheme policy.	**N/A**	Site not located in creek/waterway flood planning area.
PO12 Development involving a new road, a bridge or culvert is designed to minimise impacts to flood behaviour, minimise disruption to traffic during a flood and allow for emergency access.	**AO12** Development involving a new road complies with the flood planning levels in Table 8.2.11.3.F.	**N/A**	Does not include new roads.
PO13 Development for pedestrian and cyclist paths: a) provides a suitable level of trafficability; b) manages the impacts of flooding on asset life and ongoing maintenance costs; c) balances route availability with recreational and transport connectivity benefits to the city.	**AO13.1** Development for cyclist and pedestrian facilities other than on public roads, including those traversing through a park and adjacent to a watercourse and overland flow path, are located above the 39% AEP (2 year ARI) flood immunity from all flooding sources. Note—If the site is subject to more than one type of flooding, the requirement that affords the greatest level of protection will apply.	**N/A**	No paths as part of development.
	AO13.2 All new on-road cyclist and pedestrian facilities comply with the flood planning levels and trafficability	**N/A**	No paths as part of development.

Performance Outcome	Acceptable Outcome	Complies	Comments
	standards for the applicable category of road in Table 8.2.11.3.F or Table 8.2.11.3.K.		
PO14 Development which increases the residential population within the Brisbane River flood planning area sub-categories minimises the risk to people in all flood events with consideration to flood hazard, including warning time.	**AO14** Development in the Brisbane River flood planning area sub-categories in areas where the residential flood level is greater than 12.8m AHD involving: a) an increase in the number of residential dwellings; or b) additional residential lots c) is not subject to an unsafe hydraulic hazard in the 0.2% AEP flood event. Note—Explanation of a hydraulic hazard is provided in the Flood planning scheme policy.	**N/A**	Below 12.8mAHD.
Additional performance outcomes and acceptable outcomes for essential community infrastructure			
PO15 Development involving essential community infrastructure: a) remains functional to serve community need during and immediately after a flood event, or is part of a network that is able to maintain the function of the essential community infrastructure when parts of the development are unable to function during or after a flood; b) is designed, sited and operated to avoid adverse impacts on the community or the environment due to the impacts of flooding on infrastructure, facilities or access and egress routes; c) is able to remain functional or is part of a network which is able to remain functional even when other infrastructure or services	**AO15** Development involving essential community infrastructure: a) is ancillary to and not relied upon for the provision of the essential service during a flood; or b) is located above the flood planning levels in Table 8.2.11.3.G; c) has access to or provides the necessary back-up emergency electricity and communications supply in times of flood; d) is designed and constructed to resist hydrostatic and hydrodynamic forces as a result of inundation by the flood event listed for the development type in Table 8.2.11.3.G; e) that services a local area:	**N/A**	Not essential community infrastructure.

Performance Outcome	Acceptable Outcome	Complies	Comments
(such as electricity supply) may be compromised in a flood event; d) contains mitigation measures which are not entirely dependent on human activation to respond to a flood event. Note—Protection of function is required up to and including the flood event in Table 8.2.11.3.G.	i. is able to be accessed in times of flood to service local community needs up to the event listed for that development type in Table 8.2.11.3.G; or ii. has a service continuity plan that demonstrates the continued provision of service during the relevant flood event.		
Additional performance outcomes and acceptable outcomes if development involves the processes in Table 8.2.11.3.H			
PO16 Development involving the storage and handling of hazardous materials avoids or minimises risks to public health and safety and the environment, by: a) protecting underground tanks for hazardous materials against the forces of buoyancy, velocity flow and debris impacts; b) securing above-ground tanks for hazardous materials against flotation and lateral movement; c) preventing damage to hazardous materials pipework or entry of floodwater into hazardous materials pipework; d) preventing damage to or off-site release of packages, drums or containers storing hazardous materials. Note—A chemical hazards flood risk report prepared in accordance with the Management of hazardous chemicals in flood affected areas planning scheme policy can assist in demonstrating achievement of this performance outcome.	**AO16** Development does not include the storage or handling of hazardous chemicals that exceed the hazardous chemicals flood hazard threshold quantities in Table 8.2.11.3.M. Development involving the processes listed in Table 8.2.11.3.H: a) where located in the Flood overlay area, occurs only in the Creek/waterway flood planning area 5 sub-category or the Brisbane River flood planning area 5 sub-category; or b) is consistent with the standards contained in the Management of hazardous chemicals in flood affected areas planning scheme policy and can operate without risk of environmental harm during a flood event. Note—The Management of hazardous chemicals in flood affected areas planning scheme policy sets out further information and processes including risk	**N/A**	Residential development- will not involve hazardous materials.

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Note—A pump drainage system is not an acceptable measure to meet the performance outcome.	assessment for the management of hazardous chemicals in flood planning areas.		
Additional performance outcomes and acceptable outcomes for reconfiguring a lot			
PO17 Development locates and designs all lots resulting from reconfiguring a lot to: a) minimise the risk to people from flood hazard; b) minimise damage to property from flood hazard; c) facilitate safe and efficient evacuation. Note— Consideration of all floods up to the probable maximum flood is relevant to minimising the risk to people. Flood warning time is not considered sufficient in the Creek/waterway planning area sub-categories or the Overland flow flood planning area sub-category. Filling above the flood planning level for a flood event greater than the defined flood event cannot be assumed to mitigate the flood hazard.	**AO17.1** Development creating new lots is identified in Table 8.2.11.3.I as suitable within the relevant flood planning area.	**N/A**	Not reconfiguring a lot.
	AO17.2 Development provides for reconfiguring a lot design that achieves a road and lot layout which: a) provides trafficable vehicular egress for evacuation during a defined flood event; b) optimises hazard-free movement away from sources of flood hazard within the development. Note—Further advice on road and lot layout is contained in the Flood planning scheme policy.	**N/A**	Not reconfiguring a lot.
	AO17.3 Development which creates a new residential lot in an area subject to Brisbane River flooding, if the residential flood level is greater than 12.8m AHD is not subject to a hydraulic hazard greater than 0.6m2/s DV or 0.6m deep in a 0.2% AEP flood. Note—Refer to the Flood planning scheme policy for further explanation on the 0.2% AEP flood.	**N/A**	Not reconfiguring a lot.
PO18 Development involving reconfiguring a lot:	**AO18.1** Development involving reconfiguring a lot ensures:	**N/A**	Not reconfiguring a lot.

Performance Outcome	Acceptable Outcome	Complies	Comments
a) minimises the risk to people from flood hazard; b) creates safe evacuation routes or avoids isolation of the development during a flood greater than the defined flood event; c) minimises damage to property and services; d) provides lots and roads that are not frequently flooded or subject to nuisance ponding or seepage; e) ensures lots created for park or private open space minimise the risk to people from flood hazard and are fit for purpose; f) provides a lot that is not substantially burdened by flood mitigation infrastructure.	a) all lots comply with the flood planning levels in Table 8.2.11.3.J; b) a new road complies with the flood planning levels in Table 8.2.11.3.F.		
	AO18.2 Development involving reconfiguring a lot creating more than 6 residential lots or a lot for industry ensures the flood planning levels of a dedicated road fronting the development or providing primary access within 200m of the development: a) complies with Table 8.2.11.3.K; or b) has acceptable trafficability in accordance with the requirements in the Flood planning scheme policy and the Queensland Urban Drainage Manual. Note—The Flood planning scheme policy contains supporting information about trafficability on existing roads and serviceability during floods.	**N/A**	Not reconfiguring a lot.
	AO18.3 Development protects the conveyance of flood hazard area by providing an easement over the: a) 2% AEP flood extent for overland flow flooding; b) 1% AEP flood extent for creek/waterway flooding.	**N/A**	Not reconfiguring a lot.