

Estuarine Risk Management Report for 180 McCarrs Creek Road, Church Point, NSW 2105

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Version	FINAL
Date	28/06/2021

Document Control

Version	Date	CHECKED BY	ISSUED BY	Distribution					
				YUEY THEN					
DRAFT FOR CLIENT REVIEW	23/06/2021	DJW	DJW	E					
FINAL	28/06/2021	DJW	DJW	E					

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1 Introduction

1.1 Northern Beaches Council's Requirements for an Estuarine Risk Management Report

Salients Pty Limited was approached by Yuey Then to prepare an Estuarine Risk Management Report (this report) for a proposed boat shed at 180 McCarrs Creek Road, Church Point (Lot 12 in DP776130, "the Site"). The property is located on the eastern foreshore of McCarrs Creek, a southern sidearm of Pittwater, north of Sydney. The site locality can be seen in Figure 1.

This report addresses the requirements of Northern Beaches Council (Council), through preparation of an Estuarine Risk Management Report (ERMR). Council have requested that an ERMR be prepared as the proposed boat shed will be affected by wave action and tides.

Appendix 7 to the Pittwater 21 Development Control Plan (DCP)¹ contains the "*Estuarine Risk Management Policy for Development in Pittwater*". That policy requires that risks from wave action and tidal inundation are properly considered by the development. Consideration of those risks is the main aim of this report.

1.2 Proposed Development

The proposed development comprises a new boat shed at the foreshore fronting the property, a retaining wall, and new stairs to the boat shed. Also involved in the development is the flattening of the ground adjacent to the boat shed to create a level lawn. The retaining wall will be located behind the lawn and boat shed. The layout of these proposed additions can be seen in Figure 2, Figure 3 and Figure 4.

These figures show the floor level of the boat shed at 1.17m AHD. After discussion with the client² regarding the limitations of this design, it was agreed that the floor level of the boat shed will be raised to 1.84m AHD. Raising the floor level to this height will avoid many of the adverse effects due to regular inundation. **The remainder of this report assumes that the floor level for the boat shed will be set at 1.84m AHD.**

¹ Version incorporating Amendments 1 through 27 has been used throughout this report. The DCP for Pittwater is still in effect as of June 2021.

² Via email correspondence on 25/06/2021.



Figure 1: Site Locality

Estuarine Risk Management Report: 180 McCarrs Creek Rd

REV
A

DRAWN
ML

CHECK
DJW

GIS File: Z:\BusinessShare\Them\Projects\P00126 180McCarrsCreekRoadChurchPoint\GIS\Locality.qgz



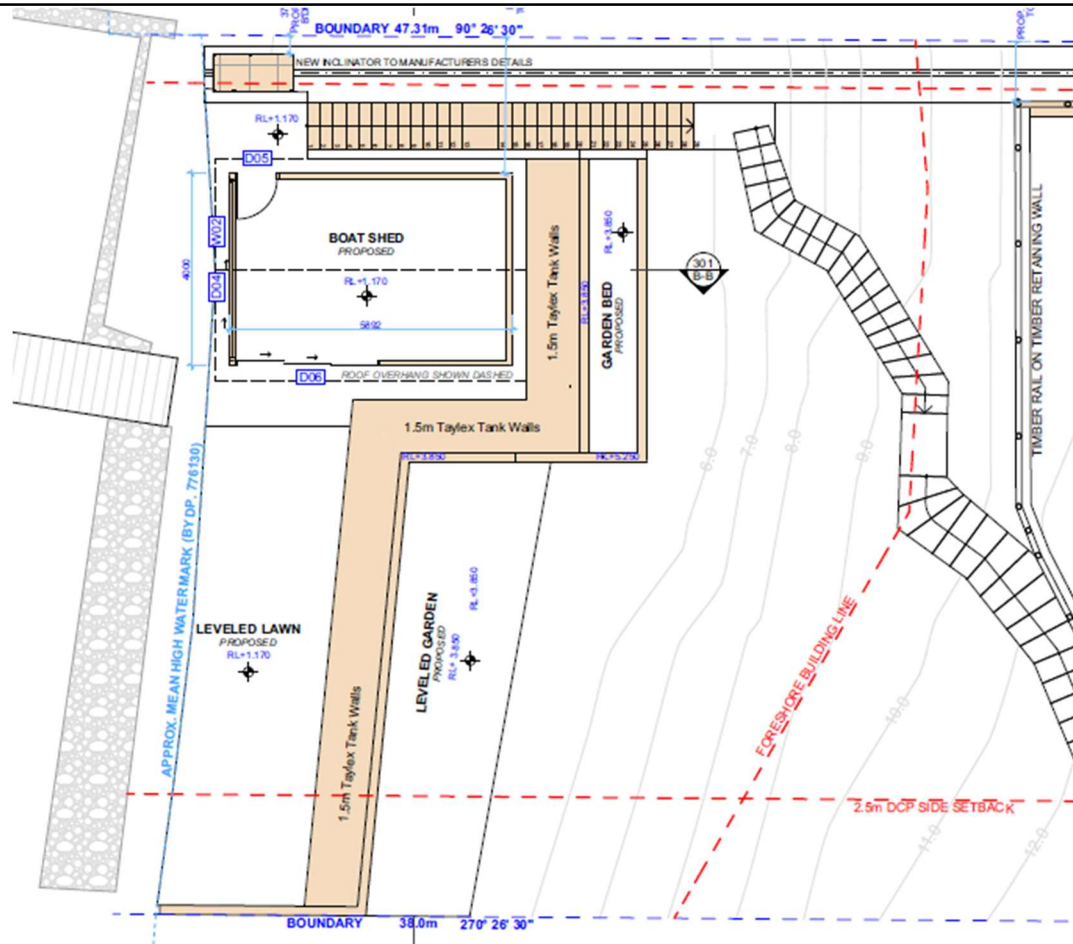


Figure 2 Plan View of Proposed Boat Shed, Retaining Wall and Access Stairs
(extracted from plans by Action Plans (2021, provided in Appendix B))

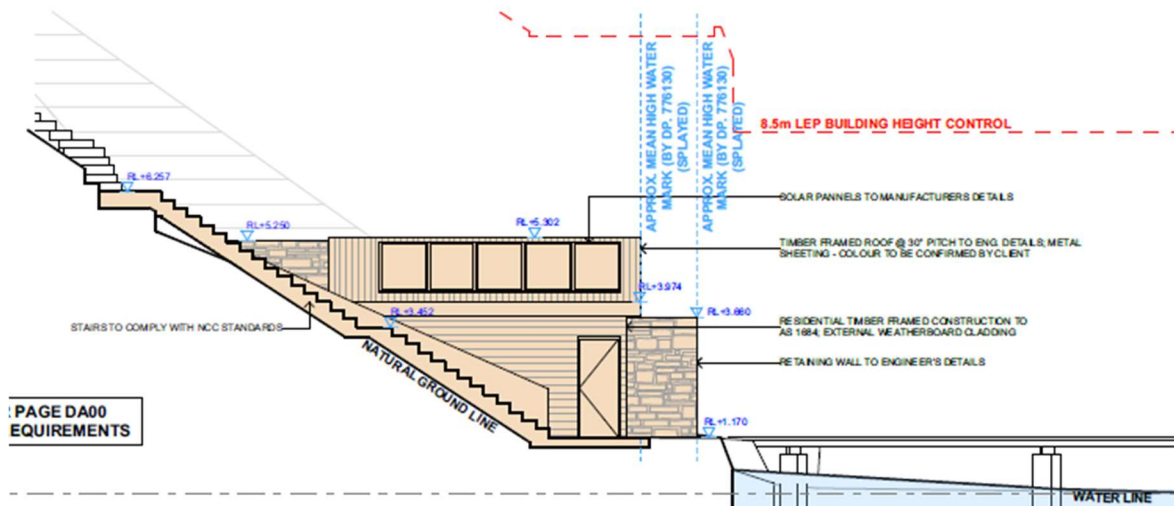


Figure 3 North Elevation of Proposed Boat Shed (extracted from drawings by
Action Plans (2021, provided in Appendix B))

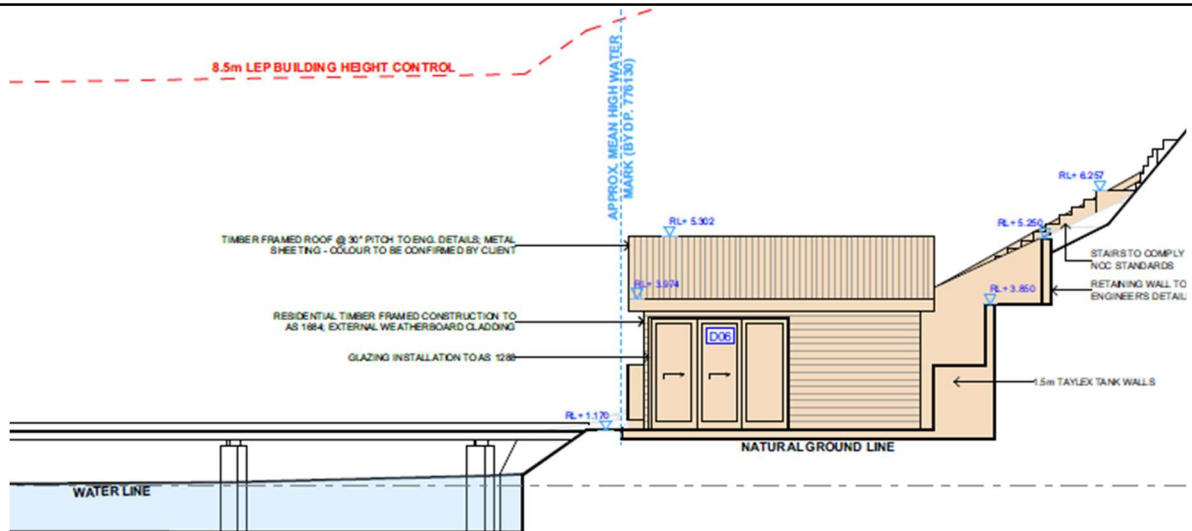


Figure 4 South Elevation of Proposed Boat Shed (extracted from plans by Action Plans (2021, provided in Appendix B))

With reference to these figures, the following development components have been considered by the present report:

- Boat Shed:** The proposed boat shed comprises a 4m (shore-parallel) by 5.9m (shore-normal) building. The proposed boat shed is timber framed with external weatherboard cladding and a sheet metal roof. The existing shed located at the foreshore will be demolished to enable construction of the new boat shed. The proposed floor level of the boat shed is 1.84m AHD. A door is located on the northern wall of the boat shed, at the end closest to the foreshore. Along the foreshore fronting wall and front half of the southern wall sliding glass doors are proposed.
- Retaining Wall:** The proposed retaining wall would comprise a stone structure fronted by 1.5m high “Taylex” Tank Walls. The retaining wall would be constructed around and to the rear of a proposed levelled lawn and the boat shed. The proposed lawn elevation at the base of the retaining wall is 1.17m AHD, and the top of the surrounding retaining wall is proposed at 3.85m AHD.
- Stairs:** The lower extent of existing access stairs, along the northern property boundary, and leading down to the shed would be demolished. In their place, new flights of stairs would be constructed to give access to the new boat shed.
- Inclinor:** An inclinor is proposed along the northern boundary of the Site, the final details regarding the design are not yet provided.

1.3 Outline of Report

The requirements for this report have been determined through a review of Appendix 7 to the DCP, correspondence from Watermark Planning who informed us of Council's defined Estuarine Planning Level, and Section B3.7 "*Estuarine Hazard – Low Density Residential*" of the DCP. The identified requirements are presented in the remainder of this report as follows:

- Section 2 contains a description of the site locality and environment, insofar as it relates to waves and water levels that could interact with the proposed structures. The design life of the development is also discussed, as this affects the allowance for sea level rise that needs to be made and the magnitude of design waves.
- Section 3 considers the nature of the existing foreshore and the structural loadings that could be applied in design. Issues surrounding durability and functionality are also discussed.
- Section 4 includes a risk assessment. Risks are identified and assessed. Where appropriate, mitigation strategies are outlined.

1.4 Confirmation

Salients Pty Ltd has 20M public liability insurance and 10M professional indemnity insurance. Furthermore, the author of this report, Dr David Wainwright is a chartered engineer with the Environmental and Civil Colleges of Engineers Australia and has been a practicing coastal engineer for close to 25 years. David's PhD is in Coastal Engineering. A signed copy of "Form 1" which pertains to this Estuarine Risk Management Report is provided as Appendix A.

2 Details of the Environment at the Site

2.1 Site Locality

Appropriate design wave and tide conditions are governed by the location of the Site within Pittwater, Pittwater's connection to the ocean, and the Site's exposure to fetches over which winds can blow to generate local waves. Due to its sheltered location, oceanic swell is not a significant issue at the Site. The location of the Site within Pittwater is shown in Figure 5.

Of interest is the fetch for local wind waves, which could approach from directions spanning clockwise from south-west to north-east.

2.2 Proposed Design Life for Facility

Council's policy specifies a design project life of 100 years unless it can be *otherwise justified by the applicant* (and accepted by Council). The design life proposed has an impact on design conditions in terms of the amount of sea level rise allowance used.

The Australian Standard for the design of maritime structures (Standards Australia, 2005) recommends that a design life of 25 years be adopted for a small craft facility³. The boat shed fits squarely into this category. A 25-year design life is appropriate and has been assumed and adopted henceforth in this report.

Overall, the scale and relatively infrequent use of the structure (compared to use of residential buildings) lead to our assessment that the structure represents a "*low degree of hazard to life or property*". A related table from the maritime structures Standard indicates that the 2% Annual Exceedance Probability (AEP) wave⁴ would be an appropriate wave height for the 25-year design life. Such wave heights would have an approximate 40% chance of occurring at least once over a 25-year design life.

2.3 Consideration of Wave Environment

Previous work by Lawson and Treloar (2004, 2003) and Cardno (2015) examined the wind wave climate around Pittwater. Those studies applied extreme wind speed analysis to a wind record from Sydney Airport, which can be reasonably applied to Pittwater, resulting in estimated extreme wind speeds from directions between south-west and north-east as shown in Table 1.

³ Refer to Table 6.1 of AS4997, 2005

⁴ Refer to Table 5.4 of AS4997, 2005

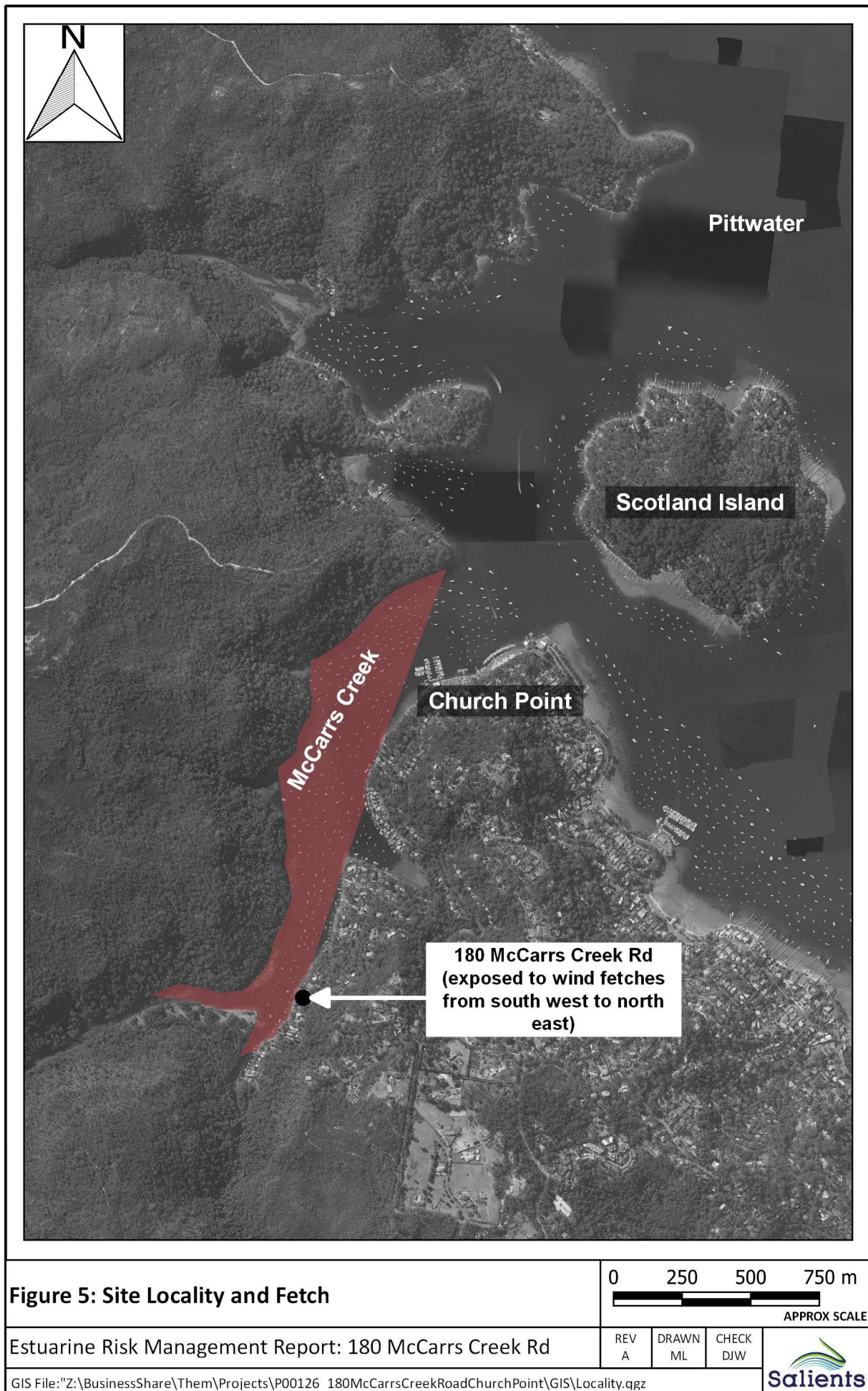


Table 1 **Estimated Extreme Wind Speeds for Pittwater (m/s)**
(from Lawson & Treloar (2003), Table 3.5)

	South West	West	North West	North	North East
1% AEP Gust Speed	35.1	38.3	33.9	28.4	23.8
5% AEP Gust Speed	31.9	35.0	31.3	26.1	22.9
1% AEP 10 min Average	25.6	26.6	21.3	19.3	18.3
5% AEP 10 min Average	23.3	24.3	21.3	17.8	17.6
1% AEP 3 hr Average	24.6	25.5	22.1	18.5	17.6
5% AEP 3 hr Average	22.4	23.3	20.4	17.0	16.9

To estimate extreme nearshore wave conditions within McCarrs Creek, the response of a computational wave model to a range of wind speeds from 16 compass directions was assessed. Those responses were used, by Lawson and Treloar, to transfer the time series of wind speeds from Sydney Airport to a corresponding time series of waves within Pittwater. Statistical analysis then determined the occurrence of extreme wave conditions at a variety of foreshores within Pittwater. The resulting local wind-generated waves that are indicated as being applicable to 180 McCarrs Creek are replicated in Table 2.

Table 2 **Estimated Extreme Wind Wave Heights near 180 McCarrs Creek (from Lawson & Treloar (2003), Table 3.7)**

Recurrence	Wind Wave Height ($H_{s,w}$, m)
5% AEP	0.50
2% AEP	0.52
1% AEP	0.56
0.5% AEP⁵	0.58

⁵ Values not reported in Lawson & Treloar (2003). Estimated via logarithmic extrapolation.

The critical wind directions for this site are north, north-east, and west. A check of design wave heights from these directions, considering the length of wave generation fetch was made using the simplified methods presented in the US Army Corps of Engineers Coastal Engineering Manual⁶.

The height of the wind waves approaching from the west using this simplified method of calculation was higher than the values in Table 2. However, the wave generation fetch in this direction is very narrow, and the simplified method does not account for this constraint. It is assumed that the wave model used by Lawson & Treloar more properly accounts for the narrow fetch and the constraining effect this has on the wind waves generated. Thus, the values for significant wind wave height presented in Table 2 are thought to be reasonable and have been adopted for design.

For this report, the 2% AEP significant wave height (H_s of 0.52m) was adopted. AS4997 recommends a factor of 1.5 be applied to the H_s wave height to obtain the H_1 wave height, which represents the highest 1% of waves occurring during a design storm and should be used in determining structural loads. Accordingly, a wave with height 0.78m (1.5×0.52) can be used in deriving forces for structural design.

It is possible that a wave of this height may not make it to the Site without breaking. This is governed by the following relationship:

$$H_b = \gamma \times h_b$$

Where H_b is the size of the wave that would break in water depth h_b and γ is the breaker index, which is commonly given a value of 0.78. A nearshore depth of around 1m is required for a 0.78m wave to pass without breaking before it reaches the foreshore.

Lidar data was obtained from Geosciences Australia⁷ and inspected to confirm the elevations of the foreshore. The inspection indicated that the bed elevations of the foreshore fronting the property were around 0.0m AHD.

Considering these factors, we conclude that the design wave could easily propagate across the foreshore and break directly onto the foreshore (and boat shed) with even moderately elevated water levels (say, around present day Highest Astronomical Tide).

Design water levels at the site are discussed in more detail in the following section.

⁶ <http://www.publications.usace.army.mil/USACE-Publications/Engineer-Manuals/u43544q/436F617374616C/>

⁷ <https://elevation.fsdf.org.au/>

2.4 Consideration of Water Level Environment

Council's designated Estuarine Planning Level (EPL) for the site is 2.53m AHD. Under this condition, the design wave of 0.78m AHD could easily propagate all the way to the foreshore and break directly onto the boat shed and the full wave height would govern design. It is important to understand how the EPL has been derived. It contains the following components:

- Storm Tide.
- Wind Setup.
- Wave Related Increment.
- Freeboard.
- Sea Level Rise.

Each of these are discussed in turn.

Storm tide includes the astronomical tide and other large-scale processes that act to raise the ocean water level over large distances (i.e., 100s of km). For the most recent analyses (Cardno, 2015), a storm tide of 1.44m AHD was applied across Pittwater, which differed from that originally determined by the Pittwater Estuary Processes Study (Lawson & Treloar, 2003).

By applying the 1% AEP 3 hourly average wind speeds from Table 1 to a hydrodynamic model, the following wind setup values were determined along the McCarrs Creek foreshore (Lawson & Treloar, 2003):

- North Westerly Wind: +0.04m
- Northerly Wind: +0.10m
- North Easterly Wind: +0.11m
- Easterly Wind: +0.08m

For all other directions, winds across Pittwater indicated a set down of water levels. The value adopted for the Site in the most recent analysis of water levels was +0.11m (Cardno, 2015). This is likely to occur concurrently with wind waves approaching from the north-east.

A "Wave Related Increment" component was also determined for McCarrs Creek. This component accounts for run-up and overtopping of the foreshore and is therefore related to the type of foreshore (e.g., sloping natural, vertical seawall etc.). The foreshore fronting 180 McCarrs Creek Road is best described as rock strewn intertidal mud flats, with a low seawall present at the foreshore. The seawall is generally in a

state of poor repair but appears stable for now and is comparatively robust in front of the location where the boat shed is proposed (north of the jetty).

The present day 1% AEP still water level, including wind set up allowance, is 1.55m AHD. The crest elevation of the low seawall at the back of the beach varies between 1.05 and 1.17m AHD. Cardno (2015) calculated the wave related increment as half of H_s when the still water is above the crest, which adds an additional 0.28m to the Estuarine Planning Level.

Ultimately, a 'present day' Estuarine Planning Level of 2.13m AHD, which also included a freeboard of 0.3m, was determined for the Site. Cardno (2015) describes the freeboard as a "factor of safety" which provides a level of mitigation against risk exposure arising from uncertainties, particularly with relation to wave run-up.

For climate change related sea level rise, Council has adopted a rise of 0.4m by 2050 and 0.9m by 2100. Within Cardno (2015), these were considered to be relative to a "present day level" of 0.0m. With sea level rise of 0.4m (by 2050), a total Estuarine Planning Level of 2.53m AHD was determined for the 2050 timeframe.

In considering the degree of periodic foreshore infrastructure inundation that could be expected from tides of different frequencies within Pittwater, Cardno (2015) also presented more statistics as shown in Table 3. These do not include the wave related increment or freeboard.

**Table 3 Comparison of Still Water Levels from Astronomical Tides
(m AHD, to nearest 0.1m) (from Cardno (2015), Table 3.1)**

	"Present Day"	2050 (including 0.4m Sea-level rise)
Fortnightly High Tide	0.6	1.0
Monthly High Tide	1.0	1.3
Biannual (King) Tide	1.2	1.6
100yr Storm Tide	1.4⁸	1.8

With 0.4m of sea level rise, monthly high tides in Pittwater would be at 1.3m AHD, above the crest of the seawall. The proposed boat shed floor level of 1.84m AHD is sufficient to avoid regular inundation events which could adversely affect the serviceability of the structure. With this floor level inundation is only expected to occur

⁸ Note that a level of 1.44 (1.84 at 2050) was used in derivation of the Estuarine Planning Level

towards the end of the structures design life during extreme water level and wave conditions.

2.5 Potential Justification for Modifying the Estuarine Planning Level

Considering the components of the EPL, the storm tide adopted is reasonably typical for estimates based on the record available from Fort Denison. Varying the storm tide level to represent a 2% AEP event (applicable for a 50yr design life), instead of a 1% event, would typically result in lowering the level by a few centimetres.

The sea level rise allowance applied in Cardno (2015) appears to be 0.4m between 2015 and 2050 and a further 0.5m between 2050 and 2100. Most widely accepted projections now indicate that the rate of sea level rise will accelerate over time. A comparatively conservative approach is to consider a linear increase between 2015 and 2050. This approach projects around 0.35m of sea level rise by 2046, at the end of a 25-year design life for the boat shed. Allowing for this adjustment represents a potential reduction in the EPL by 0.05m.

Finally, when calculating the wave related increment, adoption of the 2% AEP wave height (0.52m) instead of the wave height adopted by Cardno (2015), would reduce the EPL by 0.02m. In total, considering a design life extending to 2046, an appropriate planning level for the foreshore of around 2.46m AHD could be applied. This is only a reduction of 7cm from Council's designated EPL. The design still water level, without freeboard, for this modified condition (~1.9m AHD) only just exceeds the proposed floor elevation of the boat shed.

The potential for inundation should be considered as part of the design in terms of serviceability, with the frequency of inundation increasing as sea levels rise in future. The proposed floor level of the boat shed is 1.84m AHD, at this level inundation is expected only rarely, towards the end of the structures design life. We consider this floor level sufficient to avoid frequent inundation, thus maintaining the serviceability of the building throughout its design life.

3 Interaction of Water Levels and Waves with the Proposal

3.1 Existing Foreshore and Structural Conditions

Our assessment of the existing site is based on photographs provided by Yuey Then (captured on a variety of days from October 2020 to January 2021) and Action Plans (captured on 2nd September 2020). Also provided to us by Yuey Then were design plans of the proposed additions prepared by Action Plans (Appendix B), and a survey of the site conducted by C.M.S. Surveyors Pty Limited (Appendix C).

The foreshore fronting the Site is around 15m wide and is backed by a seawall which is generally in a poor state of repair. The foreshore is shown in Figure 6, noting that the jetty has been upgraded since the photograph was captured.



Figure 6 Foreshore of 180 McCarrs Creek, 11:50am, 2 September 2020 (Photo provided by Action Plans)

Rock outcrops are present at the foreshore which indicates bedrock is present at around 0.0m AHD, with that rock overlain by a thin veneer of estuarine mud.

Figure 7 shows the upgraded timber jetty and the seawall in more detail. On the left (north) side of the jetty (in front of the proposed boat shed) the seawall comprises

dimensioned stone. This stone is stacked to form the wall, although it appears that stone is also strewn across the foreshore in front of the wall.

To the right (south) of the jetty the seawall comprises more angular rock more randomly placed, the wall appears to be layered, more consistent with an engineered revetment and there are less rocks strewn across the foreshore.

It is recommended that the seawall be monitored to assess change over time. In the future, consideration should be given to upgrading this structure, especially as sea levels rise, noting that inundation of the lawn will become more frequent.



Figure 7 Photo Taken Offshore of Jetty, 6pm, 29 October 2020 (Photo provided by Yuey Then)

3.2 Determination of Structural Design Conditions

As described in Section 2.5, Council's Estuarine Planning Level for the site is 2.53m AHD, although it could be argued that an alternative, lower level of 2.46m AHD is justified. Clearly, the proposed floor level of the boat shed (1.84m AHD) is lower than either of the original or alternative Estuarine Planning Levels.

To provide a safe, habitable floor level for a 25-year design life, the floor of the boat shed would need to be raised to at least 2.46m AHD. However, a boat shed used

primarily for boat storage, does not need a habitable floor and a lower floor level is acceptable.

Clause B3.7 of Council's DCP notes that:

"Consideration may be given on a merit basis to a floor level of a boat shed at a level lower than the Estuarine Planning Level where it can be demonstrated through an Estuarine Risk Management Report that the boat shed is structurally designed to withstand periodic wave action and tidal inundation up the Estuarine Planning Level".

Even with a floor level set at 1.84m, the flooring and lower wall timbers can (and should) be designed to handle temporary inundation to meet the requirements of Council at the end of the structure's design life. Structural design should consider inundation to at least 2.46m AHD, including allowances for the shrink and swell of any timber or weatherboard and the ability for these to dry out once water levels subside.

The proposed level of the lawn surrounding the boat shed is 1.17m, this is acceptable for now, although it is recommended that this be monitored. In future, consideration may be given to raising the level of the lawn and concurrently raising the crest height of the sea wall fronting the property, as inundation events will become more severe with time.

The effect of wave forces on both the proposed boat shed and the surrounding retaining walls and access stairs needs to be considered. The primary way waves will load the foreshore structures are by slamming against the vertical sides of the structures. A design wave height of 0.78m at the foreshore has been assumed. Waves that reach the foreshore will break and potentially slam against vertical surface of structures in the near vicinity of the foreshore (i.e., the boat shed, tank walls and retaining walls).

3.2.1 Waves Acting against Vertical Planar Surfaces

The wave forces discussed below should be applied to all vertical planar surfaces such as boat shed walls and the sides of structural members.

The method presented by Goda (2010) for calculating the wave forces on a vertical breakwater can be conservatively adopted. Goda's model produces a (roughly) triangular pressure distribution which varies with height. It is necessary to consider those components of the EPL that should be included in this force calculation. It is appropriate to include the storm tide, wind setup and sea level rise components in determining a still water level across which the wave will propagate. The wave related increment can be ignored in this instance as Goda's method calculates the amount which the wave will run up a vertical planar surface. An argument could be mounted

for ignoring the freeboard as well, but in this instance, it is considered appropriately conservative to retain that component. Considering the information in Sections 2.3 through 2.5, and adopting the adjusted EPL, with a 2% AEP design wave, the design condition comprises a 0.78m high wave propagating across a still water level of 2.20m AHD.

Using Goda's method, a peak wave pressure of 2.5 kPa is calculated at the adopted "still water level" of 2.20m AHD. We recommend that this horizontal pressure be considered to act evenly on all parts of vertical surfaces below 2.20m AHD. Goda's method calculates that the waves could run up the face of a vertical surface to a height of 3.37m AHD, although this behaviour would be intermittent and only occur at the peak of the storm surge/tide. The wave pressure distribution should be considered to reduce linearly between 2.20m and 3.37m AHD, from 2.5 kPa to zero.

This vertical pressure distribution represents the conditions at the peak of a temporally varying distribution that changes with a period equal to the incident wave period (around 1.9 seconds, derived from linear wave theory). There is also potential for a very high impulsive breaking wave force to impact on the structure. Goda notes that this can occur when there is:

- 1 A broad rubble berm at a high elevation; or
- 2 The sea bottom is steep, and the incident wave is not.

Neither of these conditions are met, so impulsive breaking wave forces are not a concern in this instance.

3.2.2 Summary of Structural Design Actions

In summary, the following load conditions should be considered during a review of the structural adequacy of the raised structures:

- An even pressure of 2.5 kPa up to 2.20m AHD, with a linearly decreasing pressure above 2.20m, reducing from 2.5 kPa to 0kPa at 3.37m AHD. This pressure varies with time and the values presented above represent conditions as the peak of a wave slamming into the structure.

All forces should have factors applied in accordance with standard structural engineering practice. Some guidance on appropriate factors is also provided in AS4997 *Design of Maritime Structures*.

3.3 Other Design Considerations

Other structural loads, in accordance with normal structural design practice (winds, dead loads and pedestrian loads etc.) also need to be considered. Buoyancy forces should also be assessed with the structure considered empty and inundated to 2.29m AHD. The height of 2.29m is calculated from the design still water level of 1.90m AHD plus half the design wave height of 0.78m in accordance with AS4997.

The potential for fatigue to occur due to repeated but less severe loading, or deterioration of structural members, for example, through the actions of marine borers needs to be considered. As part of structural design, an appropriate program for structural inspection and expected maintenance requirements is to be provided. This is discussed further under Section 4.7. Consideration of the durability of members comprising the floor and lower walls of the boat sheds and associated walkways is required. These members should be designed to handle regular inundation at the end of the boat shed's design life. If electrical fixtures are to be provided at the boat shed, these should be kept above the adjusted Estuarine Planning Level of 2.46m AHD. Similarly, the floor of the shed should enable draining, and a gap of 6mm between decking planks, or similar if provided, is recommended to enable rapid draining, drying and ventilation after an inundation event. Structural member and connection design below the design inundation elevation should also consider the need for drying and ventilation. The grade of all surfaces should encourage water to drain back into Pittwater to avoid ponding of onshore area.

4 Risk Assessment and Management Strategy

4.1 Background

A risk assessment and management strategy for the works has been prepared using the guidance provided by the international risk management standard, ISO 31000. That standard suggests the following steps for risk assessment:

- Establish the risk management context.
- Identify the risks.
- Assess the likelihood and consequences of those risks.
- Evaluate the risks.

Management strategies can then be suggested for those risks which are unacceptable.

4.2 Establish the Context

The risks assessed by this strategy relate to elevated water levels and waves, insofar as they may impact on the following foreshore elements:

- Proposed boat shed; and
- Surrounding retaining wall.
- Tank walls.

The different risks that are of relevance in the context of Council deciding about a development application fall into the following three categories:

- 1 Structural.
- 2 Safety.
- 3 Environmental.

4.3 Identification of Risks

The three risk categories listed above were considered in turn. Risks that could possibly be of some concern (even minor) have been listed and numbered for further consideration.

4.3.1 Structural Risks

***Risk 1:** There is a risk that the foreshore structures will fail under elevated water level and/or wave conditions.*

***Risk 2:** There is a risk that the foreshore structures will deteriorate over time, making them more susceptible to failure under even moderate loads.*

4.3.2 Safety Risks

There are two types of safety risks broadly considered, those that arise during construction, and those that arise during use of the facilities. The proposed works are typical for foreshore structures of this type and abnormal construction risks are not expected. It is expected that the contractor completing the work will comply with standard safe building practice and Work Health and Safety legislation, giving due consideration to the hazards present in a marine environment. Construction safety risks are not considered further here.

Regarding safety risks during use of the facilities, the assessment requires consideration of the existing situation, and how modification of the facilities might impact on the exposure of individuals to dangerous wave and water level conditions.

Individuals may approach the facility from the water side or the land side. In terms of approaches from the water side, it is not expected that the modified facilities will change the current safety measures.

The following risks have been identified:

***Risk 3:** There is a risk that construction of the facilities will create a perception that the foreshore is safer during periods of elevated water levels and waves, increasing the exposure of people to being knocked down by waves and potentially drowned.*

***Risk 4:** There is a risk that electrical supply (wiring and outlets) provided to the Structure could be intermittently wetted by waves during an extreme storm at the end of the structures design life. Electrocution could occur.*

4.3.3 Environmental Risks

Facilities such as this can potentially interact with waves to have undesirable impacts on environmental processes. The proposed foreshore structures will not impact on water levels in Pittwater. The major component of this proposal is the boat shed, which will replace an existing shed of similar size and location, thus will not have significant impact on the wave reflection patterns or the movement of sediment along the shoreline.

The proposed works will not alter any environmental risks associated with coastal processes to a significant degree.

4.4 Method for Likelihood Assessment

The likelihoods of the identified risks have been assessed qualitatively using the descriptors provided in Table 4 (adapted from AS5334 (Australian Standards, 2013)).

Table 4 Likelihood Assessment Table.

Likelihood Rating	Descriptor
Almost Certain	Could occur several times per year
Likely	May arise about once per year
Possible	Maybe a couple of times in a generation
Unlikely	Maybe once in a generation
Very Unlikely	Maybe once in a lifetime

The assessment of likelihood for each of the identified risks is presented in Section 4.7.

4.5 Method for Consequences Assessment

The consequences of the identified risks have been assessed qualitatively using the descriptors provided in Table 5 (adapted from AS5334 (Australian Standards, 2013)).

Table 5 Consequences Assessment Table.

Consequence Rating	Structural Factors	Safety/Health Factors	Environmental Factors
Insignificant	No damage	No adverse effects	No adverse effects on natural environment
Minor	No permanent damage, minor restoration required	Slight adverse human health effects	Minimal effects on the natural environment
Moderate	Limited damage, recoverable by maintenance and minor repair	Adverse human health impacts	Some damage to the environment including local ecosystems

Consequence Rating	Structural Factors	Safety/Health Factors	Environmental Factors
Major	Extensive damage requiring major repair	Permanent physical injuries and fatalities to a single individual	Significant effect on the environment and local ecosystems. Remedial action required.
Catastrophic	Significant permanent damage or loss of structure	Injuries and/or fatalities involving multiple individuals	Very significant environmental loss with extensive remedial action required.

The assessment of consequences for the identified risks is presented in Section 4.7.

4.6 Method for Risk Evaluation

Using the likelihoods and consequences descriptors presented above, evaluation of the risks has been completed using Table 6 (adapted from AS5334 (Australian Standards, 2013)).

AS5334 regards that the following treatments are applicable:

- *Low* risks would typically be addressed through routine maintenance and day to day operations.
- *Moderate* risks would require a change to the design or maintenance regime of assets.
- *High* risks require detailed research and appropriate planning (or design).
- *Extreme* risks would require immediate action to mitigate.

The evaluation of each of the identified risks is presented in Section 4.7.

Table 6 Risk Rating Matrix

Likelihood	Consequences				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Low	Moderate	High	Extreme	Extreme
Likely	Low	Moderate	Moderate	High	Extreme
Possible	Low	Low	Moderate	High	Extreme
Unlikely	Low	Low	Moderate	Moderate	High
Very Unlikely	Low	Low	Low	Moderate	Moderate

4.7 Risk Management Discussion and Treatment

The following discusses risk assessment, evaluation, and proposed management strategies for each of the five risks in turn.

Risk 1: *There is a risk that the foreshore structures will fail under elevated water level and/or wave conditions.*

Overall, the force of waves during the design event and less severe events is destructive. These design events could be expected to occur once or twice in a generation (Possible) and, if the structure is under designed, extensive damage could be expected (Major). A “high” risk would be indicated for an under designed structure.

Risk Management Action 1

The recommended action here is to ensure that the structure is assessed by a qualified structural engineer, considering the loadings outlined in Section 3 of this report, and that other loads and suitable factors are applied in accordance with standard structural engineering practice. Allowance must be made for suitable drainage of this water back towards Pittwater.

This action would reduce the consequences to “Minor” in nature, resulting in a “Low” risk rating.

Risk 2: *There is a risk that the foreshore structures will deteriorate over time, making them more susceptible to failure under even moderate loads.*

It is likely that the structures will deteriorate with time. However, the nature of the failure that could be expected is only partial failure of a structure, which could be remediated through minor repairs and maintenance (replacement of failing members etc.). This results in a moderate risk rating, however, if the following two actions are adopted, the risk rating would be reduced to “Low”.

Risk Management Action 2

Again, ongoing degradation of the structure can be addressed by design. And Construction materials and connections should be suitable for exposure to harsh conditions, including occasional inundation and wave action. A storm generating waves of 0.35m could be expected at least once a year. If appropriate, the design should allow for a loss of structural integrity (serviceability and strength) over time.

Risk Management Action 3

A maintenance and inspection regime, appropriate for the construction materials adopted should be defined by the structural designer, so that any abnormal deterioration of the structure is identified before it becomes problematic. Furthermore, the structural design should consider the accessibility of structural members if it is expected that they could need to be replaced.

Risk 3: *There is a risk that construction of the facilities will create a perception that the foreshore is safe during periods of elevated water levels and waves, increasing the exposure of people to being knocked over by waves and potentially drowned.*

The design event is a rare occurrence. Furthermore, it would take the occurrence of abnormal circumstances, or a lapse of judgement, for individuals to approach the foreshore during the height of a storm. This may happen, but the number of individuals that could approach the foreshore from the landward side during a storm would be limited to the residents of 180 McCarrs Creek Road, and their visitors. Even if these people did approach the foreshore, the elevated and/or clear nature of landward approaches to the boat shed would normally mean that visibility is reasonable, except at night. Overall, it is considered that there is an extremely remote chance that problems would occur, but that the consequences could be “Major”. A “Moderate” risk rating is implied.

Risk Management Action 4

The probability of occurrence is remote, but the consequences could be major. It is recommended that a motion sensing light be installed to

illuminate the foreshore at night, so that dangerous water level and wave conditions can be more easily identified and avoided by persons approaching the foreshore from the land side. This light could also have the practical function of making the facility more usable at night. While this will not eliminate the potentially major consequences, it is considered that these actions are reasonably practicable and cost effective.

Risk 4: *There is a risk that electrical supply (wiring and outlets) provided to the Structure could be intermittently wetted by waves during an extreme storm at the end of the structures design life. Electrocution could occur.*

An extreme combination of actions at the end of a 25-year design life could foreseeably cause waves to rush up to 3.37m AHD against the walls of the structure. The risk of electrocution is remote (very unlikely), but the possibility of death is catastrophic, resulting in moderate risk. To reduce the risk level to an acceptably low level, the following are recommended:

Risk Management Action 5

All electrical fittings and conduits should be designed for occasional (but rare) inundation if they are located below 3.7m AHD. Alternatively, fittings and conduits could be suitably waterproofed. Any electrical fittings that cannot withstand wetting (e.g., from wave uprush and overtopping spray) should be elevated above 3.7m AHD.

5 Summary and Endorsement

The proposed boat shed and associated development at 180 McCarrs Creek Road can be structurally designed to withstand appropriate water and wave loadings without failure. Appropriate environmental loadings are presented in Section 3 of this report and summarised in Section 3.2.2. Other consideration which a structural designer should regard are presented in Section 3.3.

The current proposed boat shed floor level of 1.84m AHD is an acceptable level to mitigate against frequent inundation and resulting loss of serviceability. At this proposed floor level, inundation is only expected rarely and towards the end of the design life of the structure.

A risk assessment was undertaken and the outcomes of that assessment, including the actions that should be taken to mitigate against those risks, are summarised in Section 4.7. The residual risks arising from the development are minor and can be easily addressed during design and construction.

The proposed boat shed and associated structures can be appropriately built and managed without undue impacts or negative consequences to public safety or the environment. A formal endorsement of the findings of this report is provided in Appendix A.

As part of this assessment, we have also considered the condition of the existing foreshore seawall. The wall appears to generally be in a poor state of repair, future conditions may test its integrity as sea levels rise. In the future there may be a need for this seawall to be rebuilt and the crest level elevated, to combat sea level rise alongside filling of the lawn area proposed adjacent to the boat shed.

6 References

Australian Standards, 2013. AS 5334 Climate Change Adaptation for Settlements and Infrastructure.

Cardno, 2015. Pittwater Estuary Mapping of Sea Level Rise Impacts (Revised Draft Report No. LJ2882/R2658v7).

Goda, Y., 2010. Random Seas and Design of Maritime Structures, 3rd ed, Advanced Series on Ocean Engineering. World Scientific, Singapore.

Lawson & Treloar, 2004. Estuarine Planning Level Mapping Pittwater Estuary (No. J2230/R2075).

Lawson & Treloar, 2003. Pittwater Estuary Processes Study (No. J1942/R1945).

Standards Australia, 2005. AS4997-2005 Australian Standard Guidelines for the design of maritime structures.

Appendix A “Form 1” for Estuarine Risk Management Report Certification

FORM NO. 1

To be submitted with Estuarine Risk Management Report

Development Application for Yuey Then

Address of site 180 McCarrs Creek Rd, Church Point

Declaration made by a Coastal Engineer as part of an Estuarine Risk Management Report

I, David Wainwright, on behalf of Salients Pty Ltd

on this the 28th June, 2021

certify that I am a Coastal Engineer as defined by the Estuarine Risk Management Policy for Development in Pittwater and I am authorised by the above organisation/company to issue this document and to certify that the organisation/company has a current professional indemnity policy of at least \$2 million.

Please mark appropriate box

- ☒ I have prepared the detailed Estuarine Risk Management Report referenced below in accordance with the Estuarine Risk Management Policy for Development in Pittwater
- ☐ I am willing to technically verify that the detailed Estuarine Risk Management Report referenced below has been prepared in accordance with the Estuarine Risk Management Policy for Development in Pittwater
- ☐ I have examined the site and the proposed development/alteration in detail and, as detailed in my report, am of the opinion that the Development Application only involves Minor Development/Alterations or is sited such that a detailed Estuarine Risk Management Report is not required.

Estuarine Risk Management Report Details:

Report Title: Estuarine Risk Management Report for 180 McCarrs Creek Road, Church Point, NSW 2105

Report Date: 28th June, 2021

Author: Dr David Wainwright

Documentation which relate to or are relied upon in report preparation:

Australian Standards, 2013. AS 5334 Climate Change Adaptation for Settlements and Infrastructure.
Cardno, 2015. Pittwater Estuary Mapping of Sea Level Rise Impacts (Revised Draft Report No. LJ2882/R2658v7).
Goda, Y., 2010. Random Seas and Design of Maritime Structures, 3rd ed, Advanced Series on Ocean Engineering. World Scientific, Singapore.
Lawson & Treloar, 2004. Estuarine Planning Level Mapping Pittwater Estuary (No. J2230/R2075).
Lawson & Treloar, 2003. Pittwater Estuary Processes Study (No. J1942/R1945).
Action Plans, 2021. Plans "180 McCarrs Creek Road, Church Point NSW 2105". Prepared for Anthea and Yuey Then.
Standards Australia, 2005. AS4997-2005 Australian Standard Guidelines for the design of maritime structures.

I am aware that the above Estuarine Risk Management Report, prepared for the above mentioned site is to be submitted in support of a Development Application for this site and will be relied on by Northern Beaches Council as the basis for ensuring that the estuarine risk management aspects of the proposed development have been adequately addressed to achieve an acceptable risk management level for the life of the structure, taken as at least 100 years unless otherwise stated and justified in the Report and that all reasonable and practical measures have been identified to remove foreseeable risk.

Signature:



Name: Dr David Wainwright

Chartered Professional Status: MIEAust, CPEng, NER (Civil and Environmental Colleges), APEC Engineer, IntPE(Aus)

Membership No. 884280

Appendix B Design Plans, Action Plans, 15 April 2021



ACTION PLANS

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DEVELOPMENT APPLICATION

This is a **summary** of the **minimum** specifications in 'Planning for Bushfire Protection 2006' as amended in 2010 and 'AS 3959 2009 – Construction of buildings in bushfire-prone areas' which are recommended in this report. It is included as a courtesy, is a guide only, and may not be complete. In addition, the contents of the documents from which this information was extracted may have changed between the dates of preparation of this report, and its use or application. Specifications in other documents such as the Building Code of Australia (BCA) may apply. It is the user's responsibility to comply with all statutory conditions as well as those specified by the approving authority with particular reference to this report. The appropriate source documents should be consulted to determine the full specifications abbreviated in this table.

		BAL-12.5	BAL-19	BAL-29	BAL-40				
Floor	Slab OK	FRT or lined or enclosed			Non-combustible or FRT or enclosed				
	Timber <400mm ag								
	Timber >400mm ag	OK							
Floor posts		FRT or enclosed			Enclosed or non-combustible				
External walls		400mm FRT or non-combustible		FRT or non-combustible	Non-combustible				
Windows	Frame	FRT or metal			Metal				
	Screens	Al, Fe or Br mesh on all openable		Fe or Br mesh on all openable, 5mm toughened glass, or shutters	Fe or Br mesh on all, 6mm toughened glass, or shutters				
External doors	Sliding	Safety glass	5mm toughened glass	6mm toughened glass or full mesh	6mm toughened glass plus full mesh or shutter				
	Screens	Al, Fe or Br, if fitted			Fe or Br				
	Timber frames	FRT			Metal only				
	Garage	Lower 400mm FRT or non-combustible		FRT or non-combustible	Non-combustible				
Vents etc	Mesh	Al, Fe or Br mesh 2mm			Fe or Br mesh 2mm				
Roofs	Tiled	Fully sarked (Flammability Index <5)							
	Sheeted Non	-combustible, fully sarked (Flammability Index <5)							
	Rooflights	Non-combustible sleeve/lining, 4mm safety glass			FRL -/30/-				
Verandahs, decks etc	Enclosed	Any supports, <3mm spaced deck, FRT or non-combustible			Any supports, unspaced deck, non-combustible				
	Unenclosed	FRT or non-combustible, <3mm spaced deck			All non-combustible, unspaced deck				
	<300mm to glass	300mm wide FRT or non-combustible		FRT or non-combustible	Non-combustible				
Services		Exposed water & gas pipes to metal							
Ag	Above ground	FRT	Fire Resistant Timber	Al	Aluminium	Fe	Stainless steel	Br	Bronze

SHEET NUMBER	SHEET NAME	DATE PUBLISHED
DA00	COVER	16/04/2021
DA01	SITE ANALYSIS	16/04/2021
DA02	SITE / ROOF / SEDIMENT EROSION / WASTE MANAGEMENT / STORMWATER CONCEPT PLAN	16/04/2021
DA03	EXISTING LOWER LEVEL PLAN	16/04/2021
DA04	EXISTING LOWER GROUND FLOOR PLAN	16/04/2021
DA05	EXISTING GROUND FLOOR PLAN	16/04/2021
DA06	EXISTING FIRST FLOOR PLAN	16/04/2021
DA07	PROPOSED LOWER LEVEL PLAN	16/04/2021
DA08	PROPOSED LOWER GROUND FLOOR PLAN	16/04/2021
DA09	PROPOSED GROUND FLOOR PLAN	16/04/2021
DA10	PROPOSED FIRST FLOOR PLAN	16/04/2021
DA11	NORTH ELEVATION	16/04/2021
DA12	EAST ELEVATION	16/04/2021
DA13	SOUTH ELEVATION	16/04/2021
DA14	WEST ELEVATION	16/04/2021
DA15	CROSS SECTION	16/04/2021
DA16	LONG SECTION	16/04/2021
DA17	EXISTING BOAT SHED PLAN	16/04/2021
DA18	PROPOSED BOAT SHED PLAN	16/04/2021
DA19	BOAT SHED NORTH / EAST ELEVATION	16/04/2021
DA20	BOAT SHED SOUTH ELEVATIONS	16/04/2021
DA21	BOAST SHED WEST ELEVATION	16/04/2021
DA22	BOAT SHED LONG / CROSS SECTION	16/04/2021
DA23	INCLINATOR SECTION	16/04/2021
DA24	AREA CALCULATIONS	16/04/2021
DA25	SAMPLE BOARD	16/04/2021
DA26	WINTER SOLSTICE 9 AM	16/04/2021
DA27	WINTER SOLSTICE 12 PM	16/04/2021
DA28	WINTER SOLSTICE 3 PM	16/04/2021
DA29	BASIX COMMITMENTS	16/04/2021

NCC & AS COMPLIANCES SPECIFICATIONS

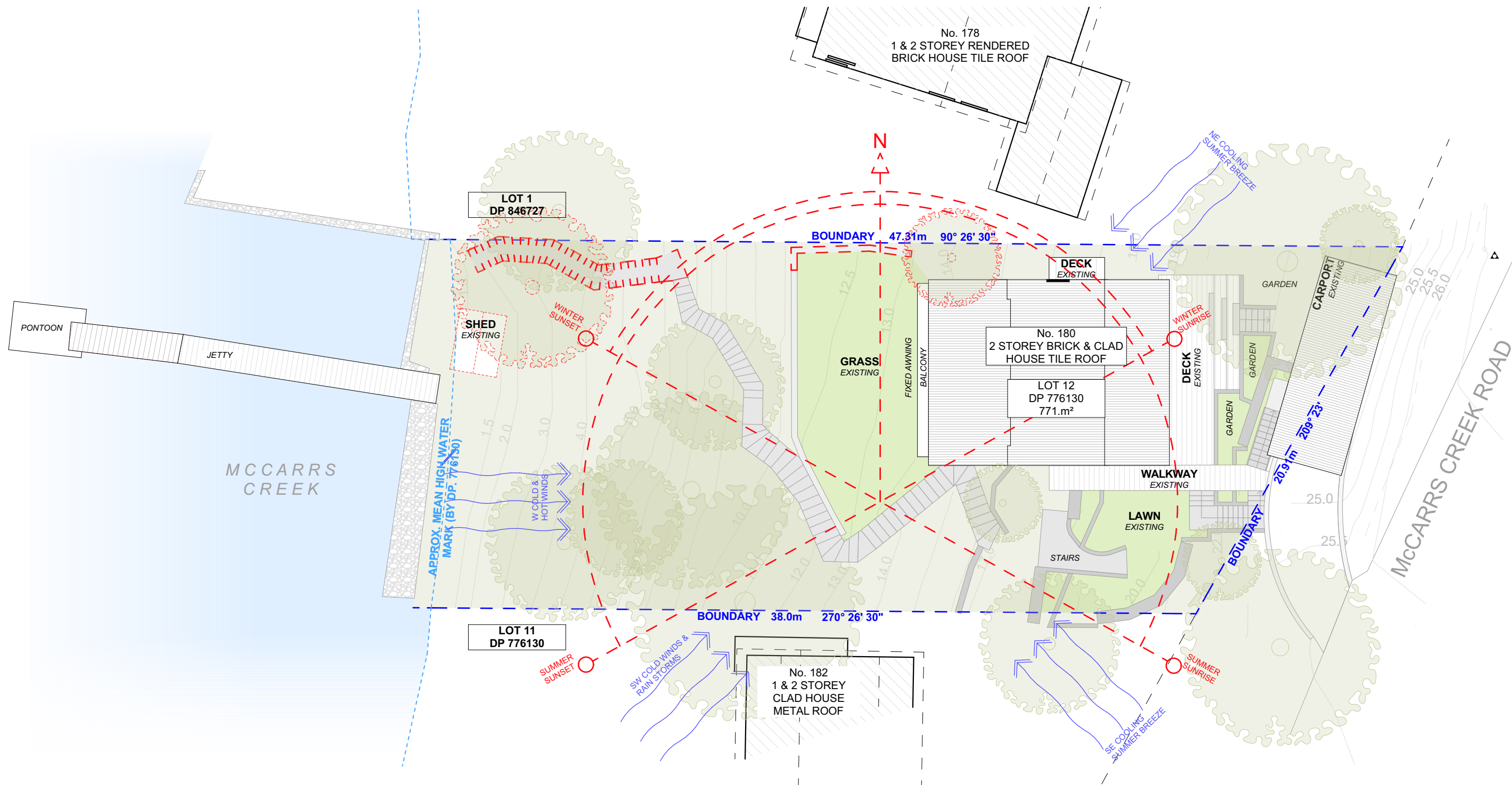
- EARTHWORKS - PART 3.1.1 OF NCC
- EARTH RETAINING STRUCTURES - PART 3.1.2 OF NCC
- DRAINAGE - PART 3.1.3 OF NCC
- TERMITE-RISK MANAGEMENT - PART 3.1.4 OF NCC
- FOOTINGS & SLAB - PART 3.2 OF NCC INCLUDING AS 2870-2011
- MASONRY - PART 3.3 OF NCC INCLUDING AS 3700:2018
- FRAMING - PART 3.4 OF NCC
- SUB FLOOR VENTILATION - PART 3.4.1 OF NCC
- ROOF CLADDING AND WALL-CLADDING - PART 3.5 OF NCC
- GLAZING - PART 3.6 OF NCC INCLUDING AS 1288
- FIRE SAFETY - PART 3.7 OF NCC
- FIRE SEPARATION OF EXTERNAL WALLS - PART 3.7.2 OF NCC
- FIRE PROTECTION OF SEPARATING WALLS AND FLOORS- PART 3.7.3 OF NCC
- SMOKE ALARMS - PART 3.7.5 OF NCC
- WET AREAS AND EXTERNAL WATERPROOFING - PART 3.8.1 OF NCC
- ROOM HEIGHTS - PART 3.8.2 OF NCC
- FACILITIES - PART 3.8.3 OF NCC
- LIGHT - PART 3.8.4 OF NCC
- VENTILATION - PART 3.8.5 OF NCC

180 McCARRS CREEK ROAD, CHURCH POINT NSW 2105



ITEM DETAILS	DEVELOPMENT APPLICATION			
ADDRESS	180 McCARRS CREEK ROAD, CHURCH POINT, NSW, 2105			
LOT & DP/SP	LOT 12 DP 776130			
COUNCIL	NORTHERN BEACHS COUNCIL (PITTWATER)			
SITE AREA	771.00m²			
FRONTAGE	20.91m			
CONTROLS	PERMISSIBLE / REQUIRED	EXISTING	PROPOSED	COMPLIANCE
	m / m² / %	m / m² / %	m / m² / %	
LEP				
LAND ZONING	E4 – ENVIRONMENTAL LIVING	E4	E4	YES
MINIMUM LOT SIZE	700m²	771.00m²	UNCHANGED	YES
FLOOR SPACE RATIO	NOT IDENTIFIED	N/A	N/A	N/A
MAXIMUM BUILDING HEIGHT	8.5m	8.689m	UNCHANGED	NO
HAZARDS				
ACID SULFATE SOILS	CLASS 5			
BIODIVERSITY	IDENTIFIED			
BUSHFIRE PRONE LAND	VEGETATION BUFFER			
GEOTECHNICAL HAZARD H1/H2	H1			
LAND BELOW FORESHORE BUILDING LINE	IDENTIFIED			
DCP				
SIDE BOUNDARY ENVELOPE	3.5m	N/A	N/A	NO
SIDE BOUNDARY SETBACKS	N: 1m S: 2.5m	N: 1.720m S: 7.292m	N: UNCHANGED S: 5.894m	YES
FRONT BOUNDARY SETBACK	10m	5.275m	UNCHANGED	YES
REAR BOUNDARY SETBACK	FORESHORE BUILDING LINE	N/A	N/A	YES
LANDSCAPE OPEN SPACE	60% (462.6m²)	69.7% (538.01m²)	61.9% (477.97m²)	YES
PRIVATE OPEN SPACE	80m²	82.01m²	83.14m²	YES

- SOUND INSULATION - PART 3.8.6 OF NCC
- STAIRWAYAND RAMP CONSTRUCTION - PART 3.9.1 OF NCC
- BARRIERS AND HANDRAILS - PART 3.9.2 OF NCC
- SWIMMING POOLS - PART 3.10.1 OF NCC
- CONSTRUCTION IN BUSHFIRE PRONE AREAS - PART 3.10.5 OF NCC
- FENCING & OTHER PROVISIONS - REGS & AS1926.1 2012
- DEMOLITION WORKS - AS2601-2001 THE DEMOLITION OF STRUCTURES.
- WATERPROOFING OF WET AREAS TO COMPLY WITH AS 3740-2010
- ALL PLUMBING & DRAINAGE WORK TO COMPLY WITH AS 3500:2018
- ALL PLASTERBOARD WORK TO COMPLY WITH AS 2588:2018
- ALL STRUCTURAL STEEL WORK TO COMPLY WITH AS 4100-1992 & AS 1554
- ALL CONCRETE WORK TO COMPLY WITH AS 3600:2018
- ALL ROOF SHEETING WORK TO COMPLY WITH AS 1562.1-2018
- ALL SKYLIGHTS TO COMPLY WITH AS 4285-2019
- ALL CERAMIC TILING TO COMPLY WITH AS 3958.1-2007 & 3958.2-1992
- ALL GLAZING ASSEMBLIES TO COMPLY WITH AS 2047-2014 & 1288
- ALL TIMBER RETAINING WALLS ARE TO COMPLY WITH AS 1720.1-2010, AS 1720.2-2006, AS 1720.4-2006, AS 1170.1-2002 & AS 1170.4-2007
- ALL RETAINING WALLS ARE TO COMPLY WITH 3700:2018 & AS 3600:2018
- ALL CONSTRUCTION TO COMPLY WITH AS 3959:2018



1

SITE ANALYSIS

1:200

NOTE: ALL DEMOLISHED ELEMENTS TO ENG. SPECIFICATIONS AND AS. 2601 - 2001





ACTION PLANS

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REV.	DATE	COMMENTS	DRWN	NOTES
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B	13/10/2020	FIRST DESIGN AMENDMENT	AL	
C	15/04/2021	DA DOCUMENTATION	JW	

LEGEND

EXISTING

PROPOSED

DEMOLISHED

CLIENT

Anthea & Yuey Then

PROJECT ADDRESS

180 Mccarrs Creek Road,
Church Point NSW 2105

DRAWING NO.

DA01

DATE

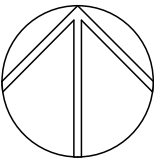
Friday, 16 April 2021

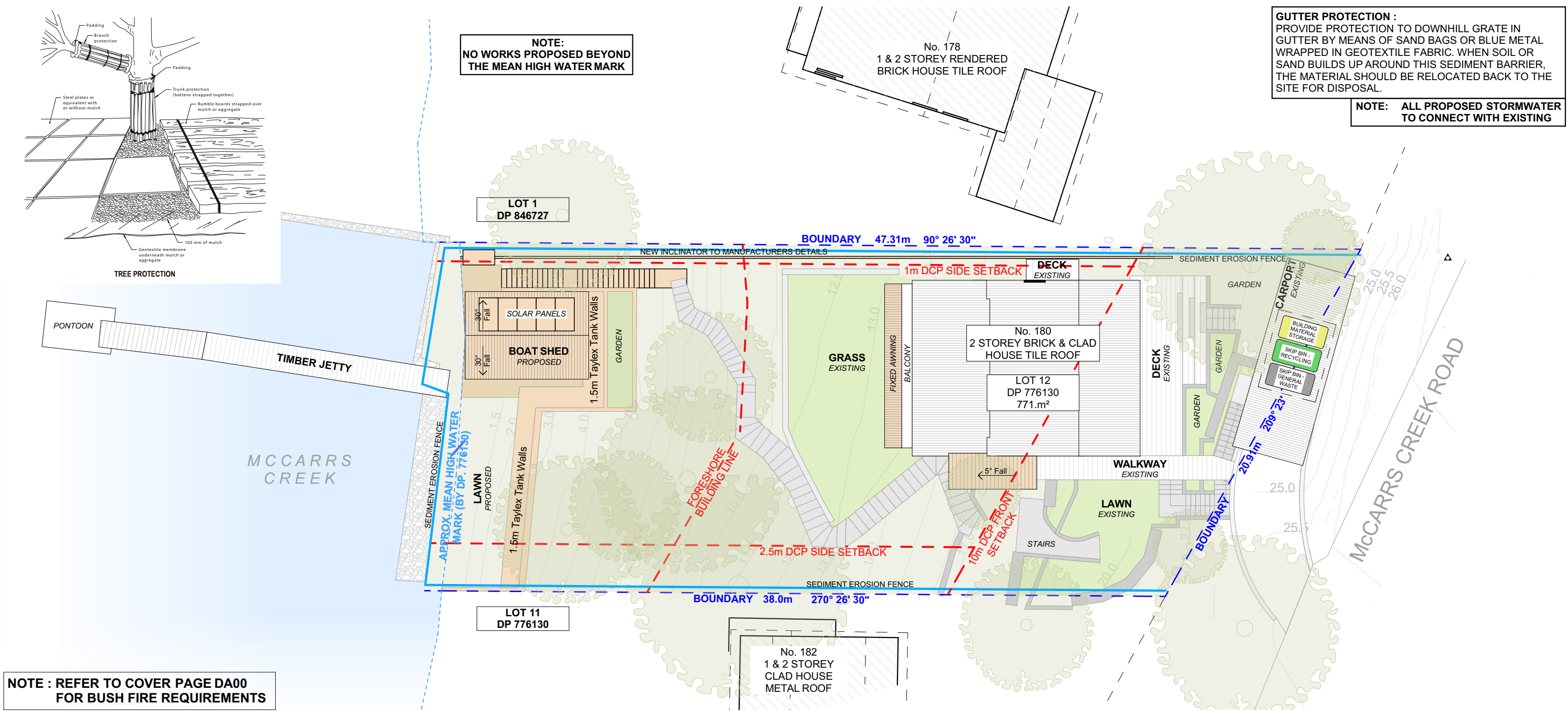
DRAWING NAME

SITE ANALYSIS

SCALE

1:200 @A3





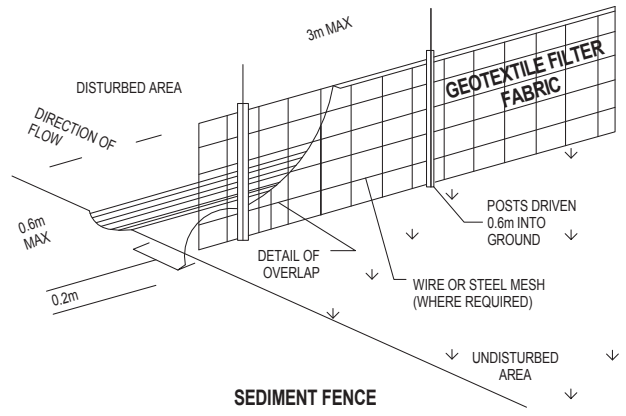
1 SITE / ROOF / SEDIMENT EROSION / WASTE MANAGEMENT / STORMWATER CONCEPT PLAN 1:200

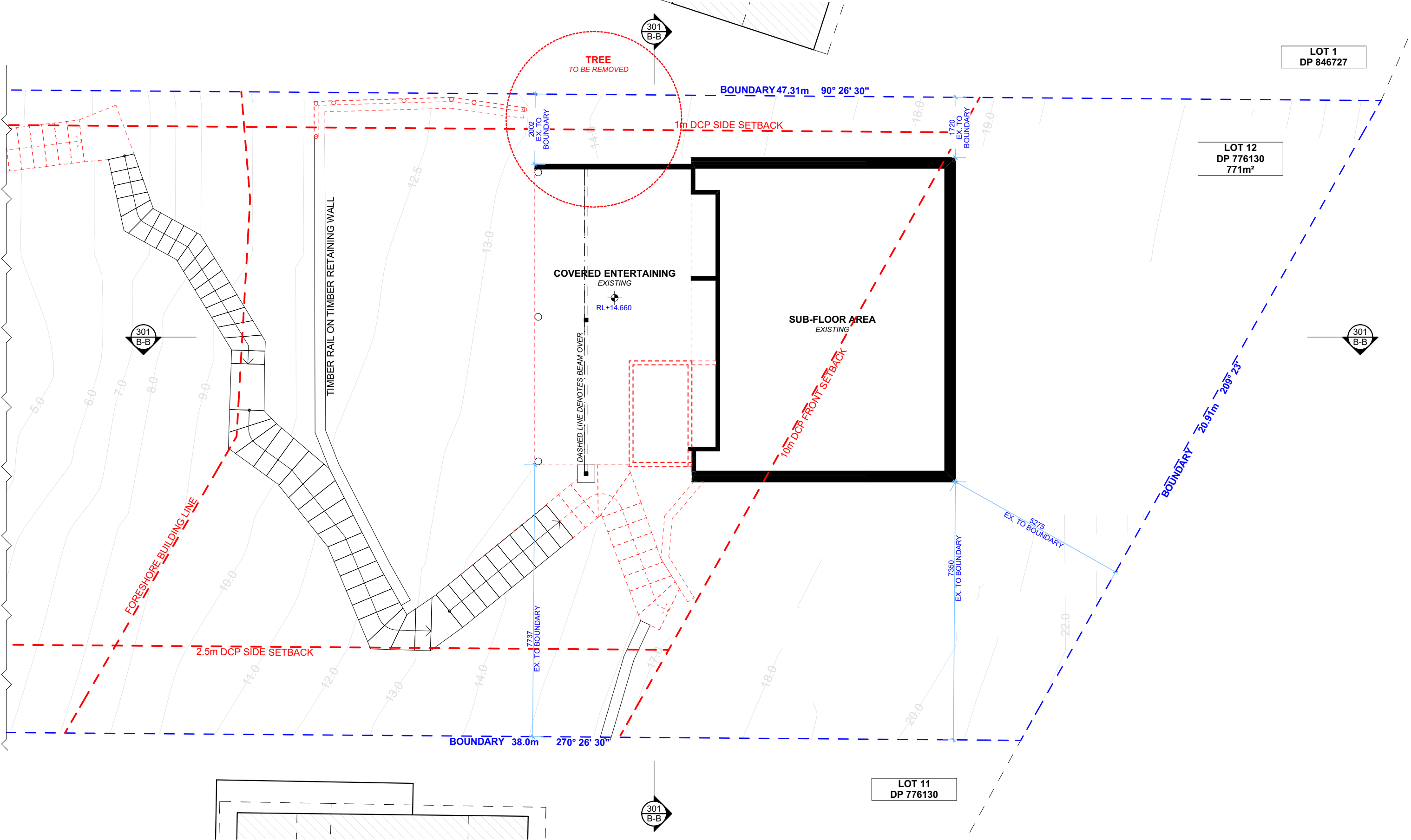
STOCKPILES :
ALL STOCKPILES ARE TO BE KEPT ON-SITE WHERE POSSIBLE. ANY MATERIALS PLACED ON THE FOOTPATHS OR NATURE STRIPS REQUIRE COUNCIL'S PERMISSION.
ALL STOCKPILES ARE TO BE PLACED AWAY FROM THE DRAINAGE LINES AND STREET GUTTERS. IT IS BEST TO LOCATE THESE ON THE HIGHEST PART OF THE SITE IF POSSIBLE. PLACE WATERPROOF COVERING OVER STOCKPILES.
IF REQUIRED PROVIDE DIVERSION DRAIN & BANK AROUND STOCKPILES.

SEDIMENT NOTE :
1. ALL EROSION AND SEDIMENT CONTROL MEASURES TO BE INSPECTED AND MAINTAINED DAILY BY THE SITE MANAGER.
2. MINIMISE DISTURBED AREAS, REMOVE EXCESS SOIL FROM EXCAVATED AREA AS SOON AS POSSIBLE.
3. ALL MATERIAL STOCKPILE TO BE CLEAR FROM DRAINS, GUTTERS AND FOOTPATHS, OR WITHIN SEDIMENT FENCE AREA.
4. DRAINAGE TO BE CONNECTED TO STORMWATER AS SOON AS POSSIBLE. IF STORED ON SITE, IT MUST BE FILTERED BEFORE RELEASING INTO STORMWATER SYSTEM OR WATERWAYS.
5. ROADS AND FOOTPATHS TO BE SWEEPED DAILY.

DUST CONTROL :
TO REDUCE DUST GENERATED BY WIND ACTION, THE REMOVAL OF THE TOP SOIL IS TO BE MINIMISED. TO PREVENT DUST GENERATION, WATERING DOWN OF THE SITE, ESPECIALLY DURING THE MOVEMENT OF MACHINERY IS REQUIRED. WHERE EXCAVATING INTO ROCK, KEEP THE SURFACE MOIST TO MINIMISE DUST. CONSTRUCT A GRAVEL ENTRY/EXIT POINT USING BLUE METAL AND RESTRICT ALL VEHICLE MOVEMENTS WITHIN THE SITE TO A MINIMUM. ENSURE WIND BREAKS, SUCH AS EXISTING FENCES ARE MAINTAINED DURING THE CONSTRUCTION PHASE UNTIL NEW LANDSCAPING IS PROVIDED OR REINSTATED. PREVENT DUST BY COVERING STOCKPILES

NOTES REGARDING BOUNDARY
THE INFORMATION SHOWN ON THIS PLAN IS FOR DESIGN PURPOSES ONLY. THE POSITION OF BOUNDARY LINES HAVE BEEN ESTABLISHED BY A SURVEY TO MEET THE IDENTIFICATION REQUIREMENTS FOR COUNCIL AND NOT FOR REGISTRATION WITH THE LAND REGISTRATION SERVICES NSW NOR MAY THIS PLAN BE USED FOR ANY OTHER PURPOSE. SUBSEQUENT REGISTERED OR OTHER SURVEYS MAY AFFECT THE DEFINED BOUNDARY POSITIONS IN THIS AREA. ANY DIFFERENCES OF THIS NATURE ARE BEYOND THE PURPOSES OF THIS PLAN. THIS PLAN IS FOR THE ABOVE STATED PURPOSES ONLY. RESTRICTIONS ON THE TITLE HAVE NOT BEEN INVESTIGATED. IF FURTHER DEVELOPMENT IS CONTEMPLATED OR CONSTRUCTION INTENDED THEN IT IS IMPORTANT THAT A SURVEY SET OUT IS CARRIED OUT.





1 EXISTING LOWER LEVEL PLAN 1:100

NOTE: ALL DEMOLISHED ELEMENTS TO ENG. SPECIFICATIONS AND AS. 2601 - 2001



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REV.	DATE	COMMENTS	DRWN
A	01/10/2020	INITIAL DESIGN PLAN	AL
B	13/10/2020	FIRST DESIGN AMENDMENT	AL
C	15/04/2021	DA DOCUMENTATION	JW

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All errors and omissions are to be verified by the Builder/Contractor and referred to the designer prior to the commencement of works.

LEGEND
■ EXISTING
■ PROPOSED
- - - DEMOLISHED

CLIENT
Anthea & Yuey Then

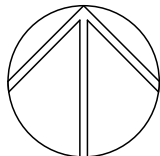
PROJECT ADDRESS
180 Mccarrs Creek Road,
Church Point NSW 2105

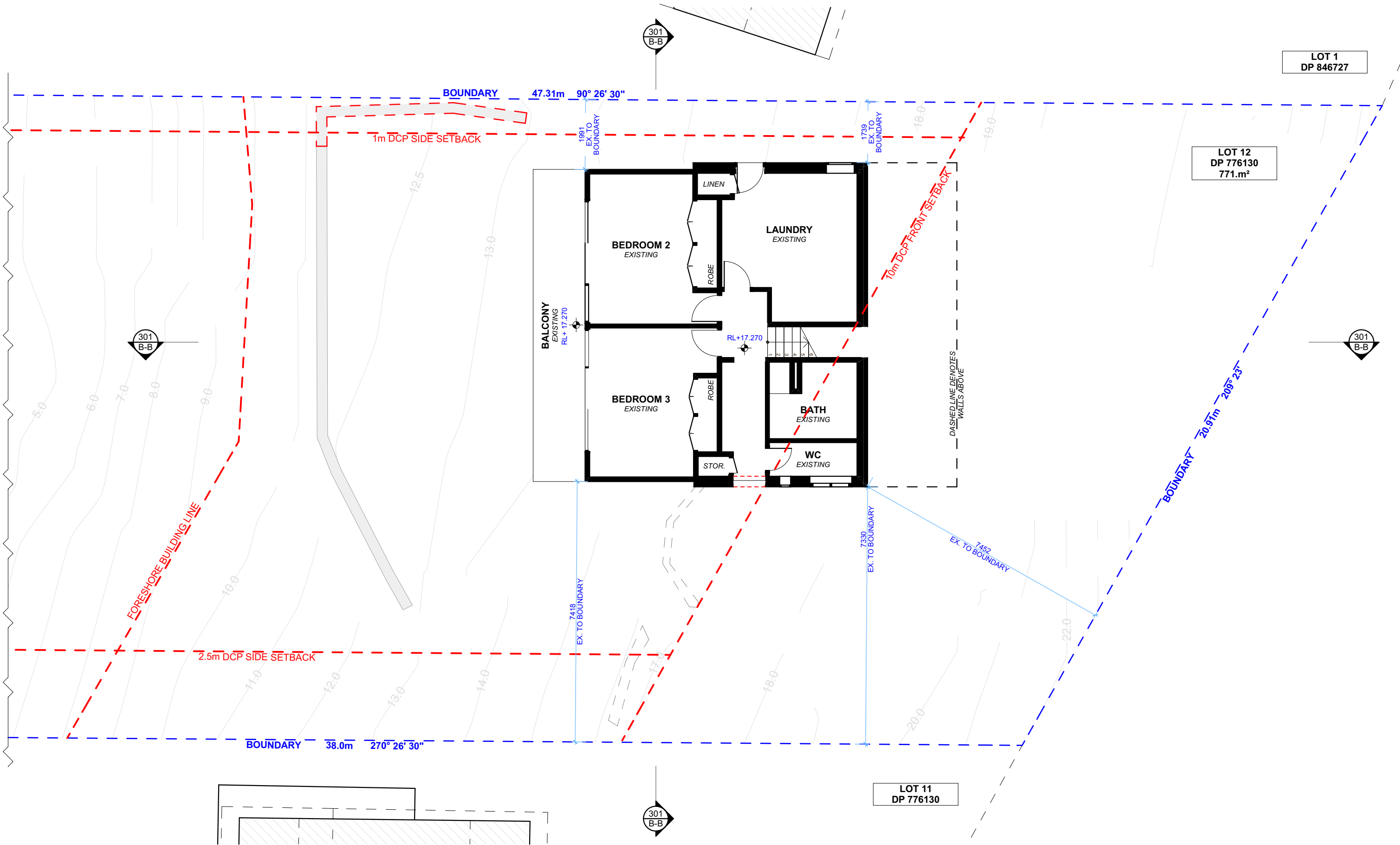
DRAWING NO.
DA03

DATE
Friday, 16 April 2021

DRAWING NAME
EXISTING LOWER LEVEL PLAN

SCALE
1:100 @A3





1 **EXISTING LOWER GROUND FLOOR PLAN 1:100**

NOTE: ALL DEMOLISHED ELEMENTS TO ENG. SPECIFICATIONS AND AS. 2601 - 2001



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C	15/04/2021	DA DOCUMENTATION	JW

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LEGEND

EXISTING

PROPOSED

DEMOLISHED

CLIENT
Anthea & Yuey Then

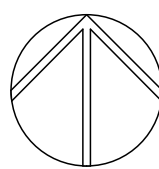
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180 Mccarrs Creek Road,
Church Point NSW 2105

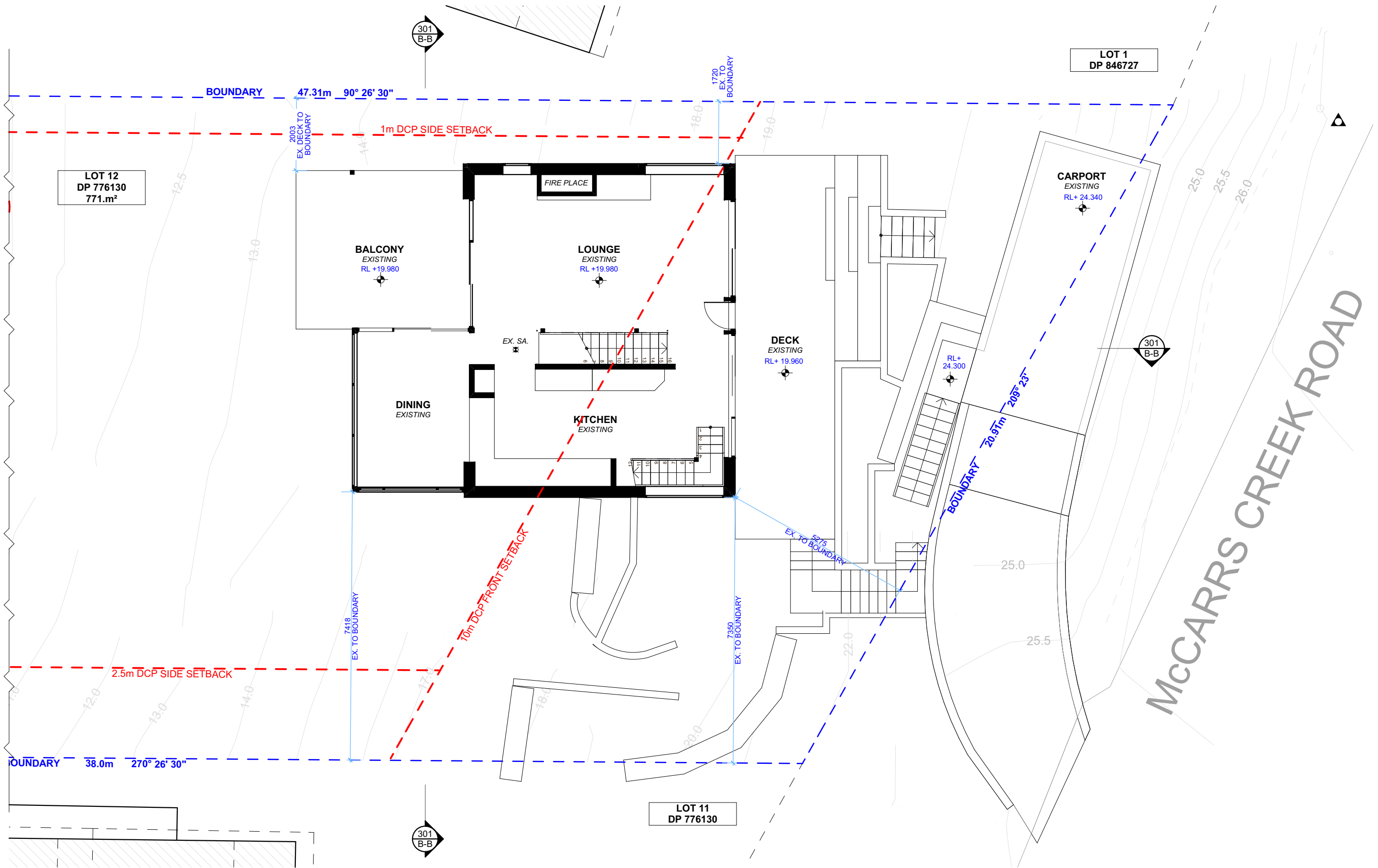
DRAWING NO.
DA04

DATE
Friday, 16 April 2021

DRAWING NAME
EXISTING LOWER GROUND FLOOR PLAN

SCALE
1:100 @A3





1 EXISTING GROUND FLOOR PLAN 1:100

NOTE: ALL DEMOLISHED ELEMENTS TO ENG. SPECIFICATIONS AND AS. 2601 - 2001



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LEGEND

EXISTING
PROPOSED
DEMOLISHED

CLIENT

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PROJECT ADDRESS

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DRAWING NO.

DA05

DATE

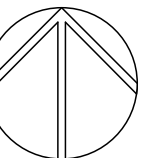
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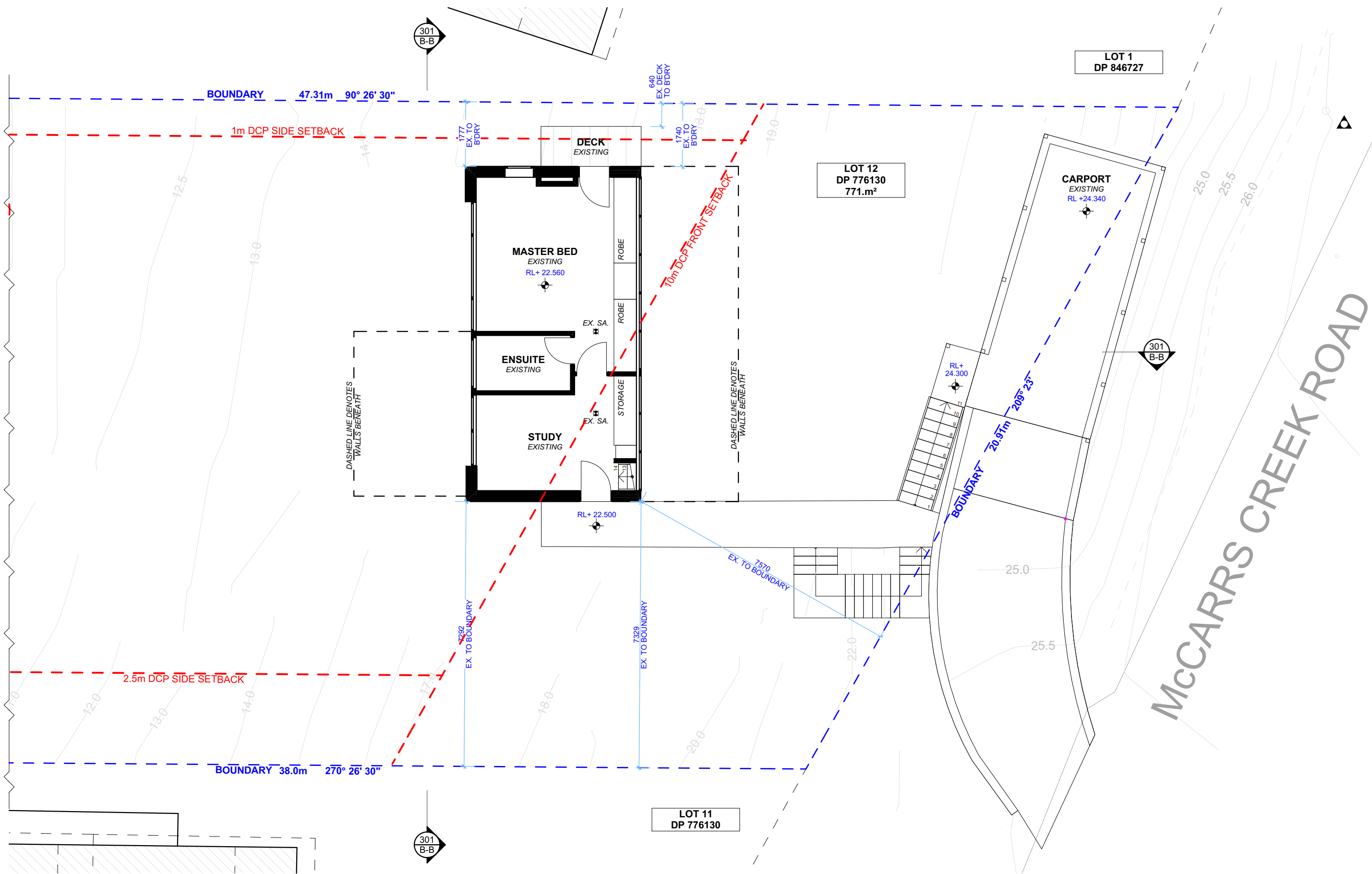
DRAWING NAME

EXISTING GROUND FLOOR PLAN

SCALE

1:100 @A3





1 EXISTING FIRST FLOOR PLAN 1:100

NOTE: ALL DEMOLISHED ELEMENTS TO ENG. SPECIFICATIONS AND AS. 2601 - 2001



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B	13/10/2020	FIRST DESIGN AMENDMENT	AL	
C	15/04/2021	DA DOCUMENTATION	JW	

LEGEND

- EXISTING
- PROPOSED
- DEMOLISHED

CLIENT
Anthea & Yuey Then

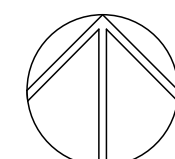
PROJECT ADDRESS
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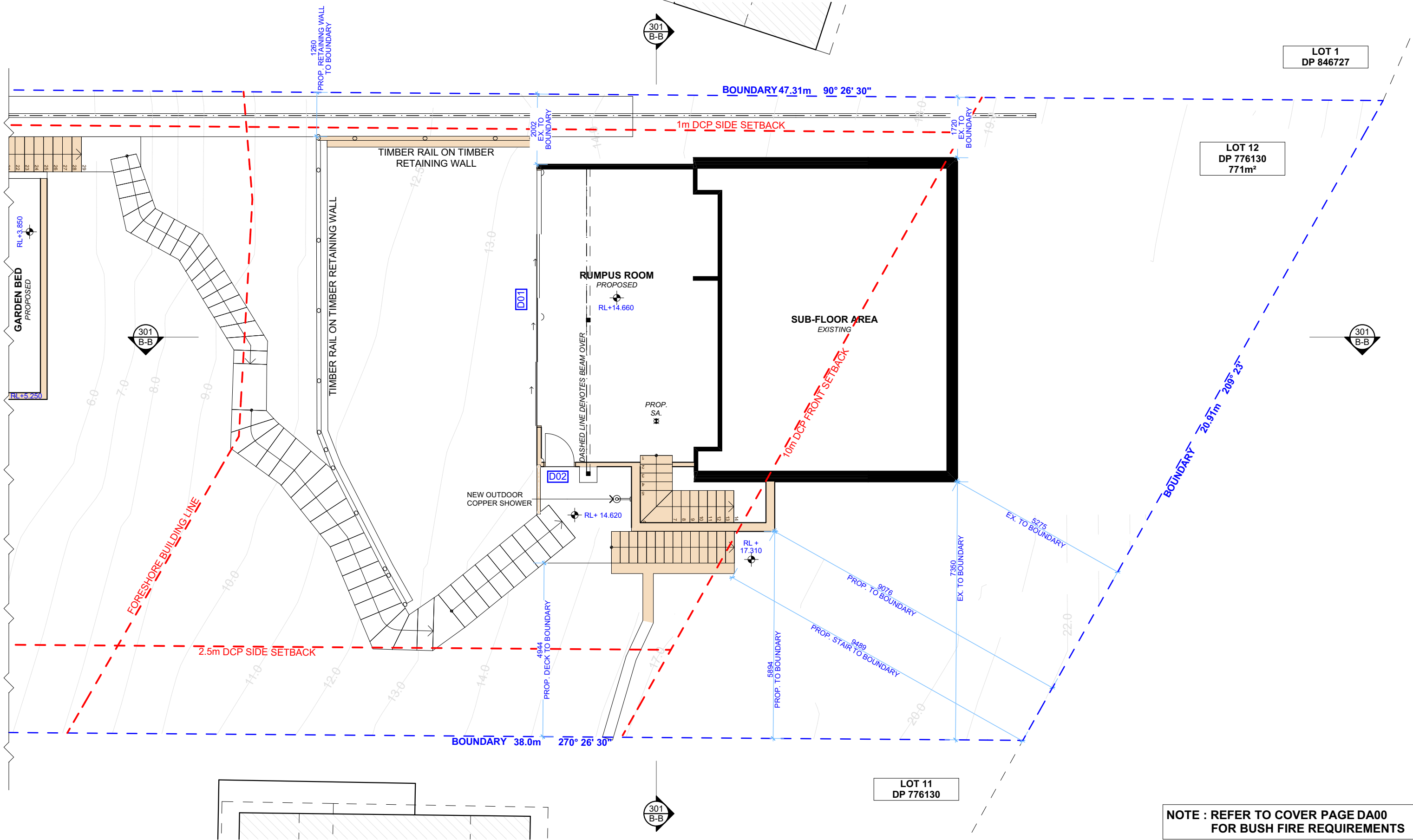
DRAWING NO.
DA06

DATE
Friday, 16 April 2021

DRAWING NAME
EXISTING FIRST FLOOR PLAN

SCALE
1:100 @A3





1 PROPOSED LOWER LEVEL PLAN 1:100

NOTE : REFER TO COVER PAGE DA00 FOR BUSH FIRE REQUIREMENTS



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LEGEND
EXISTING
PROPOSED
DEMOLISHED

CLIENT
Anthea & Yuey Then

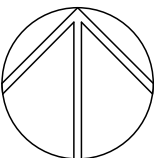
PROJECT ADDRESS
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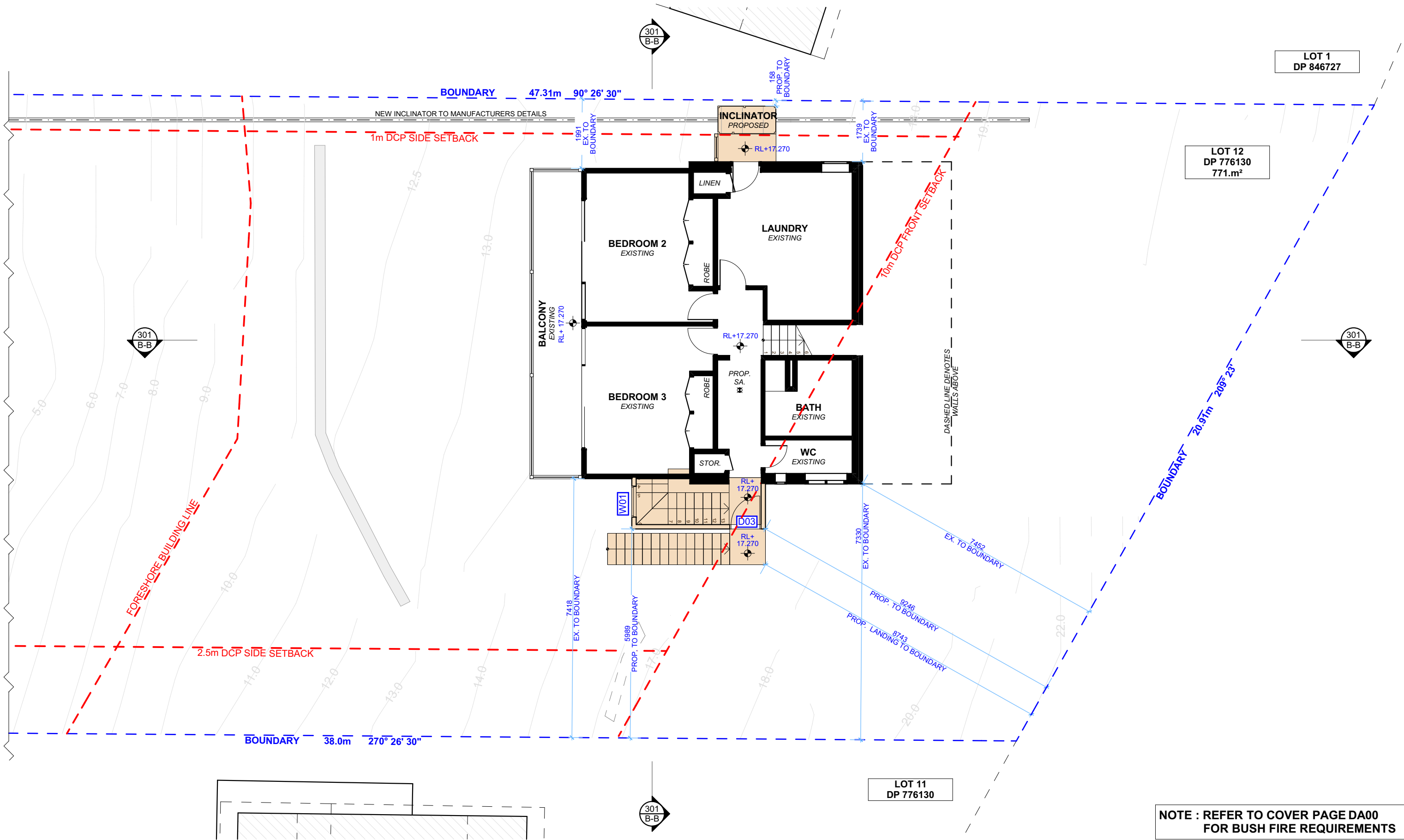
DRAWING NO.
DA07

DATE
Friday, 16 April 2021

DRAWING NAME
PROPOSED LOWER LEVEL PLAN

SCALE
1:100 @A3





1 PROPOSED LOWER GROUND FLOOR PLAN 1:100



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LEGEND
EXISTING
PROPOSED
DEMOLISHED

CLIENT
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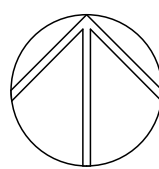
PROJECT ADDRESS
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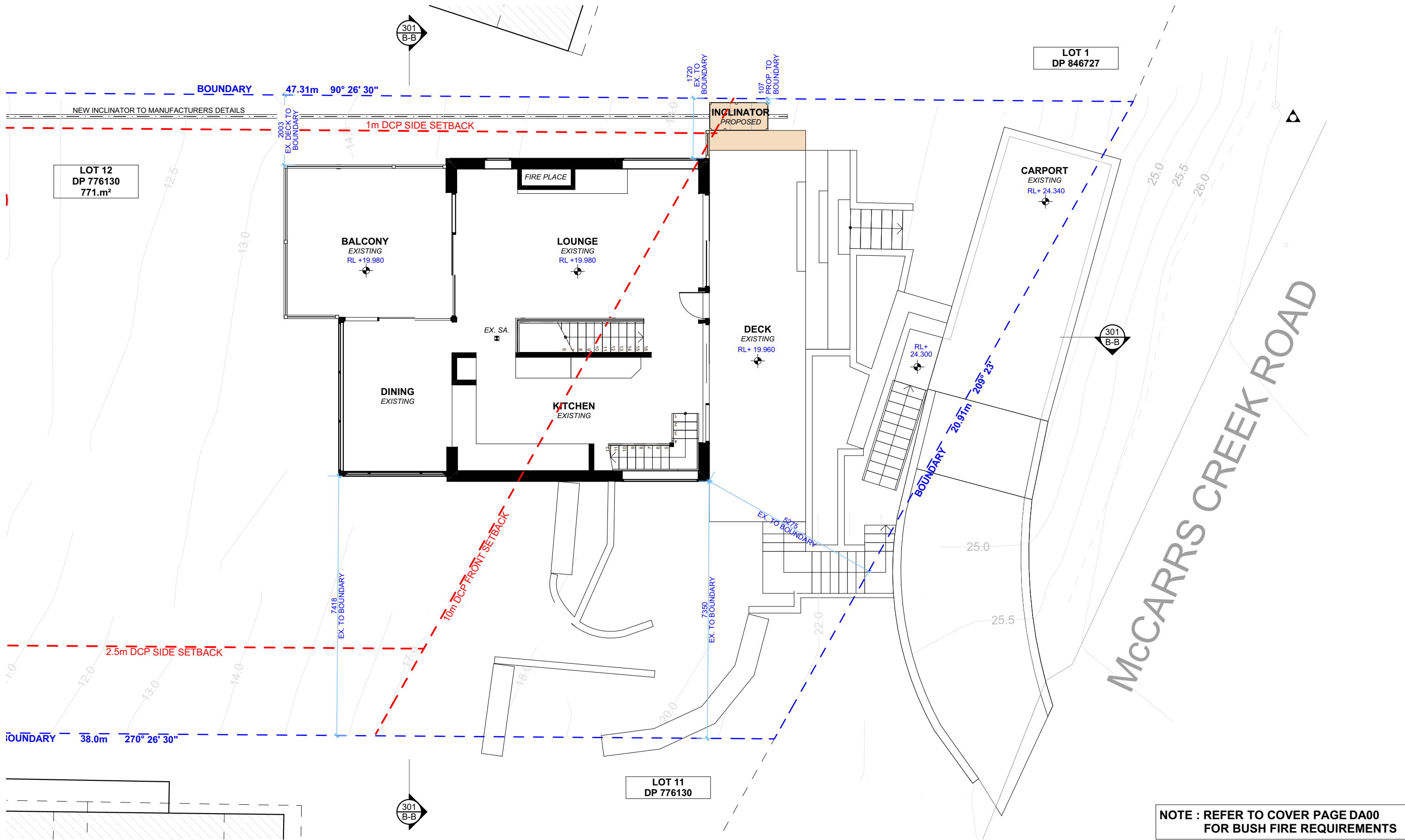
DRAWING NO.
DA08

DATE
Friday, 16 April 2021

DRAWING NAME
PROPOSED LOWER GROUND
FLOOR PLAN

SCALE
1:100 @A3





1 PROPOSED GROUND FLOOR PLAN 1:100



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LEGEND
■ EXISTING
■ PROPOSED
- - - DEMOLISHED

CLIENT
Anthea & Yuey Then

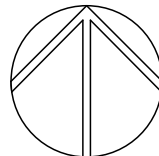
PROJECT ADDRESS
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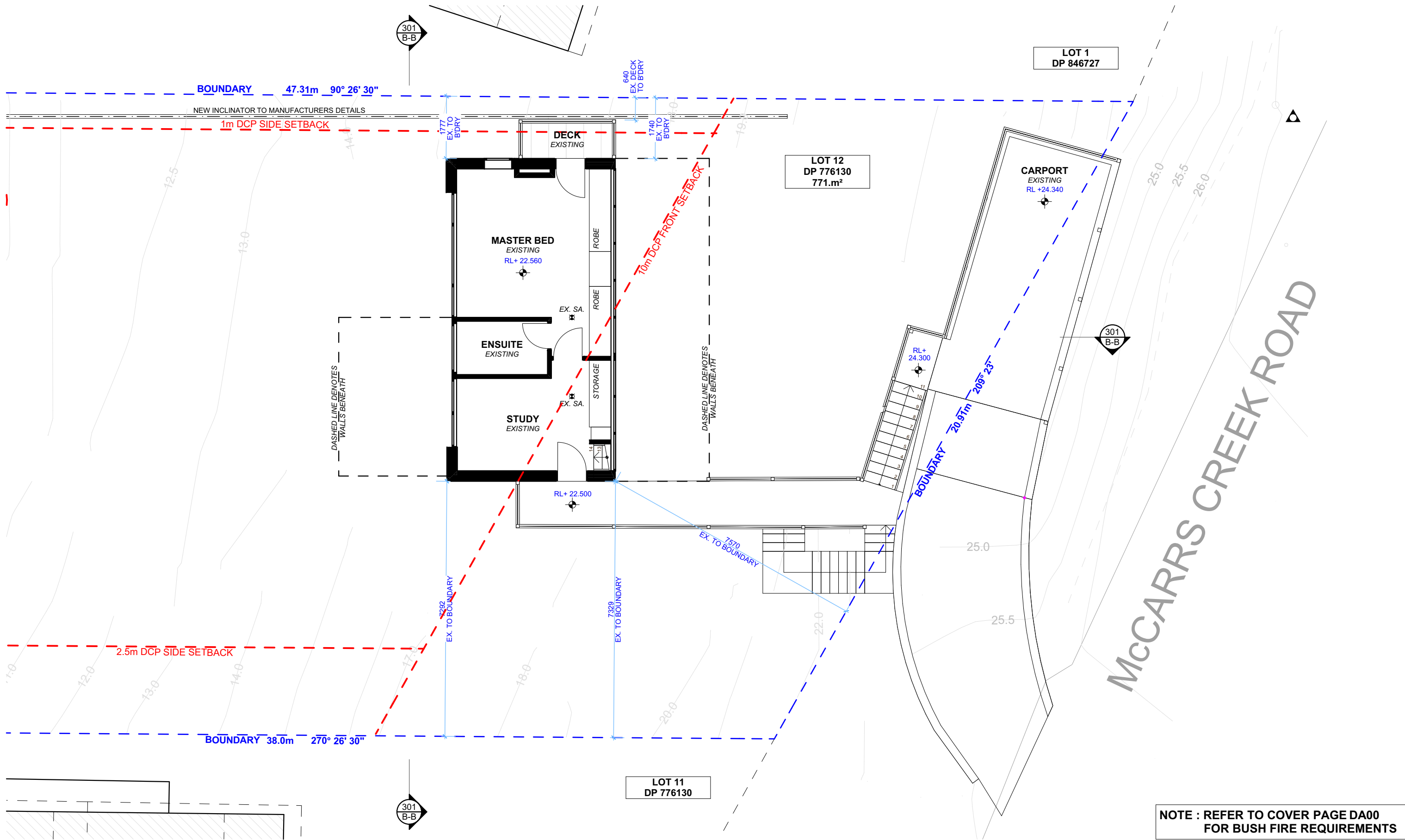
DRAWING NO.
DA09

DATE
Friday, 16 April 2021

DRAWING NAME
PROPOSED GROUND FLOOR PLAN

SCALE
1:100 @A3





NOTE : REFER TO COVER PAGE DA00
FOR BUSH FIRE REQUIREMENTS

1 PROPOSED FIRST FLOOR PLAN 1:100



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LEGEND
EXISTING
PROPOSED
DEMOLISHED

CLIENT
Anthea & Yuey Then

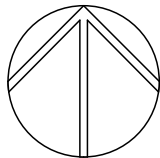
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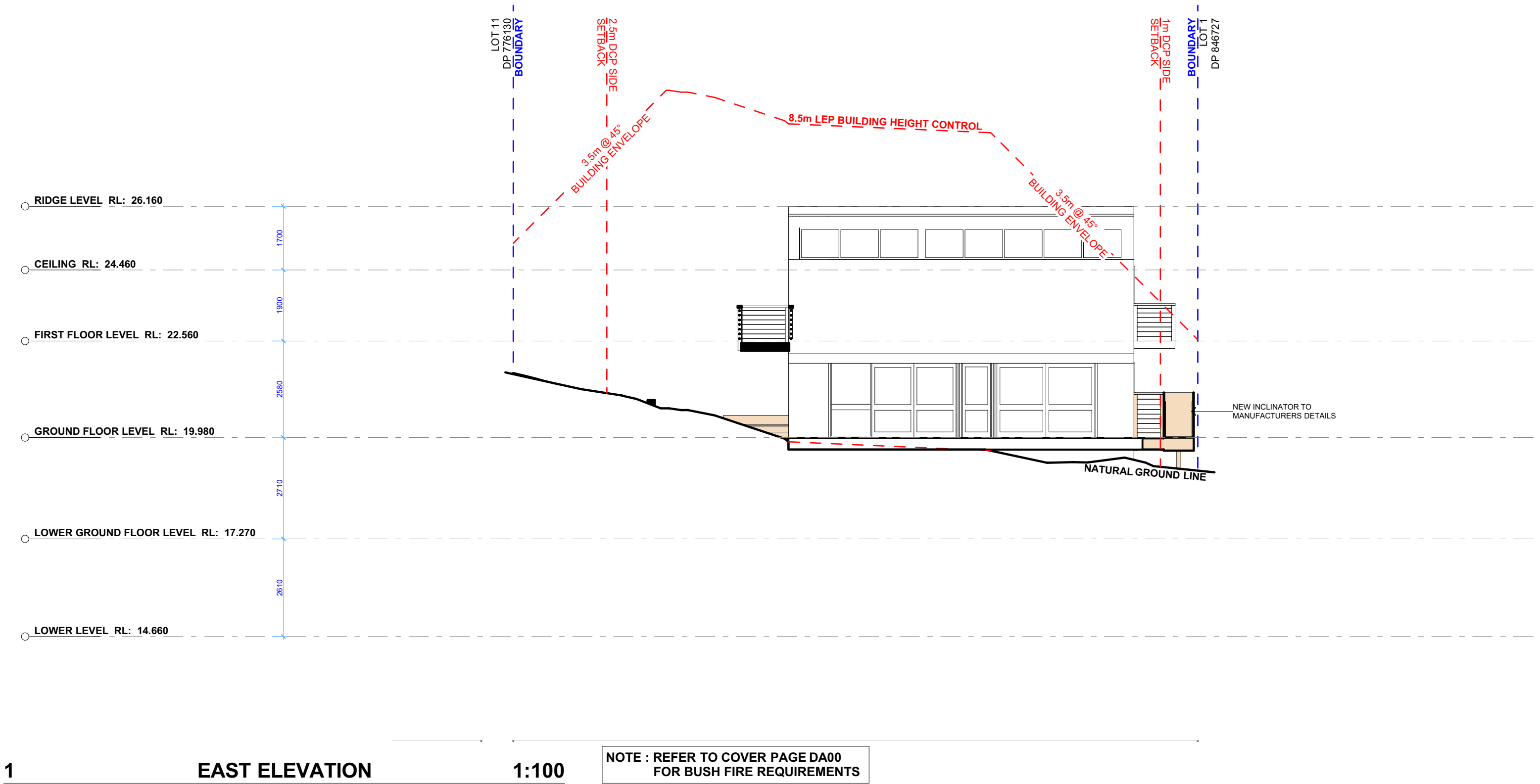
DRAWING NO.
DA10

DATE
Friday, 16 April 2021

DRAWING NAME
PROPOSED FIRST FLOOR PLAN

SCALE
1:100 @A3



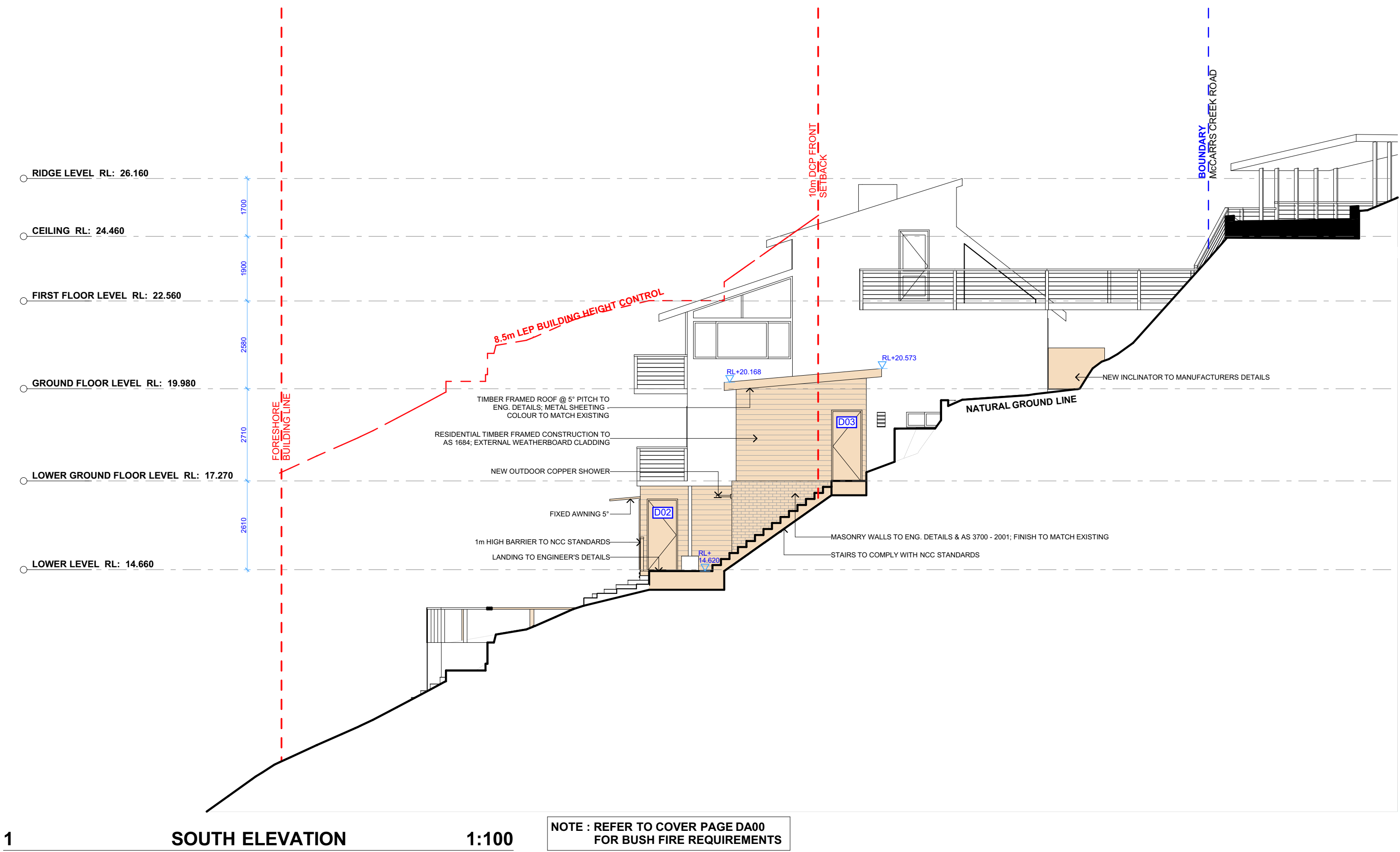


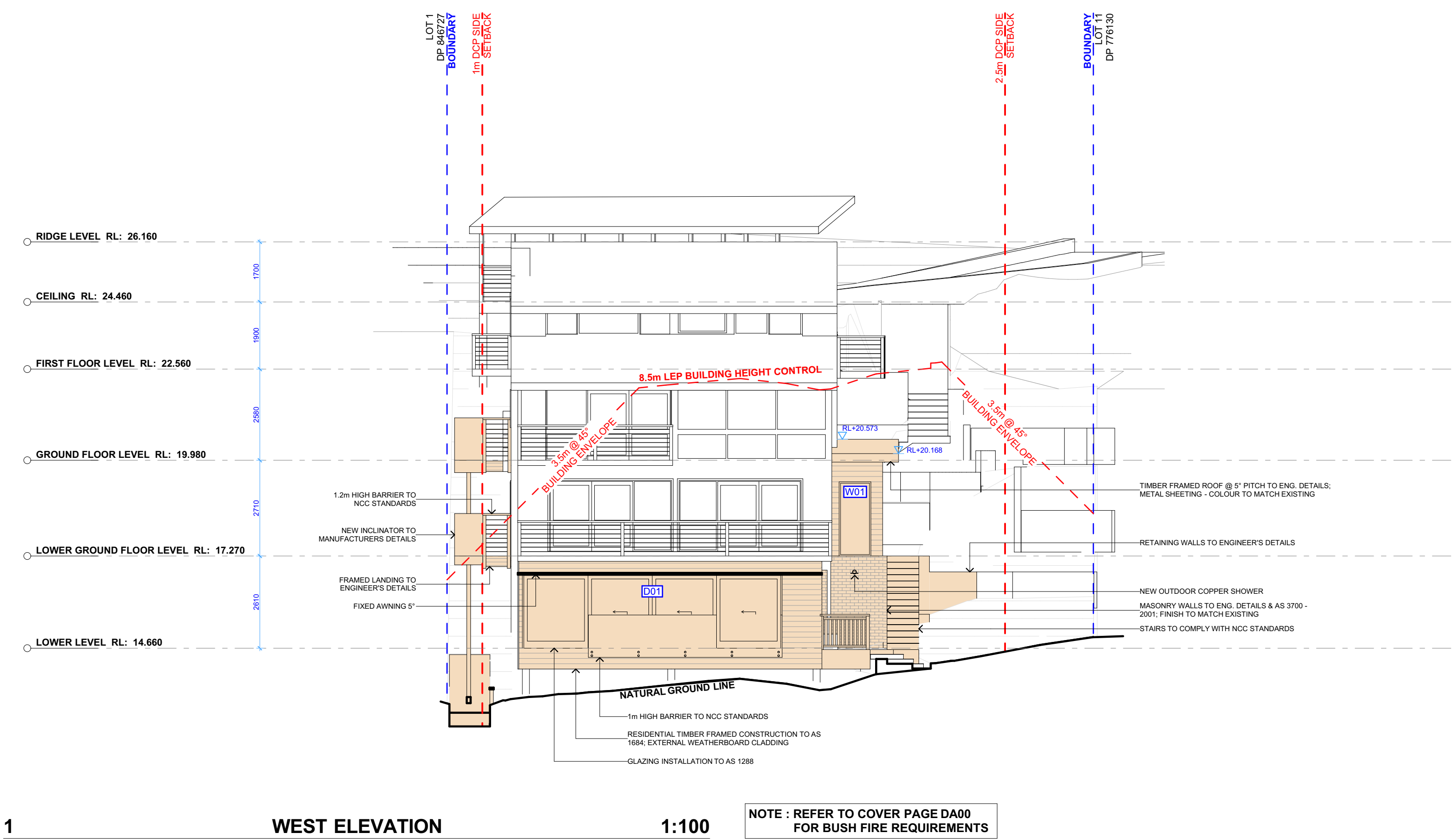
1

EAST ELEVATION

1:100

NOTE : REFER TO COVER PAGE DA00
FOR BUSH FIRE REQUIREMENTS





1

WEST ELEVATION

1:100

NOTE : REFER TO COVER PAGE DA00
FOR BUSH FIRE REQUIREMENTS

NOTE : REFER TO COVER PAGE DA00
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B	13/10/2020	FIRST DESIGN AMENDMENT	AL	
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LEGEND

EXISTING

PROPOSED

DEMOLISHED

CLIENT
Anthea & Yuey Then

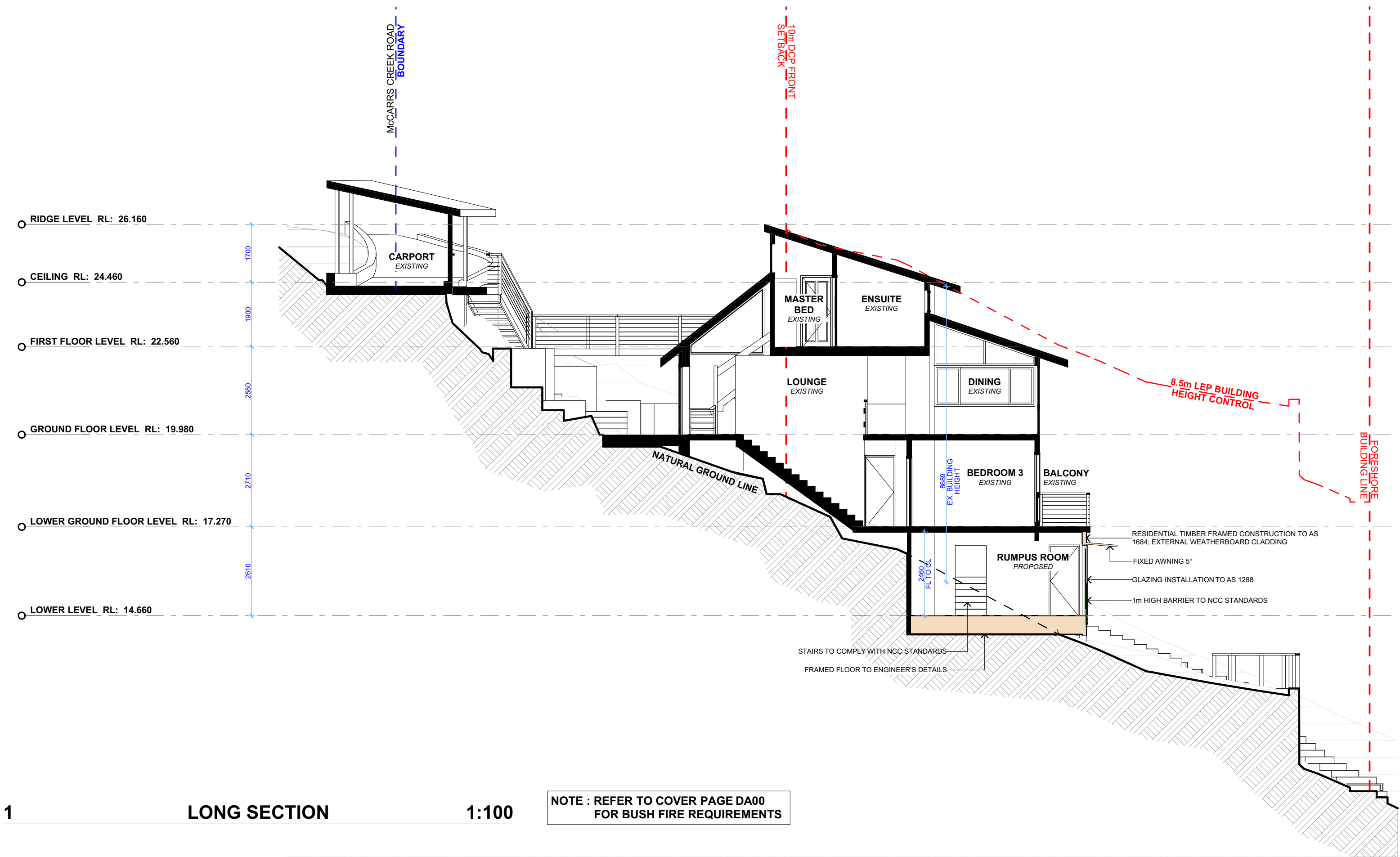
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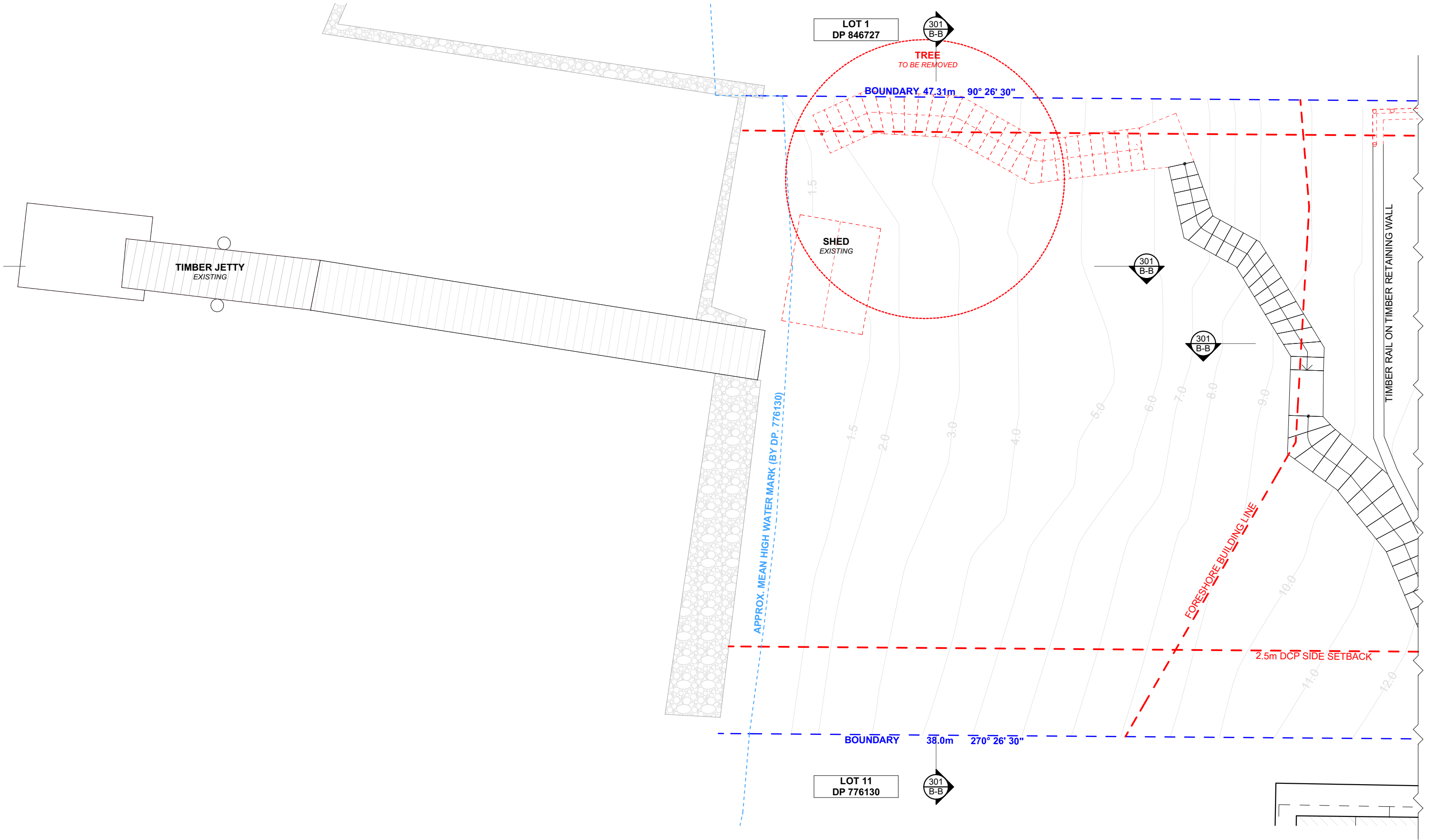
DRAWING NO.
DA15

DATE
Friday, 16 April 2021

DRAWING NAME
CROSS SECTION

SCALE
1:100 @A3

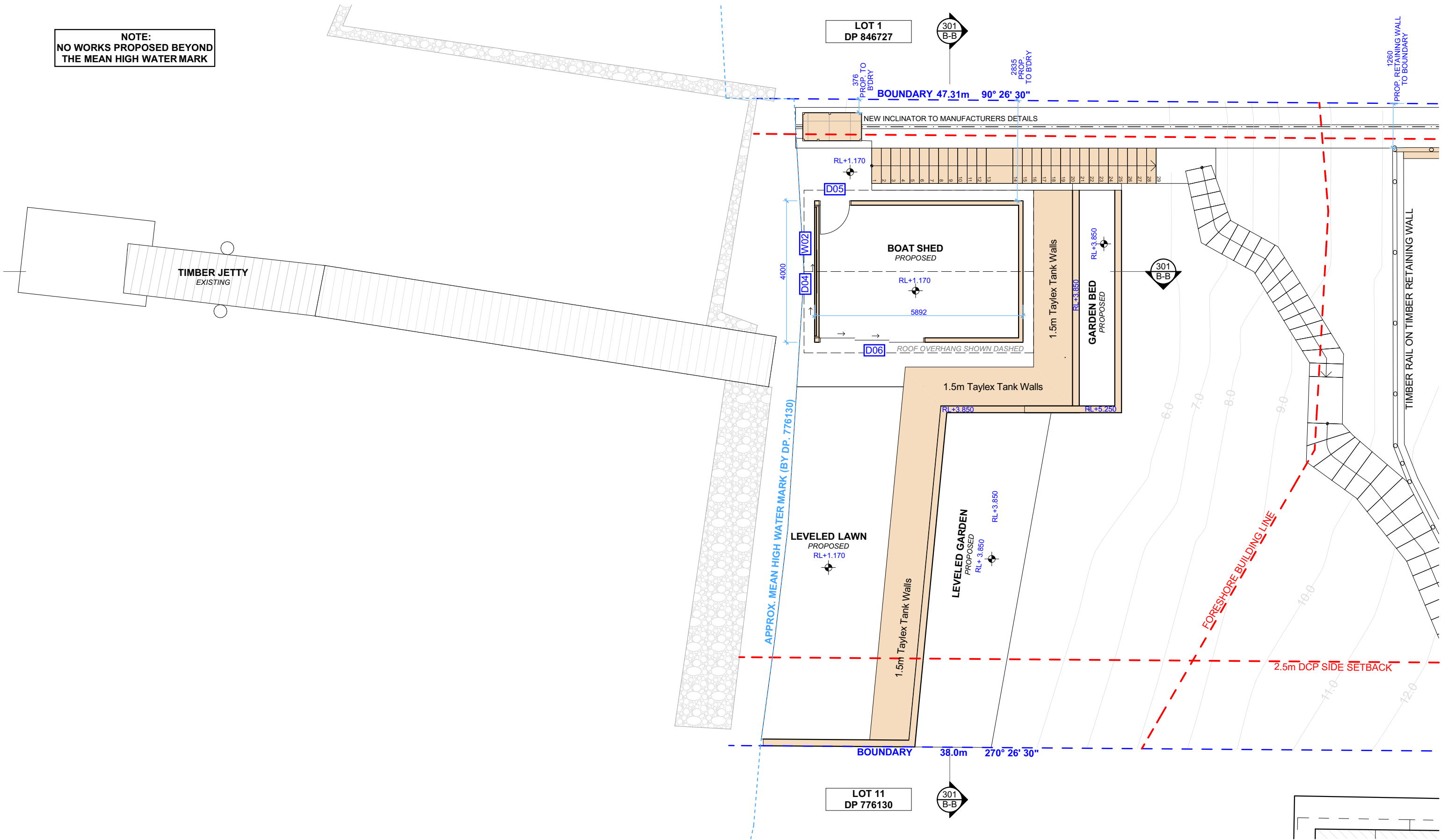




1 EXISTING BOAT SHED PLAN 1:100

NOTE: ALL DEMOLISHED ELEMENTS TO ENG. SPECIFICATIONS AND AS. 2601 - 2001

NOTE:
NO WORKS PROPOSED BEYOND
THE MEAN HIGH WATER MARK



1

PROPOSED BOAT SHED PLAN

1:100

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LEGEND

 EXISTING

 PROPOSED

 DEMOLISHED

CLIENT
Anthea & Yuey Then

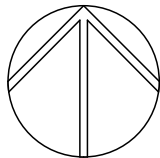
PROJECT ADDRESS
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DRAWING NO.
DA18

DATE
Friday, 16 April 2021

DRAWING NAME
PROPOSED BOAT SHED PLAN

SCALE
1:100 @A3



NOTE:
NO WORKS PROPOSED BEYOND
THE MEAN HIGH WATER MARK

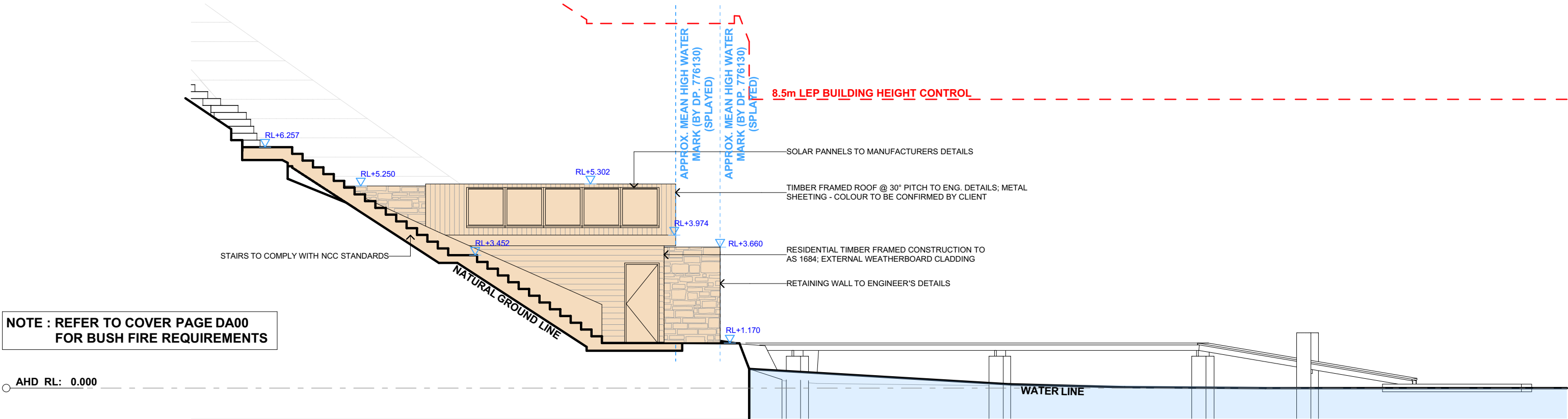
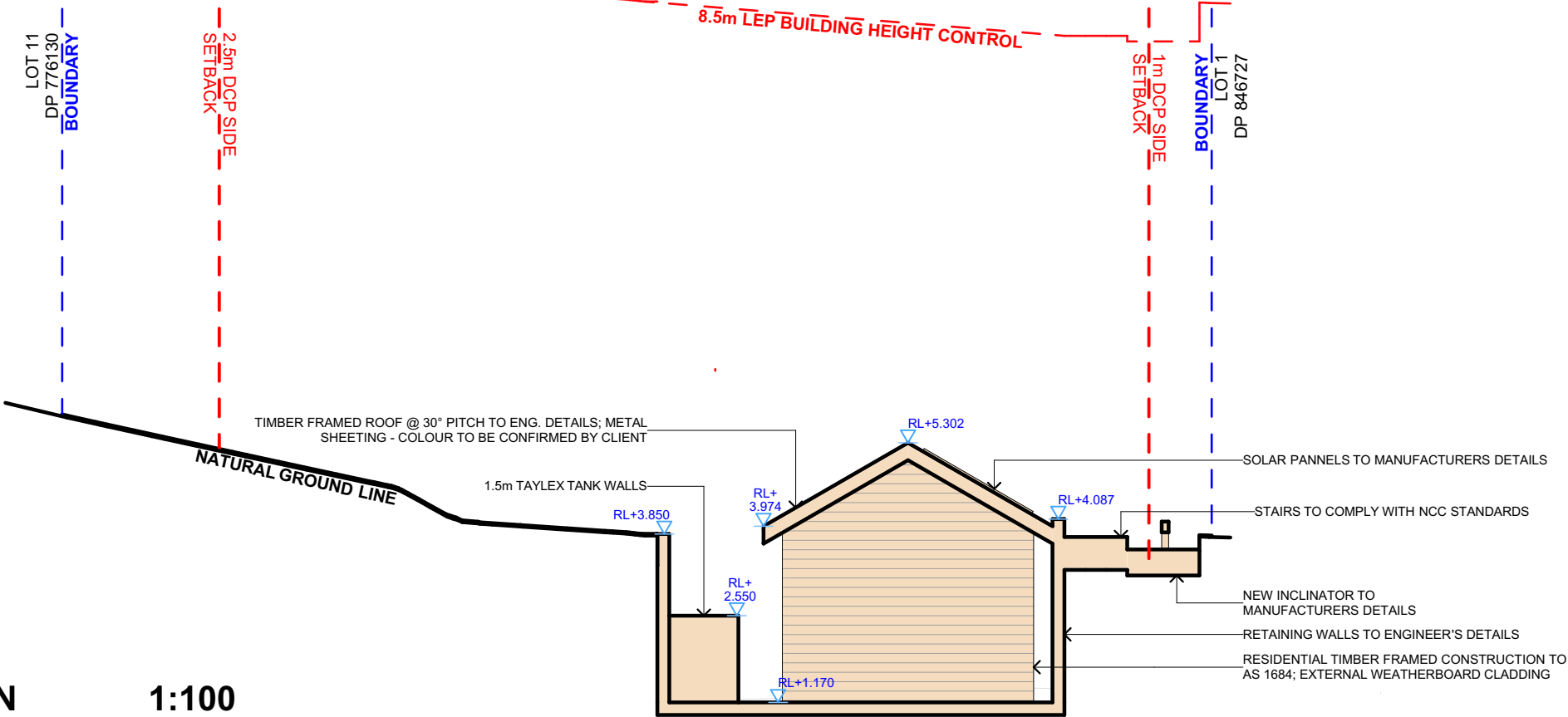
NOTE : REFER TO COVER PAGE DA00
FOR BUSH FIRE REQUIREMENTS

1

BOAT SHED EAST ELEVATION

1:100

AHD RL: 0.000



NOTE : REFER TO COVER PAGE DA00
FOR BUSH FIRE REQUIREMENTS

AHD RL: 0.000

2

BOAT SHED NORTH ELEVATION

1:100



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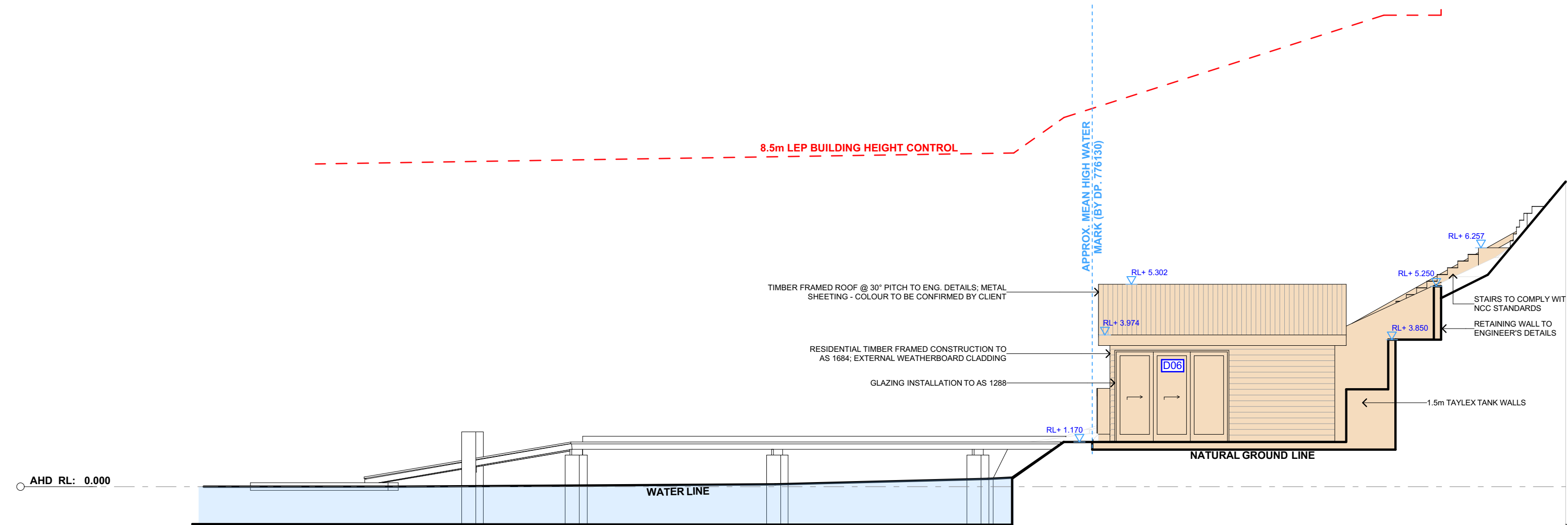
REV.	DATE	COMMENTS	DRWN
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LEGEND	
	EXISTING
	PROPOSED
	DEMOLISHED

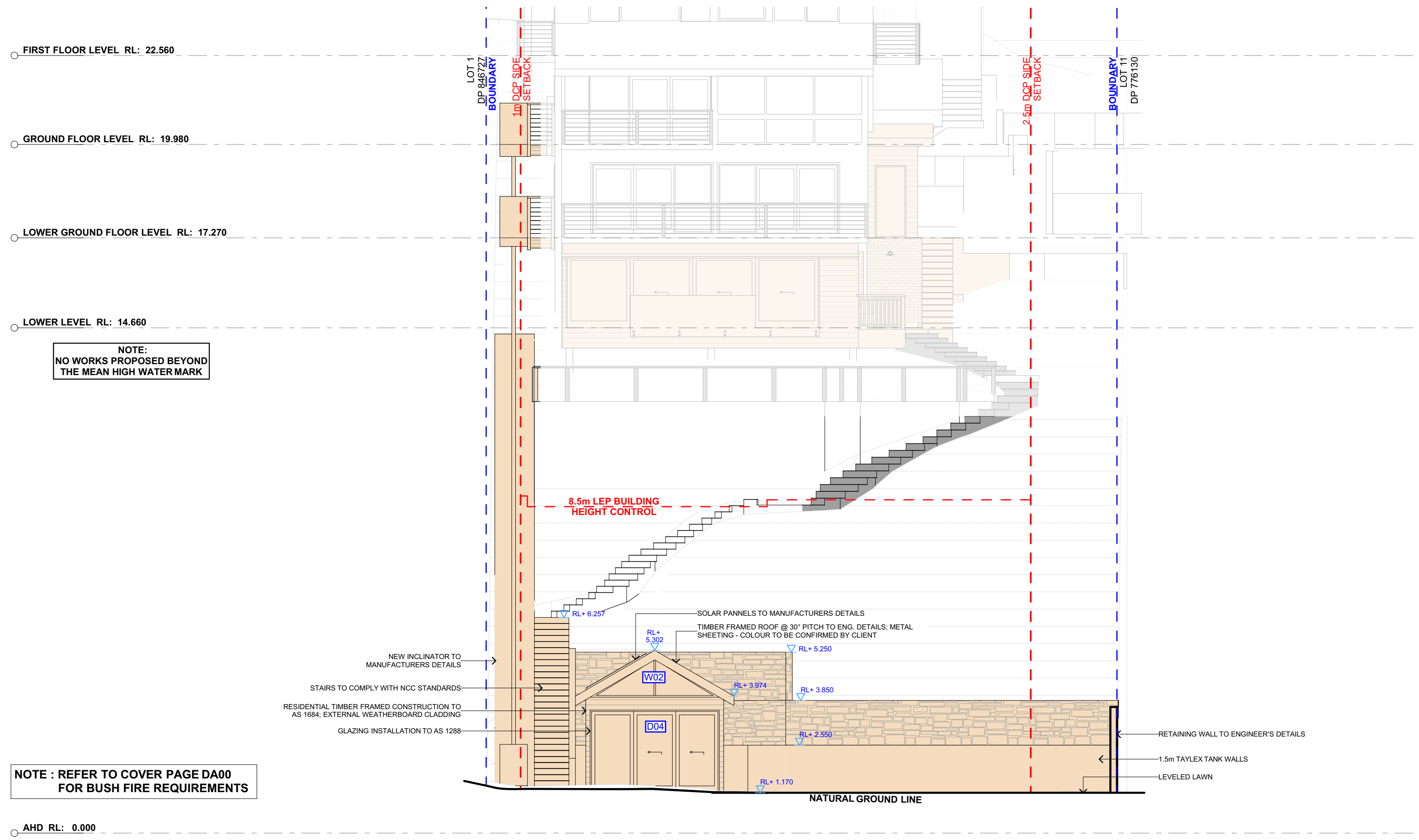
CLIENT Anthea & Yuey Then	DRAWING NO. DA19	DRAWING NAME BOAT SHED NORTH / EAST ELEVATION
PROJECT ADDRESS 180 Mccarrs Creek Road, Church Point NSW 2105	DATE Friday, 16 April 2021	SCALE 1:100 @A3

NOTE:
NO WORKS PROPOSED BEYOND
THE MEAN HIGH WATER MARK



1 BOAT SHED SOUTH ELEVATION 1:100

NOTE : REFER TO COVER PAGE DA00
FOR BUSH FIRE REQUIREMENTS



1 BOAT SHED WEST ELEVATION 1:100



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B	13/10/2020	FIRST DESIGN AMENDMENT	AL	
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LEGEND

EXISTING

PROPOSED

DEMOLISHED

CLIENT

Anthea & Yuey Then

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DRAWING NO.

DA21

DATE

Friday, 16 April 2021

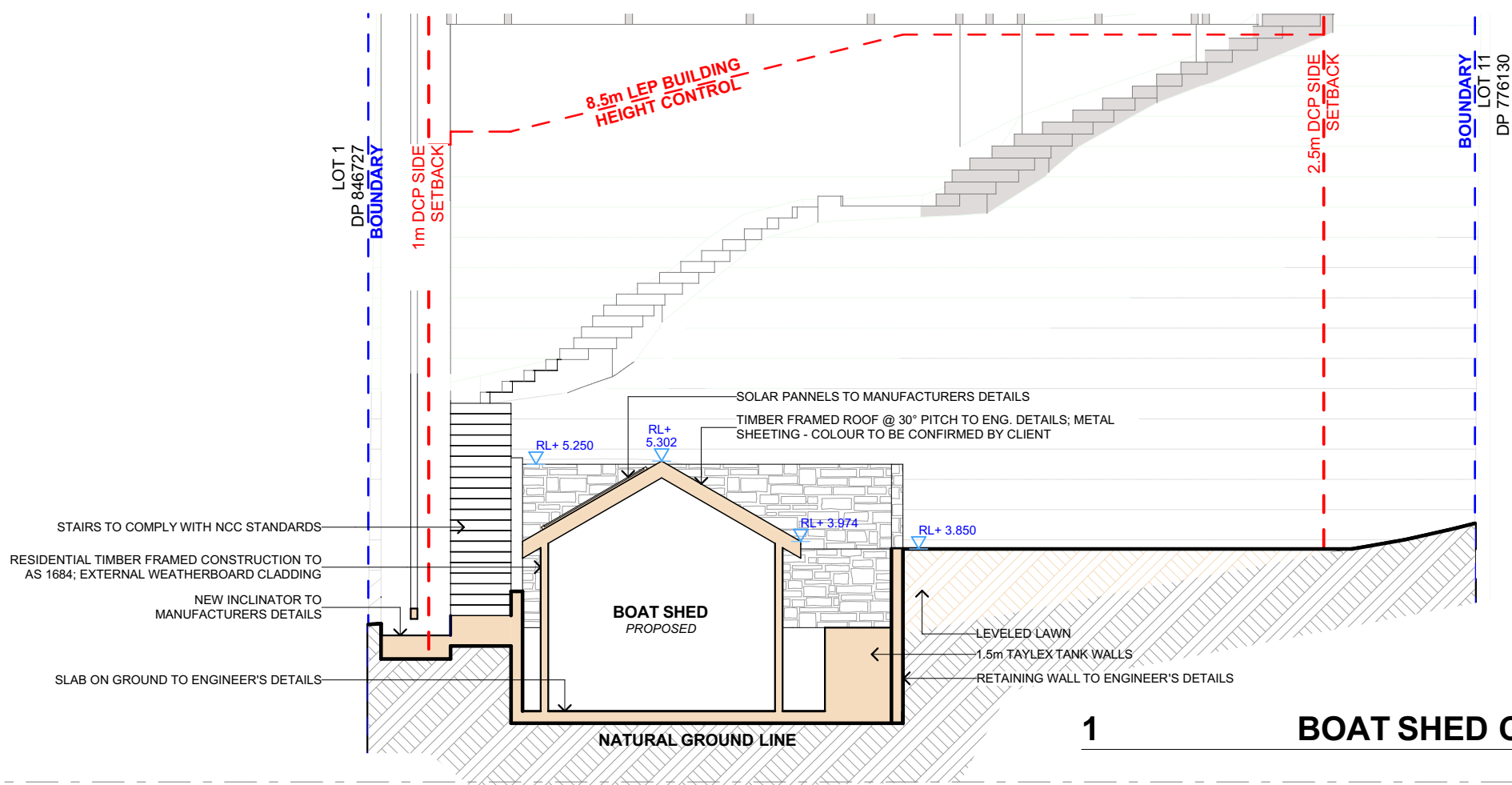
DRAWING NAME

BOAST SHED WEST
ELEVATION

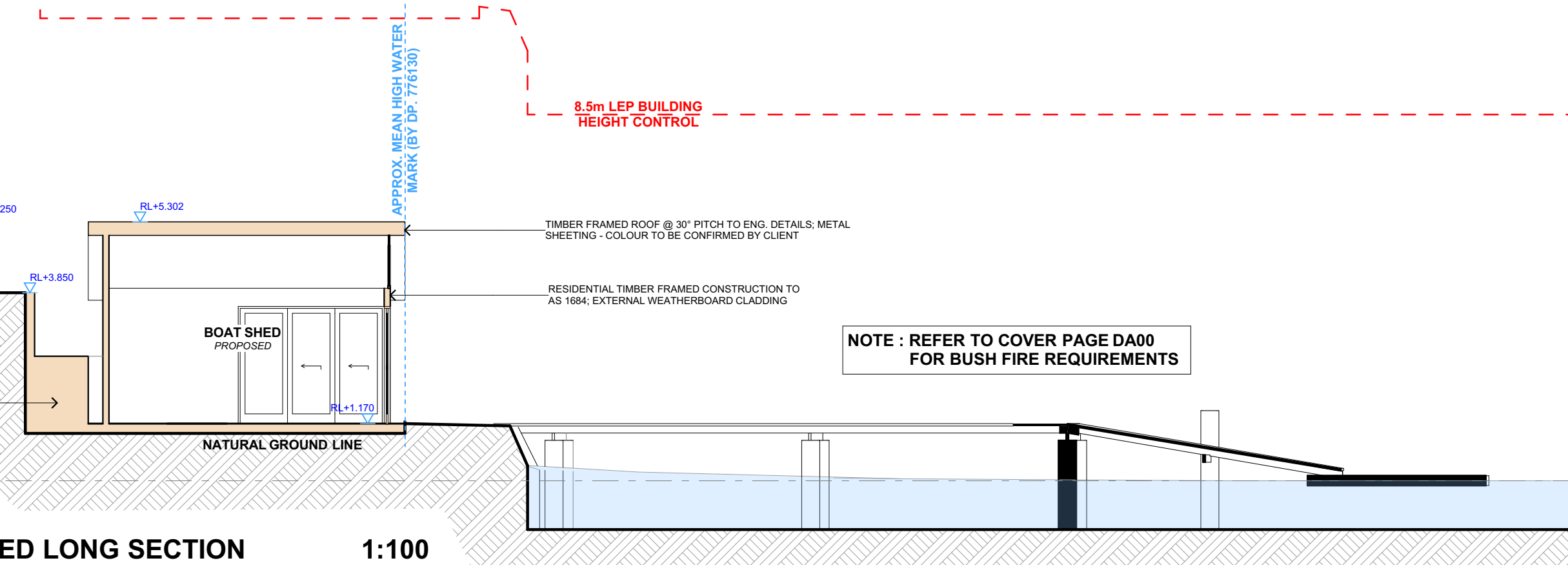
SCALE

1:100 @A3

NOTE:
NO WORKS PROPOSED BEYOND
THE MEAN HIGH WATER MARK



1 BOAT SHED CROSS SECTION 1:100



2 BOAT SHED LONG SECTION 1:100



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LEGEND
EXISTING
PROPOSED
DEMOLISHED

CLIENT
Anthea & Yuey Then

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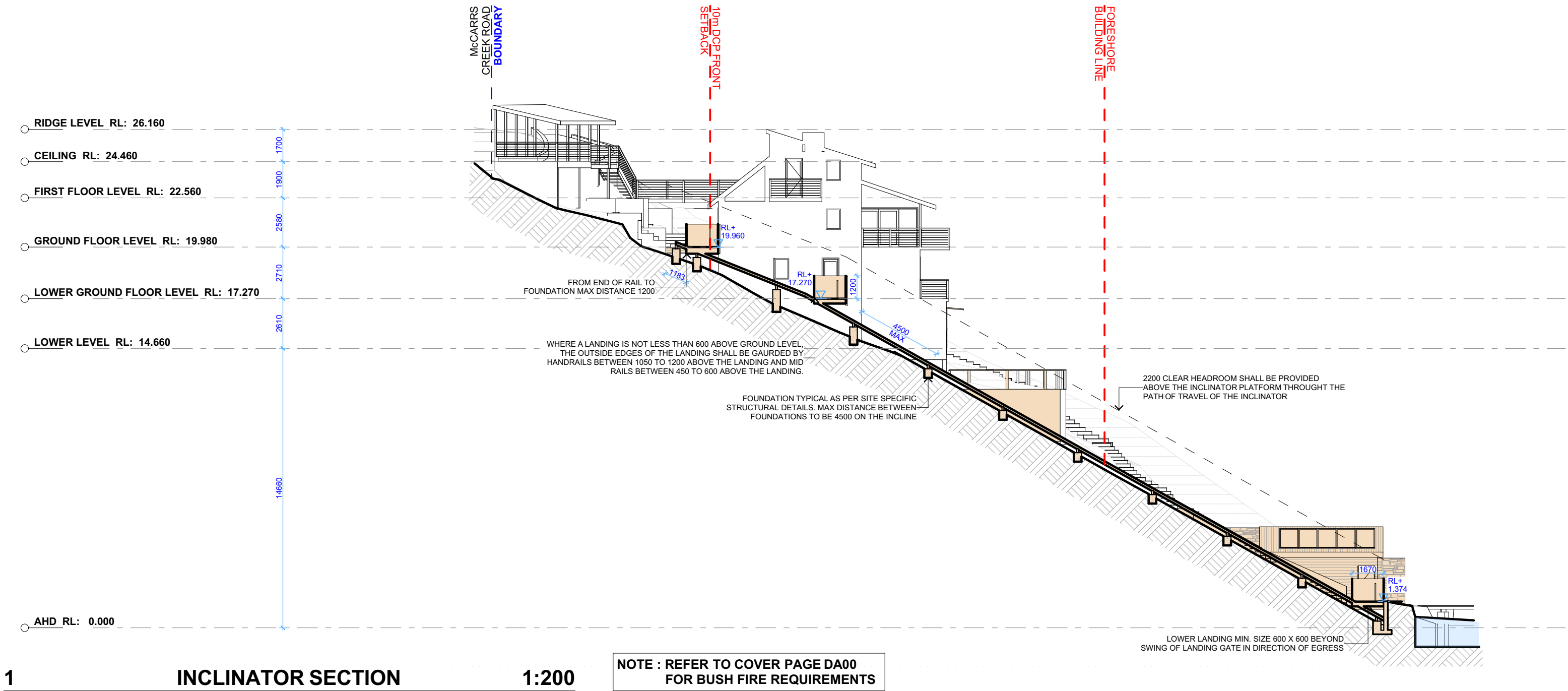
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DA22

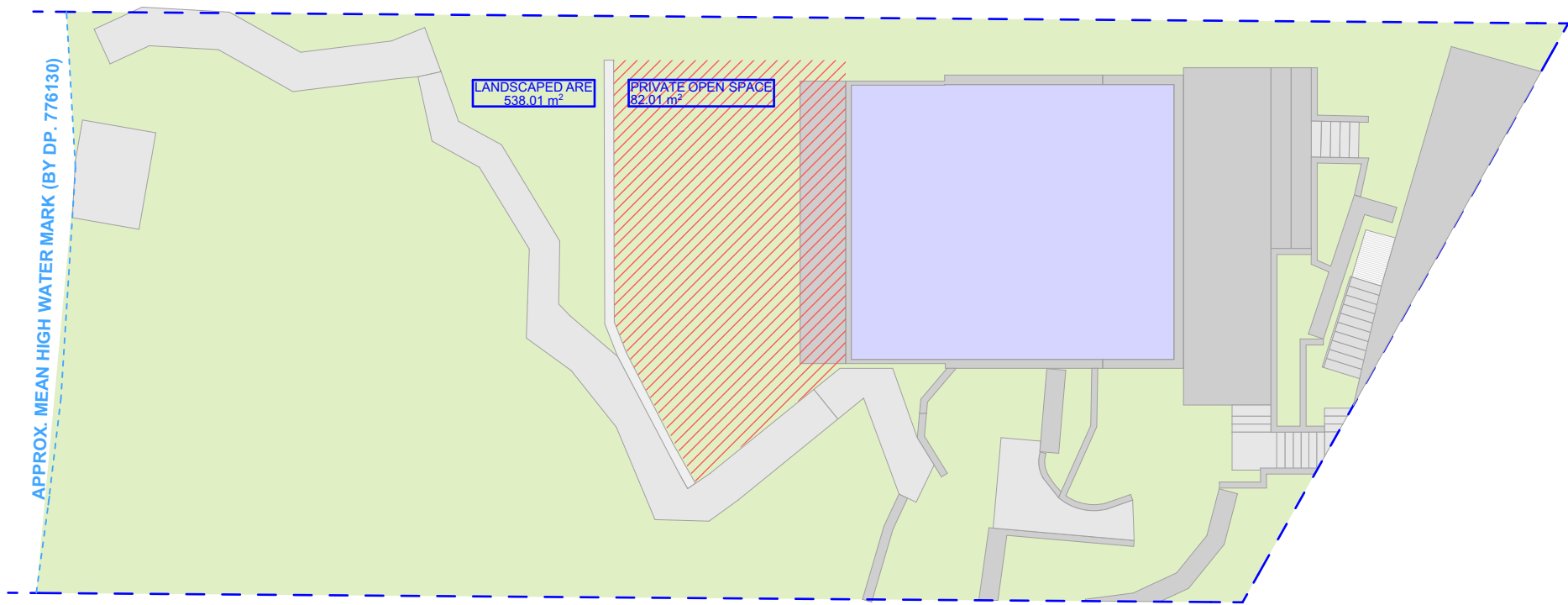
DATE
Friday, 16 April 2021

DRAWING NAME
BOAT SHED LONG / CROSS
SECTION

SCALE
1:100 @A3

NOTE:
NO WORKS PROPOSED BEYOND
THE MEAN HIGH WATER MARK





1 EXISTING AREA CALCULATIONS 1:200

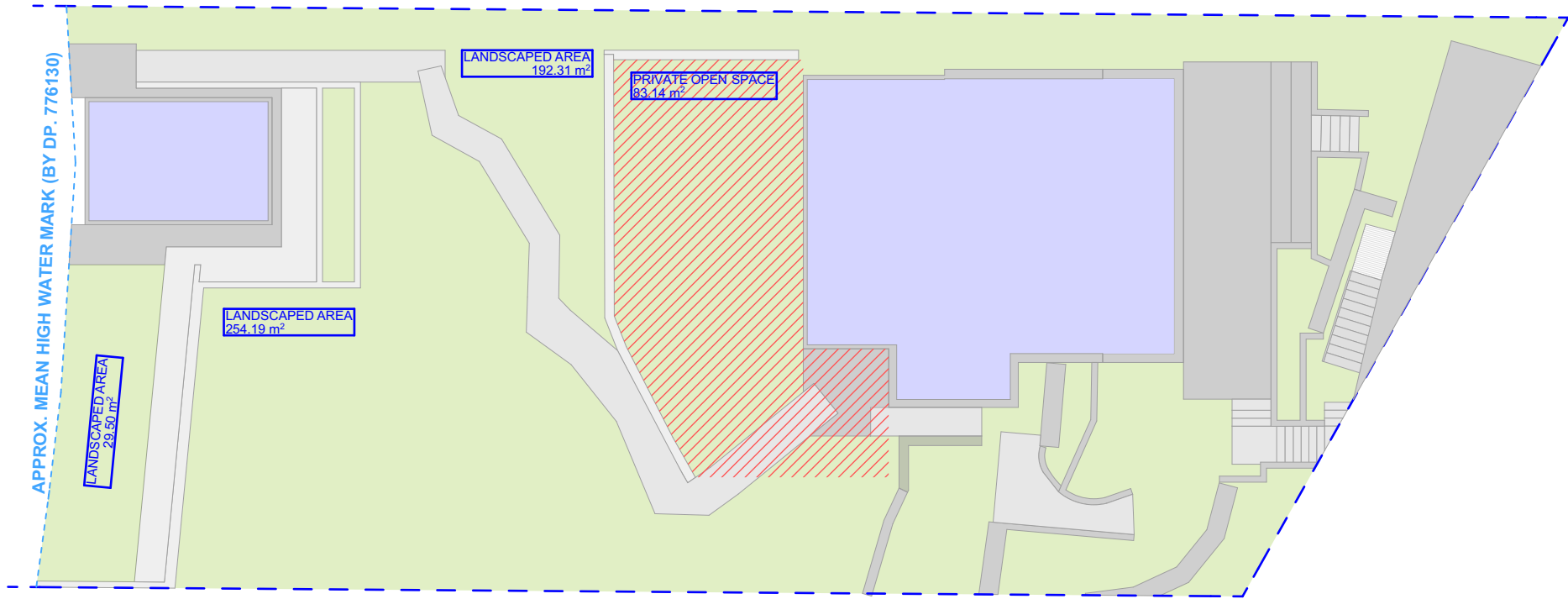
AREA CALCULATIONS
SITE AREA : 771m²

REQUIRED
LANDSCAPED AREA : 60% (462.6m²)
PRIVATE OPEN SPACE : 80m²

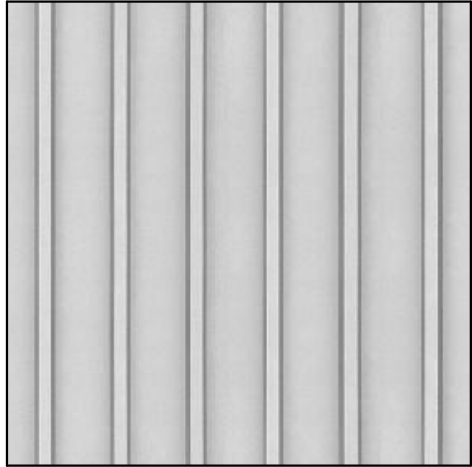
EXISTING
LANDSCAPED AREA : 69.7% (538.01m²)
PRIVATE OPEN SPACE : 82.01m²

PROPOSED
LANDSCAPED AREA : 61.7% (476m²)
PRIVATE OPEN SPACE : 83.14m²

-  LANDSCAPED AREA / LANDSCAPED OPEN SPACE
-  HARD SURFACE AREA / BUILT UPON AREA / SITE COVERAGE
-  FLOOR SPACE RATIO / FLOOR AREA
-  PRIVATE OPEN SPACE



2 PROPOSED AREA CALCULATIONS 1:200

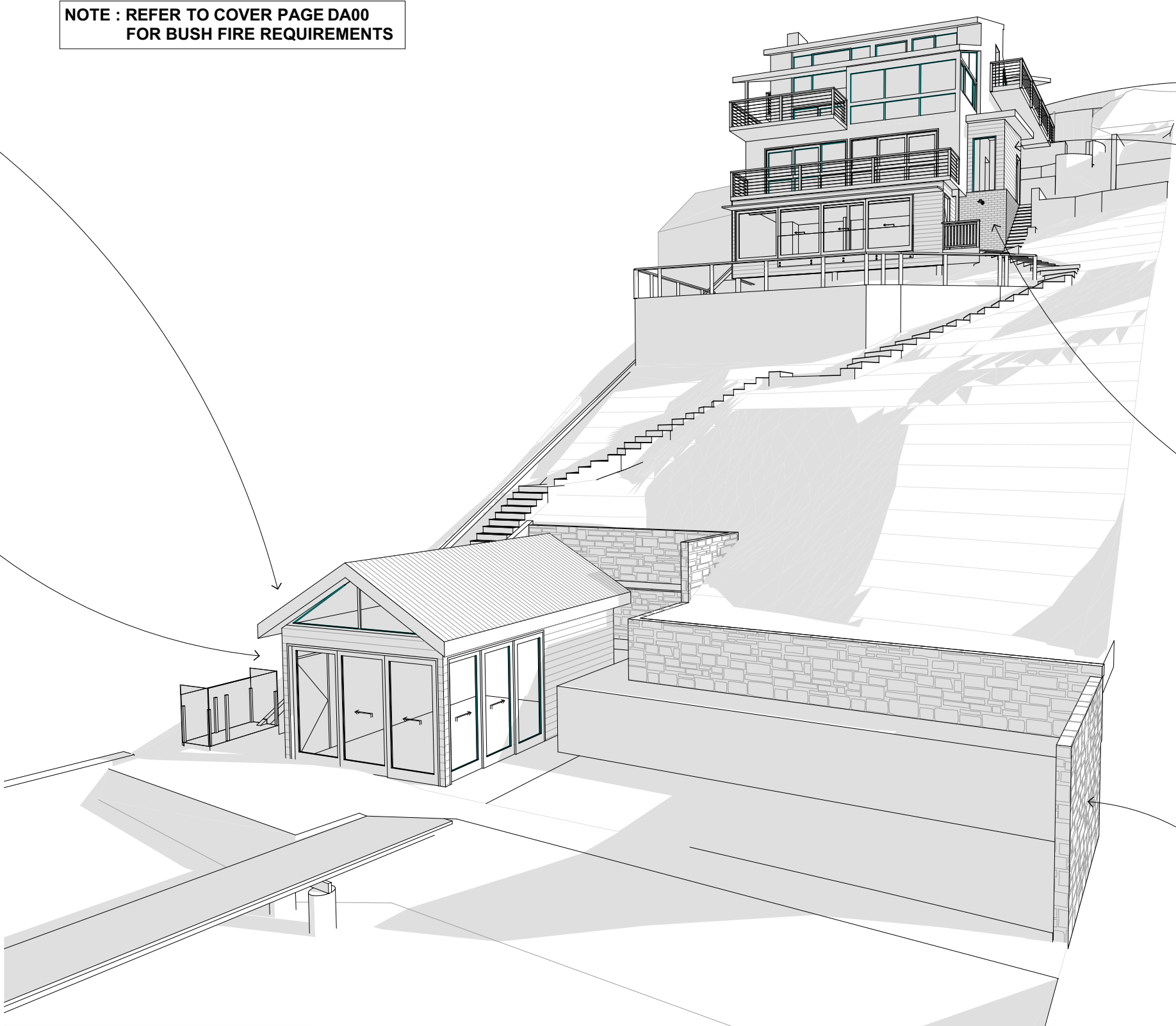


METAL ROOF -
COLOUR TO BE CONFIRMED BY CLIENT



EXTERNAL WEATHERBOARD CLADDING -
COLOUR TO BE CONFIRMED BY CLIENT

NOTE : REFER TO COVER PAGE DA00
FOR BUSH FIRE REQUIREMENTS



EXTERNAL WEATHERBOARD CLADDING -
COLOUR TO BE MATCH EXISTING



MASONARY WALL -
COLOUR TO BE MATCH EXISTING



STONE RETAINING WALL -
COLOUR TO BE CONFIRMED BY CLIENT



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All errors and omissions are to be verified by the Builder/Contractor and referred to the designer prior to the commencement of works.

LEGEND

CLIENT
Anthea & Yuey Then

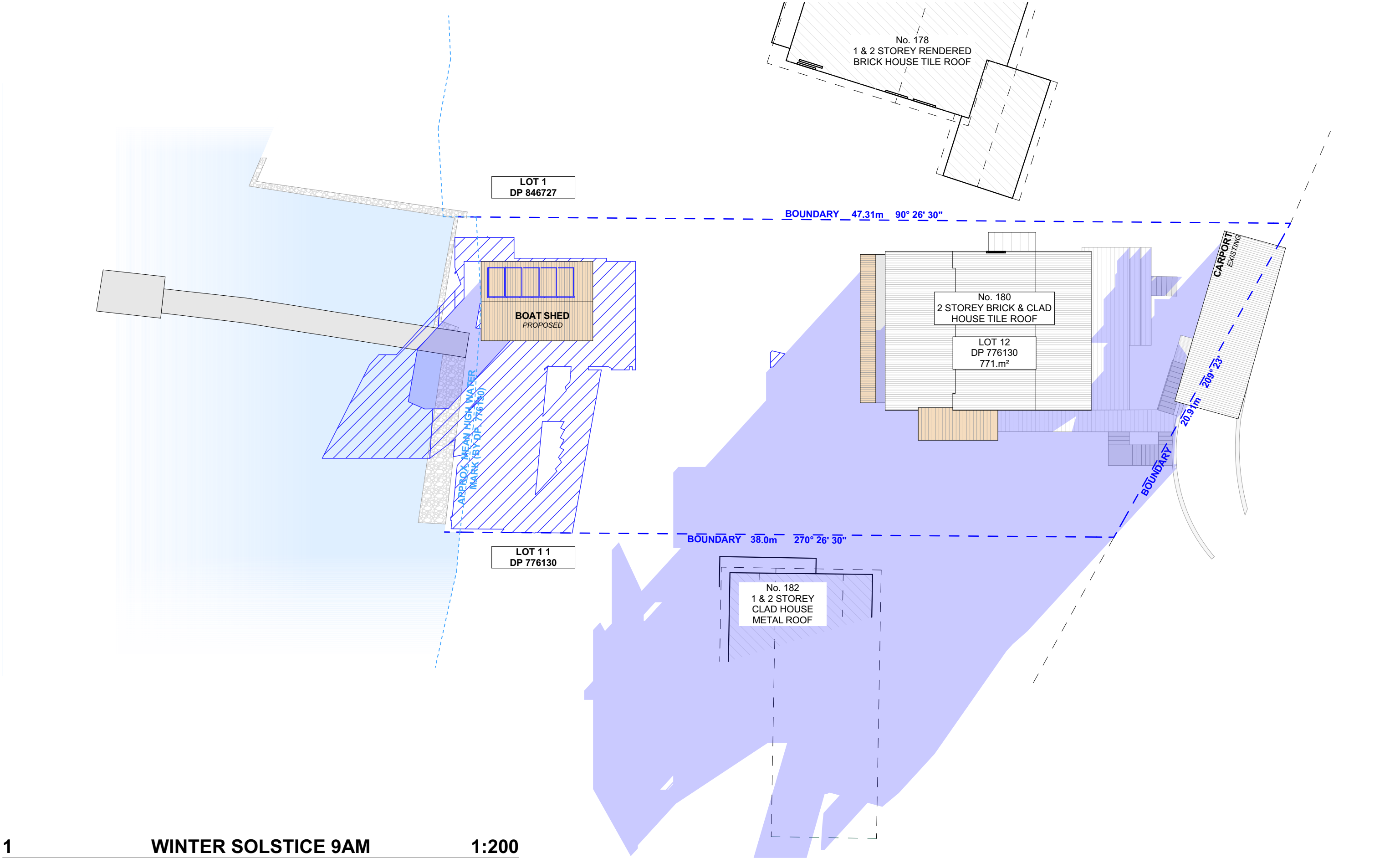
PROJECT ADDRESS
180 Mccarrs Creek Road,
Church Point NSW 2105

DRAWING NO.
DA25

DATE
Friday, 16 April 2021

DRAWING NAME
SAMPLE BOARD

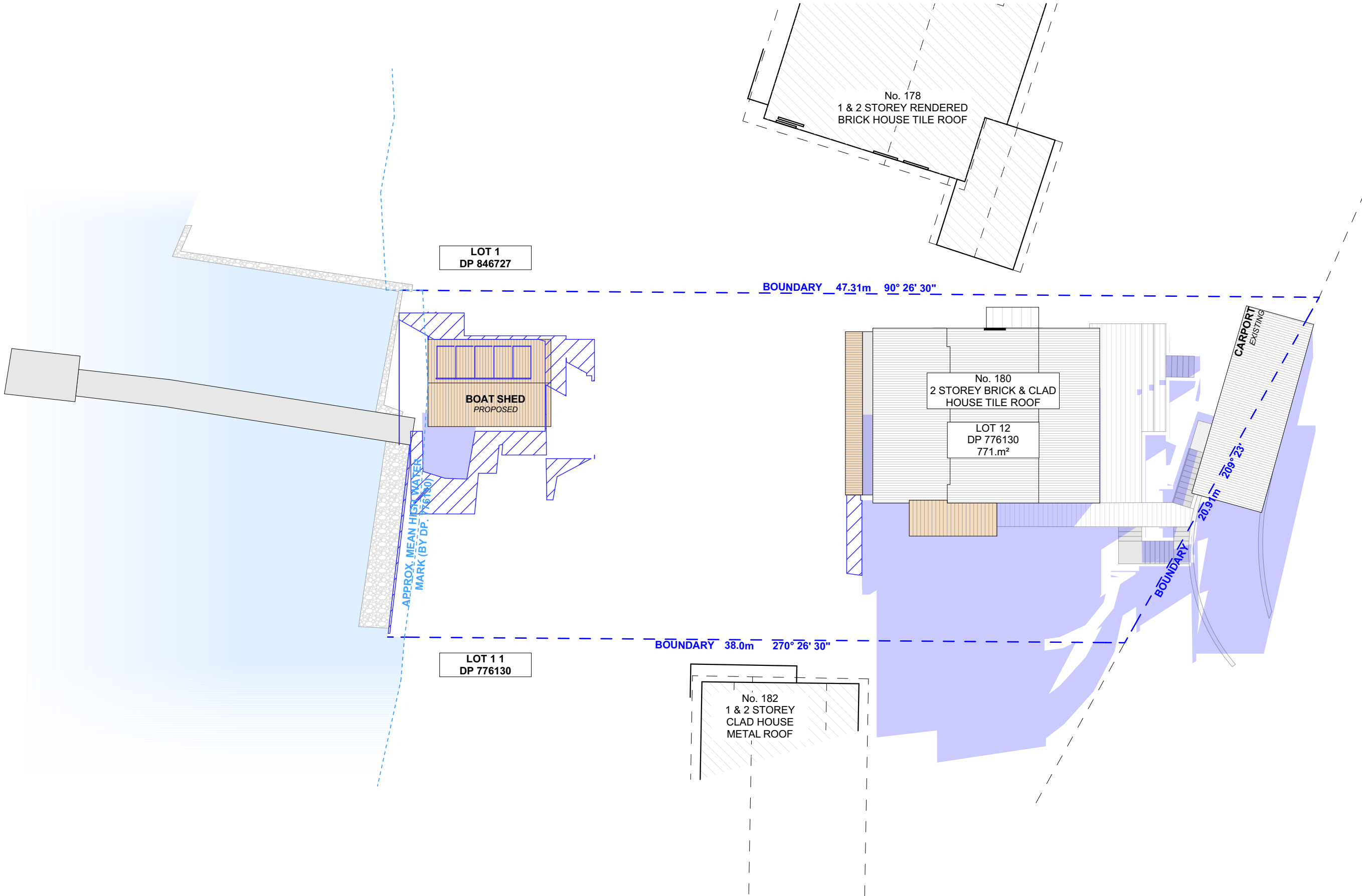
SCALE
@A3



1

WINTER SOLSTICE 9AM

1:200





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B	13/10/2020	FIRST DESIGN AMENDMENT	AL	
C	15/04/2021	DA DOCUMENTATION	JW	

LEGEND

 EXISTING SHADOWS

 PROPOSED SHADOWS

 NEIGHBOURING SHADOWS

CLIENT

Anthea & Yuey Then

PROJECT ADDRESS

180 Mccarrs Creek Road,
Church Point NSW 2105

DRAWING NO.

DA27

DATE

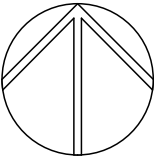
Friday, 16 April 2021

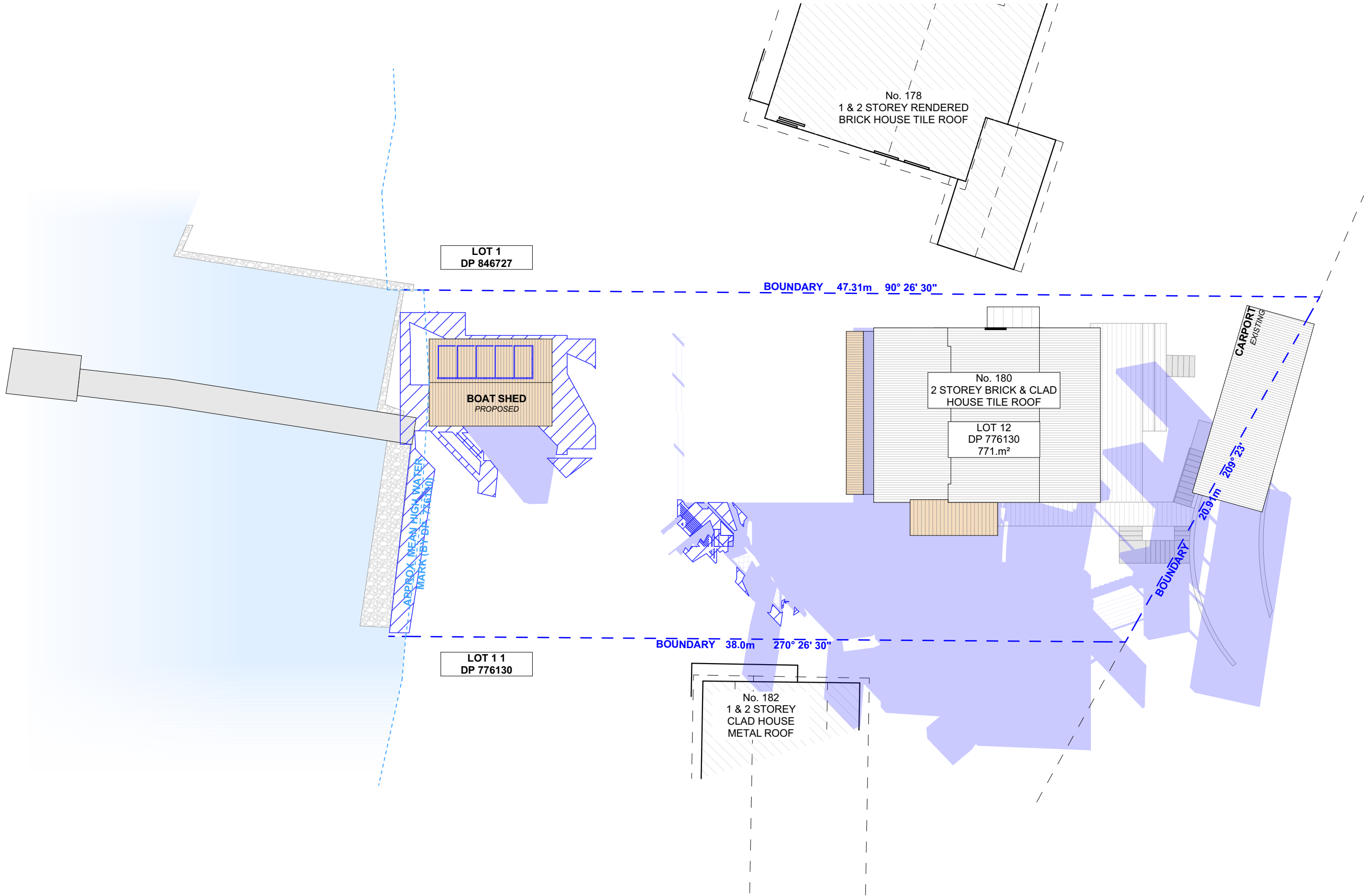
DRAWING NAME

WINTER SOLSTICE 12 PM

SCALE

@A3





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B	13/10/2020	FIRST DESIGN AMENDMENT	AL
C	15/04/2021	DA DOCUMENTATION	JW

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LEGEND	
	EXISTING SHADOWS
	PROPOSED SHADOWS
	NEIGHBOURING SHADOWS

CLIENT
Anthea & Yuey Then

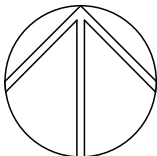
PROJECT ADDRESS
180 Mccarrs Creek Road,
Church Point NSW 2105

DRAWING NO.
DA28

DATE
Friday, 16 April 2021

DRAWING NAME
WINTER SOLSTICE 3 PM

SCALE
@A3



Alterations and Additions

Certificate number: A408101

This certificate confirms that the proposed development will meet the NSW government's requirements for sustainability, if it is built in accordance with the commitments set out below. Terms used in this certificate, or in the commitments, have the meaning given by the document entitled "BASIX Alterations and Additions Definitions" dated 06/10/2017 published by the Department. This document is available at www.basix.nsw.gov.au

Secretary
Date of issue: Thursday, 25, February 2021.
To be valid, this certificate must be lodged within 3 months of the date of issue.



Description of project

Project address	
Project name	180 Mccarrs Creek Rd Church Point
Street address	180 McCarrs Creek Road Church Point 2105
Local Government Area	Northern Beaches Council
Plan type and number	Deposited Plan 776130
Lot number	12
Section number	
Project type	
Dwelling type	Separate dwelling house
Type of alteration and addition	My renovation work is valued at \$50,000 or more, and does not include a pool (and/or spa).

Certificate Prepared by (please complete before submitting to Council or PCA)
Name / Company Name: Action Plans
ABN (if applicable): 17118297587

Fixtures and systems	Show on DA Plans	Show on CC/CDC Plans & specs	Certifier Check
Lighting			
The applicant must ensure a minimum of 40% of new or altered light fixtures are fitted with fluorescent, compact fluorescent, or light-emitting-diode (LED) lamps.		✓	✓
Fixtures			
The applicant must ensure new or altered showerheads have a flow rate no greater than 9 litres per minute or a 3 star water rating.		✓	✓
The applicant must ensure new or altered toilets have a flow rate no greater than 4 litres per average flush or a minimum 3 star water rating.		✓	✓
The applicant must ensure new or altered taps have a flow rate no greater than 9 litres per minute or minimum 3 star water rating.		✓	

Construction			Show on DA Plans	Show on CC/CDC Plans & specs	Certifier Check
Insulation requirements					
The applicant must construct the new or altered construction (floor(s), walls, and ceilings/roofs) in accordance with the specifications listed in the table below, except that a) additional insulation is not required where the area of new construction is less than 2m2, b) insulation specified is not required for parts of altered construction where insulation already exists.			✓	✓	✓
Construction	Additional insulation required (R-value)	Other specifications			
concrete slab on ground floor.	nil				
suspended floor with open subfloor: framed (R0.7).	R0.8 (down) (or R1.50 including construction)				
floor above existing dwelling or building.	nil				
external wall: framed (weatherboard, fibro, metal clad)	R1.30 (or R1.70 including construction)				
external wall: brick veneer	R1.16 (or R1.70 including construction)				
raked ceiling, pitched/skillion roof: framed	ceiling: R3.00 (up), roof: foil/sarking	medium (solar absorptance 0.475 - 0.70)			

Glazing requirements	Show on DA Plans	Show on CC/CDC Plans & specs	Certifier Check			
Windows and glazed doors						
The applicant must install the windows, glazed doors and shading devices, in accordance with the specifications listed in the table below. Relevant overshadowing specifications must be satisfied for each window and glazed door. The following requirements must also be satisfied in relation to each window and glazed door: Each window or glazed door with improved frames, or pyrolytic low-e glass, or clear/air gap/clear glazing, or toned/air gap/clear glazing must have a U-value and a Solar Heat Gain Coefficient (SHGC) no greater than that listed in the table below. Total system U-values and SHGCs must be calculated in accordance with National Fenestration Rating Council (NFRC) conditions. The description is provided for information only. Alternative systems with complying U-value and SHGC may be substituted. For projections described in millimetres, the leading edge of each eave, pergola, verandah, balcony or awning must be no more than 500 mm above the head of the window or glazed door and no more than 2400 mm above the sill. Pergolas with polycarbonate roof or similar translucent material must have a shading coefficient of less than 0.35. Pergolas with fixed battens must have battens parallel to the window or glazed door above which they are situated, unless the pergola also shades a perpendicular window. The spacing between battens must not be more than 50 mm. Overshadowing buildings or vegetation must be of the height and distance from the centre and the base of the window and glazed door, as specified in the 'overshadowing' column in the table below.	✓	✓	✓			
Windows and glazed doors glazing requirements						
Window / door no.	Orientation	Area of glass inc. frame (m2)	Overshadowing Height (m) Distance (m)	Shading device	Frame and glass type	
W1	W	1.89	1.59	5.4	eave/verandah/pergola/balcony >=450 mm	standard aluminium, single pyrolytic low-e, (U-value: 5.7, SHGC: 0.47)
W2	W	2.31	0	0	eave/verandah/pergola/balcony >=750 mm	standard aluminium, single pyrolytic low-e, (U-value: 5.7, SHGC: 0.47)
D1	W	15.45	0	0	awning (fixed) >=900 mm	standard aluminium, single pyrolytic low-e, (U-value: 5.7, SHGC: 0.47)
D4	W	9.6	0	0	eave/verandah/pergola/balcony	standard aluminium, single pyrolytic low-e,

Glazing requirements							Show on DA Plans	Show on CC/CDC Plans & specs	Certifier Check			
Window / door no.	Orientation	Area of glass inc. frame (m2)	Overshadowing		Shading device	Frame and glass type						
			Height (m)	Distance (m)								
					>=750 mm	(U-value: 5.7, SHGC: 0.47)						
D5	S	7.18	0	0	none	standard aluminium, single pyrolytic low-e, (U-value: 5.7, SHGC: 0.47)						

Legend
In these commitments, "applicant" means the person carrying out the development.
Commitments identified with a "✓" in the "Show on DA plans" column must be shown on the plans accompanying the development application for the proposed development (if a development application is to be lodged for the proposed development).
Commitments identified with a "✓" in the "Show on CC/CDC plans & specs" column must be shown in the plans and specifications accompanying the application for a construction certificate / complying development certificate for the proposed development.
Commitments identified with a "✓" in the "Certifier check" column must be certified by a certifying authority as having been fulfilled, before a final occupation certificate for the development may be issued.



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B	13/10/2020	FIRST DESIGN AMENDMENT	AL	
C	15/04/2021	DA DOCUMENTATION	JW	

CLIENT
Anthea & Yuey Then

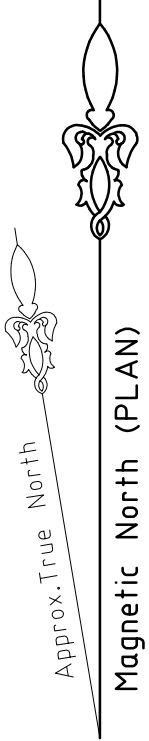
PROJECT ADDRESS
180 Mccarrs Creek Road,
Church Point NSW 2105

DRAWING NO.
DA29

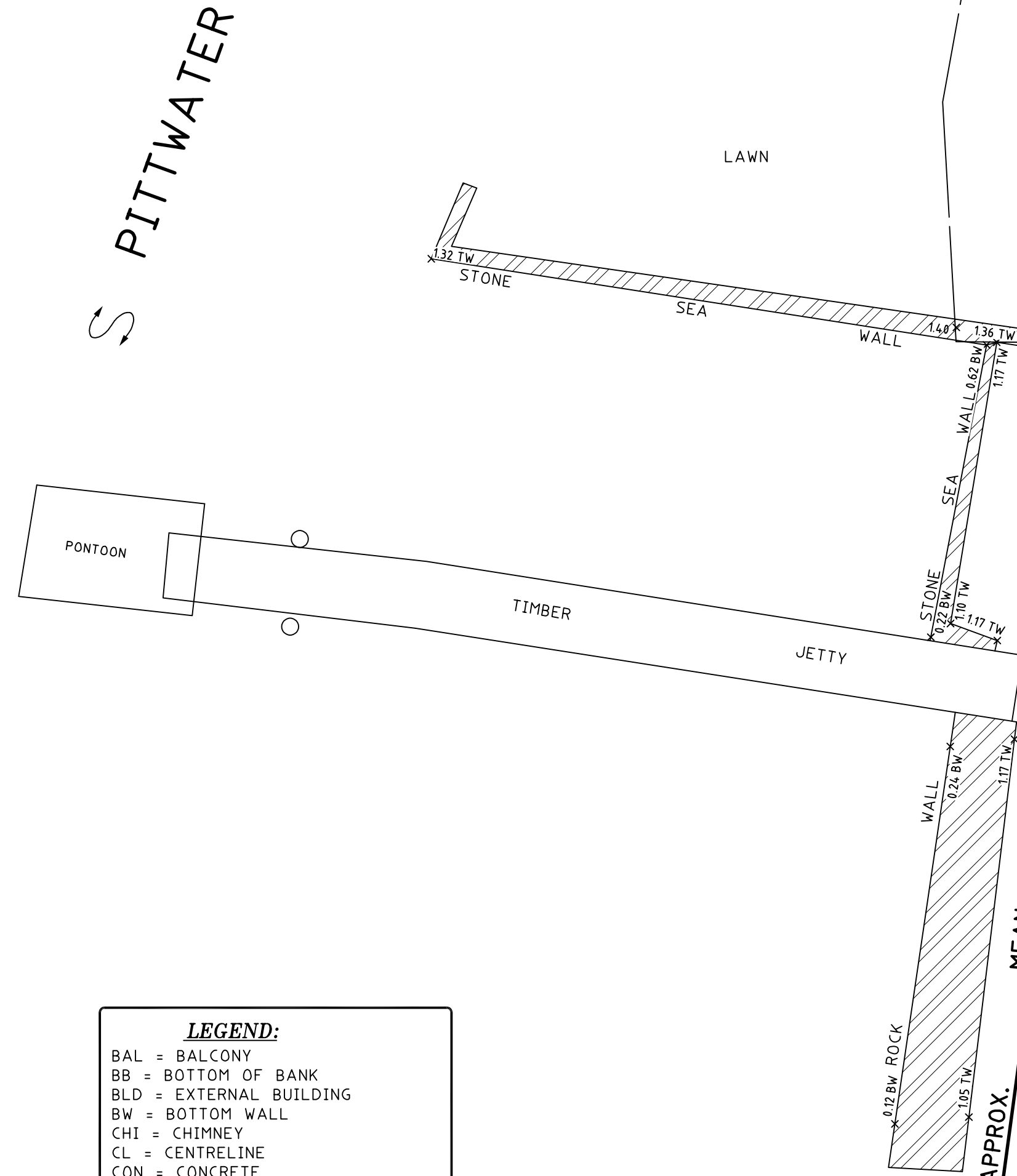
DATE
Friday, 16 April 2021

DRAWING NAME
BASIX COMMITMENTS

Appendix C Survey Plan, C.M.S Surveyors Pty Limited, 28 May 2020



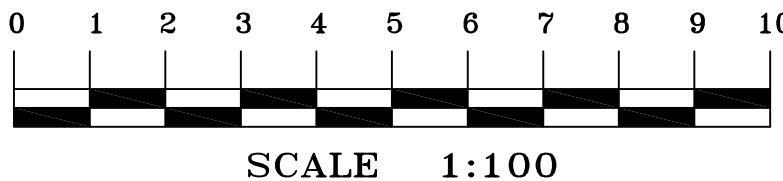
S PITTWATER



LEGEND:

BAL = BALCONY
BB = BOTTOM OF BANK
BLD = EXTERNAL BUILDING
BW = BOTTOM WALL
CHI = CHIMNEY
CL = CENTRELINE
CON = CONCRETE
DK = DECK
EB = EDGE OF BITUMEN
ELO = ELECTRICITY LINE OVERHEAD
FL = FLOOR LEVEL
HL = HEAD LEVEL
HYD = HYDRANT
JET = JETTY
LH = LAMP HOLE
NS = NATURAL SURFACE
PAV = PAVING
RF = TOP OF ROOF
RR = ROOF RIDGE
SL = SILL LEVEL
STR = STAIRS
TB = TOP OF BANK
TG = TOP OF GUTTER
TR = TREE
TW = TOP OF WALL
WM = WATER MAIN

TREE
SPREAD-DIAMETER-HEIGHT



TITLE INDICATES THAT LOT 12 IN D.P.776130 IS SUBJECT TO:
- LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANT(S)

1
D.P.846727

12
D.P.776130
771m² TITLE

11
D.P.776130

No.182
1 & 2 STOREY
CLAD HOUSE
METAL ROOF

APPROX. EXTENT OF FRONT FOOTPRINT
(PLOTTED BY AERIAL IMAGERY)

- Notes:**
- A BOUNDARY SURVEY HAS BEEN UNDERTAKEN.
 - WALL TO BOUNDARY DIMENSIONS SHOWN HEREON MUST NOT BE USED FOR CONSTRUCTION.
 - IF CONSTRUCTION IS INTENDED TO BE UNDERTAKEN ON OR ADJACENT TO PROPERTY BOUNDARIES THE BOUNDARIES OF THE LAND MUST BE MARKED OR THE BUILDING SETOUT.
 - THIS SURVEY IS FOR DESIGN PURPOSES OF THE SUBJECT LAND ONLY. THIS PLAN MUST NOT BE USED FOR ANY OTHER MATTER, PURPOSE OR CONSTRUCTION SETOUT.
 - TREE SIZES ARE ESTIMATES ONLY.
 - THIS PLAN HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF ANTHEA THEN
 - RELATIONSHIP OF IMPROVEMENTS TO BOUNDARIES IS DIAGNOSTIC ONLY. WHERE OFFSETS ARE CRITICAL THEY SHOULD BE CONFIRMED BY FURTHER SURVEY.
 - EXCEPT WHERE SHOWN BY DIMENSION LOCATION OF DETAIL WITH RESPECT TO BOUNDARIES IS INDICATIVE ONLY.
 - ONLY VISIBLE SERVICES HAVE BEEN LOCATED. UNDERGROUND SERVICES HAVE NOT BEEN LOCATED. DIAL BEFORE YOU DIG SERVICES (ph 1100) SHOULD BE USED AND A FULL UTILITY INVESTIGATION, INCLUDING A UTILITY LOCATION SURVEY, SHOULD BE UNDERTAKEN BEFORE CARRYING OUT ANY CONSTRUCTION ACTIVITY IN OR NEAR THE SURVEYED AREA.
 - SEWER MAIN PLOTTED FROM SYDNEY WATER SEWER DIAGRAM. LOCATION SHOULD BE MARKED ON SITE IF CRITICAL.
 - CRITICAL SPOT LEVELS SHOULD BE CONFIRMED WITH SURVEYOR.

- Notes:**
- CONTOURS SHOWN DEPICT THE TOPOGRAPHY. THEY DO NOT REPRESENT THE EXACT LEVEL AT ANY PARTICULAR POINT. ONLY SPOT LEVELS SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION.
 - CONTOUR INTERVAL - 0.5 metre. - SPOT LEVELS SHOULD BE ADOPTED.
 - POSITION OF RIDGE LINES ARE DIAGNOSTIC ONLY (NOT TO SCALE).
 - THE INFORMATION IS ONLY TO BE USED AT A SCALE ACCURACY OF 1:100.
 - DO NOT SCALE OFF THIS PLAN / FIGURED DIMENSIONS TO BE TAKEN IN PREFERENCE TO SCALED READINGS.
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 - THIS NOTICE MUST NOT BE ERASED.
- STEPHEN EMERY
REGISTERED SURVEYOR BOSSI NUMBER 1605

				HORIZONTAL DATUM:		VERTICAL DATUM:		CLIENT:		SURVEY PLAN		 C.M.S. Surveyors Pty Limited		<table><tr><td>SURVEYED ME</td><td>DRAWN ABS</td><td>CHECKED ME</td><td>APPROVED AF</td></tr><tr><td colspan="2">SURVEY INSTRUCTION 5868A</td><td>SCALE 1:100 A1 A3</td><td>DATE OF SURVEY 28/05/2020</td></tr><tr><td colspan="3">DRAWING NAME 5868Adetail</td><td>SHEET 1 OF 1</td></tr><tr><td colspan="3">CAD FILE 5868Adetail.l.dwg</td><td>ISSUE 1</td></tr></table>		SURVEYED ME	DRAWN ABS	CHECKED ME	APPROVED AF	SURVEY INSTRUCTION 5868A		SCALE 1:100 A1 A3	DATE OF SURVEY 28/05/2020	DRAWING NAME 5868Adetail			SHEET 1 OF 1	CAD FILE 5868Adetail.l.dwg			ISSUE 1
SURVEYED ME	DRAWN ABS	CHECKED ME	APPROVED AF																												
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DRAWING NAME 5868Adetail			SHEET 1 OF 1																												
CAD FILE 5868Adetail.l.dwg			ISSUE 1																												
		CO-ORDINATE SYSTEM: ASSUMED		DATUM: AUSTRALIAN HEIGHT DATUM (AHD)		B.M. ADOPTED: PM 53843		ANTHEA THEN		SHOWING DETAIL & LEVELS		ACN: 096 240 201																			
		MARKS ADOPTED:		R.L. 18.523 (CLASS LB)				180 MCCARRS CREEK ROAD		OVER LOT 12 IN DP776130		PO Box 463 Dee Why NSW 2099																			
				SOURCE: S.C.I.M.S. (20/04/2020)				CHURCH POINT, NSW, 2105		180 MCCARRS CREEK ROAD		2/99A South Creek Road, Dee Why NSW 2099																			
1		FIRST ISSUE	04/06/2020	LGA: NORTHERN BEACHES						CHURCH POINT, NSW, 2105		Telephone: (02) 9971 4802 Facsimile: (02) 9971 4822																			
												E-mail: info@cmsurveyors.com.au																			