Planning Proposal

LEP Boundary Anomalies – Stage 6F3 and Stage 10D2, Shell Cove

112-021-22

Prepared for
Australand

27 April 2015

Cardno
Shaping the Future

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1 Introduction

This Planning Proposal has been prepared by Cardno NSW/ACT Pty Ltd (Cardno) on behalf of Australand Property Group (Australand) to rectify an LEP boundary anomaly in the recently completed Stage 6F3 and Stage 10D2 subdivisions at Shell Cove, NSW. The anomaly results from the boundaries created by the subdivision plans not aligning with the zoning boundary and associated minimum lot size, floor space ratio and Significant Extractive Resources - Quarry Buffer Zone (QBZ). Specifically, the following amendments are proposed:

Stage 6F3

> The *E3 – Environmental Management* zone located within Lots 6772, 6773 and 6788 DP 1194372 and the road corridor of Bonville Parkway, rezoned to *R2 – Low Density Residential*

> The floor space ratio control of 0.5:1 added to Lots 6772, 6773 and 6788 DP 1194372 and the Bonville Parkway road corridor, where there is currently no control associated with the *E3* zone

> The 40ha minimum lot size within Lots 6772, 6773 and 6788 DP 1194372 and the Bonville Parkway road corridor amended to 450m^2

Stage 10D2

> The *RE1 – Public Recreation* zone located within Lots 1255, 1256, 1257, 1258 and 1264 and the Rangoon Avenue road corridor, rezoned to *R2 – Low Density Residential*

> The floor space ratio control of 0.5:1 added to Lots 1255, 1256, 1257, 1258 and 1264 and the Rangoon Avenue road corridor, where there is currently no control associated with the *RE1* zone

> The height control of 9m added to Lots 1255, 1256, 1257, 1258 and 1264 and the Rangoon Avenue road corridor, where there is currently no control associated with the *RE1* zone

> The minimum lot size control of 450m^2 added to Lots 1255, 1256, 1257, 1258 and 1264 and the Rangoon Avenue road corridor, where there is currently no control associated with the *RE1* zone

> The QBZ be relocated eastwards to remove its encumbrance from Lots 1255, 1256, 1257, 1258 and 1264 and the Rangoon Avenue road corridor.

The implications of these boundary anomalies would be felt during a Development Application (DA) or during an attempt to undertake Exempt or Complying Development by the landowner.

To rectify this anomaly, a formal Planning Proposal is required to amend the *Shellharbour Local Environmental Plan 2013* (SLEP). This amendment would rectify the zoning boundary anomaly, which would result in the affected allotments and associated road corridor being zoned solely *R2 – Low Density Residential*. Moreover, the minimum lot size, floor space ratio and building height (in the case of Stage 10D2) controls that align with the R2 zoning would also be applied.

The intended outcome of this Planning Proposal is to amend SLEP to ensure the zoning, minimum lot size, building height, floor space ratio and QBZ boundaries align with the subdivision layout.

This Planning Proposal has been prepared in accordance with Section 55 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and with regard to the then Department of Planning's *"A guide to preparing planning proposals".* Pursuant to Section 55 of the EP&A Act, this Planning Proposal includes the following:

> A statement of the objectives or intended outcomes of the proposed instrument

> An explanation of the provisions that are to be included in the proposed instrument

> The justification for those objectives, outcomes and provisions and the process for their implementation (including whether the proposed instrument will comply with the relevant directions under Section 117)

> If maps are to be adopted by the proposed instrument, such as maps for the proposed land use zones; heritage areas; flood prone land – a version of the maps containing sufficient detail to indicate the substantive effect of the proposed instrument

> Details of the community consultation that is to be undertaken before consideration is given to the making of the proposed instrument.

2 Site Description and Analysis

2.1 Subject Site

2.1.1 Stage 6F3

The Stage 6F3 subject site comprises three separate allotments and the Bonville Parkway road corridor within Stage 6F3 of the wider Shell Cove development. The three allotments are located along the western side of Bonville Parkway and are legally defined as:

> Lot 6772 DP 1194372

> Lot 6773 DP 1194372

> Lot 6788 DP 1194372

Each allotment is vacant, generally regular in shape and will be subject to future residential development. The road corridor is currently paved with asphalt, with all underground services present. **Figure 2-1** provides a Site Plan highlighting the location of each allotment and the road corridor.

The sites are not burdened by any environmentally significant communities, species or their habitats and do not contain any heritage items or watercourses.

2.1.2 Stage 10D2

The Stage 10 D2 subject site comprises five allotments and Rangoon Avenue road corridor, within the Stage 10D2 subdivision of the wider Shell Cove development. The five allotments within the subdivision are defined as:

> Lot 1255 DP 1175512

> Lot 1256 DP 1175512

> Lot 1257 DP 1175512

> Lot 1258 DP 1175512

> Lot 1264 DP 1175512

Each allotment is currently vacant, generally regular in shape and will support future low density residential development. The Rangoon Avenue road corridor is paved with asphalt, with underground services located in the verge between the road and the lot boundaries. **Figure 2-2** provides a Site Plan highlighting the location of each allotment at the road corridor.

The sites are not burdened by any environmentally significant communities, species or their habitats and do not contain any heritage items or watercourses.

2.2 Site Context

The subject sites are located at the south western and south eastern areas of Shell Cove. The surrounding context of each site is defined by a recent residential subdivision, with future development on each site being characterised by low density housing.

The Stage 6F3 site is bound by The Links Shell Cove Golf Course to the west and bushland to the east, with vacant allotments to the north and south. The Stage 10D2 site is bound by the future medium density and mixed use Boat Harbour Precinct to the north, a future public open space area to the east, the Bass Point Quarry haul road to the south and vacant and developed residential lots to the west.

The sites will support low density residential development that will form part of the wider low density context of the Shell Cove development.

Site Plan

LOTS 6772, 6773, 6788, STAGE 6F3, SHELL COVE

FIGURE 2-1

1:1,500 Scale at A3

Metres

0 20 40 60 80 100

N

Map Produced by Cardno (NSW/ACT) Pty Ltd (WOL)
Date: 2014-10-20
Coordinate System: GDA 1994 MGA Zone 56
Project: 112021-22
Map: G1001_SitePlan6F3.mxd 02
Aerial imagery supplied by Nearmap (July 2014)

Site Plan

LOTS 1255, 1256, 1257, 1258 AND 1264
STAGE 10D2, SHELL COVE

FIGURE 2-2

1:1,250 Scale at A3

Metres
0 20 40 60 80 100

N

Cardno

Map Produced by Cardno (NSW/ACT) Pty Ltd (WOL)
Date: 2014-10-20
Coordinate System: GDA 1994 MGA Zone 56
Project: 112021-22
Map: G1008_SitePlan10D2.mxd 01
Aerial imagery supplied by Nearmap (July 2014)

2.3 Current Land Use Restrictions

2.3.1 Shellharbour Local Environmental Plan 2013

SLEP provides the land use zoning and principal development standards applicable to the three allotments. The zoning and relevant principal development standards applicable to the sites include:

Stage 6F3

> **Zoning** – the three allotments are predominantly zoned *R2 – Low Density Residential*, with a minor portion of the sites zoned *E3 – Environmental Management*. Further, the road corridor is zoned *E3 – Environmental Management*, as illustrated in **Figure 2-3**.

> **Floor Space Ratio** – the three allotments are predominantly covered by a 0.5:1 floor space ratio control, with the small portions of the allotments and the road reserve associated with the E3 zone not containing any floor space ratio control, as illustrated in **Figure 2-4**.

> **Minimum Lot Size –** the three allotments are predominantly covered by a minimum lot size control of 450m^2, with the *E3* zoned portion of the site and the road reserve covered by a 40ha minimum lot size, as illustrated in **Figure 2-5**.

Stage 10D2

> **Zoning** – the five allotments are part zoned *R2 – Low Density Residential* and *RE1 – Public Recreation*, with the road reserve zoned *RE1 – Public Recreation*, as illustrated in **Figure 2-6**.

> **Floor Space Ratio –** the five allotments are partly covered by a 0.5:1 floor space ratio control, with the remaining portion of the allotments and the road reserve associated with the RE1 zone not containing any floor space ratio control, as illustrated in **Figure 2-7**.

> **Minimum Lot Size** – the five allotments are partly covered by a minimum lot size control of 450m^2, with the *RE1* zoned portion of the allotments and the road reserve not containing any control, as illustrated in **Figure 2-8**.

> **Maximum Building Height –** the five allotments are partly covered by a maximum building height control of 9m, with the portion of the allotments and the road reserve associated with the RE1 zone not containing any control, as illustrated in **Figure 2-9**.

> **Quarry Buffer Zoning –** the five allotments and Rangoon Avenue road reserve are partially encumbered by the QBZ, as illustrated in **Figure 2-10**.

The two sites and affected allotments are currently vacant with future development expected in the near future. As such, the zoning and allotment boundary anomaly needs to be addressed, as the presence of the E3 and RE1 zone, along with the absence of the floor space ratio, minimum lot size and building height (10D2 only) and QBZ (10D2 only) controls, having the following implications:

> The three impingements will affect the Exempt and Complying Development provisions potentially applicable to development on the lots under the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* (Exempt and Complying SEPP).

> The *E3* zoning impingement will affect a DA as the owner/applicant will have to provide additional information relating to the E3 zone.

> The QBZ impacts the development potential within the front (eastern) portion of the lots by requiring the consent authority to address Clause 13 of *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (SEPP Extractive Industries), which requires consideration of:

- *The existing uses and approved uses of land in the vicinity of the development, and*
- *Whether or not the development is likely to have a significant impact on current or future extraction or recovery of minerals, petroleum or extractive materials (including by limiting access to, or impeding assessment of, those resources), and*

- *Any ways in which the development may be incompatible with any of those existing or approved uses or that current or future extraction or recovery, and*
  - > *Evaluate and compare the respective public benefits of the development and the uses, extraction and recovery referred to in paragraph (a) (i) and (ii), and*
  - > *Evaluate any measures proposed by the applicant to avoid or minimise any incompatibility*…

These matters are discussed further in **Section 3.3**.

The intention of the zoning and subdivision was not to place this burden on the affected allotments. As a result, a Planning Proposal is required to rectify the anomalies.

NATIONAL AVENUE

HORIZONS AVENUE

GLADES PARKWAY

BONVILLE PARKWAY

RE2

Lot 6788

Lot 6773

Lot 6772

E3

Zone Boundary Anomaly

R2

Lot 6788

BONVILLE PARKWAY

E3

Zone Boundary Anomaly

Lot 6773

R2

Lot 6772

BONVILLE PARKWAY

E3

Legend

- Affected Allotments
- Stage 6F3 Subdivision Layout
- Cadastre (LPI, 2013)

Shellharbour LEP 2013 (DPE, 2014)

- E3 - Environmental Management
- R2 - Low Density Residential
- RE1 - Public Recreation
- RE2 - Private Recreation

Current Land Zoning Plan

LOTS 6772, 6773, 6788, STAGE 6F3, SHELL COVE

FIGURE 2-3

1:1,500 Scale at A3

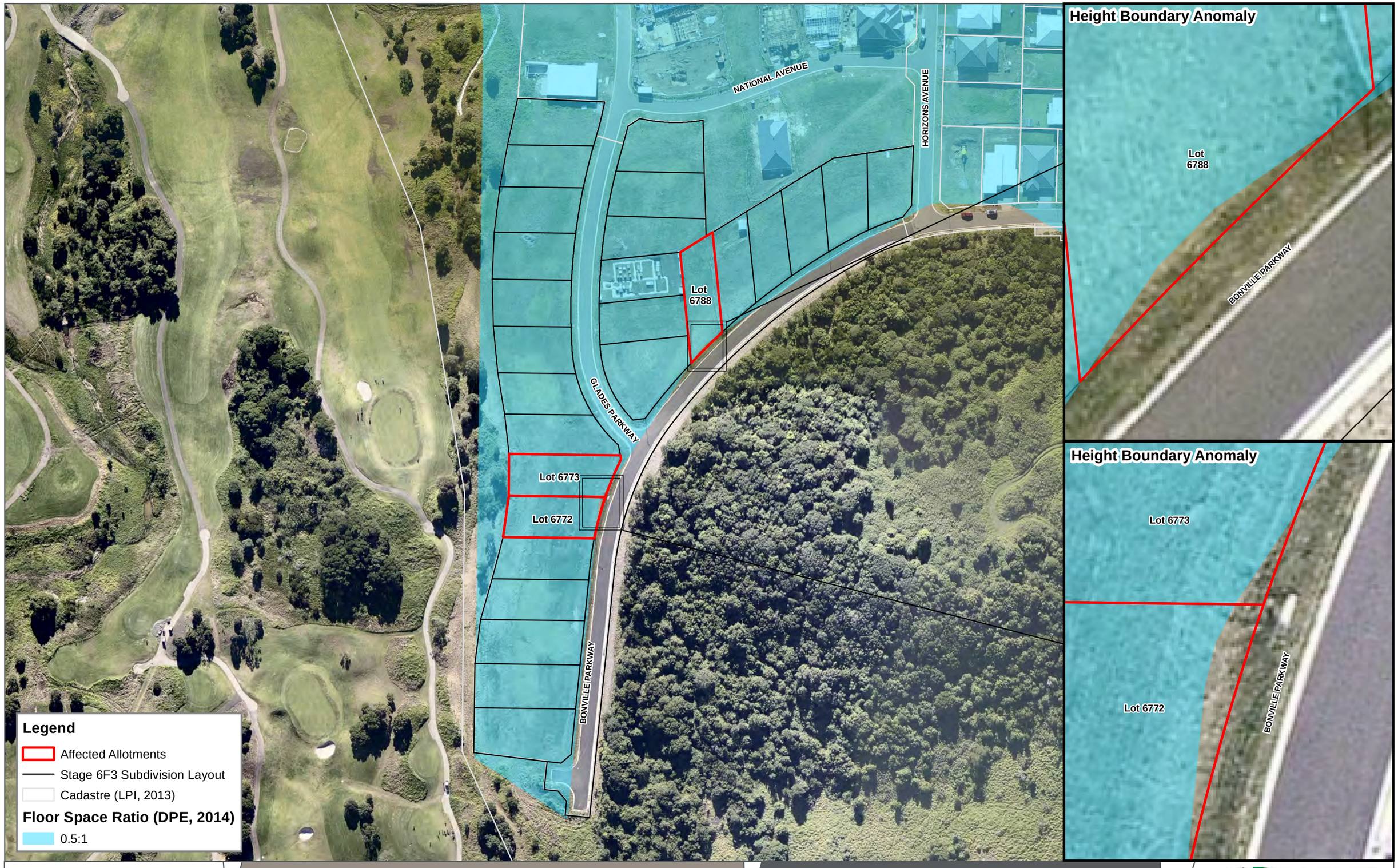
Metres

0 20 40 60 80 100

N

Cardno

Map Produced by Cardno (NSW/ACT) Pty Ltd (WOL)
Date: 2015-03-24
Coordinate System: GDA 1994 MGA Zone 56
Project: 112021-22
Map: G1002_CurrentZoningPlan6F3.mxd 04
Aerial imagery supplied by Nearmap (July 2014)



Current Floor Space Ratio Plan

LOTS 6772, 6773, 6788, STAGE 6F3, SHELL COVE

FIGURE 2-4

1:1,500 Scale at A3

Metres

0 20 40 60 80 100

N

Map Produced by Cardno (NSW/ACT) Pty Ltd (WOL)
Date: 2015-03-24
Coordinate System: GDA 1994 MGA Zone 56
Project: 112021-22
Map: G1003_CurrentFSRPlan6F3.mxd 03
Aerial imagery supplied by Nearmap (July 2014)

NATIONAL AVENUE

HORIZONS AVENUE

450 m2

Lot 6788

GLADES PARKWAY

Lot 6773

Lot 6772

BONVILLE PARKWAY

40 ha

Legend

- Affected Allotments
- Stage 6F3 Subdivision Layout
- Cadastre (LPI, 2013)

Minimum Lot Size (DPE, 2014)

- 40ha
- 450m2

FSR Boundary Anomaly

450 m2

Lot 6788

BONVILLE PARKWAY

40 ha

FSR Boundary Anomaly

Lot 6773

450 m2

Lot 6772

BONVILLE PARKWAY

40 ha

Current Floor Space Ratio Plan

LOTS 6772, 6773, 6788, STAGE 6F3, SHELL COVE

FIGURE 2-5

1:1,500 Scale at A3

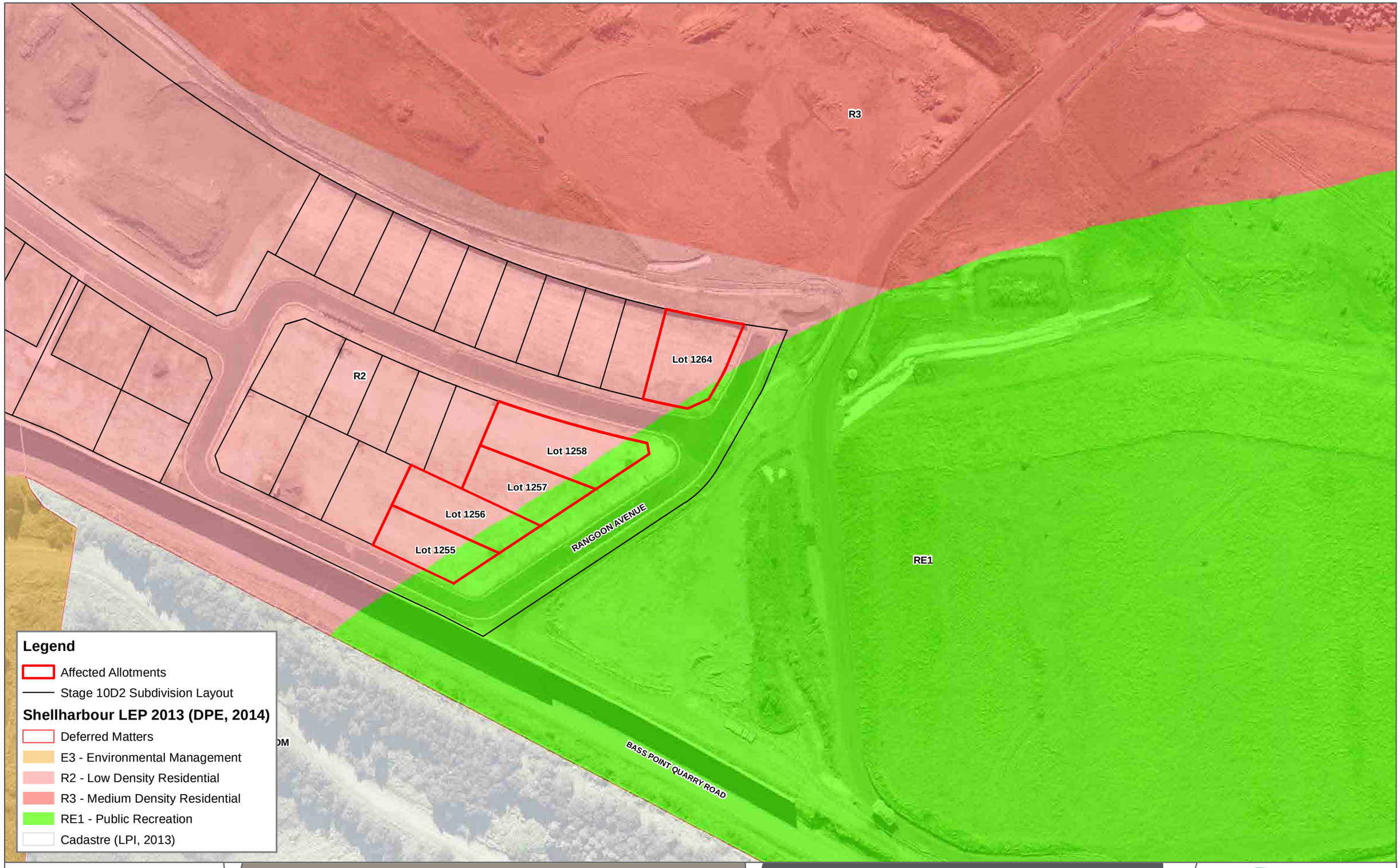
Metres

0 10 20 30 40

N

Cardno

Map Produced by Cardno (NSW/ACT) Pty Ltd (WOL)
Date: 2015-03-30
Coordinate System: GDA 1994 MGA Zone 56
Project: 112021-22
Map: G1004_CurrentLotSizePlan6F3.mxd 03
Aerial imagery supplied by Nearmap (July 2014)



Current Land Zoning Plan

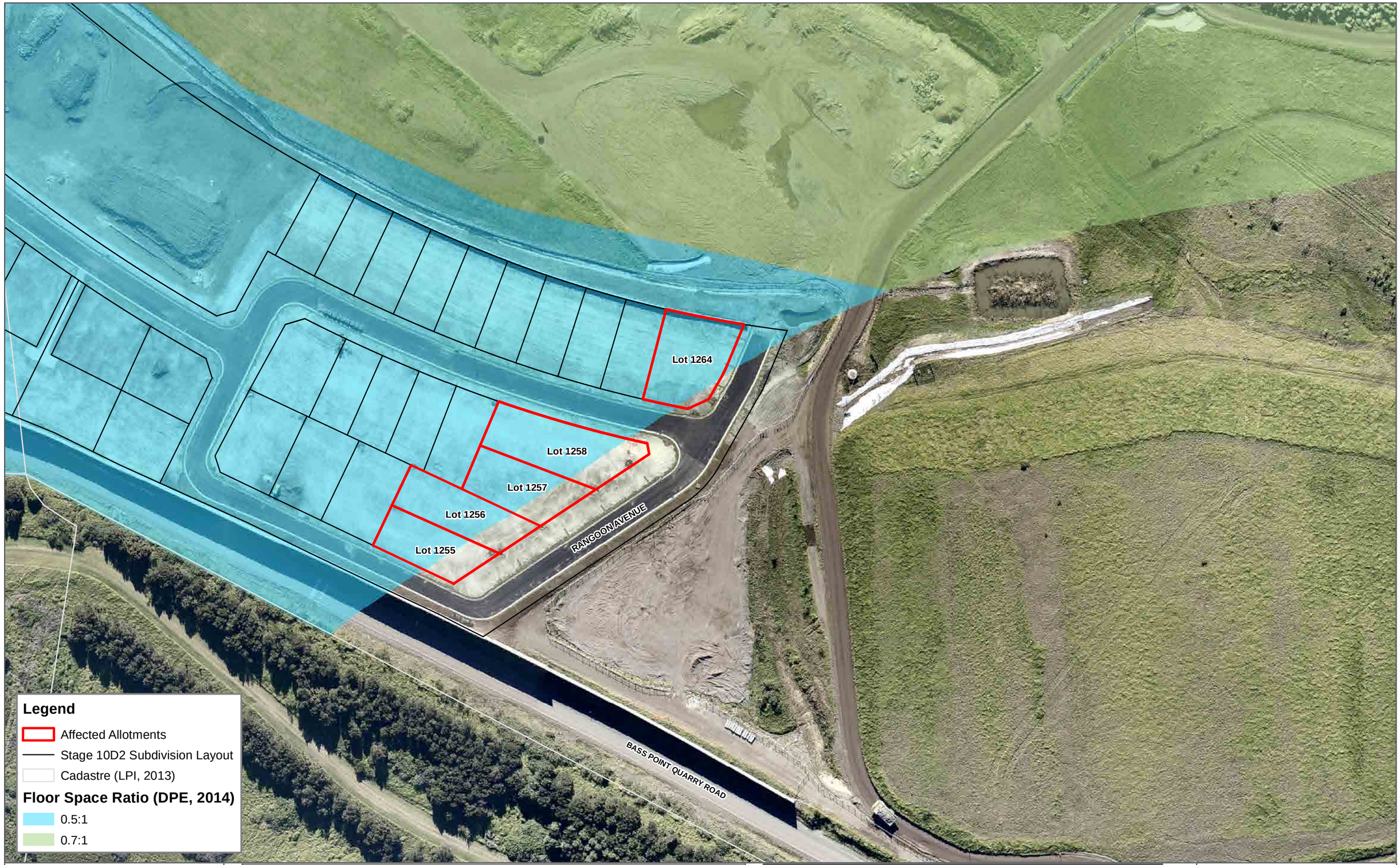
LOTS 1255, 1256, 1257, 1258 AND 1264
STAGE 10D2, SHELL COVE

FIGURE 2-6

1:1,250 Scale at A3

Metres
0 20 40 60 80 100

Map Produced by Cardno (NSW/ACT) Pty Ltd (WOL)
Date: 2014-10-20
Coordinate System: GDA 1994 MGA Zone 56
Project: 112021-22
Map: G1009_CurrentZoningPlan10D2.mxd 01
Aerial imagery supplied by Nearmap (July 2014)



Current Floor Space Ratio Plan

LOTS 1255, 1256, 1257, 1258 AND 1264
STAGE 10D2, SHELL COVE

FIGURE 2-7

1:1,250 Scale at A3

Metres
0 20 40 60 80 100

N

Cardno

Map Produced by Cardno (NSW/ACT) Pty Ltd (WOL)
Date: 2014-10-20
Coordinate System: GDA 1994 MGA Zone 56
Project: 112021-22
Map: G1010_CurrentFSRPlan10D2.mxd 01
Aerial imagery supplied by Nearmap (July 2014)

Lot 1264

Lot 1258

Lot 1257

Lot 1256

Lot 1255

RANGOON AVENUE

BASS POINT QUARRY ROAD

Legend

- Affected Allotments
- Stage 10D2 Subdivision Layout
- Cadastre (LPI, 2013)

Minimum Lot Size (DPE, 2014)

- 40 ha
- 450m^2

Current Minimum Lot Size Plan

LOTS 1255, 1256, 1257, 1258 AND 1264
STAGE 10D2, SHELL COVE

FIGURE 2-8

1:1,250 Scale at A3

Metres

0 20 40 60 80 100

N

Map Produced by Cardno (NSW/ACT) Pty Ltd (WOL)
Date: 2014-10-20
Coordinate System: GDA 1994 MGA Zone 56
Project: 112021-22
Map: G1011_CurrentLotSizePlan10D2.mxd 01
Aerial imagery supplied by Nearmap (July 2014)

Current Building Height Plan

LOTS 1255, 1256, 1257, 1258 AND 1264
STAGE 10D2, SHELL COVE

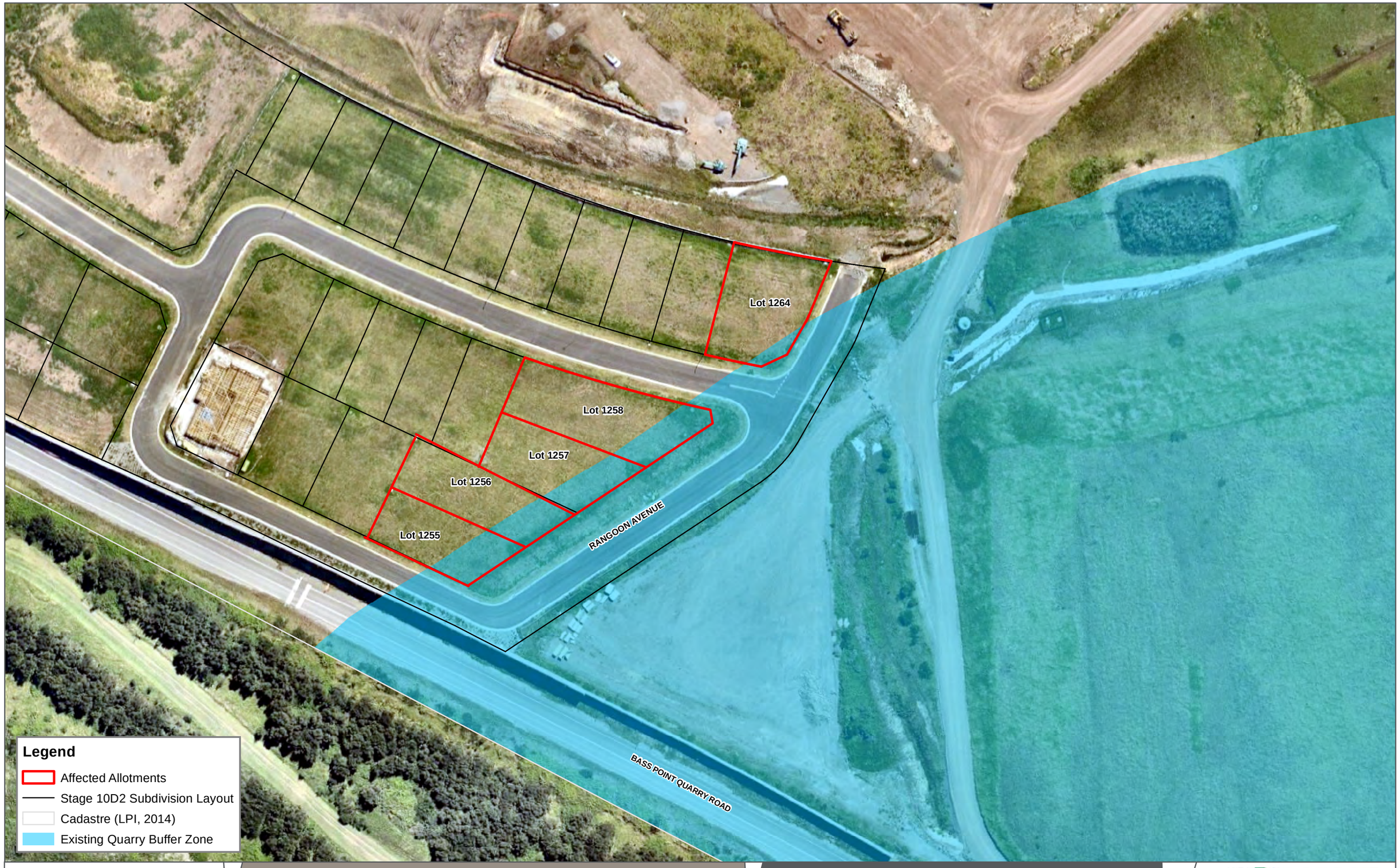
FIGURE 2-9

1:1,250 Scale at A3

Metres

0 20 40 60 80 100

Map Produced by Cardno (NSW/ACT) Pty Ltd (WOL)
Date: 2015-03-30
Coordinate System: GDA 1994 MGA Zone 56
Project: 112021-22
Map: G1012_CurrentHeightPlan10D2.mxd 01
Aerial imagery supplied by Nearmap (July 2014)



Existing Quarry Buffer Zone

LOTS 1255, 1256, 1257, 1258 AND 1264
STAGE 10D2, SHELL COVE

FIGURE 2-10

1:1,000 Scale at A3

Metres
0 20 40 60 80 100

N

Cardno

Map Produced by Cardno (NSW/ACT) Pty Ltd (WOL)
Date: 2015-03-23
Coordinate System: GDA 1994 MGA Zone 56
Project: 112021-22
Map: G1017_QuarryBufferZonePlan10D2.mxd 01
Aerial imagery supplied by Nearmap (March 2015)

3 Planning Proposal

This Planning Proposal needs to pass through the Department of Planning and Environment's (DPE) Gateway. The DPE initiated this process to streamline the creation of local environmental plans by allowing an initial review of the proposal at an early stage. This initial review gives an indication of whether the proposal has merit and should proceed further without the need to undertake extensive technical studies and reports.

Section 55 of the EP&A Act contains the requirements that a Planning Proposal must address. The first step of the process is for Council to prepare a Planning Proposal that addresses the key components of the local environmental plan and its justifications. Clause (2) details what a Planning Proposal must include. These are detailed in **Table 3-1**.

Figure 3-1 illustrates the detailed evolution of a Planning Proposal through to a local environmental plan amendment.

Table 3-1 Key Components of a Planning Proposal

Key Components	Response
A statement of the objectives or intended outcomes of the proposed instrument	Section 3.1
An explanation of the provisions that are likely to be included in the proposed instrument	Section 3.2
The justification for these objectives, outcomes and provisions and the process for their implementation	Section 3.3
If maps are to be adopted by the proposed instrument, such as maps for proposed land uses; heritage areas; flood prone land – a version of the maps containing sufficient detail to indicate the substantive effect of the proposed instrument	Figure 3-2 – Figure 3-8
Details of the community consultation that is to be undertaken before consideration is given to the making of the proposed instrument	Section 3.4

A Guide to Preparing Planning Proposals released in 2009 by the then Department of Planning outlines the specific questions that must be addressed for each component listed in **Table 3-1** by a Planning Proposal. These are detailed in the following sections.

3.1 Statement of Objectives

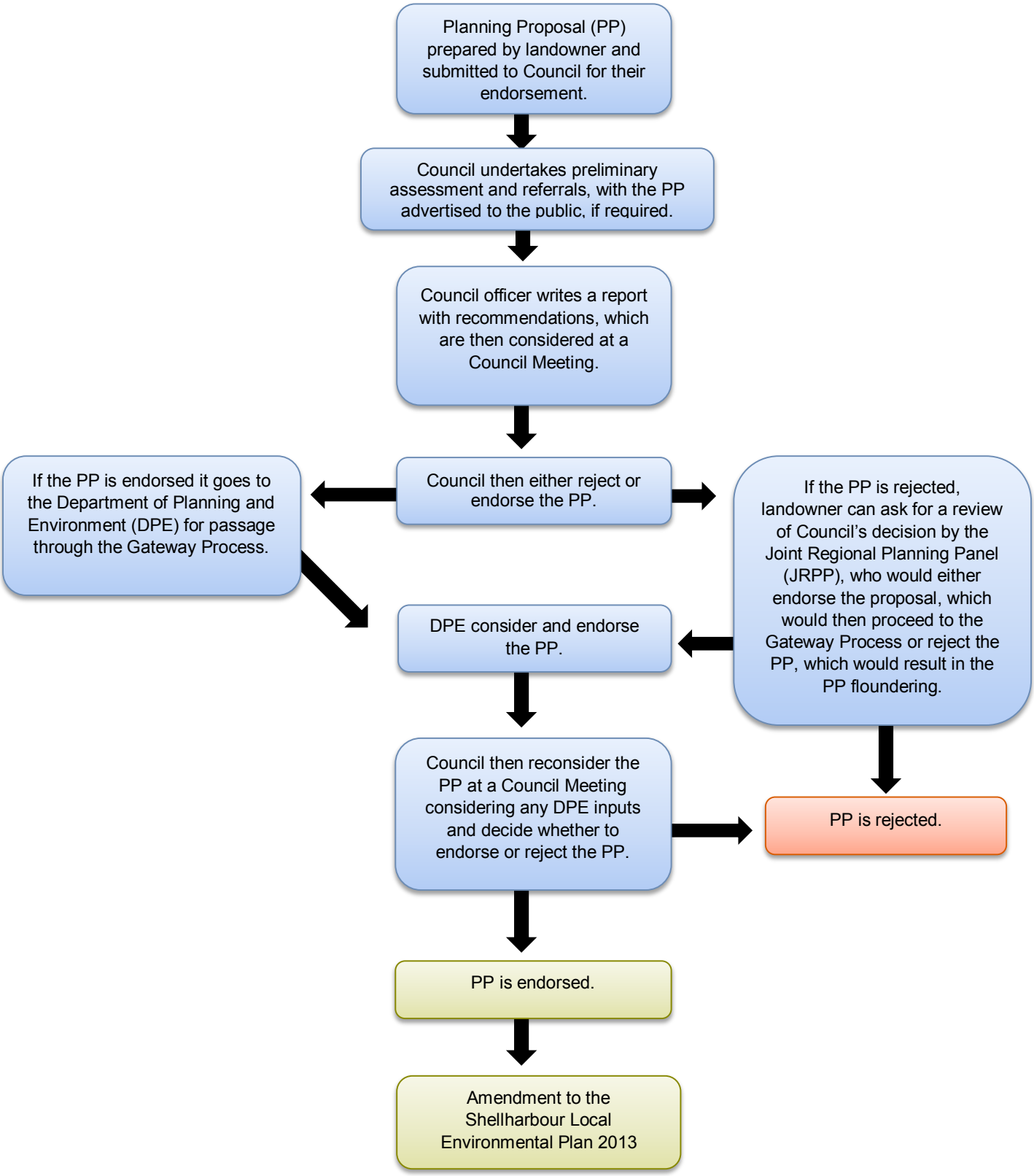
This Planning Proposal aims to amend the existing zoning, floor space ratio, minimum lot size, building height and QBZ boundaries for the identified areas within Shell Cove. Currently, the *E3 – Environmental Management* zone, *RE1 – Public Recreation* and *Significant Extractive Resources - Quarry Buffer* zones boundaries extend into residential allotments and the road reserve. This anomaly was not the intention of the subdivision or the zoning boundary. These zoning anomalies also result in the 0.5:1 floor space ratio, 450m^2 minimum lot size and the 9m building height (10D2 only) controls associated with the *R2 – Low Density Residential* zoning, to be out of alignment with the subdivision layout. Furthermore the QBZ controls unnecessarily encumber potential development on the Stage 10D2 lots as discussed further in **Section 3.3.3** and **Appendix A**. Consequently, this Planning Proposal aims to rectify these anomalies through an amendment to five SLEP maps.

Specifically, the Planning Proposal objectives are:

> *To amend the Land Zoning, Floor Space Ratio, Minimum Lot Size, Building Height and Significant Extractive Resources Shellharbour Local Environmental Plan 2013 maps. Specifically, these maps include the Land Zoning Map – Sheet LZN_031, Floor Space Ratio Map – Sheet FSR_031, Lot Size Map – Sheet LSZ_031, Height of Buildings Map – Sheet HOB_031 and Significant Extractive Resources Map (SER_031).*

> *To ensure future residential development on the eight allotments will not be unnecessarily burdened by the legislative restrictions or complications due to the current E3 – Environmental Management and RE1 – Public Recreation zones encroaching into the allotments designed for low density housing.*

Figure 3-1 Evolution of a Planning Proposal



3.2 Explanation of the Provisions

3.2.1 Local Environmental Plan Provisions

This Planning Proposal is to be implemented through a site specific amendment to SLEP. The proposal seeks to:

> Amend the SLEP Land Zoning Map (LZN_031). The *R2 – Low Density Residential* boundary will be expanded to cover all of Lots 6772, 6773 and 6788 and the Bonville Parkway road reserve for Stage 6F3, and Lots 1255, 1256, 1257, 1258 and 1264 and the Rangoon Avenue road reserve for Stage 10D2, as illustrated at **Figure 3-2** and **Figure 3-3**.

> Amend the SLEP Floor Space Ratio Map (FSR_031). The 0.5:1 boundary will be expanded to cover all of Lots 6772, 6773 and 6788 and the Bonville Parkway road reserve for Stage 6F3, and Lots 1255, 1256, 1257, 1258 and 1264 and the Rangoon Avenue road reserve for Stage 10D2, as illustrated at **Figure 3-4** and **Figure 3-5**.

> Amend the SLEP Minimum Lot Size Map (LSZ_031). The 450m^2 boundary will be expanded to cover all of Lots 6772, 6773 and 6778 and the Bonville Parkway road reserve for Stage 6F3, and Lots 1255, 1256, 1257, 1258 and 1264 and the Rangoon Avenue road reserve for Stage 10D2, as illustrated at **Figure 3-6** and **Figure 3-7**.

> Amend the SLEP Height of Buildings Maps (HOB_031). The 9m boundary will be expanded to cover all of Lots 1255, 1256, 1257, 1258 and 1264 and the Rangoon Avenue road reserve for Stage 10D2, as illustrated at **Figure 3-8**.

> Amend the SLEP Significant Extractive Resources Map (SER_031). The QBZ boundary will be relocated eastwards to remove its encumbrance from Lots 1255, 1256, 1257, 1258 and 1264 as illustrated by **Figure 3-9**.

These amendments would ensure that potential issues created by the E3, RE1 and QBZ zoning and associated controls on future residential development would be removed.

3.3 Justifications

3.3.1 Need for the Planning Proposal

Is the Planning Proposal a result of any strategic study or report?

This Planning Proposal is not the result of any strategic study or report due the minor nature of the anomaly, with no environmental impact expected.

Is the Planning Proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

It is considered that a Planning Proposal is the best way to achieve the objectives and intended outcomes of the mapping anomalies detailed above. This proposal seeks to address the boundary anomaly in an efficient and concise manner.

Is there a net community benefit?

The proposed resolution of the boundary anomaly is minor and will not have wider positive or negative community benefits.

Correcting the anomaly associated with the three SLEP maps will improve the operation of the SLEP document, which will of wider benefit to the community and the affected landowners.

3.3.2 Relationship to Strategic Planning Framework

Is the Planning Proposal consistent with the objectives and actions of the applicable regional or sub-regional strategy?

The proposal is consistent with the *Illawarra Regional Strategy 2006* as it will ensure the successful delivery of residential dwellings to the Illawarra housing stock, removing the legislative restrictions on the sites due to the boundary anomaly.

Is the Planning Proposal consistent with the local Council's Community Strategic Plan, or other local strategic plan?

It is considered that the proposal is consistent with *Shellharbour City Community Strategic Plan 2013-2023*, despite the rectification of zoning boundary anomalies not connected to a particular action item.

3.3.3 Relationship to State Level Statutory Planning Policies and Directions

Section 117 directions are guidelines that set conditions and issues, which planning proposals must address. These guidelines are designed to ensure that all planning proposals are given appropriate consideration before they are implemented. **Table 3-2** below provides an assessment of this Planning Proposal against the relevant S 117 Directions.

State Environmental Planning Policies (SEPPs) are typically used to supplement Local Environmental Plans to ensure that particular matters are regulated consistently across the entire state, or to override local planning controls in specific circumstances where the State Government sees a need for direct intervention. The interaction between SEPPs and planning proposals must be considered to avoid unanticipated effects or consequences. **Table 3-3** below provides an assessment of this Planning Proposal against the relevant SEPPs.

Table 3-2 Relevant Section 117 Ministerial Directions

Section 117 Direction	Objective	Comment
2.2 Coastal Protection	*1) The objective of this direction is to implement the principles in the NSW Coastal Policy.*	The proposal does not alter the operation of the SEPP 71: Coastal Protection within the SLEP and does not contain any provisions counter to the objectives or requirements of the Coastal Protection Act 1979.
2.3 Heritage Conservation	*1) The objective of this direction is to conserve items, areas, objects and places of environmental heritage significance and indigenous heritage significance.*	The proposal facilitates the separation of areas identified for housing from areas designated for environmental protection and conservation. The proposal does not compromise the operation of SLEP protections for matters heritage or environmental significance. The proposal avoids imposing unnecessary burdens on development on land which has already been identified as suitable for development.
3.1 Residential Zones	*The objectives of this direction are:* *a) To encourage a variety and choice of housing types to provide for existing and future housing needs,* *b) To make efficient use of existing infrastructures and services to ensure that new housing has appropriate access to infrastructures and services, and* *c) To minimise the impacts of residential on the environment and resource land.*	The proposal will rectify the SLEP mapping anomaly to reflect the desired zoning, floor space ratio and minimum lot size controls for the affected allotments. This will ensure the site can align with the objectives of the direction
3.3 Home Occupations	*1) The objective of this direction is to encourage the carrying out of low-impact small businesses in dwelling houses.*	This planning proposal will not alter the permissibility of business operations in dwelling houses.
3.4 Integrating Land Use and Transport	*1) The objective of this direction is to ensure that urban structures, building forms, land use locations, development designs, subdivision and street layouts achieve the following planning objectives:* *a. improving access to housing, jobs and services by walking, cycling and public transport, and* *b. increasing the choice of available transport and reducing dependence on cars, and* *c. reducing travel demand including the number of trips generated by development and the distances travelled, especially by car, and* *d. supporting the efficient and viable operation of public transport services, and* *e. providing for the efficient movement of freight.*	This planning proposal ensures that the site can be developed as intended by the Shell Cove Master Plan, through rectification of boundary anomalies which have arisen in the drafting of the SLEP. The master planning process has already designed Shell Cove to meet the objectives of the planning direction. This planning proposal simply allows these objectives to be met as was originally intended.

Section 117 Direction	Objective	Comment
4.1 Acid Sulfate Soils	1) *The objective of this direction is to avoid significant adverse environmental impacts from the use of land that has a probability of containing acid sulfate soils.*	This planning proposal does not affect SLEP controls on land which is identified as affected by Acid Sulfate Soils.
4.3 Flood Prone Land	1) *The objectives of this direction are:* a. *to ensure that development of flood prone land is consistent with the NSW Government's Flood Prone Land Policy and the principles of the Floodplain Development Manual 2005, and* b. *to ensure that the provisions of an LEP on flood prone land is commensurate with flood hazard and includes consideration of the potential flood impacts both on and off the subject land.*	This proposal does not impact on land subject to flooding risks. Land with flooding risks has already been allocated to protective environmental zones as part of the Shell Cove Master Planning process. This proposal simply provides for zone boundaries and controls to exist as they were intended.
4.4 Planning for Bushfire Protection	1) *The objectives of this direction are:* a. *to protect life, property and the environment from bush fire hazards, by discouraging the establishment of incompatible land uses in bush fire prone areas, and* b. *to encourage sound management of bush fire prone areas.*	This planning proposal does not affect SLEP controls regarding land which is identified as Bushfire prone. Small areas of Shell Cove including the site are classified as bushfire prone land by Council mapping.
5.1 Implementation of Regional Strategies	1) *The objective of this direction is to give legal effect to the vision, land use strategy, policies, outcomes and actions contained in regional strategies.*	This planning proposal supports the continued development of the Shell Cove area for housing. By rectifying the problematic boundary anomalies in the SLEP, the long term strategic goal of developing Shell Cove can be achieved. Shell Cove is identified for development in the Illawarra Regional Strategy (2006) and the Draft Illawarra Regional Growth and Infrastructure Plan (2014).
6.1 Approval and Referral Requirements	1) *The objective of this direction is to ensure that LEP provisions encourage the efficient and appropriate assessment of development.*	The proposal does not include provisions that require concurrence, consultation or referral of development applications to a minister or public authority.
6.2 Reserving Land for Public Purposes	1) *The objectives of this direction are:* a. *to facilitate the provision of public services and facilities by reserving land for public purposes, and* b. *to facilitate the removal of reservations of land for public purposes where the land is no longer required for acquisition.*	This planning proposal does not affect SLEP land reservations for public purposes.
6.3 Site Specific Provisions	1) *The objectives of this direction is to discourage unnecessarily restrictive site specific planning controls*	The proposal relates to the rectification of a boundary anomaly, with the site specific changes to controls considered necessary and justified.

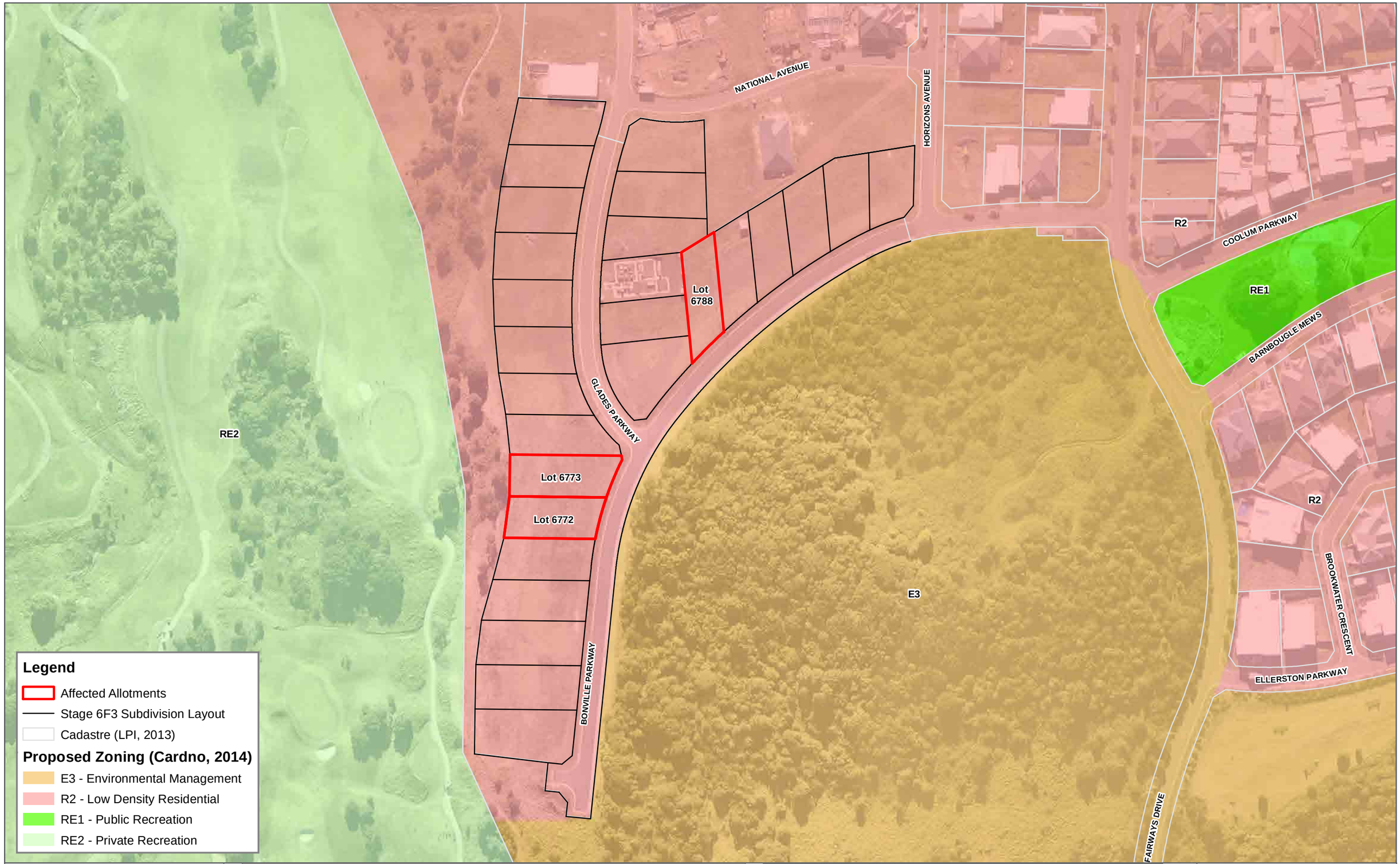
Table 3-3 Relevant State Environmental Planning Policies

State Environmental Planning Policies	Objectives	Comment
State Environmental Planning Policy No 14—Coastal Wetlands	*The aim of this policy is to ensure that the coastal wetlands are preserved and protected in the environmental and economic interests of the State.*	The proposal does not affect any land containing or adjacent to SEPP 14 wetlands. The proposal does not affect the operation of SEPP 14 within the SLEP.
State Environmental Planning Policy No 71—Coastal Protection	*(1) This Policy aims:* *a) to protect and manage the natural, cultural, recreational and economic attributes of the New South Wales coast, and* *b) to protect and improve existing public access to and along coastal foreshores to the extent that this is compatible with the natural attributes of the coastal foreshore, and* *c) to ensure that new opportunities for public access to and along coastal foreshores are identified and realised to the extent that this is compatible with the natural attributes of the coastal foreshore, and* *d) to protect and preserve Aboriginal cultural heritage, and Aboriginal places, values, customs, beliefs and traditional knowledge, and* *e) to ensure that the visual amenity of the coast is protected, and* *f) to protect and preserve beach environments and beach amenity, and* *g) to protect and preserve native coastal vegetation, and* *h) to protect and preserve the marine environment of New South Wales, and* *i) to protect and preserve rock platforms, and* *j) to manage the coastal zone in accordance with the principles of ecologically sustainable development (within the meaning of section 6 (2) of the Protection of the Environment Administration Act 1991), and* *k) to ensure that the type, bulk, scale and size of development is appropriate for the location and protects and improves the natural scenic quality of the surrounding area, and*	This planning proposal ensures that the site can be developed as intended by the Shell Cove Master Plan, through rectification of boundary anomalies which have arisen in the drafting of the SLEP. The master planning process has already designed Shell Cove to meet the objectives of the planning direction. This planning proposal simply allows these objectives to be met as was originally intended. The proposal does not affect the operation of SEPP 71 within the SLEP.

State Environmental Planning Policies	Objectives	Comment
	l) to encourage a strategic approach to coastal management. *2) This Policy:* *a) (Repealed)* *b) requires certain development applications to carry out development in sensitive coastal locations to be referred to the Director-General for comment, and* *c) identifies master plan requirements for certain development in the coastal zone.* *3) This Policy aims to further the implementation of the Government's coastal policy.*	
State Environmental Planning Policy (Exempt and Complying Development Codes) 2008	*This Policy aims to provide streamlined assessment processes for development that complies with specified development standards by:* *a) providing exempt and complying development codes that have State-wide application, and* *b) identifying, in the exempt development codes, types of development that are of minimal environmental impact that may be carried out without the need for development consent, and* *c) identifying, in the complying development codes, types of complying development that may be carried out in accordance with a complying development certificate as defined in the Act, and* *d) enabling the progressive extension of the types of development in this Policy, and* *e) providing transitional arrangements for the introduction of the State-wide codes, including the amendment of other environmental planning instruments.*	The proposal will rectify the SLEP mapping anomalies. A significant effect of this is that the exempt and complying development codes will apply to sites which are at present disqualified by virtue of their mixed zoning. The proposal does not affect the operation of SEPP (Exempt and Complying Development) within the SLEP.
State Environmental Planning Policy (Infrastructure) 2007	*The aim of this Policy is to facilitate the effective delivery of infrastructure across the State by:* *a) improving regulatory certainty and efficiency through a consistent planning regime for infrastructure and the provision of services, and*	The proposal will rectify the SLEP mapping anomalies. A significant effect of this is that the areas of sites which are rezoned to R2 may now be capable of additional infrastructure land uses as set out by the SEPP (Infrastructure). The proposal does not affect the operation of SEPP (Infrastructure) within the SLEP.

State Environmental Planning Policies	Objectives	Comment
	b) providing greater flexibility in the location of infrastructure and service facilities, and *c) allowing for the efficient development, redevelopment or disposal of surplus government owned land, and* *d) identifying the environmental assessment category into which different types of infrastructure and services development fall (including identifying certain development of minimal environmental impact as exempt development), and* *e) identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure development, and* *f) providing for consultation with relevant public authorities about certain development during the assessment process or prior to development commencing.*	
State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007	*The aims of this Policy are, in recognition of the importance to New South Wales of mining, petroleum production and extractive industries:* *a) to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State, and* *b) to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources, and* *c) to promote the development of significant mineral resources, and* *d) to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources* *Clause 13 (2) Before determining an application to which this clause applies, the consent authority must:* *(a) consider:*	The proposal would not impact the extraction of resources, as the existing approval held by the Bass Point Quarry already requires compliance with the blast emission ANZECC criteria at all nearby residences. The Shell Cove Master Plan, which included the current Stage 10D2 boundary was already approved prior to the Quarry approval. Consequently, the Stage 10D2 location would have been considered in this assessment, with the commitment made to ensure no impact. Consequently, the current QBZ places an unnecessary encumbrance on the lots and Rangoon Avenue. Further discussion is provided at **Appendix A**. Minor amendment to the QBZ would allow quarrying operations to continue with no further encumbrance beyond that already imposed by the existing Bass Point Quarry approval, with no additional impact on the future dwellings, as identified within assessments undertaken to date. The proposal would not impact on site extraction or haulage routes, with both aspects of quarrying operations considered in this document. The relocation of the QBZ would allow appropriate planning controls to remain in place to encourage sustainable development while allowing extraction to continue.

State Environmental Planning Policies	Objectives	Comment
	(i) the existing uses and approved uses of land in the vicinity of the development, and *(ii) whether or not the development is likely to have a significant impact on current or future extraction or recovery of minerals, petroleum or extractive materials (including by limiting access to, or impeding assessment of, those resources), and* *(iii) any ways in which the development may be incompatible with any of those existing or approved uses or that current or future extraction or recovery, and* *(b) evaluate and compare the respective public benefits of the development and the uses, extraction and recovery referred to in paragraph (a) (i) and (ii), and* *(c) evaluate any measures proposed by the applicant to avoid or minimise any incompatibility, as referred to in paragraph (a) (iii*	
Illawarra Regional Environmental Plan No 1 (Deemed SEPP)	*The Illawarra Regional Environmental Plan aims to provide a range of objectives to guide planning and development within the Illawarra Region. A range of objectives apply to certain land uses that need to be considered in the LEP making process. Part 7 provides objectives relating to living areas.* *The objectives relating to living areas are:* *(a) to ensure that urban expansion is orderly and efficient having regard to the constraints of the natural environment and that sufficient land is available to prevent price rises resulting from scarcity of land,* *(b) to ensure that new residential land or land for higher density development is only developed where there are adequate utility and community services available or there is a commitment from the relevant authorities or developer to provide those services,* *(c) to provide for a range of lot sizes, dwelling types and tenure forms to cater for varying household needs in all local government areas,* *(d) to ensure that residential development does not take place on hazard-prone lands, and* *(e) to minimise bush fire risks to urban development.*	The proposal aligns with the above planning objectives in the following ways: The proposal relates to two sites that are part of the planned Shell Cove community and will ensure residential, environmental and recreation lands are zoned appropriately. The proposal relates to newly released land and has access to utility and community services. This planning proposal will not affect this. The proposal will ensure that new dwellings can be developed without any unnecessary legal requirements slowing their delivery. The planning proposal will not result in residential development taking place on hazard prone lands. The planning proposal will not result in residential development taking place on bushfire prone lands.



Proposed Land Zoning Plan

LOTS 6772, 6773, 6788, STAGE 6F3, SHELL COVE

FIGURE 3-2

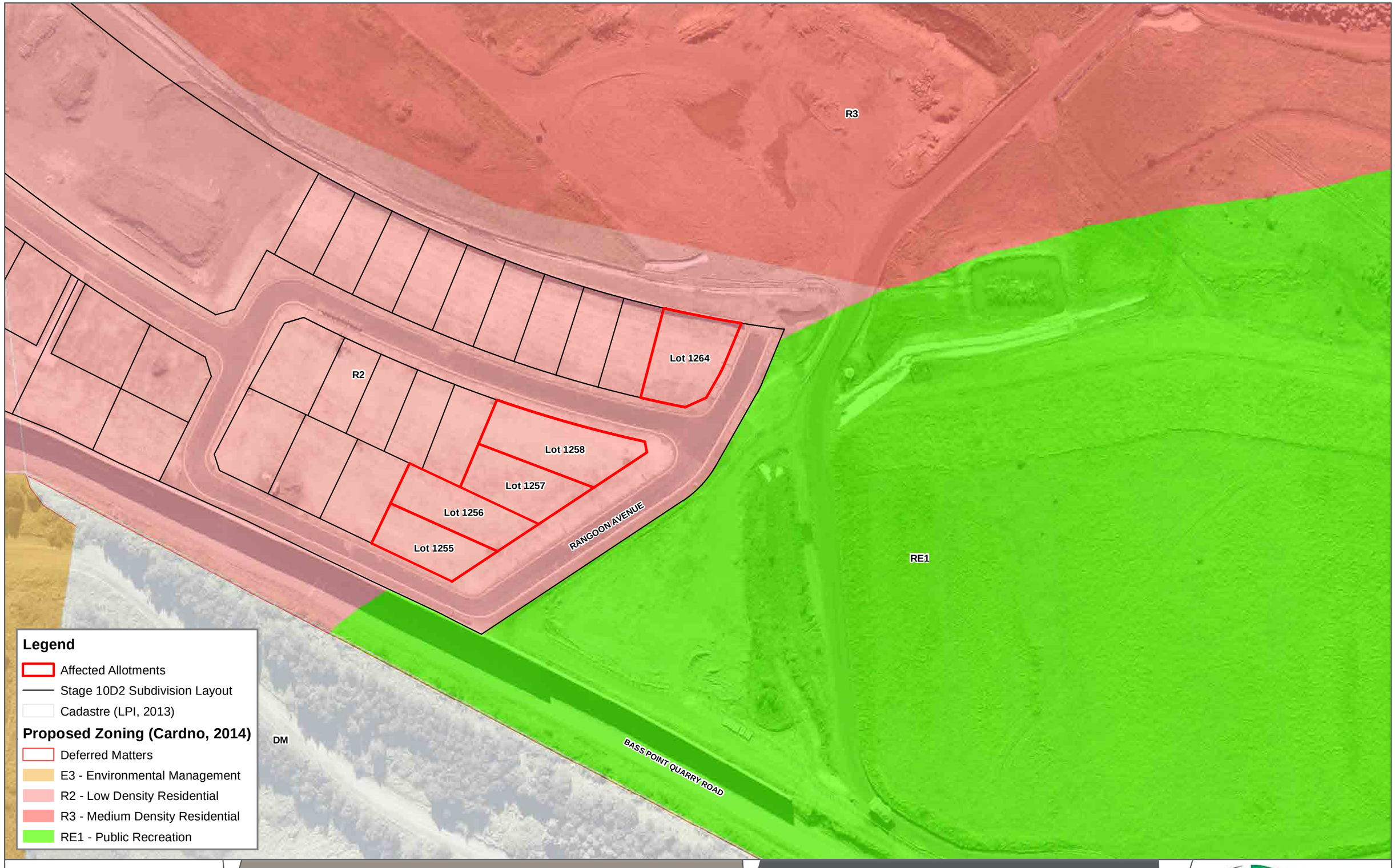
1:1,500 Scale at A3

Metres

0 20 40 60 80 100

N

Map Produced by Cardno (NSW/ACT) Pty Ltd (WOL)
Date: 2014-10-23
Coordinate System: GDA 1994 MGA Zone 56
Project: 112021-22
Map: G1005_ProposedZoningPlan6F3.mxd 02
Aerial imagery supplied by Nearmap (July 2014)



australand

Proposed Land Zoning Plan

LOTS 1255, 1256, 1257, 1258 AND 1264
STAGE 10D2, SHELL COVE

FIGURE 3-3

1:1,250 Scale at A3

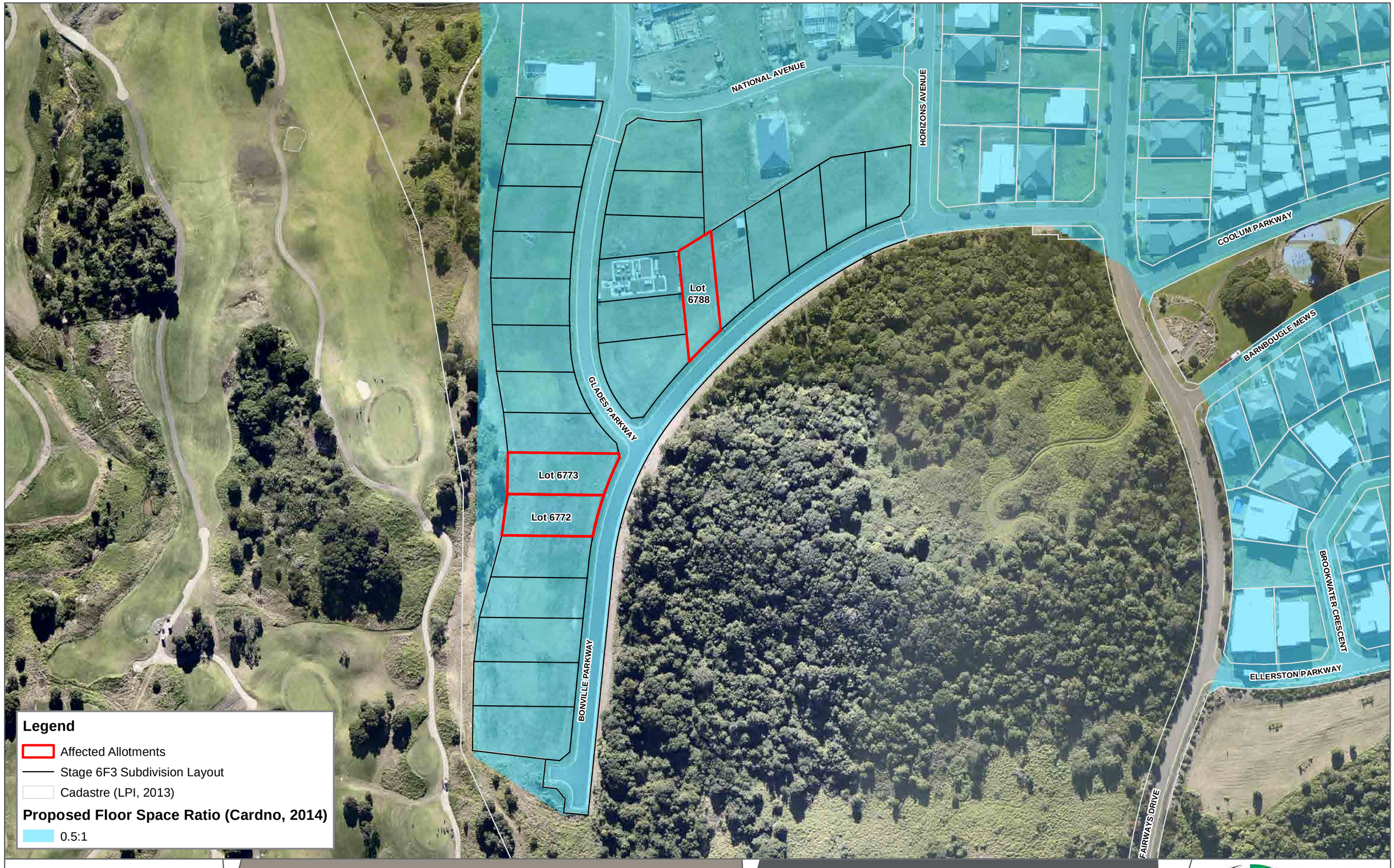
Metres

0 20 40 60 80 100

N

Cardno

Map Produced by Cardno (NSW/ACT) Pty Ltd (WOL)
Date: 2014-10-23
Coordinate System: GDA 1994 MGA Zone 56
Project: 112021-22
Map: G1013_ProposedZoningPlan10D2.mxd 01
Aerial imagery supplied by Nearmap (July 2014)



Proposed Floor Space Ratio Plan

LOTS 6772, 6773, 6788, STAGE 6F3, SHELL COVE

FIGURE 3-4

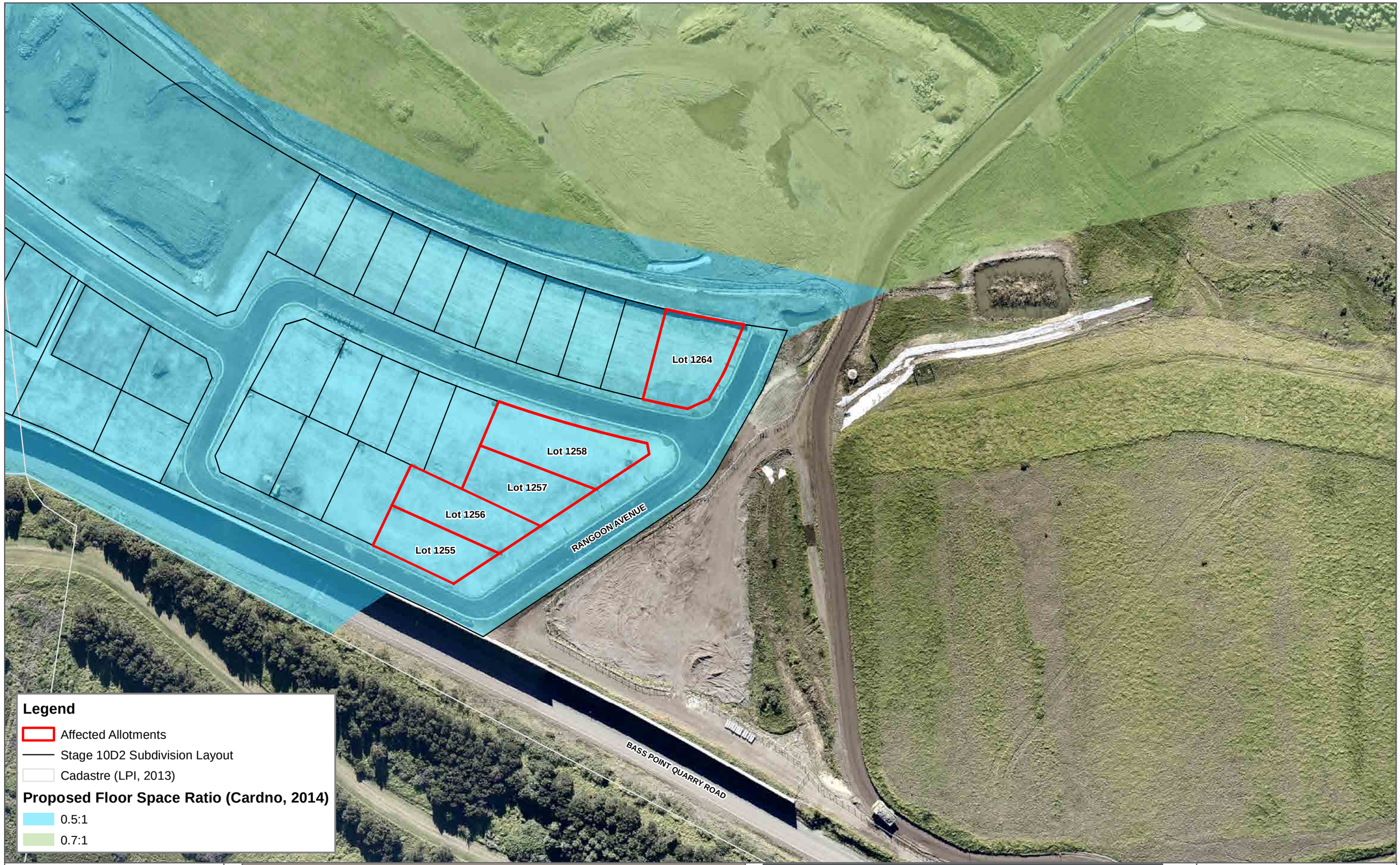
1:1,500 Scale at A3

Metres

0 20 40 60 80 100

N

Map Produced by Cardno (NSW/ACT) Pty Ltd (WOL)
Date: 2014-10-23
Coordinate System: GDA 1994 MGA Zone 56
Project: 112021-22
Map: G1006_ProposedFSRPlan6F3.mxd 02
Aerial imagery supplied by Nearmap (July 2014)



Proposed Floor Space Ratio Plan

LOTS 1255, 1256, 1257, 1258 AND 1264
STAGE 10D2, SHELL COVE

FIGURE 3-5

1:1,250 Scale at A3

Metres
0 20 40 60 80 100

N

Map Produced by Cardno (NSW/ACT) Pty Ltd (WOL)
Date: 2014-10-23
Coordinate System: GDA 1994 MGA Zone 56
Project: 112021-22
Map: G1014_ProposedFSRPlan10D2.mxd 01
Aerial imagery supplied by Nearmap (July 2014)

Proposed Minimum Lot Size Plan

LOTS 6772, 6773, 6788, STAGE 6F3, SHELL COVE

FIGURE 3-6

1:1,500 Scale at A3

Metres

0 20 40 60 80 100

N

Map Produced by Cardno (NSW/ACT) Pty Ltd (WOL)
Date: 2015-03-24
Coordinate System: GDA 1994 MGA Zone 56
Project: 112021-22
Map: G1007_ProposedLotSizePlan6F3.mxd 03
Aerial imagery supplied by Nearmap (July 2014)

Lot 1264

Lot 1258

Lot 1257

Lot 1256

Lot 1255

RANGOON AVENUE

BASS POINT QUARRY ROAD

Legend

- Affected Allotments
- Stage 10D2 Subdivision Layout
- Cadastre (LPI, 2013)

Proposed Minimum Lot Size (Cardno, 2014)

- 40 ha
- 450m^2

Proposed Minimum Lot Size Plan

LOTS 1255, 1256, 1257, 1258 AND 1264
STAGE 10D2, SHELL COVE

FIGURE 3-7

1:1,250 Scale at A3

Metres

0 20 40 60 80 100

N

Cardno

Map Produced by Cardno (NSW/ACT) Pty Ltd (WOL)
Date: 2015-03-24
Coordinate System: GDA 1994 MGA Zone 56
Project: 112021-22
Map: G1015_ProposedLotSizePlan10D2.mxd 02
Aerial imagery supplied by Nearmap (July 2014)

Proposed Building Height Plan

LOTS 1255, 1256, 1257, 1258 AND 1264
STAGE 10D2, SHELL COVE

FIGURE 3-8

1:1,250 Scale at A3

Metres
0 20 40 60 80 100

N

Cardno

Map Produced by Cardno (NSW/ACT) Pty Ltd (WOL)
Date: 2014-10-23
Coordinate System: GDA 1994 MGA Zone 56
Project: 112021-22
Map: G1016_ProposedHeightPlan10D2.mxd 01
Aerial imagery supplied by Nearmap (July 2014)

Proposed Quarry Buffer Zone

LOTS 1255, 1256, 1257, 1258 AND 1264
STAGE 10D2, SHELL COVE

FIGURE 3-9

1:1,000 Scale at A3

Metres
0 20 40 60 80 100

N

Cardno

Map Produced by Cardno (NSW/ACT) Pty Ltd (WOL)
Date: 2015-04-27
Coordinate System: GDA 1994 MGA Zone 56
Project: 112021-22
Map: G1018_ProposedQuarryBufferZonePlan10D2.mxd 01
Aerial imagery supplied by Nearmap (March 2015)

3.3.4 Environmental, Social and Economic Impact

Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected as a result of the proposal?

The proposal will not contribute to any adverse impacts to critical habitat or threatened species, populations or ecological communities, or their habitats.

Are there any other likely environmental effects of the planning proposal?

No other environmental effects will occur as the result of this planning proposal. Council has requested that the impact of noise and vibration from existing quarry operations be assessed for the Stage 10D2 site as a result of the QBZ relocation eastwards. Cardno undertook a Study to evaluate the impact of quarry operations including quarry blasting on the site (refer to **Appendix A**). The Cardno Study of operational noise reviewed the modelling accompanying the Bass Point Quarry Environmental Assessment (EA) to determine the quarry's operational noise impacts on subdivision 10D2. This study confirms that under each scenario for quarry operations, the noise levels at the subdivision will be below EPA noise criteria.

The quarry's EA includes provisions for the progressive adjustment of blasting operations to maintain compliance with ANZECC criteria at the closest residence. This anticipates the development of Shell Cove in line with the Shell Cove Master Plan which was approved in 1996 and has always indicated that residential development would occur on and around the 10D2 site. Therefore as Stage 10D2 is developed the quarry will revise their blasting program so that the ANZECC criteria are not exceeded.

A study of haulage noise by Wilkinson Murray has been reviewed, which found that the 10D2 subdivision will experience some haulage noise, but that single storey homes with appropriate acoustic mitigation measures can be constructed in compliance with EPA noise criteria (Refer to **Appendix B**) The Wilkinson Murray report informed the acoustic restrictions that were placed on title when the stage 10D2 plan of subdivision was registered (DP1175512). The noise contours extend through that part of the site currently within the QBZ, with acoustic attenuation to be provided to future residences within the Stage 10D2 site.

How has the Planning Proposal adequately addressed any social and economic effects?

The purpose of the proposal is to correct the boundary anomaly so as to have a positive social and economic effect on the eight affected allotments, through reduced legislative restrictions for future development. The proposal will not have any negative impacts on the wider social or economic welfare of the Shellharbour LGA.

3.3.5 State and Commonwealth Interests

Is there adequate public infrastructure for the Planning Proposal?

The subject site is serviced by all essential utility services, due to the recent completion of the subdivision.

What are the views of State and Commonwealth Public Authorities consulted in accordance with the gateway determination and have they resulted in any variations to the Planning Proposal?

The DPE was consulted to determine the most applicable way to rectify this boundary anomaly. They stated that the preparation of a Planning Proposal is the most appropriate way to address the anomaly, ensuring that this proposal has in-principle support.

No other authorities were consulted.

3.4 Community Consultation

It is considered that community consultation, including public exhibition, is not required due to the limited extent of the changes, which are simply rectifying an anomaly. Furthermore, the changes would not create any environmental or community impacts. As a result, consultation is not considered necessary.

4 Conclusion and Recommendation

4.1 Conclusion

This Planning Proposal illustrates that the proposed amendments to SLEP is appropriate for the two subject sites, namely Stage 6F3 and Stage 10D2 of the Shell Cove development. The changes would comprise revisions to land use zoning, floor space ratio, minimum lot size, building height and QBZ controls to rectify the SLEP boundary anomalies.

The Planning Proposal will not result in any environmental impact, with this being a minor amendment and rectification of the associated mapping within SLEP. This is required to ensure the affected lots will not be unnecessarily burdened by the anomalies when seeking future residential development on the current vacant lots.

The success of the proposal will allow residential development to add to the housing stock of the Shellharbour LGA.

Overall, the proposal meets the guidance given from applicable Section 117 Ministerial Directions and State Environmental Planning Policies, and has been prepared in accordance with Section 55 of the *Environmental Planning and Assessment Act 1979* and the Department of Planning and Environment's *Guide to Preparing Planning Proposals.*

4.2 Recommendation

It is recommended that Shellharbour City Council submit this documentation with the formal Planning Proposal to NSW Planning and Environment with a request for a Gateway determination.

LEP Boundary Anomalies – Stage 6F3 and Stage 10D2, Shell Cove

APPENDIX

A

BASS POINT QUARRY PLANNING PROPOSAL – STAGE 10D2, SHELL COVE – NOISE BUFFER BOUNDARY REVIEW

Cardno
Shaping the Future

Our Ref pl_E032_150424_10JM.docx

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Monday, 27 April 2015

Cardno (NSW/ACT) Pty Ltd
Level 1, 47 Burelli Street
WOLLONGONG NSW 2500

Attention: Daniel Thompson

Dear Daniel,

BASS POINT QUARRY
PLANNING PROPOSAL - STAGE 10D2, SHELL COVE
NOISE BUFFER BOUNDARY REVIEW

Cardno Acoustics have been engaged to review an Environmental Assessment prepared by Heggies Pty Ltd (Heggies ref: Report 10-3389-R1 Revision 0 dated 24 May 2010) (the EA) which was prepared in support of the Bass Point Quarry extension, to determine the suitability of a residential development (the subject site) partially located within the current Quarry Buffer Zone (QBZ) for Stage 10D2, Shell Cove (Lots 1255-1258 inclusive). This letter supports previous correspondence to Shellharbour City Council (SCC) from Cardno (*Cardno Ref: 111060-02/Letter 001, 17/02/2015*) by providing further technical detail to address SCC's concerns in a site specific manner.

Of concern is noise generated by quarry operations, air blast, and vibration due to blasting. These items have been included in this desktop review, with predicted levels extrapolated from results detailed in the EA. We have reviewed the criteria contained in the EA, and consider that the noise and vibration benchmarks are current and suitable for application in this review.

Quarry generated traffic impacting the subject site was previously assessed separately in a report prepared by Wilkinson Murray (*Wilkinson Murray Ref: Report No. 00229-G Version D*) (the Road Traffic Noise Assessment). The Road Traffic Noise Assessment concluded that the construction of single storey dwellings was conditionally acceptable. The findings of the Road Traffic Noise Assessment are summarised in this review.

1. Approved Blasting

The future expansion of Shell Cove towards the quarry site has clearly been anticipated in the EA, Shell Cove is mentioned specifically on page 80 of the EA in the context of sensitive receptors to blasting and vibration. "*the surrounding suburb of Shell Cove is undergoing significant residential development, with vacant lots approved for dwelling construction*". Stage 10D2 is the most recent step in this ongoing development. The development of Shell Cove has been coordinated by a master plan since its approval in 1996.

In the context of blast emissions the EA recommends that "*..all blasts are monitored at the closest/potentially most affected residence in order to establish compliance with the nominated criteria..*" (page 83).

The EA notes on page 15 that Australand lodged an application under Part 3A for approval of the Shell Cove Masterplan. The approved Shell Cove Masterplan shows stage 10D2 in numerous figures. It can therefore, be concluded that Hanson's commitment in the EA was made with the full understanding of the anticipated future development of Shell Cove in line with its

masterplan. In addition, the stage 10D2 DA was approved on 3 February 2011 prior to the approval of the EA for the quarry expansion on 28 January 2014.

The EA also requires the quarry operator "*..progressively update the blast emissions site laws in order to optimise future blast designs, based on actual site conditions. In this way, the site laws can be used to assist with the blast designs in order to ensure compliance with ANZECC criteria are met at all nearby residences.*" (page 83.) Thus the EA clearly anticipates the need to adjust blasting operations as Shell Cove encroaches on the quarry site. The ANZECC noise limits of 115dB and 120dB are referenced in EPL 2193 which permits quarry operations on the site and was last updated following the EA in 2011. This suggests that failure to comply with these noise limits at nearby residences could result in suspension of the license.

The Shell Cove masterplan includes development of future residential lots that are closer to the quarry operation than Stage 10D2 and the proposed location of the QBZ (refer Figure 2). As such, Hanson have committed in their EA to further modify their blast designs to ensure there is no environmental impacts on residences that are closer the quarry operations that the subject site. Stage 10D2 and any dwellings constructed within the subject site will therefore not be the controlling point for Hanson's blast design once the next phases of the approved development within Shell Cove are completed. Any marginal impacts on blast design caused by the relocation of the QBZ at the subject site are therefore only relevant to quarry operations in the short term.

2. Baseline Noise Monitoring

The EA included noise monitoring results from a number of locations, as well as the adoption of noise monitoring results referenced from an earlier study prepared by Wilkinson Murray in 2005. Monitoring Location 7 (R7) was the nearest monitoring location to the subject site. Data for this site was obtained by Heggies during preparation of the EA rather than from the Wilkinson Murray report.

R7 is located approximately 350 metres west of the subject site and a similar distance to Bass Point Quarry Haul Road as the subject site. Additionally, there is no significant intervening topography between the two locations. Taking these factors into account, we have assumed that the R7 monitoring location and the subject site are located within the same noise catchment area, and that baseline monitoring results at this location could be used as the basis of the criteria at the subject site. An aerial photo showing the location of the subject site, R7, and the quarry is attached to this letter (Figure 1).

The results of the noise monitoring at R7 resulted in the Rating Background Levels (RBL) displayed in Table 1.

Table 1: Recommended Subject Site RBL (Heggies 2010)

Time Period	RBL
Day, 7am -6pm	36
Evening, 6pm-10pm	35
Night, 10pm-7am	33

3. Assessment Criteria

3.1 Air-blast

The EA outlined limits for air-blast to prevent building damage and human discomfort. The limits for structural damage were taken from work conducted by the US Bureau of Mines. The limits for human comfort and disturbance were based upon the Australian and New Zealand Environment Council (ANZECC) guidelines. The limits applied in the EA are presented as follows:

Table 2: Recommended Airblast Noise Limits (Heggies 2010)

Criteria	Criteria Source	Noise Limit, dB	Comments
Structural Damage	US Bureau of Mines	132dB at 2Hz or Lower 130dB at 6Hz or Lower	Depends on the low frequency limit of measurement device
Human	ANZECC	115dB	Can be exceeded in 5% of blasts over a 12 month

Criteria	Criteria Source	Noise Limit, dB	Comments
Comfort			period.
		120dB	Not to be exceeded

3.2 Blast Vibration

The EA specified blast vibration limits for preventing building damage that were adopted from British Standard BS 7385-2: 1993 "*Evaluation and measurement for vibration in buildings - Part 2 Guide to damage levels from groundborne vibration*". The limits for human comfort and disturbance were based upon the ANZECC guidelines. The applicable limits for vibration are shown in Table 3.

Table 3: Recommended Vibration Limits (Heggies 2010)

Criteria	Peak Component Particle Velocity (mm/s)	Standard
Disturbance to Persons (Day)	5 mm/s	ANZECC
Damage to Dwellings	15 mm/s at 4 Hz increasing to 20 mm/s at15 Hz, increasing to 50mm/s at 40 Hz and	BS 7385

3.3 Airborne Noise

The EA determined the *Controlling Noise Criteria* for R7 in accordance with the NSW *Industrial Noise Policy* (NSW EPA, 2000). The Controlling Noise Criteria represent the more stringent of the *Intrusiveness Criteria* or the *Amenity Criteria*. In all cases, the Intrusiveness Criteria was the most stringent noise limit. The noise limits for R7 recommended in the EA applicable to the subject site are therefore provided in Table 4.

Table 4: Recommended Subject Site Controlling Noise Criteria (Heggies 2010)

Time Period	Intrusiveness Criteria	Amenity Criteria	Controlling Noise Criteria
Day, 7am -6pm	41	60	**41**
Evening, 6pm-10pm	40	50	**40**
Night, 10pm-7am	38	45	**38**

3.4 Site Generated Road Traffic Noise

The Road Traffic Noise Assessment applied noise limits for the subject site as detailed in Table 5.

Table 5: Noise Level Criteria as Determined by the NSW EPA (Wilkinson Murray 2014)

Time Period	Intrusiveness Criteria $L_{Aeq, 15\ min}$	Amenity Criteria $L_{Aeq, period}$
Day, 7am -6pm	50	60
Evening, 6pm-10pm	45	50
Night, 10pm-7am	40	45

Note: On Sundays and Public Holidays, the daytime period is 8.00am-6.00pm and night time is 10.00pm-8.00am

4. Predicted Noise & Vibration Levels

4.1 Airblast Levels

The EA for the expanded quarry blasting operations indicates an extrapolated noise level at the existing QBZ of 121.4 dB for current blasting operations indicating that the blasting activities are likely to require adjustment to comply with the ANZECC limits at the current QBZ.

A calculation in accordance with Australian Standard "*AS 2187.2-2006 Explosives-Storage and use, Part 2: Use of explosives*", Appendix J was carried out to predict the increase in airblast levels between the subject site boundary and the QBZ.

Based upon a separation distance of 450 metres between a blast and the subject site boundary, and distance attenuation of 8.7 dBL per doubling of distance from the blast, we predict that airblast levels will be 0.3 dB(L) lower at the existing QBZ than at the proposed subject site boundary. This is considered a marginal increase and would not be subjectively detectably louder than that currently being experienced at the existing QBZ.

4.2 Predicted Vibration Levels

The subject site is located approximately 450m from the nearest potential location for quarry blasting. The EA had not presented predicted levels for this distance. Extrapolation of data presented in Figure 5 of the EA indicates a predicted level of 3.5mm/s at the site, which complies with the recommended vibration limits (5mm/s). Extrapolation of the data to the existing QBZ results in a predicted level of 3.4 mm/s, which is 0.1 mm/s lower.

4.3 Operational Noise

Based upon a separation distance of 450 metres between the future quarry pit and the proposed site boundary, and a noise reduction of 6dB per doubling of distance from the sound source, we predict that noise levels at the proposed site boundary will 0.2 dB(A) higher than at the existing QBZ. A shift in sound pressure level of 1-2 dB would not be perceptible to most people, therefore an increase of 0.2 dB(A) should not be regarded as significant.

In addition, a review of operational noise was conducted to evaluate compliance at the proposed subject site boundary. R7 was nominated in the EA as a receiver location; therefore predicted noise levels from this location have been extrapolated to the proposed site boundary. The EA provided predicted noise impacts in tabulated form for R7 and as noise contour maps, which included the Quarry and encompassed a radius of potentially impacted residential areas. The noise contour maps included R7 and the subject site, therefore a comparison of the predicted levels between these two locations was possible.

Predicted noise levels in the EA were provided for 4 operational scenarios, which were as follows:

1. Initial works only in the eastern extraction pit, an extraction rate of 2.4 Mtpa, and a pit RL of 20m.
2. Initial works only in the western extraction pit, an extraction rate of 2.4 Mtpa, and a pit RL of 10m.
3. Works only in the eastern extraction pit, an extraction rate of 4 Mtpa, and a RL of -10m.
4. Works only in the western extraction pit, an extraction rate of 4 Mtpa, and a RL of -40m.

The predicted noise levels for R7 are presented in Table 6.

Table 6: Predicted Noise Levels R7 (Heggies 2010)

Scenario	Predicted Noise Level, dB(A), $L_{Aeq\ 15min}$	Controlling Noise Criteria			Complies
		Day	Evening	Night	
1	32	41	40	38	Yes
2	31	41	40	38	Yes
3	32	41	40	38	Yes
4	29	41	40	38	Yes

The noise levels presented in Table 6 were predicted to comply with the day, evening, and night criteria.

To determine whether this same outcome would be likely to be achieved at the subject site, a review of the noise contour maps indicates that predicted noise levels at the subject site may be in the range 0-3 dB(A) higher than the predicted noise levels at R7.

A distance correction calculated at 6 dB per doubling of distance from the quarry indicates a correction of +5 dB(A) is appropriate. Therefore applying a correction factor of +5 dB(A) to the predicted levels for R7 may provide a conservative estimate of noise impacts at the subject site. This results in predicted noise levels at the subject site, for Scenarios 1-4 as detailed in Table 7.

Table 7: Predicted Noise Levels R7

Scenario	Predicted Noise Level, dB(A), $L_{Aeq\ 15min}$	Controlling Noise Criteria			Complies
		Day	Evening	Night	
1	37	41	40	38	Yes
2	36	41	40	38	Yes
3	37	41	40	38	Yes
4	34	41	40	38	Yes

Based on the noise levels presented in Table 7, compliance with recommended noise limits, for the four operational scenarios assessed in the EA, is predicted to be achieved.

4.4 Road Traffic Noise

The predicted road traffic noise levels in Figure 6-1 of the Road Traffic Noise Assessment outlined that proposed lots 1255-1258 of Stage 10D2 Shell Cove were permitted to have single storey dwellings provided acoustic mitigation measures were incorporated. The predicted levels exceeded the criteria for two storey dwellings; therefore only single storey dwellings were recommended to be permitted. Restrictions to this affect have been registered on the title via DP 1175512.

5. Conclusions

The review has indicated the following conclusions:

- Hanson's Bass Point Quarry operates under EPL2193 which requires Hanson to ensure that limits for operation noise, vibration and air blast are not exceeded at the closest residential lot.
- The EA that supported Hanson's application for the proposed quarry expansion recommends that Hanson's current blasting methodologies be modified to ensure that license requirements are met as the Shell Cove development advances.
- The application for the quarry expansion and the recommendations and commitments within it were made on the full understanding of the masterplanned extents of the Shell Cove development, including Stage 10D2.
- Relocation of the Quarry Buffer Zone as proposed in Australand's Planning Proposal impacts the key environmental criteria at dwellings constructed within the subject site as follows:

Impact Type	Unit	Effect of QBZ Relocation
Operational Noise (day)	dB(A)	+0.2
Vibration	mm/s	+0.1
Air blast	dB(L)	+0.3

- It is considered that the increases in impacts at the subject site when compared to the current QBZ location are very marginal. These increases are readily manageable and should have a negligible impact on quarry operations.
- The Shell Cove masterplan includes development of future residential lots that are closer to the quarry operation than Stage 10D2 and the proposed location of the QBZ. As such, Hanson have committed in their EA to further modify their blast designs to ensure there is no environmental impacts on residences that are closer the quarry operations that the subject site. Stage 10D2 and any dwellings constructed within the subject site will not be the

controlling point for Hanson's blast design once the next phases of the approved development within Shell Cove are completed. Any marginal impacts on blast design caused by the relocation of the QBZ at the subject site are therefore only relevant to quarry operations in the short term.

- The predicted levels provided in this assessment, including operational noise and vibration, were extrapolated from results provided in the EA for the quarry expansion, and road traffic noise assessment carried out by others. No attempt has been made to determine the validity or accuracy of the data and information contained within the EA or the Road Traffic Noise Assessment.

We trust that the above information is constructive. Please do not hesitate to contact the undersigned if you require clarification of the above.

Yours sincerely

Julie McDonagh
Manager Acoustics Qld
For **Cardno**

Figure 1: Subject Site, Quarry and R7 Locations (Nearmap 2015)

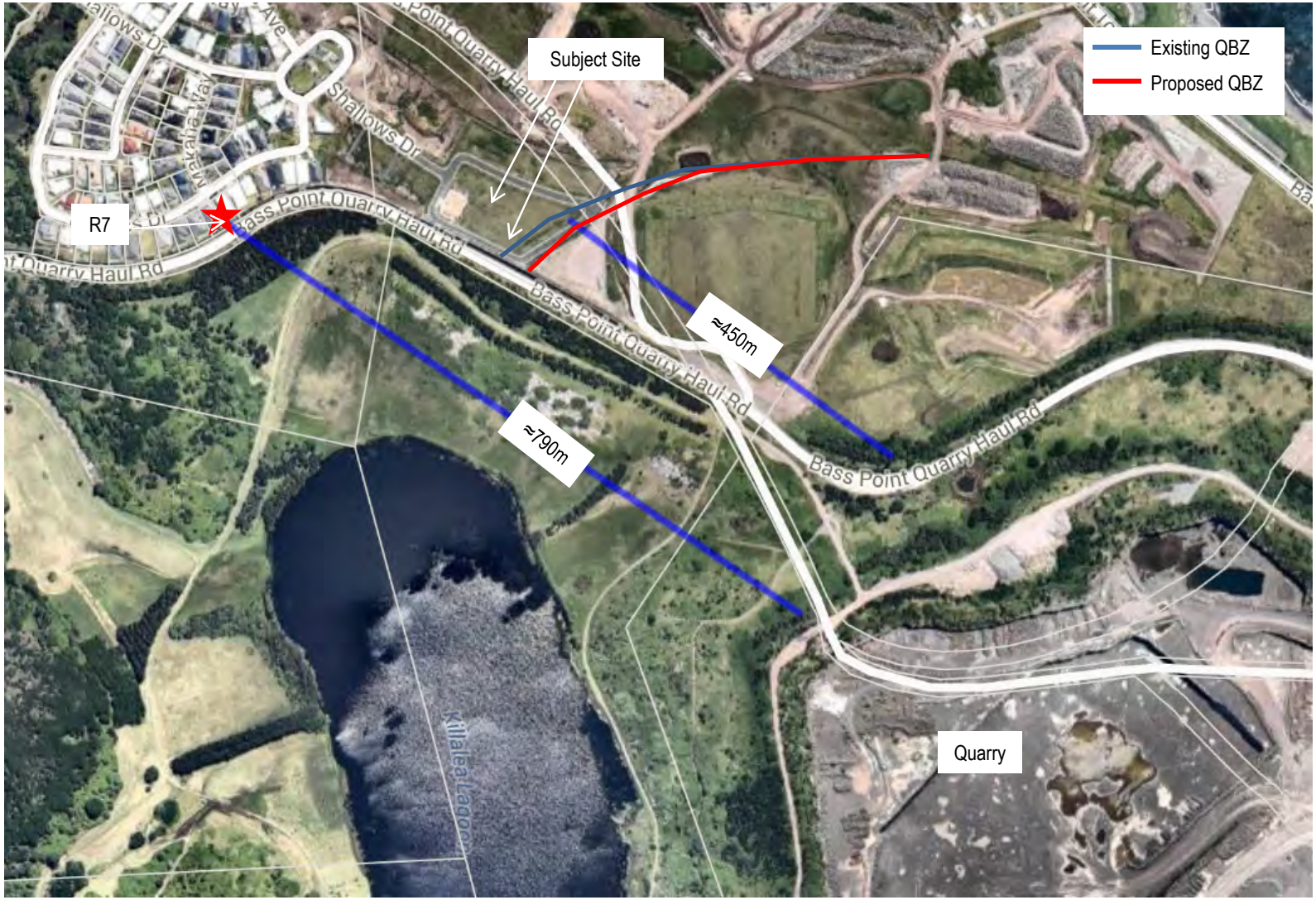
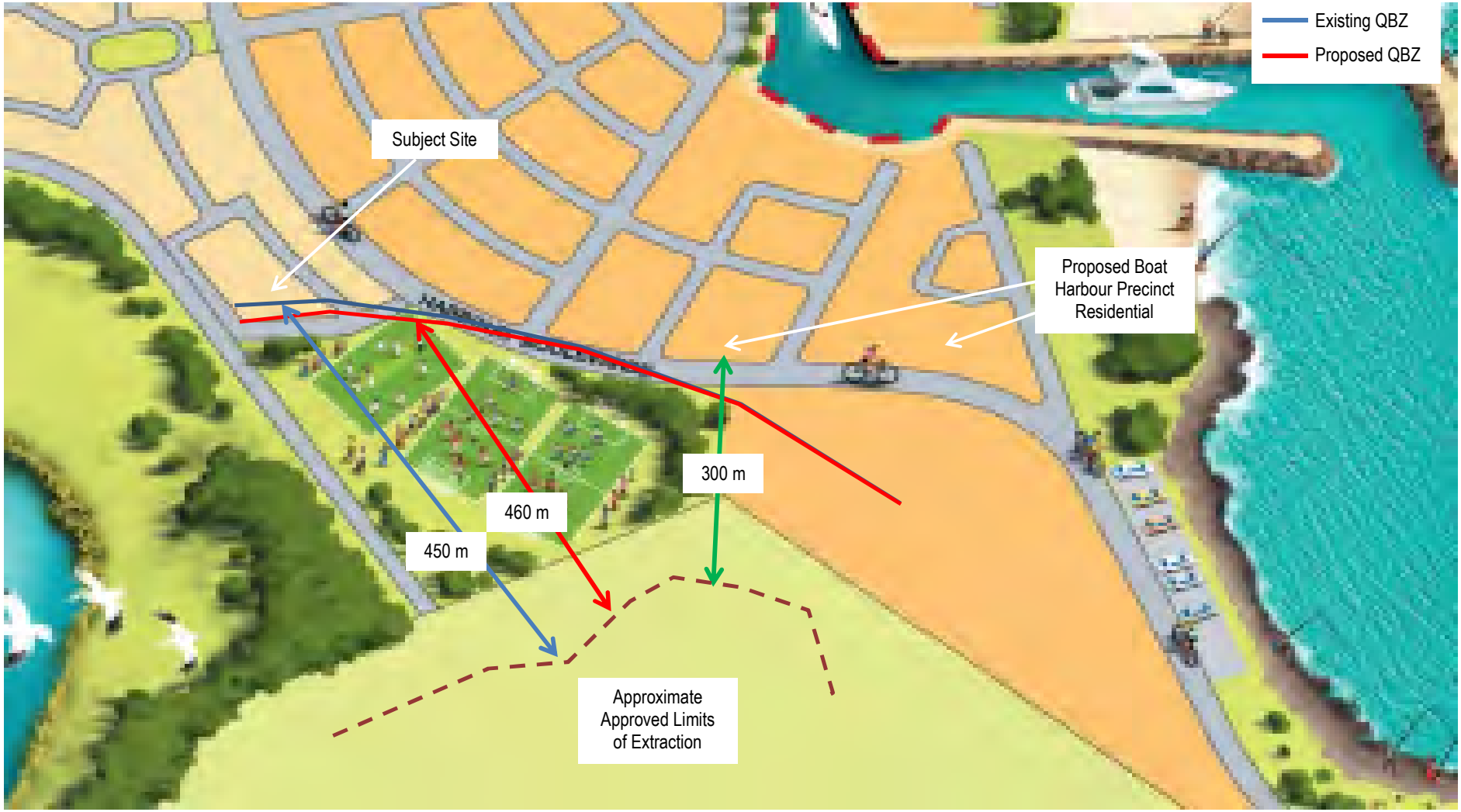


Figure 2: Subject Site, Referenced to the Shell Cove Development Masterplan



LEP Boundary Anomalies – Stage 6F3 and Stage 10D2, Shell Cove

APPENDIX

B

ASSESSMENT OF NOISE IMPACT – STAGE 10D2 (WILKINSON MURRAY, 2014)

Cardno
Shaping the Future

ACOUSTICS AND AIR

BASS POINT QUARRY HAUL ROAD

ASSESSMENT OF NOISE IMPACT - STAGE 10D2

REPORT NO. 00229-G
VERSION D

SEPTEMBER 2014

PREPARED FOR

AUSTRALAND HOLDINGS LTD
PO BOX A148
SHELLHARBOUR NSW 2529

WILKINSON MURRAY

DOCUMENT CONTROL

Version	Status	Date	Prepared By	Reviewed By
A	Final	31 October 2013	Sam Demasi	Rob Bullen
B	Final	20 November 2013	Sam Demasi	-
C	Final	19 August 2014	Sam Demasi	Rob Bullen
D	Final	3 September 2014	Sam Demasi	-

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Wilkinson Murray is an independent firm established in 1962, originally as Carr & Wilkinson. In 1976 Barry Murray joined founding partner Roger Wilkinson and the firm adopted the name which remains today. From a successful operation in Australia, Wilkinson Murray expanded its reach into Asia by opening a Hong Kong office early in 2006. 2010 saw the introduction of our Queensland office and 2011 the introduction of our Orange office to service a growing client base in these regions. From these offices, Wilkinson Murray services the entire Asia-Pacific region.

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GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

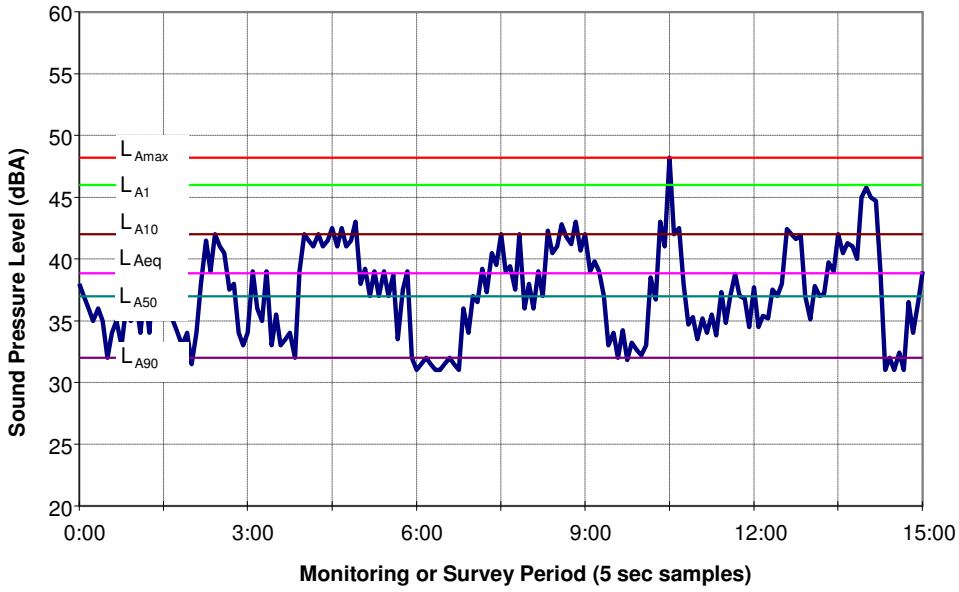
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.

Typical Graph of Sound Pressure Level vs Time



1 INTRODUCTION

Bass Point Quarry is located near Shellharbour, on the NSW south coast. A haul road to the Quarry passes adjacent to the Shell Cove residential development. Several stages of the development are currently under construction.

To limit noise impact associated with truck movements on this haul road, noise level criteria were previously determined using the NSW Environment Protection Authority (EPA) guideline document entitled *Industrial Noise Policy (INP)*. The criteria applicable to this project are set out in a letter from the EPA dated 8 December 2000, and are based on advice from Shellharbour City Council as well as estimated future background noise levels as determined by Wilkinson Murray Pty Limited (WMPL).

Noise mitigation measures, consisting largely of barriers, have been designed by others to reduce noise impact from the road on the new residential development. At the time of writing this report, these measures have been implemented over the entire haul road.

Previous reports, WM Report No. 00229-A to F inclusive, provided advice in relation to other stages of the development, adjacent to the barriers which were in place at that time. This report is an assessment of Stage 10D2 of the development and is the last Stage that requires mitigation in the form of barriers.

The barriers have been constructed from pre-cast concrete panels and are a height of 6.5m between chainage 0m to 173m and then 4.5m to chainage 273m. The barrier layout is shown in Figure 1-1.

Figure 1-1 Barrier Height Layout

2 NOISE CRITERIA

2.1 Criteria Specified by the EPA

As mentioned previously, specific noise criteria for this project are set out in a letter from the EPA to WMPL, dated 8 December 2000. As described in the *INP*, two forms of criterion are applicable – "amenity" criteria which control the total noise level from all industrial noise sources, and "intrusiveness" criteria which are based on the difference between noise levels from a particular source and the background noise level in the absence of the source in question.

"Amenity" criteria are set based on Shellharbour Council's advice that the future residential development could be classified as an "urban" area for the purposes of the *INP*. They are in terms of the $L_{Aeq,Period}$ noise descriptor, which represents the average noise energy over a daytime, evening or night time period.

"Intrusiveness" criteria are set based on assumed typical background noise levels in a residential development such as this. They are in terms of the $L_{Aeq,15min}$ noise descriptor, which represents the average noise energy in any 15-minute period during the daytime, evening or night time. Although only the night time intrusiveness criterion is specifically mentioned in the EPA's letter, daytime and evening criteria can be inferred from other information.

The relevant noise level criteria are set out in Table 2-1. Both types of criterion should be met during all time periods.

Table 2-1 Noise Level Criteria as Determined by the NSW EPA

Time Period	Noise Criterion (dBA)	
	Intrusiveness $L_{Aeq,15min}$	Amenity $L_{Aeq,Period}$
Daytime (7.00am-6.00pm)	50	60
Evening (6.00pm-10.00pm)	45	50
Night time (10.00pm-7.00am)	40	45

Note: On Sundays and Public Holidays, the daytime period is 8.00am-6.00pm and night time is 10.00pm-8.00am.

The EPA letter indicates that where the intrusiveness criteria are exceeded by up to 5dBA, *residential development may occur provided the house incorporates acoustic treatments in its layout and construction and potential residents are formally notified that the site is exposed to noise from the operation of the quarry and its haul road*. Where these criteria are exceeded by more than 5dBA, *residential development should not occur*.

2.2 Consequences for Vehicle Noise Levels

The period of time when the truck movements on this road are highest and the criterion most stringent is the hour between 6.00-7.00am. This is in the night time period, and an $L_{Aeq,15min}$ value of 40dBA is required to meet the intrusiveness criterion.

It is understood that 55 truck movements has been agreed between Australand Holdings and Pioneer Construction Materials (now known as Hanson Construction Materials (HCM)) as the maximum number of movements to be permitted between 6.00am-7.00am. This value is therefore assumed in calculating the L_{Aeq} noise level during this period.

To achieve the criterion of 40dBA the logarithmic average Sound Exposure Level (SEL) from each truck movement should not exceed 58dBA. SEL is a measure of the total noise energy recorded during a noise event. With acoustic controls and notification of residents regarding noise exposure, residences may be constructed with noise levels up to 45dBA which is equivalent to a logarithmic average SEL of 63dBA.

3 NOISE MEASUREMENTS

3.1 Noise Measurement Procedure

On Sunday, 20 October 2013 noise level measurements were conducted while two trucks (both unloaded) drove up and down the haul road.

The following information regarding the trucks has been provided:

- Mack
    - 2004 model;
    - CH Fleetliner Series; and
    - Mack Engine (470Hp)
- Kenworth
    - 2004 model;
    - T404SAR Series; and
    - Caterpillar Engine (550Hp)

Both drivers drove at approximately 50km/h and engaged the engine brake as required. It is understood that this driving technique is typical along the haul road.

The following equipment was used to measure the truck pass-bys:

- Bruel & Kjaer (B&K) type 2260 sound level meter;
- B&K type 2250 sound level meter;
- Acoustic Research Laboratory (ARL) type 316 noise logger; and
- ARL type NGARA noise logger.

For this stage, three axes were chosen by WMPL with three measurement points along each axis.

At each of these points a set of measurements was conducted at a height of 1.5m and 4.5m. The measurements at 1.5m are considered to represent the noise levels experienced at the residence of a single storey home, whereas the 4.5m high measurements are representative of a top storey of a double storey home.

In order to better correlate measurements, the six measurement locations have been undertaken at the same time for each single axis. This was achieved as follows:

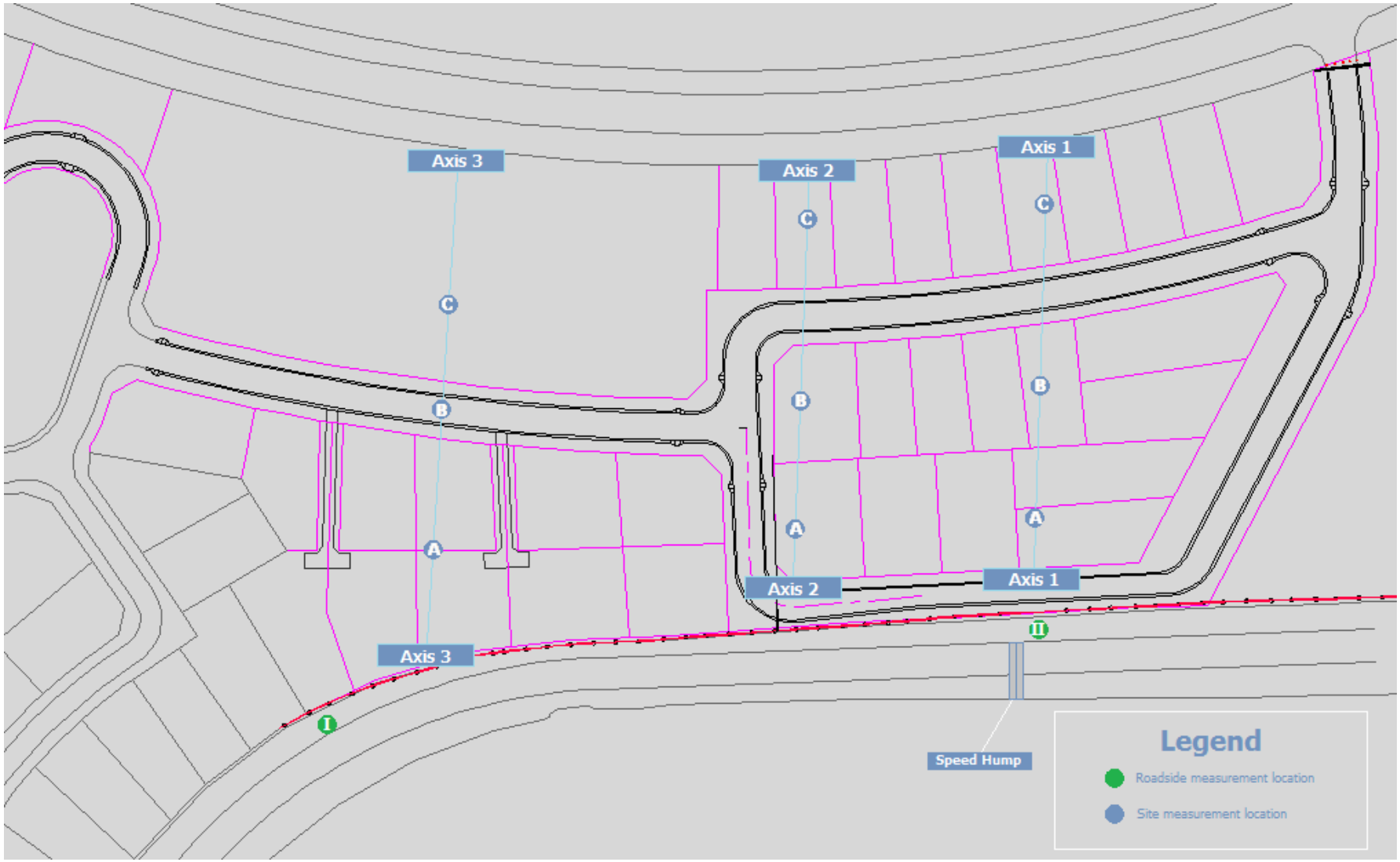
- The three measurement locations at 4.5m were undertaken using three NGARA's, each set to record L_{Aeq} noise levels at 100ms intervals.
- The three measurement locations at 1.5m were undertaken using the following:
    - B&K type 2250 and 2260 sound level meter; and
    - ARL type 316 noise logger.

During all measurements, there were two ARL type 316 noise loggers measuring truck pass-by's on the road side of the barriers.

A total of 16 pass-by measurements were conducted at each axis (8 for each truck). In total, 48 measurements were conducted across all three axes.

The locations of all monitoring positions are shown in Figure 3-1.

Figure 3-1 Site Layout & Noise Monitoring Locations



3.2 Number of "Clean" Recorded Events

Of the 48 measurements, the number of "clean" (not significantly influenced by any other noise sources) measurements will typically be less. Table 3-1 shows the number of noise events considered to be clean at each on-site monitoring location and the distance from the adjacent noise barrier at the closest point.

Table 3-1 Number of Clean Recorded Truck Movements

Axis	Distance from Barrier to each Measurement (m)	No. of Recorded Movements	
		1.5m	4.5m
1	A - 12	16	16
	B - 51	16	13
	C - 99	15	16
2	A - 13	16	16
	B - 47	16	16
	C - 75	16	16
3	A - 34	15	16
	B - 54	15	16
	C - 73	16	16

3.3 Noise Emission Levels from the Trucks

It is expected that the noise from individual trucks using the haul road will vary. Some factors contributing to this may include:

- Duration of the brakes;
- Intensity of the brakes;
- Average speed;
- The gear that the truck is in at the time;
- Different make and model of trucks;
- Whether the truck is loaded or unloaded;
- Driver technique and
- Direction travelled.

Analysis of the noise measurements from the roadside loggers (43 clean measurements) showed that on this occasion the Kenworth truck supplied was on average louder than the Mack truck supplied. However, all truck pass-bys have been used to obtain the logarithmic average noise levels as presented in Table 3-2.

3.4 Noise from Trucks Passing Over Speed Hump

Previous WM reports addressed the noise impact from trucks passing over speed humps. One speed hump is located along the haul road (refer Figure 3-1) near Stage 10D2. Any specific impact has been captured by our measurements conducted along Axis 1.

3.5 SEL Noise Levels by Distance

Table 3-2 show the logarithmic average SEL values from recorded noise events at a height of 1.5m and 4.5m.

Table 3-2 Noise Level of Recorded Truck Movements

Axis	Distance from Barrier to each Measurement (m)	Average SEL (dBA)	
		1.5m	4.5m
1	A - 12	62.1	63.8
	B - 51	60.6	65.9
	C - 99	49.4	62.7
2	A - 13	61.7	63
	B - 47	60	61.9
	C - 75	48.4	60.4
3	A - 34	60.6	61.3
	B - 54	58.8	59.9
	C - 73	47.8	59.5

4 ASSESSMENT OF MEASURED NOISE LEVELS WITHIN STAGE 10D2

Figure 4-1 and Figure 4-2 represent this data on a graph that also highlight the criteria. The 58dBA criterion ($L_{Aeq,15min}$ 40dBA) is required to meet the EPA's "baseline" noise criterion for residential development without treatment, and 63dBA criterion ($L_{Aeq,15min}$ 45dBA) defines the zone in which residential development can occur with treatment to the residence.

Table 4-1 Estimated Differences between Noise Levels at 1.5m & 4.5m from Ground

Axis	Distance from Barrier to each Measurement (m)	Difference between Noise Level at 1.5m & 4.5m from Ground (to nearest 0.5dBA)
1	A - 12	1.5
	B - 51	5.5
	C - 99	13.5
2	A - 13	1.5
	B - 47	2
	C - 75	12
3	A - 34	1
	B - 54	1
	C - 73	12

Figure 4-1 SEL Noise Level by Distance at a Height of 1.5m

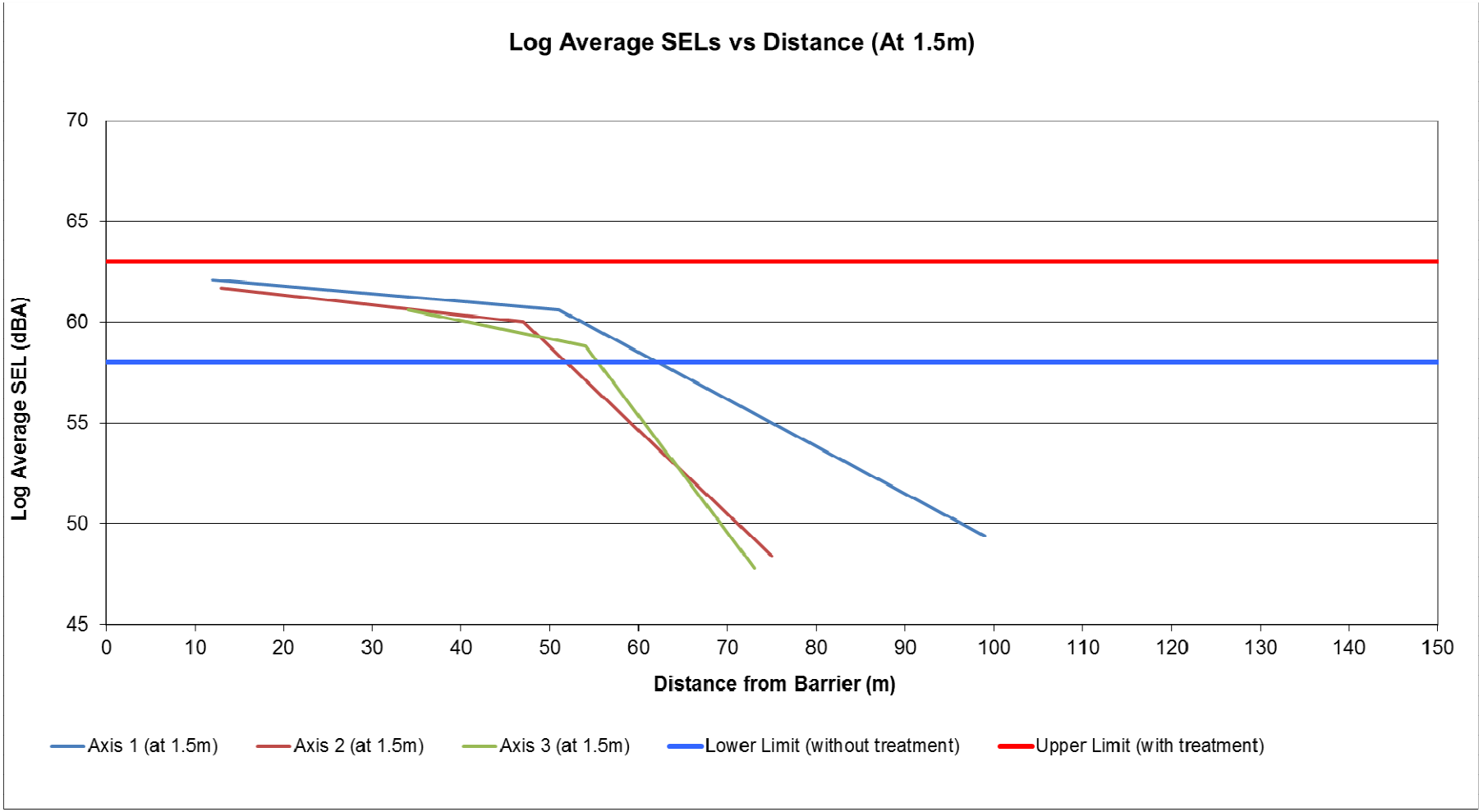
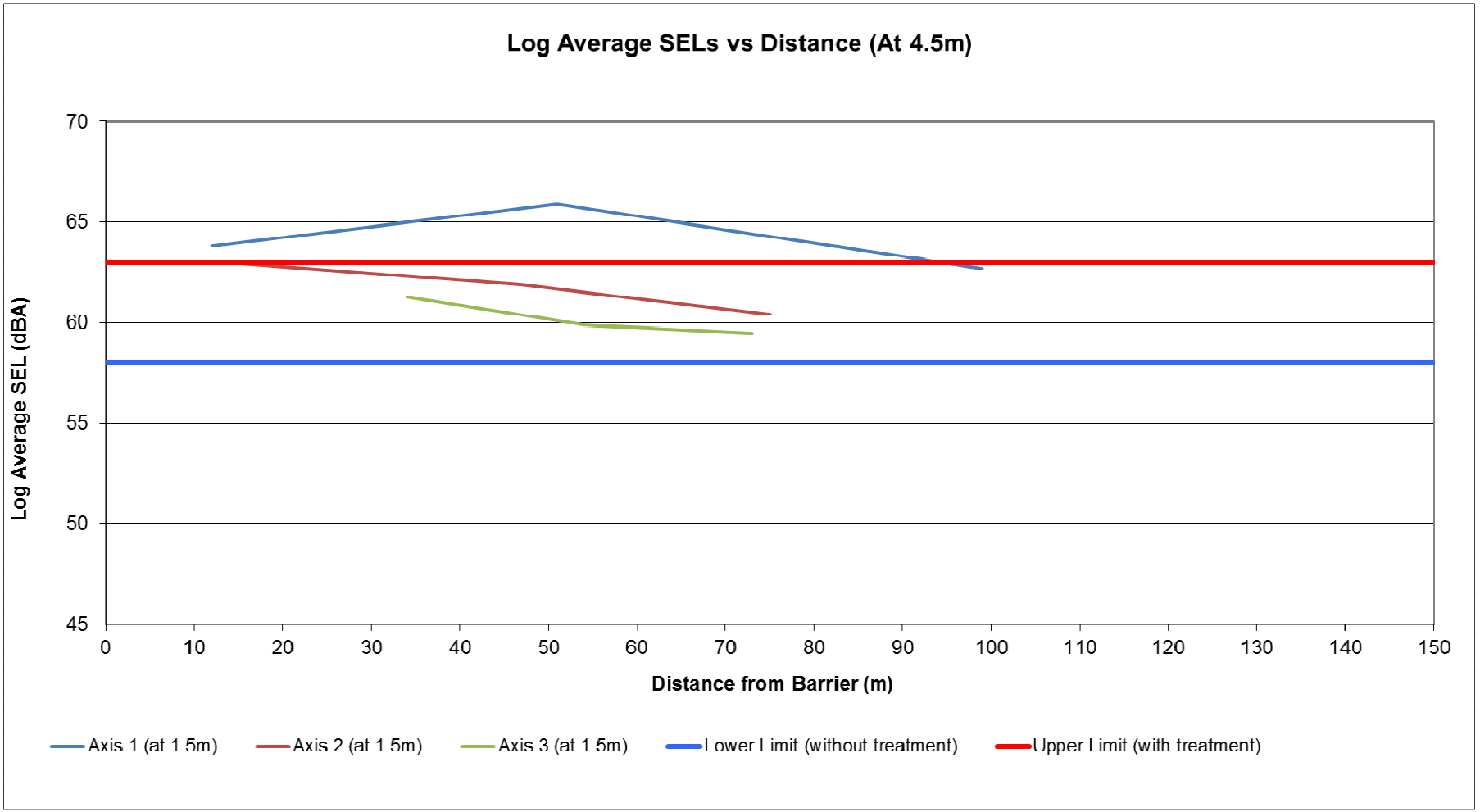


Figure 4-2 SEL Noise Level by Distance at a Height of 4.5m



5 NOISE MODELLING OF BOAT HARBOUR AND LANDFILL CELL

Following the measurements, it was confirmed by Australand that the impact (if any) to the Boat Harbour Precinct (in particular Precinct A and B) and the Landfill Cell (future playing fields) was also to be assessed.

The most appropriate assessment approach to extend the noise contours was to develop a noise model. This is based on a low risk of major impact due to the following:

- The site adjoining Stage 10D2 is not residential (Landfill Cell).
- The worst-case scenario within Precinct A and B would be that a double storey house would require acoustic controls, however this would only be the case on a few lots.

Therefore, the impact of noise emissions from haul truck pass-bys were modelled using the CadnaA noise prediction software using the site noise level measurements to validate the model. In this regard, upon completion of the modelling, the contours derived from the measurements have been extended into the Boat Harbour and Landfill Cell.

A representative 3-D model was constructed of the haul road, barrier and relevant land.

Factors that are addressed in the modelling include:

- Truck source sound level emissions and locations;
- Screening effects from barrier;
- Receiver locations across Stage 10D2, Boat Harbour and Landfill Cell;
- Ground topography;
- Noise attenuation due to geometric spreading; and
- Ground absorption.

The inputs associated with the ground topography and location and height of barrier were provided by Craven Elliston & Hayes (Dapto) P/L.

6 DEVELOPMENT OF NOISE CONTOURS

The final noise contours have been developed by considering the measured levels within Stage 10D2 and extending these contours into the Boat Harbour and Landfill Cell areas with outputs from a noise model using CadnaA software. In generating these contours, the model has been calibrated against the measured levels.

Based on the summary of measurement results together with Figure 4-1 and Figure 4-2, the contours at which residences within Stage 10D2 should be located to ensure that relevant noise criteria, as set down by the EPA, are met are shown in Figure 6-1. In addition, the contours across the Boat Harbour and Landfill Cell are shown.

With reference to Figure 6-1 , the following provides and explanation of the contours.

Ground Floor 45dBA Contour (red)

- Between this contour and the noise barrier, there can be no construction.

Ground Floor 40dBA Contour (blue)

- Between this contour and the noise barrier/ground floor 45dBA contour (red), single storey houses may only be constructed if they incorporate acoustic mitigation measures.
- Beyond this contour (further away from the noise barrier) single storey houses can be constructed without specific acoustic mitigation measures.

First Floor 45dBA Contour (light green)

- Between this contour and the noise barrier, double storey houses are not permitted to be constructed.
- Beyond this contour (further away from the noise barrier) double storey houses incorporating acoustic mitigation measures can be constructed.

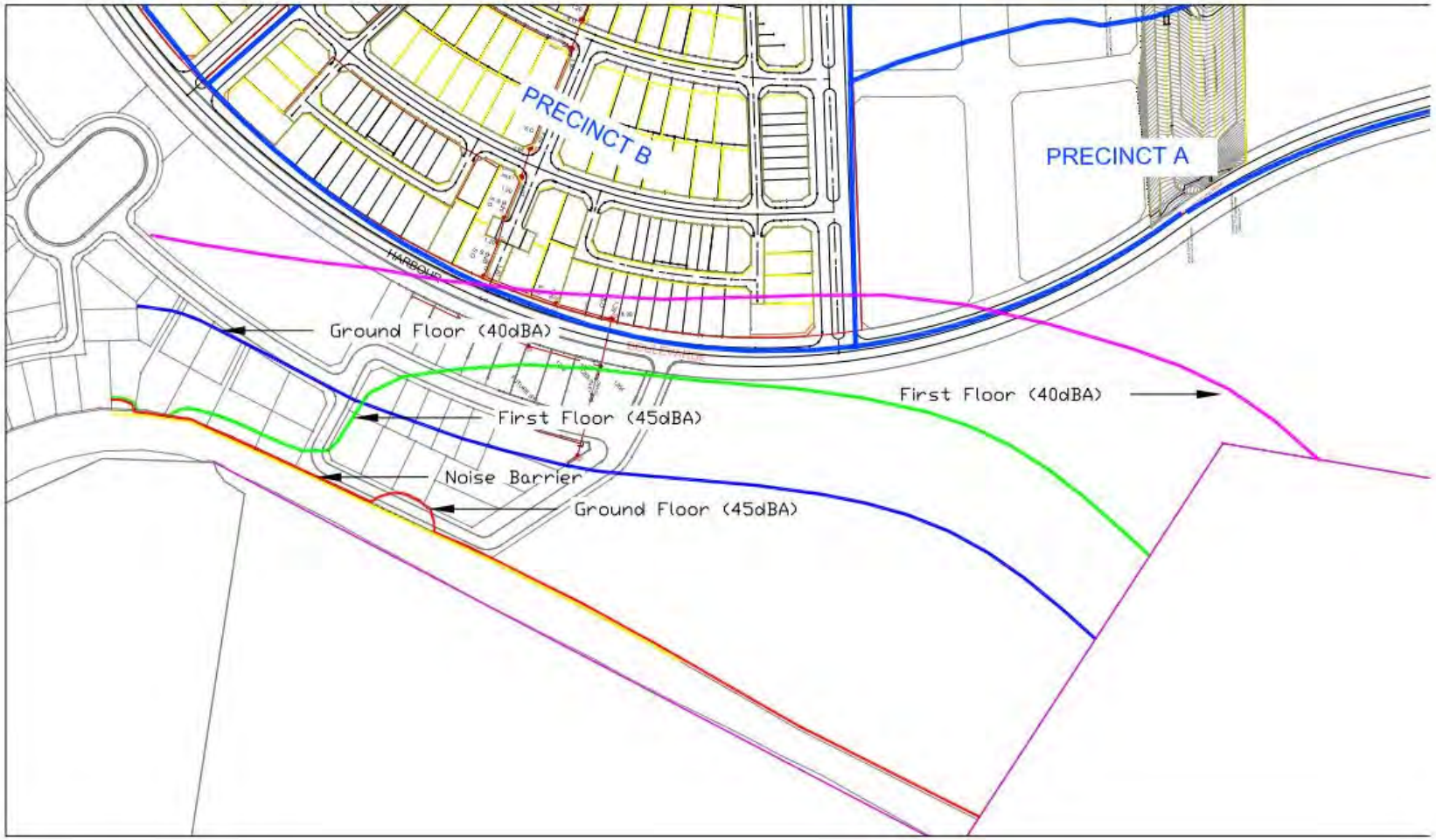
First Floor 40dBA Contour (magenta)

- Between this contour and the first floor 45dBA contour (light green), double storey houses can be constructed with specific acoustic mitigation measures. This contour impacts a few lots within Boat Harbour Precincts A and B.
- Beyond this contour (further away from the noise barrier) double storey houses can be constructed without specific acoustic mitigation measures.

As noted in the EPA's requirements, "mitigation" implies that:

> *"the house incorporates acoustic treatments in its layout and construction and potential residents are formally notified that the site is exposed to noise from the operation of the quarry and its haul road."*

Figure 6-1 Noise Contours



7 CONCLUSION

The barriers along the haul road for Stage 10D2 of the residential development at Shell Cove have been completed. Wilkinson Murray Pty Limited undertook noise level measurements during programmed truck movements along the haul road past Stage 10D2. These tests were conducted at three locations along three axes at both a 1.5m and 4.5m height.

Following analysis of the measurements, our assessment confirms the following zones within Stage 10D2 with reference to the on-site measured levels:

1. Where a single storey or double storey house will not be permitted.
2. Where single storey houses can be constructed and whether or not they require mitigation.
3. Where double storey houses can be constructed and whether or not they require mitigation.

These zones were extending utilising the outputs of a noise model to consider the Boat Harbour and Landfill Cell.