CITY OF MANDURAH

NOTICE OF MEETING

PLANNING AND COMMUNITY CONSULTATION COMMITTEE

Members of the Planning and Community Consultation Committee are advised that a meeting of the Committee will be held in the Council Chambers, 83 Mandurah Terrace, Mandurah on:

Wednesday 9 November 2022
at 5.30pm

MARK R NEWMAN
Chief Executive Officer
3 November 2022

Committee Members

Councillor D Pember [Chairperson]
Mayor R Williams
Councillor B Pond
Councillor J Green
Councillor D Wilkins
Councillor R Burns
Councillor A Kearns
Councillor C Knight
Councillor P Jackson
Councillor A Zilani
Councillor D Schumacher

AGENDA

1 OPENING OF MEETING AND ANNOUNCEMENT OF VISITORS

2 APOLOGIES

3 IMPORTANT NOTE:

Members of the public are advised that the decisions of this Committee are referred to Council Meetings for consideration and cannot be implemented until approval by Council. Therefore, members of the public should not rely on any decisions of this Committee until Council has formally considered the resolutions agreed at this meeting.

4 RESPONSES TO QUESTIONS TAKEN ON NOTICE

5 PUBLIC QUESTION TIME

Public Question Time provides an opportunity for members of the public to ask a question of Council. For more information regarding Public Question Time please visit the City's website mandurah.wa.gov.au or telephone 9550 3787.

6 PRESENTATIONS

7 DEPUTATIONS

Any person or group wishing to make a Deputation to the Committee meeting regarding a matter listed on this agenda for consideration must complete an application form. For more information regarding making a deputation please visit the City's website mandurah.wa.gov.au or telephone 9550 3787.

NB: Persons making a deputation to this Committee meeting will not be permitted to make a further deputation on the same matter at the successive Council meeting, unless it is demonstrated there is new, relevant material which may impact upon the Council's understanding of the facts of the matter.

8 CONFIRMATION OF MINUTES: 12 JULY 2022

Minutes available on the City's website via mandurah.wa.gov.au/council/council-meetings/agendas-and-minutes

9 DECLARATIONS OF FINANCIAL, PROXIMITY AND IMPARTIALITY INTERESTS

10 QUESTIONS FROM COMMITTEE MEMBERS WITHOUT DISCUSSION

11.1 Questions of which due notice has been given

11.2 Questions of which notice has not been given

11 BUSINESS LEFT OVER FROM PREVIOUS MEETING

12 REPORTS:

13 LATE AND URGENT BUSINESS ITEMS

14 CONFIDENTIAL ITEMS

15 CLOSE OF MEETING

1	**SUBJECT:**	Amendment 4 to Local Planning Scheme No 12
	DIRECTOR:	Business Services
	MEETING:	Planning and Community Consultative Committee
	MEETING DATE:	9 November 2022

Summary

Council is requested to consider an amendment to Local Planning Scheme No 12 (Scheme 12) seeking the rezoning of Lots 124 and Lot 801 Pleasant Grove Circle, from "Residential R5" to "Residential R10". The proposed density of R10 is considered to be a low-density coding, in keeping with the character of the Pleasant Grove Estate.

Council previously adopted this proposal for advertising in October 2014, as Amendment 128 to Town Planning Scheme No 3. The Western Australian Environmental Protection Authority (EPA) did not consent to the advertising due to the presence of Ministerial Statement 266 which had been in effect over the site since 1992 restricting lot sizes to a minimum of 1,500m^2.

The EPA has subsequently investigated the ministerial statement, and the Minister for Environment made the decision to remove the implementation conditions in August 2019.

As a complex Scheme Amendment, Council is recommended to support the adoption of the proposed Scheme Amendment. Council's adoption will commence the process of referral to the Environmental Protection Authority (EPA) and Western Australian Planning Commission (WAPC). Advertising would be undertaken following referral and endorsement to advertise by those agencies.

Disclosure of Interest

Nil

Location

Property Details

Applicant:	Element
Owner:	Pleasant Grove Pty Ltd
	Directors: Ian Bassett-Scarfe Malcolm Bassett-Scarfe William Bassett-Scarfe
Scheme No 12 Zoning:	Residential (R5)
Peel Region Scheme Zoning:	Urban
Lot Size:	11.13ha
Topography:	Low-lying
Land Use:	Vacant

Previous Relevant Documentation

• G.22/6/20	23 June 2020	Council resolved to proceed Scheme 12 to final approval by the Western Australian Planning Commission and the Minister for Planning.
• G.18/4/19	30 April 2019	Council adopted a modified Scheme 12 and Local Planning Strategy which incorporated changes suggested by the Environmental Protections Authority.
• G.6/01/17	24 January 2017	Council adopted draft Local Planning Scheme and Strategy for forwarding toto the Western Australian Planning Commission and the Environmental Protection Authority for consent to advertise the draft Scheme.
• PCDS.24/10/1	28 October 2014	Council adopted Amendment 128 to Town Planning Scheme No. 3 for advertising purposes, seeking to rezone the site from R5 to R10.

Background

The subject site forms part of the Pleasant Grove Estate, a residential estate characterised by low-density residential development (R2.5 – R5). Immediately east and south of the site is Peel Region Scheme "Regional Open Space", providing separation to the Peel-Harvey Estuary.

In December 2010, the Western Australian Planning Commission (WAPC) granted conditional subdivision approval (WAPC 142801) for the creation of 48 lots at the existing zoning of Residential R5. The subdivision did not proceed, however detailed engineering design was undertaken at the time.

In October 2014, Amendment 128 (seeking R10 density) was adopted by Council for advertising purposes but did not progress past the EPA due to the presence of Ministerial Statement 266 restricting lot sizes to 1,500m^2. Subsequently, the applicant approached the EPA to review the implementation conditions of Ministerial Statement 266. In addition to restricting lot size, the Ministerial Statement also focused on a number of key areas including land use, vegetation retention, stormwater and water management.

In August 2019, the Minister for the Environment determined to remove the implementation conditions that applied to the site through Ministerial Statement 266. Significantly, the applicant was seeking to remove /

replace conditions restricting lot sizes to 1,500m^2. It was determined that the Ministerial Statement 266 conditions have either been met or exceeded by:

- Implementation of previous subdivision applications;
- Gazettal of the City's Town Planning Scheme No. 3; and,
- Existing development controls under State Government policies.

Comment

Density

The proposal seeks an increase in density from R5 (as per R-Codes minimum lot size of 2,000m^2) to R10 (as per R-Codes minimum lot size of 875m^2, average lot size of 1,000m^2). The lot yield potential is demonstrated below, and based on a proposed lot size range of 880m^2 to 1,666m^2:

	Lot Yield Potential at R5	***Lot Yield Potential at R10***
Total	48 *based on WAPC 142801 approval and R5 minimum lot frontage of 30m	74 *based on Subdivision Concept Plan and R10 minimum lot frontage of 20m

The WAPC's operational policy Liveable Neighbourhoods considers it appropriate for higher residential densities to be located adjacent to areas of amenity, such as public open space (including foreshore reserves), to take advantage of the location and provide opportunities for passive surveillance.

Adjacent to the Peel-Harvey Estuary (Estuary), there is increased density to the north at Blue Rise Cove (R10) and to the south at Wannanup (R20) of the proposed development area.

Historically, residential density in Pleasant Grove has increased as time has progressed, and as the development moves closer to the Estuary. The proposal would continue to represent a low-density coding and, as such is considered to be in keeping with the character of the Pleasant Grove Estate.

Local Planning Strategy

The City's Local Planning Strategy (Strategy) identifies the need for an additional 20,000 dwellings to be built within Mandurah over the next two decades in order to accommodate an additional 50,000 residents. Pleasant Grove is identified within the Suburban (Large Lot) urban form category, which has a residential density code of R2.5-R10.

The Strategy suggests that increased density can be supported where community benefits such as bushland protection have been identified. In this instance, the site is zoned and can be developed at an R5 density already, however the financial implications of servicing the site through the provision of sewer is a significant consideration for the applicant.

Development of the site will result in the connection of Pleasant Grove Circle, providing a complete road network for the neighbourhood and providing an escape route in the event of a bushfire (the current subdivision design predates State Planning Policy 3.7 Planning in Bushfire Prone Areas, with some properties not benefitting from secondary access routes).

Furthermore, development of the site will provide the nexus for works to the foreshore interface (i.e. provision of footpath connection, controlled fencing, rehabilitation and weed management, and on-street parking). If well designed it would provide enhancement and protection to existing vegetation and improve amenity.

Although modest in its consideration the proposed amendment seeks to make more efficient use of urban zoned land so is considered in keeping with the overall objectives of Perth and Peel @3.5.

Flood / Inundation

Australian Height Datum (AHD) is the height of a point above mean sea level.

Mean Sea Level is the average height of the ocean's surface.

Average Recurrence Interval (ARI) and Annual Exceedance Probability (AEP) is a *way of explaining how rare an event is, by comparing how often, on average, the particular event of interest has occurred in the past. - more than once a year, more than once a decade and more than once in 30 years. In this case, average recurrence intervals are calculated by comparing the rainfall temperature observations on the day you select with all the rainfall and temperature data for that month in the climate record* (Bureau of Meteorology).

An important consideration for the proposal is that of future flood and inundation risk. The site is located adjacent to the Peel-Harvey Estuary, and is considered to be low-lying given it includes portions with a natural ground level as low as 1m AHD. The Figure below shows the subject lot outlined in red where majority of the lot is located on the flood fringe. In order to mitigate risk, the applicant had initially intended to fill the lot levels to 2.7m AHD to mitigate this risk.

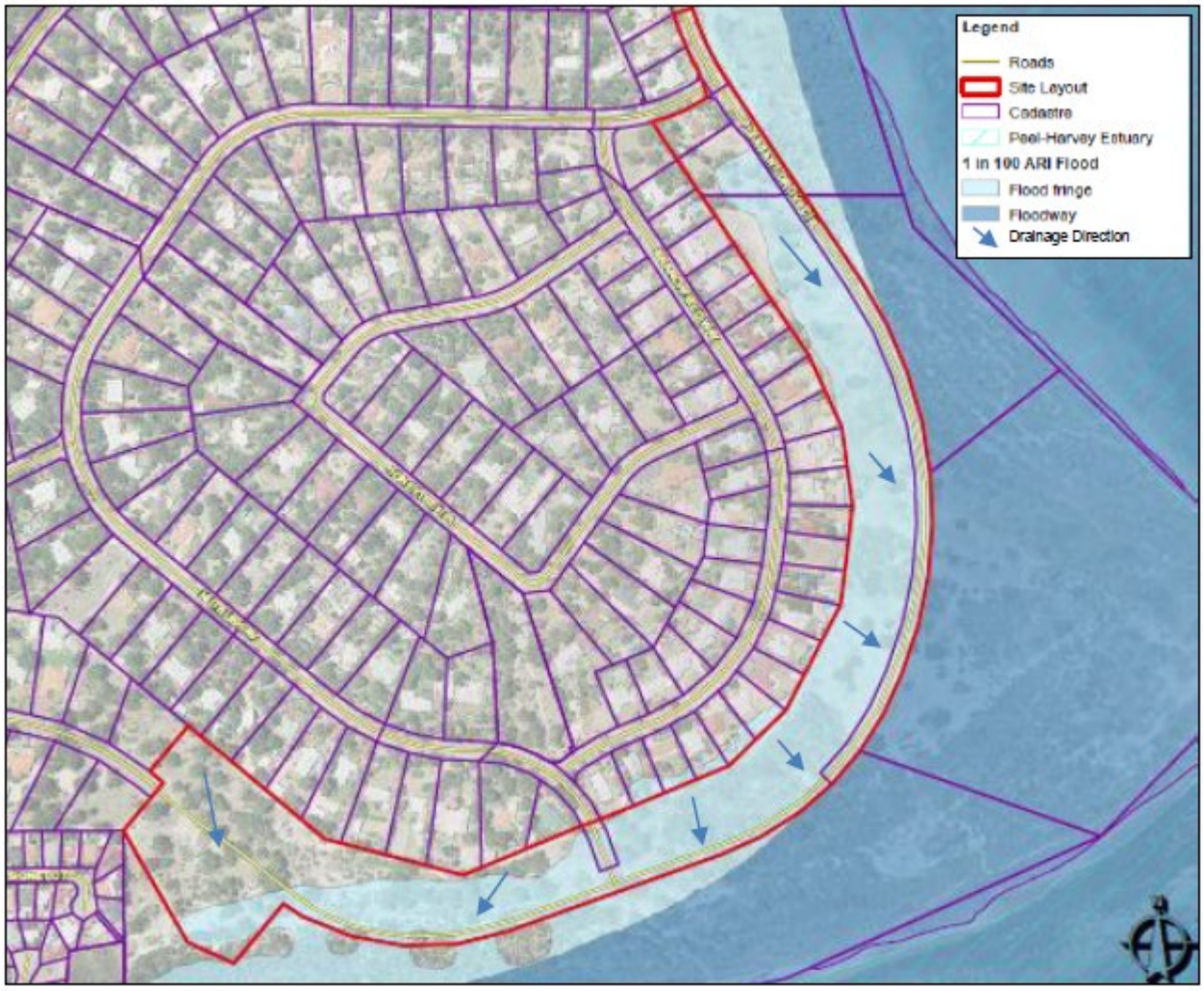


Figure: 100yr ARI flood level

In establishing a suitable minimum habitable floor level for development, the City has considered the advice of the Department of Water Environment and Regulation (DWER) from the findings of the "Floodplain Development Strategy: Murray Drainage and Water Management Plan and Associated Studies". DWER recommends a minimum habitable floor level of 2.7m AHD for new development – in

order to accommodate a 0.6m freeboard allowance for wind/waves within the context of a 0.9m sea level rise and 1.2m AHD Estuary water level.

Filling lots entirely to 2.7m AHD raises a number of planning concerns including impacts on streetscape due to level differences between proposed and existing development, excessive retaining and site works and as mentioned a significant reduction in tree retention which are of significant environmental value. DWER recommend a finished floor level (FFL) of 2.7m AHD for "habitable rooms", however have advised that this can be reduced to 2.25m AHD where planning concerns are present.

Given the historic value placed on vegetation protection by all agencies and character that has been created within the Pleasant Grove development the City does not consider this extent of filling to be an acceptable outcome.

State Planning Policy 2.6 Coastal Planning provides that decision makers should ensure that land use and development, including roads, adjacent to the coast is sited and designed to complement and enhance the coastal environment in terms of its visual amenity, social and ecological values and must be considered over a 100 year development horizon.

Given the presence of planning concerns as noted, officers recommend filling the lots to a lower level of 2.15m AHD (Note additional 100mm concrete pad to establish a 2.25m AHD FFL) in order to limit the impact of fill on tree retention, streetscape and surrounding residential amenity.

Specific site requirements are recommended to be inserted into the Scheme to ensure tree retention is a primary consideration at detailed design stage. This does not exclude individual landowners from designing dwellings with a FFL of 2.7m AHD by utilising alternative construction methods – but it will reduce the amount of fill required across the site in order to:

- Lessen the impact of site works on established residential properties to the rear;
- Increase the number of trees which may be retained within private lots, consistent with the "leafy" character of Pleasant Grove – the lower fill level results in the potential for up to 100 trees to be retained;
- Ensure a consistent streetscape level that is compatible with the locality.

Attachment 1.1 provides a comparison between trees that would be retained with a FFL of 2.7 versus what could be achieved with a fill height of 2.25. The red circles represent trees lost with the green circles representing trees retained – the lower fill level provides the opportunity to retain an additional 100 trees.

From an inundation risk perspective, the lower finished floor level does reduce the period the lots will be above the expected 1 in 100 year flood level. Notifications on title would be required in accordance with State Planning Police 2.6 State Coastal Planning Policy as follows:

"VULNERABLE COASTAL AREA –This lot is located in an area likely to be subject to coastal erosion and/or inundation over the next 100 years."

The adjacent foreshore is considered to be mostly well vegetated, and at its narrowest provides over 75m of separation to the water line. The preparation of a Coastal Vulnerability Assessment prior to subdivision is considered to be an appropriate method of exploring the measures necessary to provide suitable opportunities for protection of infrastructure as sea levels rise.

The Assessment would allow consideration of the foreshore context and provide the applicant with some certainty moving forward. The applicant is seeking certainty that the Amendment is progressed before financing this assessment but has committed to providing this information.

Tree Retention

The fill level as noted above is a primary consideration for tree retention, however, previous attempts to provide large lots to retain trees have resulted in mixed outcomes, examples within the City include Bortolo Drive, Bulara Road and Lakelands (R10). The ability to retain trees has been explored further through an updated tree survey, which can be used to guide the placement of future dwellings and control through a Local Development Plan (LDP) which provide site specific controls on development.

Local Development Plan

The requirement for a Local Development Plan would form part of any subdivision condition and can be used to establish development footprints to further enhance tree retention - this is proposed to be enforced through the Scheme Amendment via Specific Site Requirements in the Scheme.

Bushfire

The site is identified as being within a bushfire prone area, and therefore requires the preparation of a Bushfire Management Plan. The vegetation within the adjacent foreshore reserve is the origin of bushfire risk, however given the proposed road reserve will separate the foreshore reserve and future lots. The majority of lots achieve BAL-19 – BAL- 29.

Lots within the south-west corner of the site have been identified as BAL-40, however the size of the lots allows dwelling construction to achieve the required Bushfire Hazard Level. The preparation of an LDP can provide development controls (i.e. minimum setbacks) to ensure development is capable of achieving BAL-29 or lower, in keeping with State Planning Policy 3.7 – Planning in Bushfire Prone Areas. It should be noted that the City will not support the removal of vegetation within Reserve 39788 to facilitate lower BAL ratings on these lots.

EPBC Act 1999

The Scheme Amendment has the potential to impact upon the Ramsar listed Peel-Harvey Estuary, and the forest red-tailed black cockatoo and Carnaby's black cockatoo, threatened species listed under the *Federal Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999). The applicant has been encouraged to seek advice from the Commonwealth Department of Environment, Heritage and the Arts to determine if there is a requirement for the proposal to be referred for assessment under the EPBC Act 1999. The applicant has advised that the proponent would seek the necessary referral approval from the Commonwealth prior to any subdivision / development associated site works.

Acid Sulfate Soils

The majority of the site is identified as having a medium – high risk of acid sulfate soils being present. The site will require clean fill, which will reduce the risk of disturbing existing soils. It is recommended that an acid sulfate soil investigation is undertaken in order to determine the likely extent of soils present, and to determine any limitations on the construction of swimming pools and/or excavation.

Effluent Disposal

The requirement for connection to reticulated sewerage is consistent with State Planning Policy 2.1 'The Peel-Harvey Coastal Plain Catchment' and Government Sewerage Policy. Connection to reticulated sewerage would have benefits from a nutrient retention perspective, particularly the subject site's close proximity to the Estuary. The increased density proposed provides increased viability for the installation of sewer to the area.

Mosquito Management

Similar to mosquito management for other recent developments in Mandurah, measures can be included through the LDP requiring at least one outdoor living area being capable of being enclosed, and placement of a mosquito memorial on the property titles at subdivision stage advising:

"This lot is in close proximity to known mosquito breeding areas. The predominant mosquito species is known to carry viruses and other diseases."

Urban Water Management

SPP 2.9 – Planning for Water (draft) identifies the importance of protecting remnant vegetation and maintaining or increasing deep-rooted perennial vegetation coverage to improve water quality when considering planning proposals in the Peel-Harvey coastal plain catchment. No significant issues have been identified however further detailed planning around urban water management will be required at the subdivision stage.

Foreshore Management Plan

The Amendment recommends a Scheme condition requiring the preparation of a Foreshore Management Plan to detail future works to be undertaken by the developer within the adjacent foreshore reserve. The applicant has indicated a willingness to investigate upgrades to the foreshore, and include elements such as footpaths, fencing, and weed management / vegetation rehabilitation.

MEAG Comment

This item will be considered by the Mandurah Environmental Advisory Group at a future meeting (subject to Council initiation of the amendment request, and EPA and WAPC consent to advertise).

Consultation

If adopted, the Amendment will need to be referred to the Environmental Protection Authority and WAPC for consideration; after this time, public advertising as outlined in the Regulations will be required; direct landowner and surrounding property notification for modifications (a) to (d) will be undertaken inviting submissions for Council's consideration following advertising.

Advertising will be undertaken via the following methods: directly letter / email notification to surrounding landowners, sign on-site, notification on the City's website and notification in the local newspaper. City officers will hold an information session to local residents during the submission period.

The period for making submissions on the proposed modification is 60 days after the day the proposal is first advertised.

It is important to note that the wording "in accordance with Section 75 of the Planning and Development Act 2005, resolves to prepare Amendment No. 4" in the recommendation is terminology for agreeing to refer to the EPA and WAPC, if suitable and if confirmed as suitable advertise the proposed Scheme amendment.

Council will have further opportunity to consider the proposed Scheme amendment after the advertising process and consider submissions received.

A Copy of the Complex Scheme Amendment Process is provided in Attachment 1.2.

Statutory Environment

Provisions in regard to the *Planning and Development Act 2005* and the *Planning and Development (Local Planning Schemes) Regulations 2015* have been addressed in the body of the report.

In addition to the above, Council needs to consider whether the Amendment is a 'Basic', 'Standard' or 'Complex' amendment. For the following reasons, the amendment is considered a 'Complex' amendment as outlined in Regulation 35(2):

(a) the amendment is inconsistent with a local planning strategy for the scheme that has been endorsed by the Commission.

The Local Planning Strategy states that all structure plans and proposals to rezone land adjacent to the waterways (coast, rivers and estuary) shall be subject to a Climate Change (sea level rise) assessment to determine appropriate form of development and necessary setbacks to mitigate climate change and extreme weather events. This is an onerous task for an applicant and it is recommended that this occurs prior to subdivision and not at this stage as Council may not approve the proposed amendment. The relationship between this development with sea level rise, vegetation protection and the interface with existing properties are the primary reasons for the proposal to be considered "Complex." Practically this designation results in the additional step of referral to the WAPC before advertising in addition to the EPA. Prior to any subdivision occurring, the applicant will be required to undertake a coastal vulnerability assessment.

In the event that Council resolves not to support the amendment, under Section 76 of the Regulations the applicant may request the Minister to intervene and instruct Council progress the amendment to consultation.

Policy Implications

Nil

Financial Implications

Whilst not an impact on the Council, the costs involved in connecting the development to sewer is a key consideration for the applicant.

Risk Analysis

If adopted for advertising, the proposal is likely to generate significant community interest, particularly amongst the existing Pleasant Grove community. This is not a City proposal and the Minister for Planning approves amendments to the City of Mandurah Local Planning Scheme 12. As soon as practicable after the submission period, the Council will decide whether to support or not support the amendment.

Strategic Implications

The following strategies from the City of Mandurah Strategic Community Plan 2020 – 2040 are relevant to this report:

Social:
- Facilitate safe neighbourhoods and lifestyles by influencing the built form through urban design.

Environment:
- Protect and manage our local natural environment ensuring our actions don't adversely impact our waterways.

Organisational Excellence:
- Listen to and engage with our community in the decision-making process.

Conclusion

Council is requested to adopt Amendment 4 to the Local Planning Scheme No 12 for advertising purposes. Prior to commencement of advertising, the EPA is required to consent to the proposal being advertised.

Proposed Scheme provisions seek a balanced planning and environmental outcome given the lower fill level provides greater potential for tree retention and maintenance of the locality's character which can be further controlled via a Local Development Plan, whilst meeting the minimum FFL of 2.25m AHD for habitable rooms.

Whilst the absence of a Coastal Vulnerability Assessment is inconsistent with the Planning Strategy, the adjacent foreshore is considered to be well vegetated and provides separation of 75m.

NOTE:
- Refer ***Attachment 1.1*** ***Preliminary Tree Retention and Earthworks Plans (Comparison of Fill Levels)***
  Attachment 1.2 ***Process for Complex Scheme Amendments (Flowchart)***

RECOMMENDATION

That the Planning and Community Consultation Committee recommend that Council:

1. In accordance with Section 75 of the *Planning and Development Act 2005*, resolves to prepare Amendment No. 4 of the City of Mandurah Local Planning Scheme No 12 as follows:

"PLANNING AND DEVELOPMENT ACT 2005

RESOLUTION DECIDING TO AMEND A TOWN PLANNING SCHEME

CITY OF MANDURAH LOCAL PLANNING SCHEME NO 12

AMENDMENT NO 4

Resolved that the Council, in pursuance of Section 75 of the Planning and Development Act 2005, amends Local Planning Scheme No 12 by:

(a) Modifying the R-Code density from R5 to R10 for the following lots:

- ***Lots 124 and 801 Pleasant Grove Circle, Falcon.***

(b) Add the following to "Schedule 1 – Additional requirements that apply to land in Scheme area, Specific Site Requirements":

No	*Description of Land*	*Requirement*
8	*Lots 124 and 801 Pleasant Grove Circle, Falcon*	*1. The minimum habitable floor level for development shall be 2.25m AHD.* *2. All residential development shall be connected to reticulated sewerage.* *3. Prior to the subdivision / development of the site (whichever occurs first), the following*

		management plans shall be prepared / conditions imposed, and thereafter implemented: ***a. A Coastal Vulnerability Assessment shall be prepared to assess the suitability of the foreshore reserve for protection against inundation and sea level rise, in accordance with relevant State Planning Policy.*** ***b. A Tree Retention Management Plan shall be prepared.*** ***c. A Local Development Plan shall be prepared detailing built form provisions and requirements relating to development footprints, tree retention and bushfire planning.*** ***d. An Acid Sulfate Soils Investigation shall be undertaken to determine the extent of soils present and limitations on the construction of swimming pools and/or excavation.*** ***e. A Foreshore Management Plan for the regional open space adjacent to the site, detailing the extent of improvements, footpaths, vegetation rehabilitation / weed management and fencing.*** ***f. An Environmental Management Plan including fauna management.*** ***g. An Urban Water Management Plan shall be prepared***

(c) Amending the Scheme Maps accordingly.

Dated this 22nd day of November 2022.
Chief Executive Officer "

2. in accordance with Regulation 35(2) of the *Planning and Development (Local Planning* Schemes*) Regulations 2015*, determines that Amendment No 4 of the City of Mandurah Local Planning Scheme No. 12 is a complex amendment for the following reason/s:

(a) the amendment is inconsistent with a local planning strategy for the scheme that has been endorsed by the Commission.

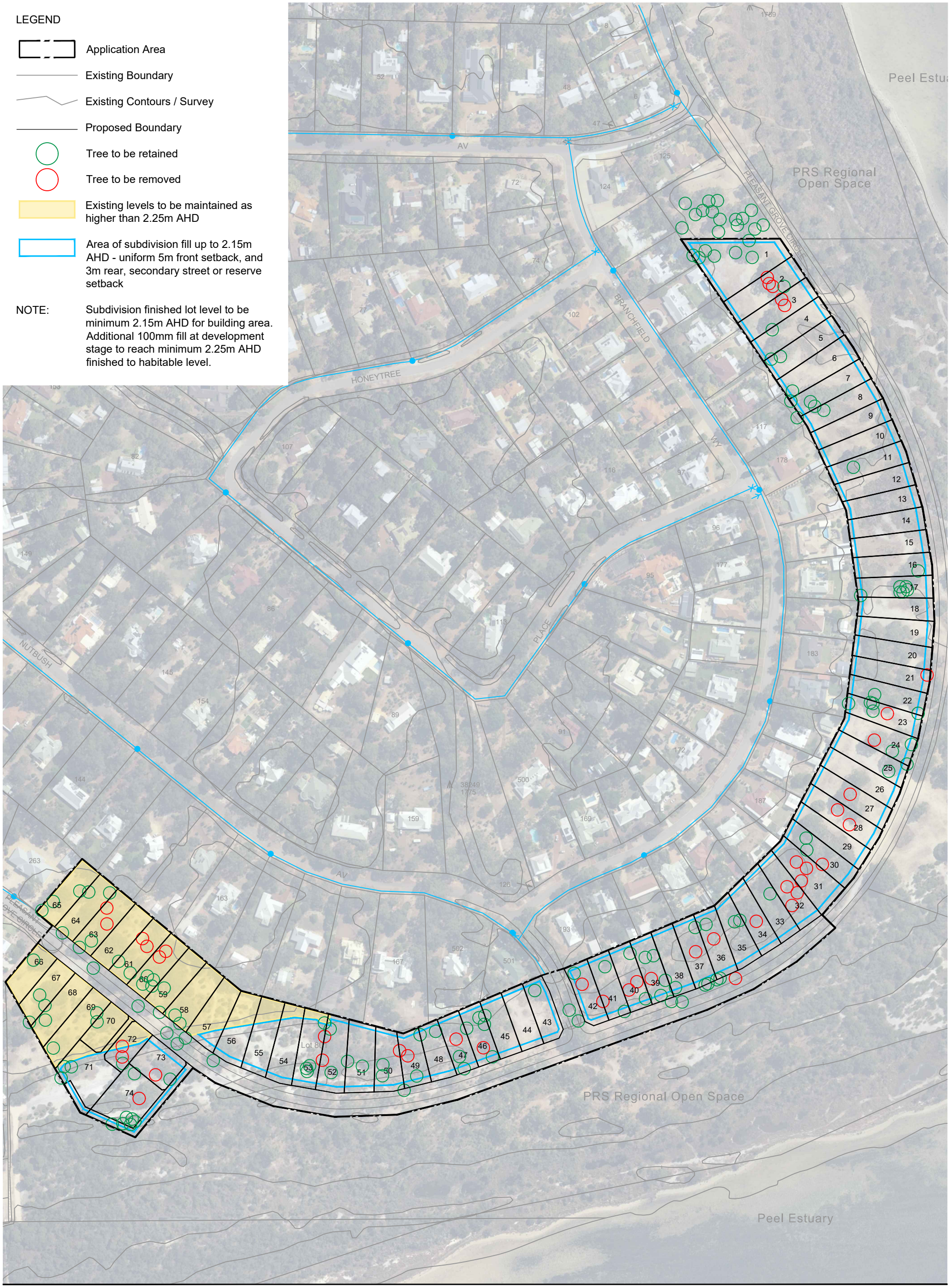
3. Authorises the Chief Executive Officer to prepare the necessary Scheme Amendment documentation for Amendment No 4 to the City of Mandurah Local Planning Scheme No 12 in preparation for referral to the Environmental Protection Authority and Western Australian Planning Commission.

4. Subject to advice from the Environmental Protection Authority and Western Australian Planning Commission, Authorises the Chief Executive Officer to commence an advertising process in accordance with the *Planning and Development (Local Planning* Schemes*) Regulations 2015.*

LEGEND

- Application Area
- Existing Boundary
- Existing Contours / Survey
- Proposed Boundary
- Tree to be retained
- Tree to be removed
- Existing levels to be maintained as higher than 2.25m AHD
- Area of subdivision fill up to 2.15m AHD - uniform 5m front setback, and 3m rear, secondary street or reserve setback

NOTE: Subdivision finished lot level to be minimum 2.15m AHD for building area. Additional 100mm fill at development stage to reach minimum 2.25m AHD finished to habitable level.



Tree Retention and Earthworks Plan

Pleasant Grove Circle, Falcon

0 60m

Date: 8 Sep 2022 Scale: 1:3000 @ A3 1:1500 @ A1 File: **19-369 SU01B** Staff: JP GW Checked: JP

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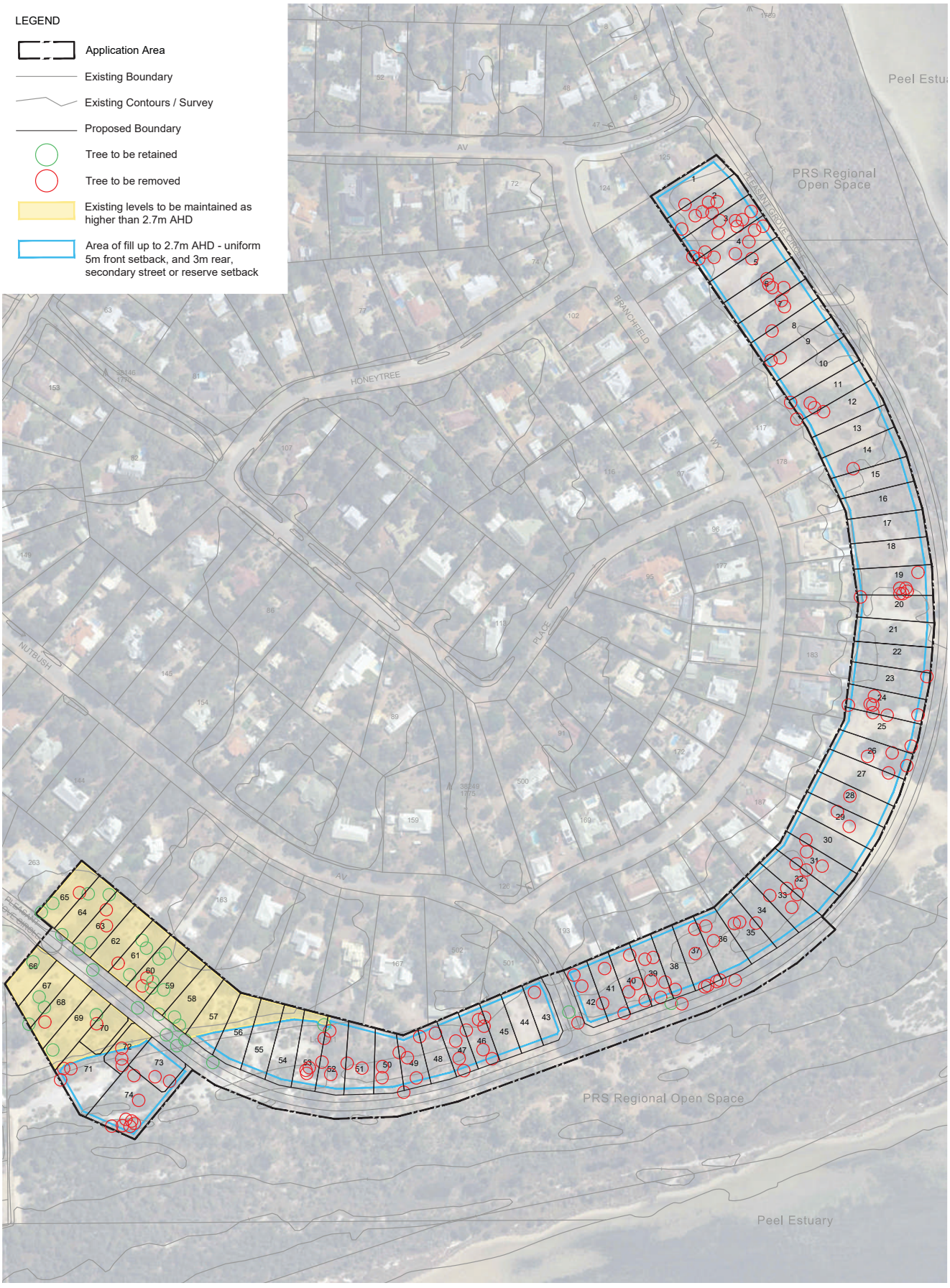


Figure 4. Tree Retention and Earthworks Plan

Process for complex amendments to local planning schemes flowchart

LG refuses to adopt amendment where no agreement for LG to use copyrighted material: **r. 35(4)**

LG resolves to **adopt** an amendment to a scheme prepared by a landowner: **r.35(1).** Resolution to specify that the amendment is a complex amendment: **r.35(2)**

LG resolves **to prepare** an amendment to a scheme: **r.35(1).** Resolution to specify that the amendment is a complex amendment: **r.35(2)**

LG must refer the proposed amendment to the EPA in accordance with **s.81 PD Act**

Landowner may request the Commission to advise whether amendment is complex, standard or basic**: r.36**

LG prepares amendment

EPA determines whether or not amendment needs to be assessed: **s.48A EP Act**

If EPA determines that the amendment should not be assessed and provides advice, the LG should consider modifications to the amendment to incorporate the EPA's advice

If EPA determines that environmental review is required under **s.48C(1)(a) of the EP Act,**

- the LG must complete the environmental review and forward it to the EPA; and
- the EPA must advise the LG that the review has been undertaken in accordance with instructions, or 30 days must have elapsed since the LG forwarded the review and the EPA has not provided advice,

before the amendment can be advertised: **s.82(2)**

Commission advises LG that amendment stream chosen is incorrect: **r.36(2)**

Amend resolution to reflect the correct amendment stream **r. 36(2)**

Commission advises LG that amendment stream chosen is correct

LG must resolve whether to proceed to advertise the complex amendment: **r.37(1)**

Resolves not to proceed: **r.37(1)(c)**

LG must within 21 days provide copy of resolution to the Commission: **r.37(5)**

Resolves to proceed with modifications : **r.37(1)(b)**

Modifications made

Resolves to proceed: **r. 37(1)(a)**

LG must submit 2 copies of proposed amendment to the Commission within 21 days: **r.37(2)**

Modifications made if not considered suitable

Commission to examine documents and within 60 days advise if it considers the amendment suitable for advertising: **r.37(3)** and **(4)**

If the Commission advises that amendment is suitable for advertising , LG must prepare a notice and advertise amendment in accordance with r.38(2) and accept submissions for at least 60 days: **r.38(1) and (4)**

NO SUBMISSIONS RECEIVED

SUBMISSIONS RECEIVED

LG considers submissions

Must consider all submissions received before end of submission period, may consider submission received after submission period but before end of consideration period: **r.41(2).** See r.41(1) for length of consideration periods.

If the amendment will be subject to environmental review LG must refer submissions received that relate to enviro issues to EPA and inform EPA of its views in relations to the environmental concerns raised in the submissions: **s.85 PD Act**

As soon as practicable after the end of the submission period (if no submissions received) or the consideration period (if submissions received) LG must resolve whether to support amendment: **r.41(3) and (4)**

Resolves not to support: **r.41(3)(c)**

Resolves to support with proposed modifications: **r.41(3)(b)**

Resolves to support: **r.41(3)(a)**

LG may decide to advertise proposed modifications if considered significant: **r.42**

If applicable, environmental conditions set by the EPA are incorporated: **r.43**

Within 21 days of passing resolution to support or not to support amendment under **r.41(3)(a) or (c)**, or of making a recommendation with respect to advertising of proposed modifications under **r.42(7)**, LG must provide amendment to WAPC together with relevant information: **r.44(1); r. 44(3).** Note: proposed modifications to the amendment should not be made by the LG prior to providing the documents to the Commission.

Commission must within 90 days consider and make recommendations with respect to the amendment and submit to the Minister in accordance with s 87(1) of the PD Act: **r.45**

If the Minister considers modifications to advertised amendment by the LG or Commission to be significant, Minister can direct LG to advertise proposed modifications: **r.46(1)**

LG advertises proposed modifications in the manner specified by the Minister and organises the recommendations to be provided to the Minister in the manner that the Minister directs (may require resubmitting to the Commission): **r.46(2)**

Minister to decide whether to support amendment

Approves amendment: **s.87(2)(a) PD Act**

Requires amendment to be modified and resubmitted: **s.87(2)(b) PD Act**

Refuses to approve amendment: **s.87(2)(c) PD Act**

Within 14 days LG must forward 2 copies of the amendment to the Commission for endorsement: **r.62(3) and (4)**

Within 42 days LG must modify the amendment, execute the modified amendment to the scheme and resubmit executed docs to the Minister and Minister approves: **r.62(2)**

As soon as practicable LG must notify each person who made a submission of the refusal **: r.62(1)**

Commission endorses copies and provides one endorsed copy to the Minister for endorsement: **r.63(1)**

Minister endorses the copy with the Minister's approval and returns it to the Commission: **r.63(2)** This also serves as the Minister's notification of approval for the purposes of s.87(3) of the PD Act.

A person authorised by the Commission is to certify that the amendment is a true copy approved by the Minister: **r.63(3)**

Commission publishes the amendment in the Gazette: **s.87(3) PD Act**

Commission forwards copy of the notice published in the Gazette to the LG: **r.64(1)**

LG advertises approved amendment in accordance with **r. 64(2)**

LEGEND

- **Local government**
- **Commission**
- **Minister**
- **EPA**

2	**SUBJECT:**	Proposed Local Development Plan – Lot 2002 Marina Quay Drive
	DIRECTOR:	Business Services
	MEETING:	Planning and Community Consultation Committee
	MEETING DATE:	9 November 2022

Summary

Council is requested to consider a Local Development Plan (LDP) proposed for Lot 2002, 21 Marina Quay Drive, Erskine. The LDP includes requirements relating to development applications and built form. The LDP is required to satisfy a condition of the approved Subdivision (WAPC ref 157905) for Lot 2002, Marina Quay Drive, Erskine.

A LDP is a mechanism used to coordinate and assist in achieving better built form outcomes by linking lot design to future development in addition to applying specific additional design requirements that may be required in certain areas. The proposed LDP includes provisions relating to the following:

- All proposed dwellings will require a Development Approval;
- Setbacks relating to primary street, secondary street, side and rear boundaries;
- Corner lots providing visual surveillance;
- Reducing garage dominance on narrow lots;
- Permitting second storey boundary walls for narrow lots;
- Open space requirements;
- Acoustic requirements (acoustic walls and quiet house design principles applied);
- A minimum of 2.7m AHD for habitable floor level due to flood zone requirements;
- Permeable fencing to public open space and public access ways;
- Dwelling orientation;
- Roof colour;
- Single dwelling lots limited to two storeys;
- Tree planting to be native species;
- Garage locations; and
- Preferred outdoor living area locations

The zoning of the subject land results in single residential being discretionary land uses and as such, development approval is required prior to constructing any dwellings. The LDP informs the assessment process and provides greater scrutiny and consistency across the site, whilst addressing the subdivision condition requirements.

The Marina Quay Drive Local Development Plan (Attachment 2.1) has been assessed and undergone amendments, requested at officer level, to reach an acceptable standard for public consultation to occur. Due to the history of the site, subdivision and Council's recommendation for community involvement the proposal was advertised for 28 days.

Letters were sent to approximately 100 landowners within the Mandurah Quay Estate via direct notification, installation of signs on-site, publishing on Mandurah Matters and direct contact with the Mandurah Quay Home Owners Association. A total of 30 submissions were received (Attachment 2.2) and the applicant has made some revisions to the proposal based on concerns raised during advertising. The LDP is considered to be acceptable and it is recommended that Council resolves to approve the proposal.

Disclosure of Interest

Nil

Location

Property Details

Applicant:	Ennis Advisory
Owner:	Gemplanet Pty Ltd Hitesh Chhaganlal Jethwa Kenneth Oscar Thomas Derrick Victor D'souza Antonio Mucciarone
Scheme No 12 (LPS 12) Zoning:	Special Use
Peel Region Scheme Zoning:	Regional open space, Urban, Waterways
Lot Size:	1.7178ha
Topography:	Relatively flat
Land Use:	Vacant and Hotel (‘Microbrewery’)

Previous Relevant Documentation

• G.8/7/21	27 July 2021	Council supported the proposed Hotel (‘Microbrewery’) subject to conditions.
• WAPC157905	28 May 2019	Council resolved that the proposed subdivision should not be approved in the absence of a Local Structure Plan with further requirements.

Background

Zoning
The LDP area is zoned Special Use 2 (SU2) under Local Planning Scheme 12 and applies the surrounding residential density coding of R40. Lot 2002 Marina Quay Drive has subdivision approval for residential use, however the Special Use Zone for this land has discretionary permissibility for single house, grouped dwelling and multiple dwelling. Discretionary means that the use is not permitted unless the local government has exercised its discretion by granting development approval. The result is all development proposed within the LDP area will require Planning Approval, allowing Officers to ensure all development proposals are assessed against the relevant provisions.

Subdivision
In May 2019, Council did not support a subdivision plan for the above-mentioned site, resolving the following;

> *"That Council provides this report to the Western Australian Planning Commission for the proposed subdivision of Lot 2002 Marina Quay Drive, Erskine (WAPC ref: 157905) recommending that the proposed subdivision should not be approved in the absence of a Local Structure Plan that addresses the following:*
>
> 1. *The demand, scale and desirability for long term future tourist development at this location given recommendations of the Local Tourism Planning Strategy;*
> 2. *Considerations of State Planning Policy 2.6 in dealing with Coastal Planning;*
> 3. *The subdivision and development design (lot and street layout, built form, scale, height, appearance);*
> 4. *Existing trees and public open space in the location; and*
> 5. *Provides for a period of public advertising.*
>
> *That Council acknowledges the significant community interest in the proposed subdivision and encourages the Western Australian Planning Commission to provide the opportunity for the community to participate in the decision-making process."*

The item was considered by the WAPC Statutory Planning Committee (SPC) and was granted conditional approval in September 2020, notwithstanding the City's recommendation. The approval comprised 27 residential lots ranging in size between 220m^2 and 355m^2 with a larger additional lot suitable for grouped or multiple dwellings measuring 1790m^2 and Lot 29 comprising of 5919m^2 where the Hotel ('Microbrewery') "Boundary Island Brewery" operates. The Hotel is not subject to the LDP.

As part of the WAPC conditions of subdivision approval, the developer is required to prepare a Local Development Plan (LDP) for the subdivision site. As outlined in the condition below, the LDP is required to address specific elements.

Condition 7. Local Development Plan(s) being prepared and approved for lots shown on the plan dated 23 March 2020 that address the following:

a. *Noise for Lots 8-16*
b. *Tree Preservation for Lots 1, 3, 5, 7, 10, 11 14, 15, 17 and 18*
c. *Bin Pad location for Lots 8-11*
d. *Minimum habitable floor level of 2.7m AHD for all lots; and*
e. *Fencing and passive surveillance over the public realm for Lots 15, 16, 27 & 28*

To the satisfaction of the Western Australian Planning Commission

Given the condition wording refers to it being to the satisfaction of the Western Australian Planning Commission, together with the scope of the development provisions, should Council resolve to approve the proposed LPD, it will be forwarded to the WAPC for their endorsement.

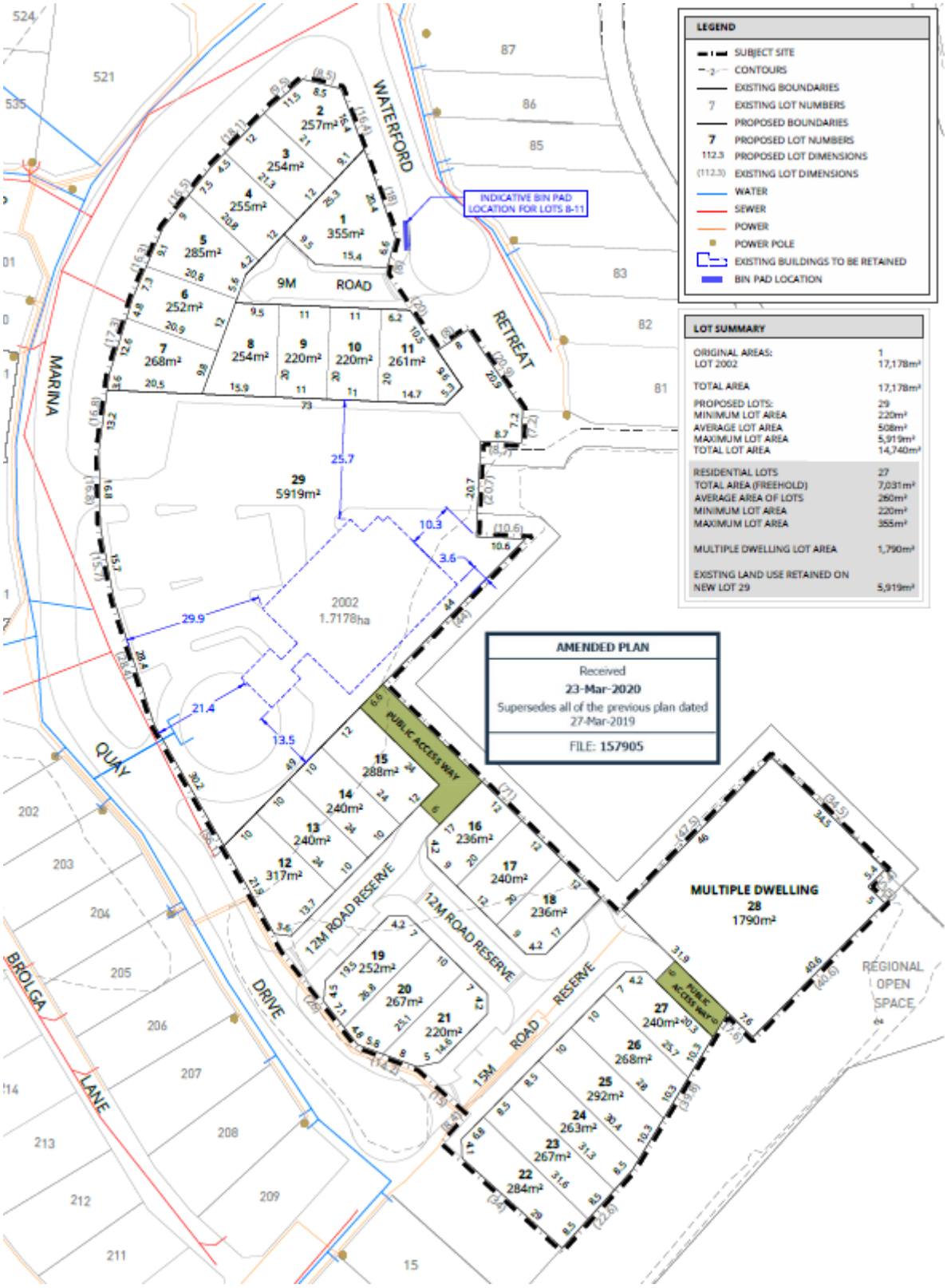


Figure 1. Lot 2002 Marina Quay Drive Approved Subdivision Design

Land Use
The land subject to the LDP is vacant, relatively flat and contains some established vegetation, grassed areas and access paths.

In July 2021, Council supported the proposed change of use to Hotel ('Microbrewery') on Lot 2002, Marina Quay Drive (Lot 29 on the approved subdivision plan). The proposed Hotel was advertised to approximately 400 surrounding residents and received 44 submissions; the key comments raised related to: boat ramp access and trailer parking, hours of operation, licence type, noise, patron numbers and availability of parking.

Officers assessment of parking proposed on-site – 1 bay per 4 patrons / seats – was sufficient for the maximum patron number of 328. Whilst relevant conditions mitigating potential noises sources have been recommended, and guided by a noise impact assessment which the Hotel must comply with as per conditions of approval.

The Officer Recommendation included conditions relating to the proposed plans (built form elements), patron/seating numbers, trading hours, noise/music, waste collection/deliveries, takeaway alcohol, security, food and odour. The recommendation was supported by Council unanimously.

As noted this LDP does not cover the Hotel site. Currently informal parking is occurring on the lots. The use of these lots for parking is not a suitable reason for refusing the LDP and the issue of parking for the Boundary Island Brewery requires alternative solutions and are discussed further in the report.

Comment

Proposed Local Development Plan
A Local Development Plan (LDP) is a planning tool used to provide alternative site-specific design control measures to those under the Residential Design Codes (R-Codes) for matters relating to urban design and the overall look of a built area. At the local government's discretion, can also streamline the development approval process.

While the LDP provides specific requirements for development, unless otherwise defined within the LDP, all development will be subject to the City of Mandurah Local Planning Scheme 12 (LPS12), State Planning Policy 7.3 Residential Design Codes (R-Codes) and City of Mandurah Local Planning Policy 1 Residential Development (LPP1).

The land is zoned Special Use under LPS12 with a density of R40. An assessment against the R-Codes determines if development satisfies the deemed-to-comply requirements. Deemed-to-comply provisions are R-Code standards that proposals are measured against. An LDP is a mechanism to vary the deemed-to-comply provisions. The below table outlines the proposed LDP provisions in comparison to the standard requirement:

Proposed LDP Provision	Standard Requirement (Deemed to Comply)	Comment
Primary street for all lots to have a 2m minimum setback	R-Codes require 4m minimum primary street setback for R40	2m primary street setback supports dwelling design on narrow lots
Secondary street for all lots to have a 1m minimum	R-Codes require 1m minimum secondary street setback for R40	Provisions are consistent
Rear boundaries for lots 22-27 have a 4m minimum setback	Lots 22-28 adjoin a Foreshore Reserve; section 4 of LPP1 (Lots Adjoining Foreshore Reserves) requires a minimum setback to a dwelling to be 4.5m to an open balcony, verandah and/or the like, and 6m to the main building.	Requiring a 4m minimum setback allows views to be maintained along the rear of all properties and provides visual surveillance to the foreshore reserve with outdoor living occurring within the 4m minimum setback area. The 4m minimum supports development on narrow lots, while

		being similar to the requirements of LPP1. It should be noted that Lot 28 is not subject to the 4m minimum and therefore will be subject to the LPP1 requirements for setbacks to the foreshore reserve
Boundary walls for Lots 3-10, 13, 14, 17, 20, 23-26 are permitted on both side boundaries and must comply with front and rear setbacks	R-Codes require in areas coded R30 and higher, walls not higher than 3.5m for two-thirds the length of the balance of the site boundary behind the front setback, to up to two site boundaries	The subject lots are narrow, allowing boundary walls on both boundaries supports development
Boundary walls for Lots 1, 2, 11, 12, 15, 16, 21, 22, 27 are permitted on one side boundary and must comply with front and rear setbacks	As above	Limits boundary walls for lots that are wider, meaning impact to neighbours is reduced
Garages setback minimum 4.5m from primary street	R-Codes require 4.5m setback to primary street except that the setback may be reduced where the garage adjoins a dwelling provided the garage is at least 0.5m behind the dwelling alignment	Specifying a minimum 4.5m garage setback means visitor parking will be accommodated on each lot.
For Lots 22 - 24, a garage door and its supporting structures may occupy up to 70 per cent of the frontage as the setback line as viewed from the street, where an upper floor or balcony extends for more than half the width of the garage and its supporting structures and the entrance to the dwelling is clearly visible from the primary street.	R-Codes allow garage width up to 60 per cent where an upper floor or balcony extends for more than half the width of the garage and its supporting structures and the entrance to the dwelling is clearly visible from the primary street.	Similar requirements, the LDP allows an extra 10% to accommodate the narrow lots
For Lots 22 - 27 two storey boundary walls are permitted up to a maximum height of 6.5m and are located between a minimum 4.0m front setback and a minimum 4.0m rear setback.	R-Codes only permit boundary walls up to 3.5m high, meaning two storey boundary walls are not permitted.	Allowing these lots to have 2 storey boundary walls accommodates two storey development on narrow lots
All lots have an open space minimum of 40%	R-Codes require 45% open space for R40	The 5% discretion is considered acceptable. Surrounding properties that are subject to Mandurah Quay Design Guidelines have the same requirement of 40% open space
Except for Lot 28, all lots have a maximum building height limit of 2 storeys. Wall and roof heights are as per Category B under Table 3 of State Planning Policy 7.3 Residential Design Codes Volume 1.	LPP1 applies category C under Table 3 of SPP7.3 which permits 3 storey development	Limiting the development to two storeys for Lots 1-27 means development will be consistent with the surrounding properties and the LDP area will not detract from the existing amenity
Any tree planting is required to be of a native species.	R-Codes Section 5.3.2 require all development to have a 2m by 2m tree planting area and 1 tree per dwelling	Specifying the tree to be native species is an effort by the applicant to compensate for the minimal tree retention due to lot size.

Other requirements mentioned in the LDP do not vary the R-Codes or LPP1, however are considered to be beneficial to the amenity of the LDP area. These provisions include the following:

- corner lots addressing both front and secondary streets with a habitable room, major opening and permeable fencing
- front fencing restricted to solid height of 1.2m and above 1.2m must be visually permeable
- Lots 7-16 are subject to quiet house design guidelines to reduce impact from the nearby Hotel ('Microbrewery')
- the material of the roof to be light in colour (white, shale grey or similar) to be of similar nature to the properties of Mandurah Quay
- garage locations specified to minimise impact of vehicles exiting/entering from Marina Quay Drive
- Dwelling orientation specified to encourage good public street interface
- Preferred outdoor living area location to encourage solar passive design of dwellings
- The external finish of visible boundary walls shall be finished with the same materials as the dwelling
- Tree required as per section 5.3.2 of the R-Codes, LDP requires tree to be a native species

The LDP provisions are considered to be acceptable and provide opportunity for good quality built-form and design of dwellings. The proposed LDP has undergone various amendments to resolve Officer and community concerns, where possible. The LDP provisions have been assessed with the provisions of the R-Codes and LPP1 to ensure each LDP provision results in outcomes that are supported when Development Approval is applied for.

Land Use and Planning Framework

Local Planning Scheme 12

The LDP area is zoned Special Use 2 (SU2) under Local Planning Scheme 12. Special use zones apply to special categories of land use which do not comfortably sit within any other zone in the Scheme. Lot 2002 Marina Quay Drive has subdivision approval for residential use, however the Special Use Zone for this land has discretionary permissibility for single house, grouped dwelling and multiple dwelling.

Discretionary means that the use is not permitted unless the local government has exercised its discretion by granting development approval. The result is all the development proposed within the LDP area will require Planning Approval, allowing Officers to ensure all development proposals are assessed against the provisions of the LDP, R-Codes and LPP1.

The below table includes LPS12 conditions of SU2 and LDP comments:

Special Use 2 Condition:	LDP comment:
a) In addition to any general provisions of LPS12, further development of land is to accord with the development requirements of the R-Codes for the coding of the adjoining residential zoned land unless a Local Development Plan has been approved as per Part 6 of the Deemed Provisions.	The adjoining properties are zoned Residential R40, therefore the residential zone R40 applies to the LDP
b) Where Residential Uses are proposed, the site shall require to be subject to a Local Development Plan as per Part 6 of the Deemed Provisions to determine the location, form and scale of development for the site, the interface to existing residential development and the application of the R-Codes.	Condition of LPS12 and subdivision approval (WAPC ref 157905) requiring LDP to be applied to the subject land

c) The Local Development Plan shall have regard to the prevailing form of development surrounding the site, and ensure an appropriate interface to existing residential development.	Provisions of the proposed LDP do consider the prevailing form of development surrounding the site through roof material requirements, setback provisions, application of the R-Codes and LPP1 where the LDP is silent.

R-Codes

A Local Development Plan is intended as a planning instrument to address site specific opportunities or constraints. In addressing these issues, an LDP may require variations to the deemed-to-comply provisions of the R-Codes to achieve desired outcomes. In these circumstances, R-Code variations may be acceptable provided that they are incidental to the primary purpose of the LDP and are consistent with the design principles of the R-Codes.

Unless defined within the LDP, all standard requirements of the R-Codes and the applicable provisions of LPP1 will be applied to all development proposed within the LDP.

LPP1

Local Planning Policy No. 1 Residential Development provides further interpretation of the R-Codes in the assessment of residential developments and provides the basis for consistent assessment and decision making. LPP1 replaces certain development standards of the R-Codes where a specific local need arises. The following provisions of LPP1 will be applicable to the LDP area unless defined within the LDP such as street setback, lot boundary setback, building height, outbuildings, wall height and lots adjoining foreshore reserves.

Lot 28 Development

During advertising, multiple submissions included queries regarding the development of Lot 28 due to its prominent location, size and less prescriptive LDP provisions. Lot 28 is 1790m^2 and intended for grouped or multiple dwellings. The LDP applies provisions to fencing of the adjoining public access way (PAW) and public open space (POS) to be 50% visually permeable above 1.2m high. Provisions within the LDP that apply to 'all lots', will apply to Lot 28 as it is located within the LDP area (indicated on the LDP as per Attachment 2.3). Therefore, any development proposal will require an application for planning approval to be submitted.

Lot 28 will be subject to standard development requirements from the R-Codes and LPP1. These standard development requirements will limit the building envelope within setbacks being as per R-Codes and LPP1 (unless specified in LDP). LPP1 will influence the building envelope for Lot 28 due to the lot adjoining a foreshore reserve, which requires a minimum setback to a dwelling to be 4.5m to an open balcony, verandah and/or the like, and 6m to the main building. This will maintain the view corridor for properties adjoining the foreshore reserve (labelled POS on the LDP as per Attachment 2.3). LPP1 will also influence the building envelope relating to height which applies Category C as per table 3 of the R-Codes which permits the maximum height of the wall to 9m and the maximum total building height to 10m (gable, skillion and concealed roof) or 12m (hipped and pitched roof). All other requirements will be considered against the provisions of the R-Codes.

Car Parking

Through submissions it was evident that the LDP area while vacant, is currently being used as informal parking for Boundary Island Brewery. This raised concerns as to where the current overflow of parking from the Microbrewery would park when the LDP lots are created/developed. During assessment for the Hotel ('Microbrewery') it was determined that the proposed parking ratio of 1 bay per 4 seats / patrons was determined sufficient for the following reasons:

- Ratio is consistent with a restaurant car parking rate
- Venue is to operate predominantly as a fully seated venue
- A portion of patrons are anticipated to travel to the site by taxi / uber
- Surrounding residential properties and established walking network – anticipated that a portion of patrons will walk / cycle to the venue
- The site is accessible by boat – anticipated that a portion of patrons will arrive via boat

In the event that patrons park their vehicles within the surrounding streets and on local government property, the *City of Mandurah Parking and Parking Facilities Local Law 2015* applies and can be enforced by the City.

While the informal parking from Boundary Island does not directly relate to the proposed Local Development Plan, officers have committed to investigate measures to ensure parking does not occur unlawfully. The overflow and concerns of residents has been raised at the City's monthly Parking Meeting with the resolution that signage will be installed in nearby streets to indicate no street parking areas.

People who raised concerns relating to on street parking have been encouraged to contact the City's Rangers if any illegal parking occurs.

The LDP requires all garages to be setback 4.5m from the street boundary. This requirement will accommodate visitor parking in the driveway reducing the need for on street parking. This was raised as a concern during the assessment as the R-Codes allow garage setbacks to be varied when garages are setback 500mm behind the dwelling; as dwellings are permitted to 2m setback. This could result in garages being setback 2.5m from the primary street which would not allow visitor parking in the driveway. The LDP specifying a 4.5m minimum setback for garages will accommodate visitor parking by not permitting a 2.5m setback. While parking within the LDP for individual lots has not been raised as a concern in submissions, the current informal parking and potential overflow into streets has been raised as a concern. The 4.5m setback for garages will accommodate visitor parking for individual lots.

Amenity

Trees
Despite the subdivision approval conditioning the retention of ten trees within the LDP area, due to the lot sizes and subdivision condition that minimum habitable floor level must be 2.7m AHD for all lots, tree retention is not possible for all ten trees. The need to raise the lot levels to a height of 2.7m requires fill of up to 700mm in some areas, which is likely to compromise the survival of the trees. As the lot sizes are between 220m^2 and 355m^2, the retention of trees within these lots is not possible. The LDP has identified two trees for retention, one located on the front boundary of Lot 17 and the other located in the Lot 30 (PAW). The two retained trees are of good quality and retaining these trees is considered a good outcome given the difficulties in retaining more trees.

Section 5.3.2 of the R-Codes requires that all dwellings provide a tree and 2m by 2m tree planting area. As all proposed dwellings will be required to apply for development approval; the City will be able to ensure all development approvals include a tree and tree planting area on the approved plans. In an effort to compensate the removal of eight of the trees identified for retention, the applicant agreed to including a provision that the LDP requires that the tree within the 2m by 2m tree planting area, be native species.

Concerns were raised through submissions regarding the minimal tree retention within the LDP area and efforts made to register more trees on the *City's Significant Tree Register.* The trees were assessed based on them being nominated as having '*Outstanding Visual/Aesthetic Significance'* and for having '*Significant Ecological Value.'* While acknowledging that the trees are aesthetically important to the site – officers did not consider that the nominations were outstanding in nature and several of the trees exhibit poor growth habit as well as signs of decline. Some of the trees nominated previously have since died and others that were in good condition have now also declined in health.

With regard to the significant ecological value, one of the measures is that a remnant species is now reduced in range or abundance. The Marri tree has an extensive range across the south west and is not considered to be significantly reduced in range. The tree is common throughout Mandurah in both public and private land. In addition, this element relates to trees that have a significant habitat element for rare or threatened species. While acknowledged and agreed these trees provide some foraging and habitat for black cockatoos however given distance to any known breeding sites foraging value has not been considered significant.

While they are not significant trees, it is important to note that a Structure Plan as requested by the City in 2019 when it recommended refusal of the subdivision would have provided a more suitable mechanism to achieve better tree retention outcomes.

Building materials
While the R-Codes do not require specific building materials or finishes, some of the surrounding properties within Mandurah Quay are subject to a restrictive covenant on titles which require roof finishes to be of a light colour. The properties within the LDP area are not subject to the same restrictive covenant, however it was raised throughout submissions that a specified light colour roof requirement is desired to have the same look as the surrounding properties. The applicant agreed to including this provision on the LDP.

The LDP also requires *"The external finish of all visible boundary walls shall be finished with the same materials as the dwelling to the satisfaction of the City of Mandurah."* This will ensure that any visible boundary walls will be of a quality finish and not detract from the surrounding amenity.

Noise Impact Assessment
Lots directly adjoining Lot 29 (site of the Hotel - Microbrewery) and Lot 16, are required to have Quiet House Design Guidelines applied to development as a condition of the subdivision approval. The Quiet House Design Guidelines are required by condition of subdivision. The Guidelines relate to techniques for Noise Avoidance and Mitigation. The LDP was submitted with an Acoustic Report (Attachment 2.3) which outlined which Quiet House Design Guidelines applied to the subject properties. The Acoustic Report was reviewed by the City's Environmental Health Officer and deemed acceptable and comprehensive.

It should be noted that given the close proximity of future residences to the proposed microbrewery the operator will likely be required to reduce their noise emissions significantly to comply with the standards set by the *Environmental Protection (Noise) Regulations 1997*. It is a requirement of the brewery as the noise emitter to ensure they do not exceed the regulated levels; however, the quiet house design requirements will certainly help in minimizing noise issues.

MEAG Comment

Whilst it is acknowledged the development results in the loss of vegetation and this has been raised through the submissions process, the proposed LDP does not have any influence on this as the lots have been created. As the purpose of the LDP is to provide development standards, it was not presented to MEAG.

Consultation

The proposal was advertised between 8 September and 5 October 2022 to 111 landowners adjoining and surrounding the LDP area via direct letter notification, sign on-site and publishing on Mandurah Matters.

Planning Officers attended the Mandurah Quay Home Owners Association Annual General Meeting on October 5th 2022 at the Halls Head Bowling Club in order to assist with answering questions community members had, with approximately 70-80 attendees at this session. During this meeting, officers made it clear that the advertising was only relating to the proposed LDP and reiterated that subdivision approval for the land had already been given by the WAPC. Submissions or objections relating to the subdivision, while noted, could not change the outcome of the subdivision approval.

30 submissions were received which have been summarised and responded to in the Schedule of Submissions (Attachment 2.2).

Key issues raised in submissions were identified as:

- Parking
- Tree Retention
- Roof Material
- Building Height
- Development of Lot 28

Statutory Environment

• *Planning and Development Act 2005;*

• *Planning and Development (Local Planning Schemes) Regulations 2015* ("Deemed Provisions");

• Peel Region Scheme;

• Local Planning Scheme No. 12

Policy Implications

- Local Planning Policy 1 Residential Development
- State Planning Policy 3.7 Residential Design Codes Volume 1
- State Planning Policy 2.6 Coastal Planning

Financial Implications

Nil

Risk Analysis

It should be noted that the community may consider some of the outcomes created by the subdivision as being undesirable. The subdivision was approved in September 2020 and this report requests Council to consider the Local Development Plan which addresses matters such as lot numbers, setbacks, wall height, vehicle access and parking, fencing, landscaping and private open space.

Should the applicant feel aggrieved by the determination, then an appeal may be lodged with the State Administrative Tribunal.

Strategic Implications

The following strategies from the City of Mandurah Strategic Community Plan 2020 – 2040 are relevant to this report:

Environment:
- Advocate for and partner with key stakeholders to ensure environmental impacts are considered in all planning, strategy development and decision making.

Organisational Excellence:
- Provide professional customer service, and engage our community in the decision-making process.

Conclusion

The City opposed the subdivision of Lot 2002 Marina Quay Drive (WAPC ref 157905), noting poor outcomes in a range of areas. Separating that decision and the proposed Local Development Plan (LDP) it is considered to be acceptable and supported. The LDP has been assessed and undergone amendments, requested at officer level, to reach an acceptable standard that responds to concerns raised through submissions and assessment.

As the subdivision has been approved by the WAPC, requiring the submission of this LDP, efforts have been made by officers and the applicant to include provisions within the LDP that will influence development and address concerns where possible. This includes provisions relating to setbacks to accommodate visitor parking, requiring light coloured roofs to be in keeping with the surrounding development, specifying tree planting for each development to be native to account the minimal tree retention and building height limits.

While it is evident the proposed LDP had a lack of support from the community due to the underlying subdivision approval, officers believe the LDP addresses community concerns to the best of its ability. Therefore, it is recommended that Council support the proposed Local Development Plan in its current form.

NOTE:

- Refer ***Attachment 2.1 Proposed Local Development Plan Lot 2002 Marina Quay Drive Erskine***
  Attachment 2.2 Submissions Table
  Attachment 2.3 Acoustic Report

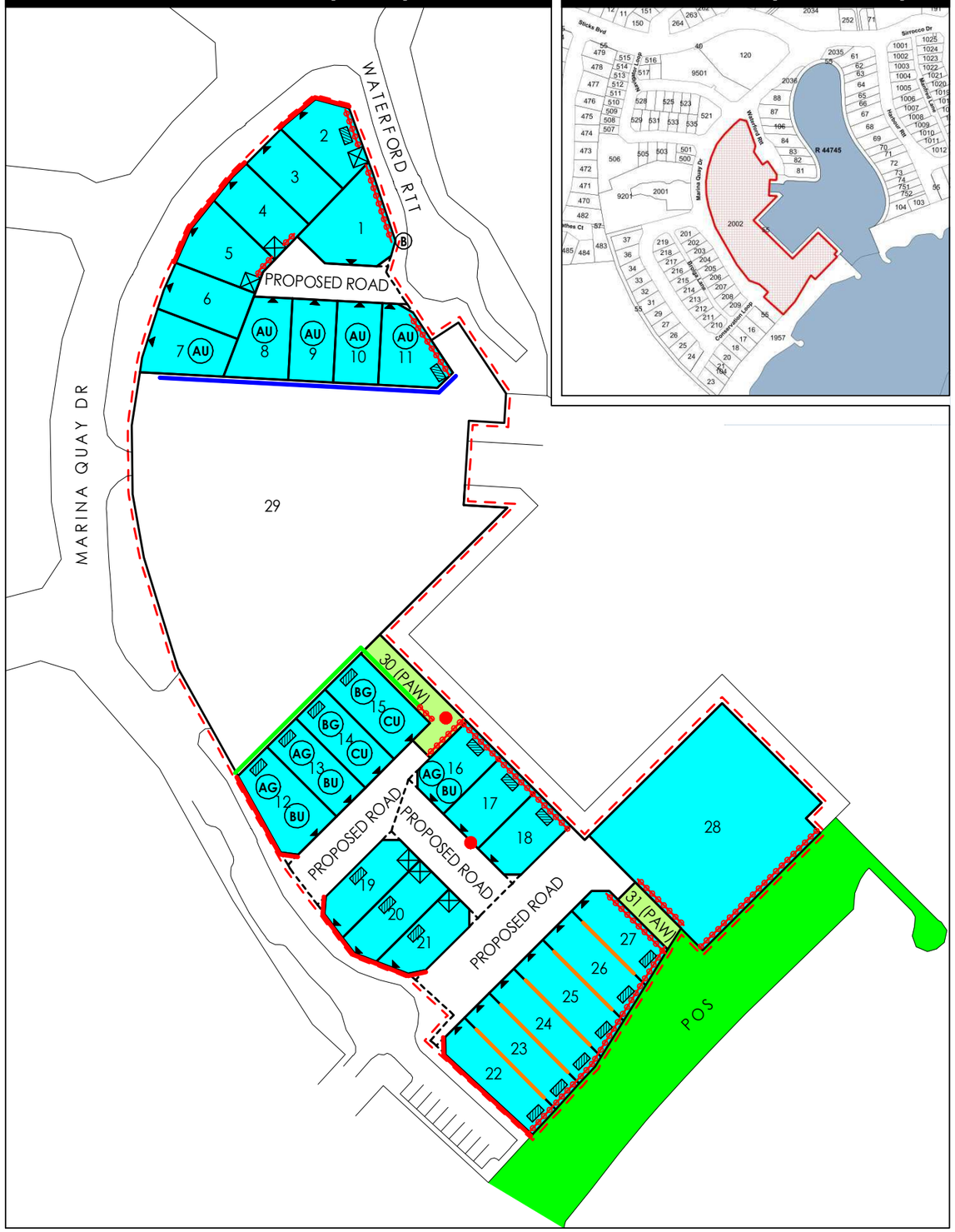
RECOMMENDATION

That Council:

1. **Endorse the proposed Local Development Plan for Lot 2002, No. 21 Marina Quay Drive Erskine as detailed in Attachment 2.1.**

2. **Acknowledge that the Local Development Plan for Lot 2002, No. 21 Marina Quay Drive Erskine requires approval from the Western Australian Planning Commission.**

LOCAL DEVELOPMENT PLAN (1:1250)



LOCATION PLAN (not to scale)

LEGEND

- LOTS SUBJECT TO LOCAL DEVELOPMENT PLAN
- SPECIAL USE (R40)
- PUBLIC OPEN SPACE
- P.A.W.
- FENCING TO BE 50% VISUALLY PERMEABLE ABOVE 1.2m HIGH
- DWELLING ORIENTATION
- TREE PRESERVATION
- (B) BIN PAD LOCATION FOR LOTS 8 - 11
- (AG) LOTS REQUIRE "QUIET HOUSE PACKAGE A" Noise Mitigation to Ground Floor
- (AU) LOTS REQUIRE "QUIET HOUSE PACKAGE A" Noise Mitigation to Upper Floor
- (BG) LOTS REQUIRE "QUIET HOUSE PACKAGE B" Noise Mitigation to Ground Floor
- (BU) LOTS REQUIRE "QUIET HOUSE PACKAGE B" Noise Mitigation to Upper Floor
- (CG) LOTS REQUIRE "QUIET HOUSE PACKAGE C" Noise Mitigation to Ground Floor
- (CU) LOTS REQUIRE "QUIET HOUSE PACKAGE C" Noise Mitigation to Upper Floor
- 1.8m HIGH ACOUSTIC WALL
- 2.4m HIGH ACOUSTIC WALL
- NO VEHICLE ACCESS PERMITTED
- DESIGNATED GARAGE LOCATION
- PREFERRED OUTDOOR LIVING AREA LOCATION
- PERMITTED TWO STOREY BOUNDARY WALL

PROVISIONS

Unless otherwise defined on this Local Development Plan, all development shall be in accordance with the City of Mandurah Town Planning Scheme No. 12 (TPS 12) and the Residential Design Codes of WA (RD Codes).

1 GENERAL

1.1 The requirements of the RD Codes are varied as shown on the Local Development Plan.

1.2 Due to the land being zoned 'Special Use' under the provisions of TPS 12, the 'Single Dwelling', 'Grouped Dwelling' and 'Multiple Dwelling' are discretionary uses and require an Application for Planning Approval to be submitted with the City of Mandarah for each lot under the Local Development Plan.

2 STREETSCAPE & SETBACK REQUIREMENTS

R40			
Criteria	**Location**	**Setback**	**Requirement**
Primary street	All lots	2.0m	Minimum setback
Secondary street	All lots	1.0m	Minimum setback
Rear boundaries	Lots 22 - 27	4.0m	Minimum setback
Side boundaries	Lots 3 - 10, 13, 14 17, 20, 23 - 26	Nil	Both side boundaries Maximum length determined by front and rear setbacks Maximum height as per RD Codes
	Lots 1, 2, 11, 12 15, 16, 21, 22, 27		One side boundary Maximum length determined by front and rear setbacks Maximum height as per RD Codes
Garages	Primary street	4.5m	Minimum setback
	Other than Primary street	1.5m	

2.1 For all corner lots, the dwelling shall include at least one habitable room major opening with a clear view of the Secondary Street and must not be obscured by visually impermeable fencing.

2.2 Where front fencing is not supplied as part of the subdivision works, the fencing is restricted in solid height to 1.2m and above a height of 1.2m must be 50% visually permeable.

2.3 For lots 22 - 24, a garage door and its supporting structures may occupy up to 70 per cent of the frontage as the setback line as viewed from the street, where an upper floor or balcony extends for more than half the width of the garage and its supporting structures and the entrance to the dwelling is clearly visible from the primary street.

2.4 For lots 22 - 27 two storey boundary walls are permitted up to a maximum height of 6.5m and are located between a minimum 4.0m front setback and a minimum 4.0m rear setback.

2.5 For lots 22 - 27 a minimum 4.0m rear building setback (including patios and verandahs) applies.

2.6 No vehicle access is permitted from Marina Quay Drive for lots 2, 12 and 22.

3 OPEN SPACE REQUIREMENTS

R40		
Location	**Minimum**	**Requirement**
All lots	40%	All dimension of the outdoor living area shall be a minimum of 4m

4 ACOUSTICS

4.1 Any dwelling constructed on lots 7 - 16 is required to comply with the nominated 'Quiet House Package A, B or C'. Quiet House design requirements contained on page 2 of this Local Development Plan.

5 SITE WORKS

5.1 All dwellings are to be established with a minimum finished floor level of 2.7m AHD.

6 BUILDING HEIGHT

6.1 Except for lot 28, all lots have a maximum building height limit of 2 storeys. Wall and roof heights are as per Category B under Table 3 of State Planning Policy 7.3 Residential Design Codes Volume 1.

7 HOUSING DESIGN

7.1 For all lots under the Local Development Plan, the roofing colour to the main dwelling and any ancillary buildings is to be finished in 'surf mist'.

7.2 The external finish of all visible boundary walls shall be finished with the same materials as the dwelling to the satisfaction of the City of Mandurah.

7.3 Any tree planting is required to be of a native species.

LOCAL DEVELOPMENT PLAN

LOT 2002 ON DP 404283 (#21) MARINA QUAY DRIVE, ERSKINE WA 6210
City of Mandurah

ENNIS ADVISORY TOWN PLANNING & DEVELOPMENT DELIVERY

DATE : 2 November 2022
DRAWN BY : K.R.D.
CHECKED BY : J.E.
FILE : 21-10_(SK-15)
PAGE : 1 of 2

SCALE 1:1250 @ A3
0m 10m 20m 30m 40m 50m

N

QUIET HOUSE DESIGN REQUIREMENTS

Quiet House Package A

Element	Orientation	Room	
		Bedroom	Indoor Living and Work Areas
External Windows	Facing	• Up to 40% floor area ($R_w + C_{tr} \geq 28$): ○ Sliding or double hung with minimum 10mm single or 6mm-12mm-10mm double insulated glazing; ○ Sealed awning or casement windows with minimum 6mm glass. • Up to 60% floor area ($R_w + C_{tr} \geq 31$): ○ Sealed awning or casement windows with minimum 6mm glass.	• Up to 40% floor area ($R_w + C_{tr} \geq 25$): ○ Sliding or double hung with minimum 6mm single or 6mm-12mm-6mm double insulated glazing; • Up to 60% floor area ($R_w + C_{tr} \geq 28$); • Up to 80% floor area ($R_w + C_{tr} \geq 31$).
	Side On	As above, except $R_w + C_{tr}$ values may be 3 dB less or max % area increased by 20%.	
	Opposite	No specific requirements	
External Doors	Facing	• Fully glazed hinged door with certified $R_w + C_{tr} \geq 28$ rated door and frame including seals and 6mm glass.	• Doors to achieve $R_w + C_{tr} \geq 25$: ○ 35mm Solid timber core hinged door and frame system certified to R_w 28 including seals; ○ Glazed sliding door with 10mm glass and weather seals.
	Side On	As above, except $R_w + C_{tr}$ values may be 3 dB less.	
	Opposite	No specific requirements	
External Walls	All	• $R_w + C_{tr} \geq 45$: ○ Two leaves of 90mm thick clay brick masonry with minimum 20mm cavity; or ○ Single leaf of 150mm brick masonry with 13mm cement render on each face; or ○ One row of 92mm studs at 600mm centres with: ▪ Resilient steel channels fixed to the outside of the studs; and ▪ 9.5mm hardboard or fibre cement sheeting or 11mm fibre cement weatherboards fixed to the outside; ▪ 75mm thick mineral wool insulation with a density of at least 11kgkg/m³; and ▪ 2 x 16mm fire-rated plasterboard to inside.	
Roofs and Ceilings	All	• $R_w + C_{tr} \geq 35$: ○ Concrete or terracotta tile or metal sheet roof with sarking and at least 10mm plasterboard.	

Quiet House Package B

Element	Orientation	Room	
		Bedroom	Indoor Living and Work Areas
External Windows	Facing	• Up to 40% floor area ($R_w + C_{tr} \geq 31$): ○ Fixed sash, awning or casement with minimum 6mm glass or 6mm-12mm-6mm double insulated glazing. • Up to 60% floor area ($R_w + C_{tr} \geq 34$): ○ Fixed sash, awning or casement with minimum 10mm glass or 6mm-12mm-10mm double insulated glazing.	• Up to 40% floor area ($R_w + C_{tr} \geq 28$): ○ Sliding or double hung with 6mm-12mm-10mm double insulated glazing; ○ Sealed awning or casement windows with minimum 6mm glass. • Up to 60% floor area ($R_w + C_{tr} \geq 31$); • Up to 80% floor area ($R_w + C_{tr} \geq 34$).
	Side On	As above, except $R_w + C_{tr}$ values may be 3 dB less or max % area increased by 20%.	
	Opposite	As above, except $R_w + C_{tr}$ values may be 6 dB less or max % area increased by 20%.	
External Doors	Facing	• Fully glazed hinged door with certified $R_w + C_{tr} \geq 31$ rated door and frame including seals and 10mm glass.	• Doors to achieve $R_w + C_{tr} \geq 28$: ○ 40mm Solid timber core hinged door and frame system certified to R_w 32 including seals; ○ Fully glazed hinged door with certified $R_w + C_{tr} \geq 28$ rated door and frame including seals and 6mm glass.
	Side On	As above, except $R_w + C_{tr}$ values may be 3 dB less or max % area increased by 20%.	
	Opposite	As above, except $R_w + C_{tr}$ values may be 6 dB less or max % area increased by 20%.	
External Walls	All	• $R_w + C_{tr} \geq 50$: ○ Two leaves of 90mm thick clay brick masonry with minimum 50mm cavity between leaves and 25mm glasswool or polyester (24kg/m³). Resilient ties used where required to connect leaves. ○ Two leaves of 110mm clay brick masonry with minimum 50mm cavity between leaves and 25mm glasswool or polyester insulation (24kg/m³). ○ Single leaf of 220mm brick masonry with 13mm cement render on each face. ○ 150mm thick unlined concrete panel or 200mm thick concrete panel with one layer of 13mm plasterboard or 13mm cement render on each face. ○ Single leaf of 90mm clay brick masonry with: ▪ A row of 70mm x 35mm timber studs or 64mm steel studs at 600mm centres; ▪ A cavity of 25mm between leaves; ▪ 50mm glasswool or polyester insulation (11kg/m³) between studs; and ▪ One layer of 10mm plasterboard fixed to the inside face.	
Roofs and Ceilings	All	• $R_w + C_{tr} \geq 35$: ○ Concrete or terracotta tile or metal sheet roof with sarking and at least 10mm plasterboard ceiling with R3.0+ fibrous insulation.	

Quiet House Package C

Element	Orientation	Room	
		Bedroom	Indoor Living and Work Areas
External Windows	Facing	• Up to 20% floor area ($R_w + C_{tr} \geq 31$): ○ Fixed sash, awning or casement with minimum 6mm glass or 6mm-12mm-6mm double insulated glazing. • Up to 40% floor area ($R_w + C_{tr} \geq 34$): ○ Fixed sash, awning or casement with minimum 10mm glass or 6mm-12mm-10mm double insulated glazing.	• Up to 40% floor area ($R_w + C_{tr} \geq 31$): ○ Fixed sash, awning or casement with minimum 6mm glass or 6mm-12mm-6mm double insulated glazing. • Up to 60% floor area ($R_w + C_{tr} \geq 34$): ○ Fixed sash, awning or casement with minimum 10mm glass or 6mm-12mm-10mm double insulated glazing.
	Side On	As above, except $R_w + C_{tr}$ values may be 3 dB less or max % area increased by 20%.	
	Opposite	As above, except $R_w + C_{tr}$ values may be 6 dB less or max % area increased by 20%.	
External Doors	Facing	• Not recommended.	• Doors to achieve $R_w + C_{tr} \geq 30$: ○ Fully glazed hinged door with certified $R_w + C_{tr} \geq 31$ rated door and frame including seals and 10mm glass; ○ 40mm Solid timber core side hinged door, frame and seal system certified to R_w 32 including seals. Any glass inserts to be minimum 6mm.
	Side On	As above, except $R_w + C_{tr}$ values may be 3 dB less or max % area increased by 20%.	
	Opposite	As above, except $R_w + C_{tr}$ values may be 6 dB less or max % area increased by 20%.	
External Walls	All	• $R_w + C_{tr} \geq 50$: ○ Two leaves of 90mm thick clay brick masonry with minimum 50mm cavity between leaves and 25mm glasswool or polyester insulation (24kg/m³). Resilient ties used where required to connect leaves. ○ Two leaves of 110mm clay brick masonry with minimum 50mm cavity between leaves and 25mm glasswool or polyester insulation (24kg/m³). ○ Single leaf of 220mm brick masonry with 13mm cement render on each face. ○ 150mm thick unlined concrete panel or 200mm thick concrete panel with one layer of 13mm plasterboard or 13mm cement render on each face. ○ Single leaf of 90mm clay brick masonry with: ▪ A row of 70mm x 35mm timber studs or 64mm steel studs at 600mm centres; ▪ A cavity of 25mm between leaves; ▪ 50mm glasswool or polyester insulation (11kg/m³) between studs; and ▪ One layer of 10mm plasterboard fixed to the inside face.	
Roofs and Ceilings	All	• $R_w + C_{tr} \geq 40$: ○ Concrete or terracotta tile roof with sarking, or metal sheet roof with foil backed R2.0+ fibrous insulation between steel sheeting and roof battens; ○ R3.0+ insulation batts above ceiling; ○ 2 x 10mm plasterboard ceiling or 1 x 13mm sound-rated plasterboard affixed using steel furring channel to ceiling rafters.	

LOCAL DEVELOPMENT PLAN

LOT 2002 ON DP 404283 (#21) MARINA QUAY DRIVE, ERSKINE WA 6210
City of Mandurah

ENNIS ADVISORY
TOWN PLANNING & DEVELOPMENT DELIVERY

DATE : 2 November 2022
DRAWN BY : K.R.D.
CHECKED BY : J.E.
FILE : 21-10_(SK-15)
PAGE : 2 of 2

SCALE 1:1250 @ A3
0m 10m 20m 30m 40m 50m

N

ATTACHMENT 2.2

Proposed Local Development Plan: Lot 2002, No. 21 Marina Quay Drive, Erskine

Summary of Submissions Table

Owner / Address	Submission (Summarised comments)	Comment
1. A Walker	a. Request that development be subject to same requirements as Mandurah Quay Development – Sea Mist Colorbond roofing only	*a.* Applicant has agreed to implement the following to the LDP to address this: "*For all lots under the Local Development Plan, the roofing to the main dwelling and any ancillary buildings is to be finished in a light roof colour. The preferred roofing colours being white, shale grey or similar."*
	b. Queried development of Lot 28 and specific built form requirements	b. Development of Lot 28 requires development approval and while likely to be grouped dwellings, assessment will be undertaken upon lodgement of plans and considered against the provisions of the Residential Design Codes and Local Planning Policy.
	c. Queried definition of 'foreshore reserve' regarding LPP1 setback requirements to foreshore reserve. Does this apply to the boardwalk on the east and north sides of the boardwalk in the marina and do these setbacks also apply to these 2 sides of Lot 28?	c. Lot 28 will need to comply with the foreshore setback requirements of LPP1 for the south east boundary (where the boundary adjoins the 'POS' area on the LDP). It will not be applied along the boardwalk as the water portion is not POS.
2. M Tranfield	a. Boundary Island Brewery (BIB) does not have enough parking and parking spills into the proposed LDP lots. Where are these cars going to park if the proposed building site goes ahead? Concerns for street parking overflow, on verge and blocking the streets	a. The parking for the Restaurant/Bar is a separate concern to the proposed LDP. The parking ratio was deemed compliant for the seating amount proposed by the restaurant. If BIB patrons park their vehicles within the surrounding streets and on local government property, the City of Mandurah Parking and Parking Facilities Local Law 2015 applies and can be enforced by the City.
	b. Concerns regarding trees being destroyed and prevent wildlife around the area	b. Retention of all trees is not possible. Each lot will be required to have one tree planted as per R-Codes Landscaping requirements.

	c. Buildings should be a maximum of two stories so they do not overshadow	c. Applicant has included the following to address concerns: *"Except for Lot 28, all lots have a maximum building height limit of 2 storeys. Wall and roof heights are as per Category B under Table 3 of State Planning Policy 7.3 Residential Design Codes Volume 1."*
3. T Piklington	a. Queried Lot 28 development	a. Development of Lot 28 requires development approval and while likely to be grouped dwellings, assessment will be undertaken upon lodgement of plans and considered against the provisions of the Residential Design Codes and Local Planning Policy.
4. J Sibson	a. Current parking issue in and around BIB. Cars are parking where the proposed lots for the LDP. Congestion and noise. Plan is unacceptable within more space for parking allocated	a. See 2a
	b. Concerns for increased traffic	b. The traffic increase has been considered through the subdivision process.
	c. Concerns for Lot 28 being an apartment complex	c. The future development of Lot 28 will be considered against the Residential Design Codes and Local Planning Policy 1 which do allow for grouped and multiple dwellings
5. D & P Browning	a. Concern for Lot 28 building height	a. Lot 28 building height is subject to LPP1 which applies Category C as per table 3 of the R-Codes which permits maximum height of wall 9m, maximum total building height 10m (gable, skillion and concealed roof) or 12m (hipped and pitched roof). This effectively means three storeys.
6. J & T Lindley	a. Concerns for significant tree registered tree	a. Subject significant tree is located within road reserve, not intended for removal
	b. Don't want to see trees removed	b. Retention of all trees is not possible. Two trees are being retained and R-Codes require each lot to include a tree

7. R & A Jepson	a. Concern for parking with BIB, cars forced to park on roads around Mandurah Quay. b. Increased volume of parked vehicles c. Concerned about the size of the blocks of land. Ask to reconsider the proposed plan	a. See 2a b. LDP requires 4.5m setback to garages to accommodate visitor parking c. Lot sizes and subdivision has been approved by WAPC. The proposed LDP cannot alter lot sizes
8. J Hewison	a. Parking concerns relating to BIB on proposed LDP lots. Increased water traffic since BIB	a. See 2a
9. R & S Rummer	a. Traffic associated to BIB has increased, parking issue associated to BIB. When the Brewery is at capacity there is nowhere for people to park. If proposed LDP goes ahead, where will the people park. b. Streets surrounding the venue are very narrow and concern for illegal verge parking c. Concerns for garages and driveways facing Marina Quay Drive, directly onto oncoming traffic in both directions and on a bend. d. Aboriginal site on the LDP land – illegal to cover/build over e. Too many dwellings/lots proposed f. Concern for number of trees that are going to be removed	a. See 2a b. See 2a c. The LDP has limited garages and driveways facing Marina Quay to only three properties. These properties have no alternative access location d. The WAPC has approved the subdivision through their processes e. The WAPC has approved the subdivision. The LDP cannot alter this decision f. Retention of all trees is not possible. Each lot will be required to have one tree planted as per R-Codes Landscaping requirements.
10. G Noske	a. Concern for Lot 28 development	a. Development of Lot 28 requires development approval and while likely to be grouped dwellings, assessment will be undertaken upon lodgement of plans and considered against the provisions of the Residential Design Codes and Local Planning Policy.

11. J & A Kreibich	a. Parking issues associated with BIB. Not enough parking. concerns parking will occur on street illegally. b. Concerns with BIB using the disabled parking for trucks and sea containers c. Speed limit along Marina Quay Drive needs to be reduced and zebra crossing near the entry to the Brewery	a. See 2a b. Noted, however not related to LDP assessment c. Technical Services have provided comment on Marina Quay Drive Speed: "*Average speed is less than 40km/hr"*
12. G and B Leach	a. Parking issues associated with BIB. Not enough parking. concerns parking will occur on street illegally. b. Concerns for garages and driveways facing Marina Quay Drive, directly onto oncoming traffic in both directions and on a bend. c. Traffic speed and noise concerns relating to BIB traffic d. deliveries of goods/foodstuffs have been constantly performed between the hours of 1.30 to 2.30am two or three times each week to the service area of the building e. LDP proposal is greedy, no consideration of open space, preservation of trees, environment, birds/wildlife or safety and wellbeing of present residents	a. See 2a b. Noted. The LDP has been amended to have limited garages and driveways facing Marina Quay to only three properties. These properties have no alternative access location c. See 11b and 11c d. See 11b. Further investigation is required relating to noise and compliance with development conditions. e. Lot sizes and subdivision approved by WAPC. LDP cannot alter lot sizes
13. S & N Robinson K Pomlett E Moczulska R & D Williams P Wilson	a. Parking: no public parking provided. Overflow from BIB occurring b. No additional parking for new housing lots. Concerns for visitor parking c. Existing tree canopy being removed, only leaving two trees d. Increased boating traffic e. Water quality needs to be closely monitored	a. See 2a b. LDP requires 4.5m setback to garages to accommodate visitor parking c. Retention of all trees is not possible. Each lot will be required to have one tree planted as per R-Codes Landscaping requirements. d. See 11b e. See 11b

	f. Traffic density: additional vehicles along Sticks Boulevard	f. See 11b
14. C & S Brown	a. Overflow parking on LDP land	a. See 2a
	b. Concern regarding an increase in vehicles and limited on street parking within LDP area	b. Number of lots approved by WAPC through subdivision. LDP requires 4.5m setback to garages to accommodate visitor parking
	c. Only 2 out of 14 trees to be retained are being retained foraging for food in these trees by Forest Red Tailed Black Cockatoos	c. Retention of all trees is not possible. Each lot will be required to have one tree planted as per R-Codes Landscaping requirements.
	d. current drainage area being removed, how will this impact?	d. Approved by WAPC. All drainage will have to comply with relevant standards and be approved by City's Engineering
	e. Brewery noise concerns	e. Acoustic report provides requirements and recommendations for lots closest to BIB. Quiet house design guidelines applied and noise walls installed along BIB boundary. The onus is on the brewery as the noise emitter to ensure they don't exceed the regulated levels
	f. Query regarding Lot 28 having a separate LDP	f. Development of Lot 28 requires development approval and while likely to be grouped dwellings, assessment will be undertaken upon lodgement of plans and considered against the provisions of the Residential Design Codes and Local Planning Policy.
	g. Tree condition of the flooded gum tree opposite 46 Marina Quay Drive (on significant tree register) has an application been made to remove this? If so, we object	g. Subject tree is located on road reserve and no application has been submitted for removal
15. B Wilkerson	a. Parking concern relating to BIB and new residential development	a. See 2a
	b. Will building guidelines be the same as Mandurah Quay Home Owners Association?	b. Applicant has implemented the following to the LDP to address this: "*For all lots under the Local Development Plan, the roofing to the main dwelling and any ancillary buildings is to be finished in a light roof colour. The preferred roofing colours being white, shale grey or similar."*

	c. Storm water sump or drainage area to be filled, what are the implications? d. Lot 28 what are the developer's intentions? e. Traffic flow impacts on Stick Boulevard and Old Coast Road from increase in traffic	c. Approved by WAPC. All drainage will have to comply with relevant standards and be approved by City's Engineering d. Explanation of development of Lot 28 is discussed in report. e. Noted, not relevant to LDP assessment
16. D Vardy	a. Not enough parking for BIB currently; where is everyone going to park? b. Trees being removed that should be retained c. What's the intention for lot 28? Looks like an apartment d. Lot size should be bigger, with less houses and retain some parkland e. Mandurah is being ruined by development	a. See 2a b. Retention of all trees is not possible. Each lot will be required to have one tree planted as per R-Codes Landscaping requirements. c. Explanation of development of Lot 28 is discussed in report. d. Lot sizes approved by WAPC e. Noted
17. R & D Willard	a. Parking is currently a major problem. Lot 2002 currently used for parking overflow from the Brewery. Where is everyone going to park? Concerns for street parking b. Large pond on Lot 2002 which used to be a natural spring, of aboriginal heritage. Surely illegal to build over this? c. Trees being destroyed that should be retained	a. See 2a b. WAPC have approved the subdivision through their process. c. Retention of all trees is not possible. Each lot will be required to have one tree planted as per R-Codes Landscaping requirements.
18. R & T Connor	a. Parking from BIB occurring on the land, where will these cars park? b. Noise from brewery play area c. Query proposal for Lot 28, no information on plan	a. See 2a b. See 14e c. See 11b

	d. Trees being removed on Lot 12, believe they are on council land and should be protected	d. See 16b
	e. The proposed development and the current car parking situation at BIB cannot co-exist, something has to give	e. See 2a
19. I Readwin	a. Where will the overflow of parking from BIB go? On the weekend over 40 cars were parked each day on the vacant lot. Where will everyone park?	a. See 2a
	b. Concern for parking overflow spilling into the suburb and destroy the tranquillity	b. See 2a
20. J & M Geoghegan	a. Trees. The corridor of trees on the south side of the brewery should be maintained as habitat for the fauna and flora preservation as the last remaining natural and native species in the area.	a. See 17c
	b. Parking. Serious thought needs to be given for planning on how to accommodate in excess of 50 plus vehicles before any other accommodation approval is given.	b. See 2a
	c. Marina. Access for vehicles and people to the marina pens need to be included in any development plan.	c. Noted, not considered for assessment of the LDP provisions
	d. Traffic. A reduction in the number of dwellings proposed and to include extra parking will help to minimise the traffic problems.	d. Subdivision is already approved by WAPC
	e. Block size. All proposed block sizes need to compliment the neighbourhood rather than create a congested area within. Minimum block size of 400m²	e. See 20d
	f. Lot 28. Better to be left as public open space.	f. Noted, land is privately owned, therefor land owner's choice of development
	g. Noise. As the developer recognises the noise problem of the boat playground for new properties, they should accept responsibility and replace windows on existing properties with double glazing or remove the boat playground.	g. It is the brewery's responsibility to comply with noise requirements

21. P & U Fowles	a. NBN being installed for the new buildings, does this mean it's going ahead regardless? b. BIB carpark is full and cars parking on LDP land c. Love the tranquillity of the area, don't relish overflow parking in our street	a. The subdivision has been approved by WAPC b. See 2a c. See 2a
22. P & H Naylor	a. If development is approved the cars from BIB will have nowhere to park. There is insufficient parking room for boat trailers. Street parking is already occurring b. Concern for Waterford Retreat and Marina Quay Drive becoming more congested and dangerous for the many daily walkers	a. See 2a b. Noted, not a consideration for LDP provisions. Vehicle access is limited on Marina Quay Drive and Waterford Retreat
23. R Heilbronn	a. Protection of the environment: removal of trees, concern for Forest Red-tailed Black Cockatoos. EPA requirements for threated species b. Open space: R-Code R40 requires 45% open space. LDP requires 40% open space? c. parking BIB overflow parking issue will only worsen. Concern for street/verge parking d. casual area users: POS users are limited to 10 parking spaces, their needs are neglected in this LDP e. Lot 28 concerns for development f. large drainage area: what happens to this and drainage capacity? g. Amenity: Mandurah Quay has a quiet, safe and pristine environment. Proposed development is of a great concern to the amenity	a. The applicant has been reminded of their requirements to comply with the EPA b. The LDP can reduce the requirement for open space. A 5% decrease is considered acceptable due to the size of the lots c. See 2a d. The 10 parking spaces within the road reserve are maintained e. See 11b f. See 14d g. noted
24. G & L Wray	a. Overflow of parking from BIB is of great concern	a. See 2a
25. J Sangster & S Tischler	a. Overflow of parking from BIB what measures have been put in place to provide extra parking to accommodate BIB?	a. See 2a

	b. Noticeable litter throughout the area, cars driving fast around the estate, concern for safety with traffic speed and volumes	b. Noted, however not related to LDP provisions
	c. Visitors from BIB have little regard for our special residential area	c. noted
26. R & H Oxley	a. Construction and design to compliment existing properties. MQHOA building guidelines to be incorporated where possible.	a. See 1a
	b. More trees to be retained	b. 2b
	c. COM to ensure the developers to made particularly aware of clearing restrictions in mind of Cockatoo habitat and any possible penalties for breeches.	c. See 23a
	d. Access to garages and off street residents parking to be contained within the internal perimeter of the LDP, not on Marina Quay Drive.	d. Subdivision already approved by WAPC. See 12b
	e. Attention be given to the building height of properties fronting the estuary in considering the flight path of birds and probable collisions into buildings.	e. All lots except Lot 28 are maximum 2 storey. Lot 28 permitted to 3 storey. Flight path of birds not a planning consideration
	f. Drainage, new and existing be sufficiently addressed.	f. See 14d
	g. COM Planning to acknowledge that in the course of the proceeding of the LDP, the redevelopment of the Marina and the existing substantial shortfall of parking at the Brewery, then planning must responsibly take these matters into consideration within the current LDP process	g. See 2a
27. C Heilbronn	a. Birdlife: implore you to take into consideration reserving bird habitat and foraging on Lot 2002	a. Noted, see 2b
	b. BIB parking on Lot 2002 and destroying vegetation	b. See 2a
	c. Overflow of parking, where will BIB patrons park if land is developed	c. See 2a
	d. Environment: people dumping rubbish and white goods on the site	d. Noted
	e. Noise: children playground creating noise issues, weekend	e. See 20g

	noise late into evenings of screaming	
	f. Late night noise: frightening verbal abuse voices as they return to cars	f. See 20g
28. K Drage	a. Safety and evacuation: Marina Quay Drive is small and winding, blind corners and near misses of accidents. Concerns of increased vehicles with dwellings and concern of emergency service vehicles not being able to use the site	a. Noted, however not considered relative to LDP provisions
	b. Parking: overflow parking from BIB on Lot 2002. Proposal does not demonstrate that there will be sufficient parking to accommodate for this	b. See 2a
	c. Block sizes: proposal shows very small block sizes, not consistent with surrounding residential properties, minimal garden and greenery, which will reduce the aesthetics of the area.	c. Subdivision already approved by WAPC
	d. Tree removal	d. See 17c
	e. Clarification for Lot 28	e. See 11b
	f. Noise and antisocial behaviour. BIB patrons throwing rocks and abusing residents. Security of homes is a risk	f. See20g
29. S & J Jovicic	a. Overdevelopment of the land	a. Subdivision already approved by WAPC
	b. Overflow of cars from BIB on the LDP land	b. See 2a
	c. Size of the lots is small and no reference to where potential owner's visitors would park	c. See 20f
	d. Currently the land is used for public recreation, if the subdivision is passed it will impact the wider community	d. See 20f
	e. There is only one way in and one way out of Mandurah Quays. In case of an emergency, this poses risk	e. Noted, existing road layout cannot be altered through proposed LDP
	f. Having so many lots will contribute to noise and traffic	f. See 29a
	g. Are there any covenants attributed to these proposed lots?	g. No

	h. Feel the number of lots proposed unfairly represents a detriment to our own house values	h. See 29a
	i. We have had to conform to the various constraints such as height restrictions, fencing, containing parking on site etc and we feel this proposed subdivision does not have adequate planning involved	i. The proposed LDP has height limitations, fencing requirements and R-Codes require visitor parking
	j. Bird environment being affected	j. Noted, however not relative to LDP provisions
	k. Another concern is the environmental impact that such a development would have on the marina with potential drainage and overflow going into the water affecting the aquatic environment. The lots are very close to the water and the plan does not indicate what the potential setbacks would be and how they would address these environmental issues	k. Noted, see 14d
	l. We believe this land could be purchased by the government and given back to the people of Mandurah Quays and the wider community to be enjoyed as a public open space	l. See 20f
30. MQHOA	a. Block sizes are not in keeping with existing surrounding block sizes	a. 29a
	b. Lack of detail regarding Lot 28, what's the size of the dwelling, height, design and parking provision?	b. 1b
	c. Currently the lot is used for overflow parking from BIB. Will the Council consider that the development will remove all current overflow parking and create congestion, illegal parking and nuisance both to residents and patrons?	c. See 2a
	d. Traffic flows have increased. Will the Council require updated traffic flows, especially in the approaching Summer months/holiday period, before considering the LDP rather than to base decisions on current unrepresentative information?	d. Subdivision is already approved by WAPC, therefor amount of dwellings is already confirmed. Technical Services review traffic flow data
	e. Existing building guidelines in Mandurah Quay: construction and	e. See 1a

	colours of roofing, render and fencing. Will these be applied to the LDP so they remain in keeping with the area?	
	f. Loss of trees and habitat for the protected species of black cockatoos and for spoonbills. Has the developer applied to for, and received, permission to remove the protected habitat?	f. See 23a
	g. Noise impacts. Will the Council place sufficient weight and require additional measures from the developer to protect existing homeowners?	g. The developer is not required to protect existing home owners regarding noise impacts from BIB
	h. Water table impact on proposed lots and existing drainage built over. Will the Council include water and drainage as a risk issue?	h. See 14d
	i. Rumour that the tennis court is being considered for overflow parking?	i. No formal application for the tennis court to be a parking lot has been received
	j. What does the Council believe the solution to overflow parking could be as this is going to be a “forever problem” for the City to control?	j. See 2a
	k. Can the subdivision be revised?	k. No, the subdivision has been approved by WAPC

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Environmental Noise Assessment

Marina Quay Drive, Erskine

Reference: 21096664-01

Prepared for:
Ennis Advisory

Report: 21096664-01

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Date:	Rev	Description	Prepared By	Verified
10-Sep-21	0	Issued to Client	Terry George	Rob Connolly

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Appendices

1 INTRODUCTION

It is proposed to subdivide land at Lot 2002 Marina Quay Drive, Erskine as generally shown in *Figure 1-1*, with the proposed subdivision plan provided in *Figure 1-2*.

Figure 1-1 Project Locality (PlanWA)

As part of the approval conditions, it is stated a Local Development Plan is required to address, amongst other things, noise to proposed Lots 8-16.

The reason for the above condition is that it is proposed to convert the existing Mandurah Quay Function Centre to a Micro Brewery and the subdivision will encroach on this proposal.

A noise assessment was undertaken for the proposed micro brewery (based on existing residences) by EcoAcoustics Pty Ltd and a copy of this report[1] has been provided (refer *Appendix B*) and utilised in this assessment.

Appendix C contains a description of some of the terminology used throughout this report.

[1] *Mandurah Quay Resort – Boundary Island Brewery Redevelopment, 40 Marina Quay Drive, Erskine, Noise Impact Assessment*; 23 June 2021, 21050950-01

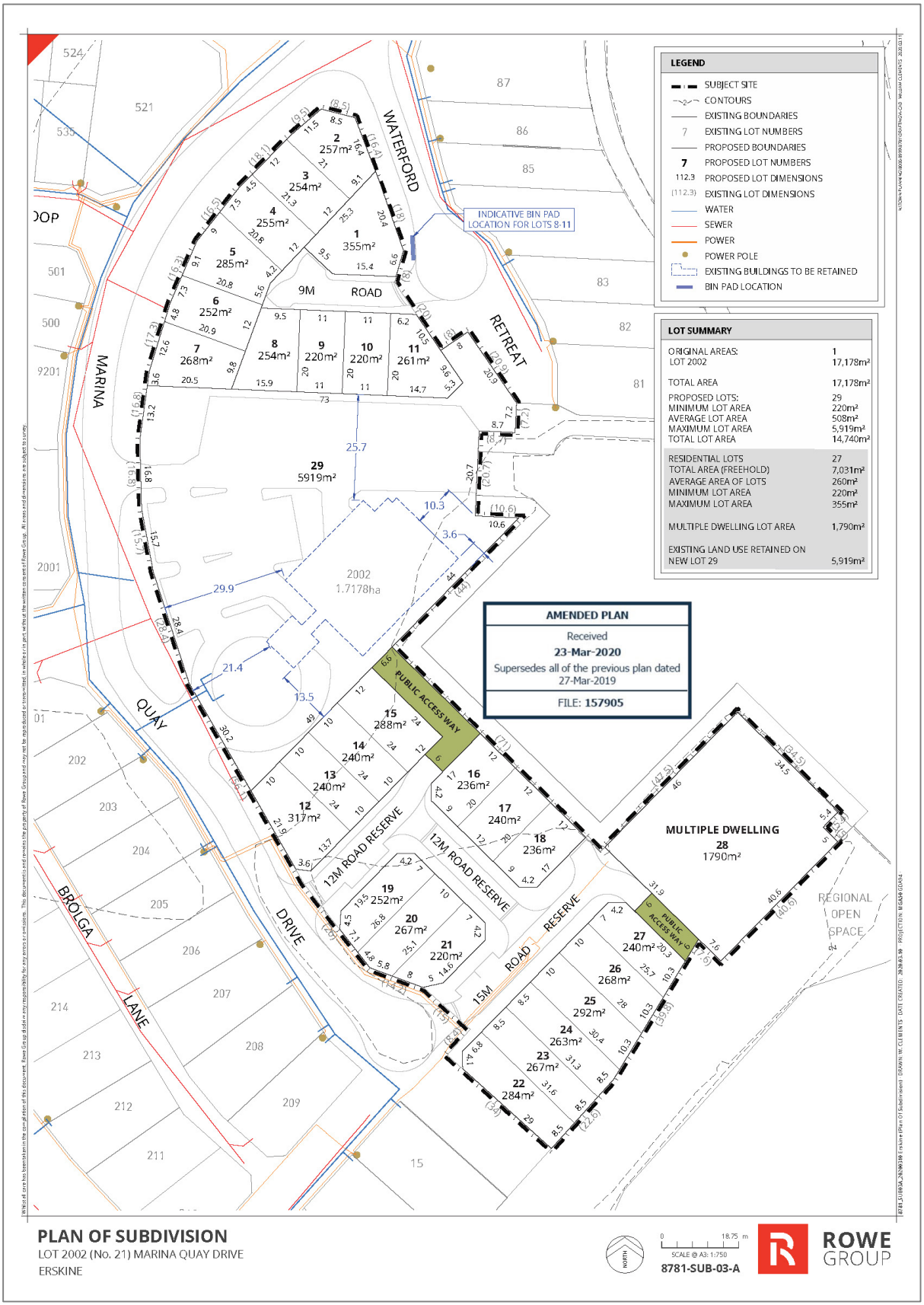


Figure 1-2 Proposed Subdivision

2 CRITERIA

Environmental noise in Western Australia is governed by the *Environmental Protection Act 1986*, through the *Environmental Protection (Noise) Regulations 1997* (the Regulations).

Regulation 7 defines the prescribed standard for noise emissions as follows:

"7. (1) Noise emitted from any premises or public place when received at other premises –

(a) Must not cause or significantly contribute to, a level of noise which exceeds the assigned level in respect of noise received at premises of that kind; and

(b) Must be free of –

i. tonality;

ii. impulsiveness; and

iii. modulation,

when assessed under regulation 9"

A "…noise emission is taken to significantly contribute to a level of noise if the noise emission … exceeds a value which is 5 dB below the assigned level…"

Tonality, impulsiveness and modulation are defined in Regulation 9. Noise is to be taken to be free of these characteristics if:

(a) The characteristics cannot be reasonably and practicably removed by techniques other than attenuating the overall level of noise emission; and

(b) The noise emission complies with the standard prescribed under regulation 7 after the adjustments of *Table 2-1* are made to the noise emission as measured at the point of reception.

Table 2-1 Adjustments Where Characteristics Cannot Be Removed

Where Noise Emission is Not Music			Where Noise Emission is Music	
Tonality	Modulation	Impulsiveness	No Impulsiveness	Impulsiveness
+ 5 dB	+ 5 dB	+ 10 dB	+ 10 dB	+ 15 dB

Note: The above are cumulative to a maximum of 15dB.

The baseline assigned levels (prescribed standards) are specified in Regulation 8 and are shown in *Table 2-2*.

Table 2-2 Baseline Assigned Noise Levels

Premises Receiving Noise	Time Of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive premises: highly sensitive area[1]	0700 to 1900 hours Monday to Saturday (Day)	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sunday and public holidays (Sunday)	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days (Evening)	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	35 + influencing factor	45 + influencing factor	55 + influencing factor

1. ***highly sensitive area*** means that area (if any) of noise sensitive premises comprising —
   (a) a building, or a part of a building, on the premises that is used for a noise sensitive purpose; and
   (b) any other part of the premises within 15 metres of that building or that part of the building.

The influencing factor is calculated as 2 dB within the EcoAcoustics report such that this has also been adopted. As such, the assigned noise levels are provided in *Table 2-3.*

Table 2-3 Assigned Noise Levels

Premises Receiving Noise	Time Of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive premises: highly sensitive area[1]	0700 to 1900 hours Monday to Saturday (Day)	47	57	67
	0900 to 1900 hours Sunday and public holidays (Sunday)	42	52	67
	1900 to 2200 hours all days (Evening)	42	52	57
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	37	47	57

1. ***highly sensitive area*** means that area (if any) of noise sensitive premises comprising —
   (a) a building, or a part of a building, on the premises that is used for a noise sensitive purpose; and
   (b) any other part of the premises within 15 metres of that building or that part of the building.

3 METHODOLOGY

As described in *Section 1*, the basis of the assessment utilises the information within the EcoAcoustics Report contained within *Appendix B*. This report describes the proposal as:

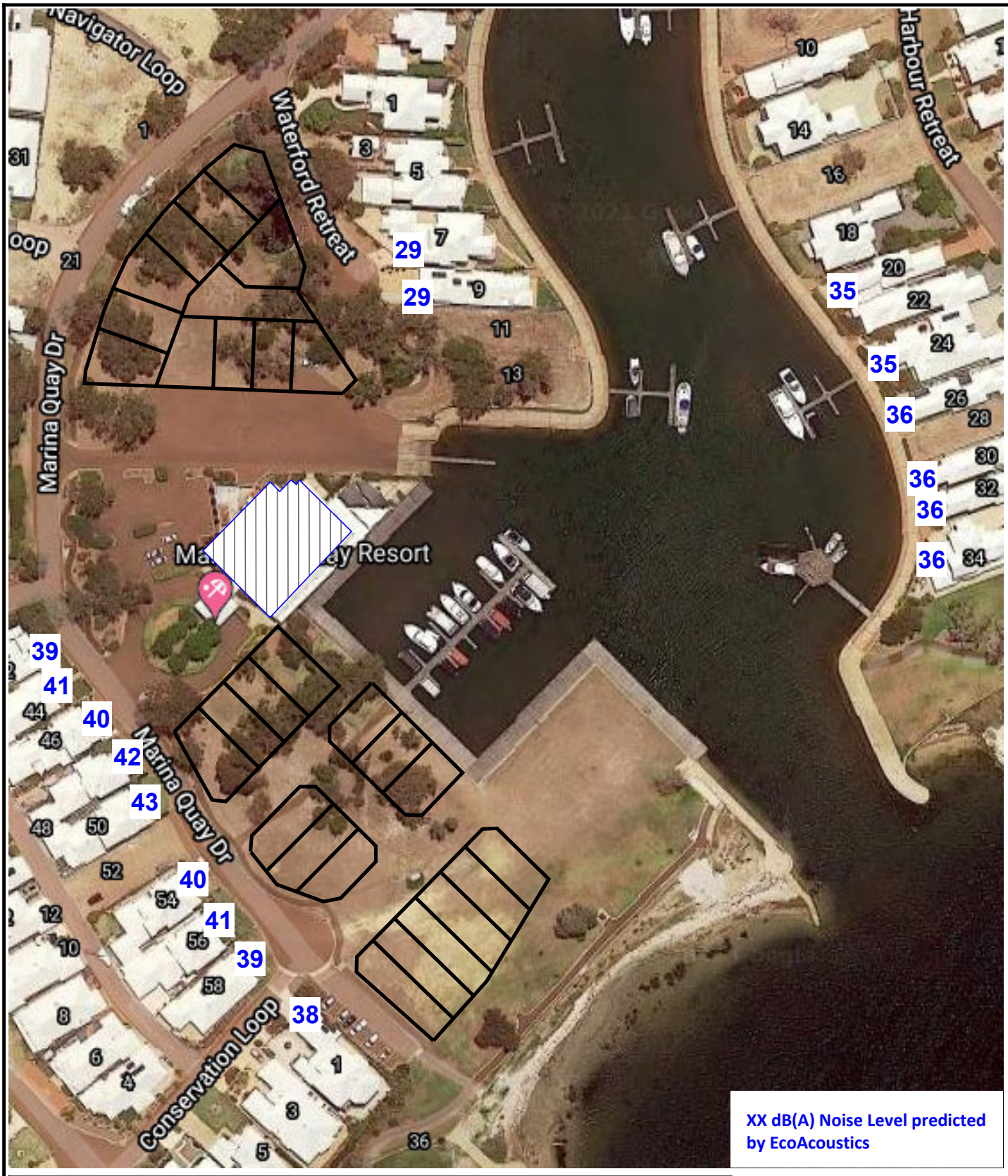
- *"The existing restaurant/function area will be retained and refurbished to include seating. The existing dance floor will be removed and replaced with dining areas;*
- *Seating will be provided on the terrace area fronting onto the canal; A sundeck will be added to the north eastern corner of the site to allow for outdoor dining and very low level music;*
- *Music will be generally played through in-house speaker systems only with the exception of an occasional "acoustic act" to be played within the building;*
- *A new children's play area will be located at the Marina Quay Drive frontage of the site; Air conditioning and mechanical plant will remain insitu …"*

The report considers four scenarios:

1. Normal Summer – windows and doors all open, patrons dining on the sundeck and terrace areas. The findings of this scenario was it was compliant (excluding music penalties) during the day and evening periods at existing residences – refer *Figure 3-1*;
2. Normal Winter – windows and doors closed, patrons dining on the sundeck with low level music playing. The findings of this scenario is it is compliant during the day and evening periods (with music penalty) at existing residences – refer *Figure 3-2*;
3. Closed with music – windows and doors closed with higher level music playing inside, patrons dining on the sundeck only. The findings of this scenario was it was compliant during the day and evening periods at existing residences – refer *Figure 3-3*;
4. After 10pm Operation – Windows and doors closed, no music on sundeck. Patrons dining externally on the sundeck and terrace. Noise levels are deemed compliant at all times by EcoAcoustics – refer *Figure 3-4*.

To achieve compliance at the existing residences, the following management was also recommended by EcoAcoustics (amongst others):

- When doors and windows are open, internal music levels must be restricted;
- Doors and windows are to be closed at 10pm and external speakers turned off;
- Children's play area to be closed at 10pm.



Marina Quay Drive, Erskine
Proposed Subdivision

Predicted Noise Level from EcoAcoustics Report
Scenario 1 - Normal Summer Operating Conditions

SoundPLAN v8.2
CONCAWE Algorithms

9 September 2021

Signs and symbols
- Proposed Brewery
- Proposed Subdivision

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Length Scale 1:1500
0 7.5 15 30 45 60 m

Figure 3-1

Marina Quay Drive, Erskine
Proposed Subdivision

Predicted Noise Level from EcoAcoustics Report
Scenario 2 - Normal Winter Operating Conditions

SoundPLAN v8.2
CONCAWE Algorithms

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Length Scale 1:1500
0 7.5 15 30 45 60 m

Figure 3-2

Marina Quay Drive, Erskine
Proposed Subdivision

Predicted Noise Level from EcoAcoustics Report
Scenario 3 - Music at Higher Level Inside (Windows and Doors to Canal Closed)

SoundPLAN v8.2
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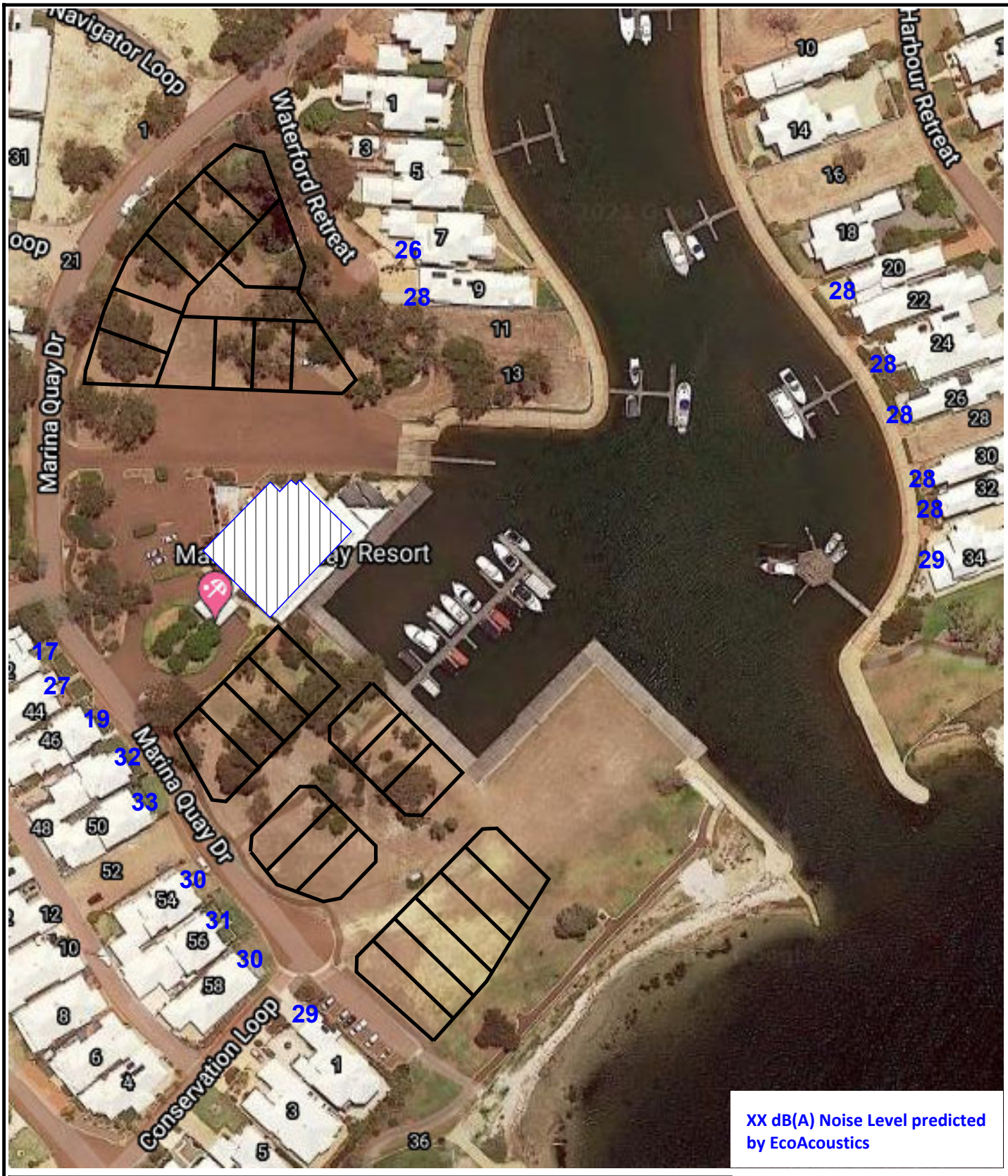
Length Scale 1:1500
0 7.5 15 30 45 60 m

Figure 3-3



Marina Quay Drive, Erskine
Proposed Subdivision

Predicted Noise Level from EcoAcoustics Report
Scenario 4 - Normal Operations After 10pm

SoundPLAN v8.2
CONCAWE Algorithms

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Length Scale 1:1500
0 7.5 15 30 45 60 m

Figure 3-4

4 RESULTS

From the EcoAcoustics model, Scenario 1 represents the worst-case noise emissions for daytime and evening, where the assigned noise levels are 47 dB(A) and 42 dB(A) respectively, noting the latter also applies on Sundays and public holidays during the day. Scenario 4 represents the worst-case noise emissions during the night, after 10pm where the assigned noise level is 37 dB(A).

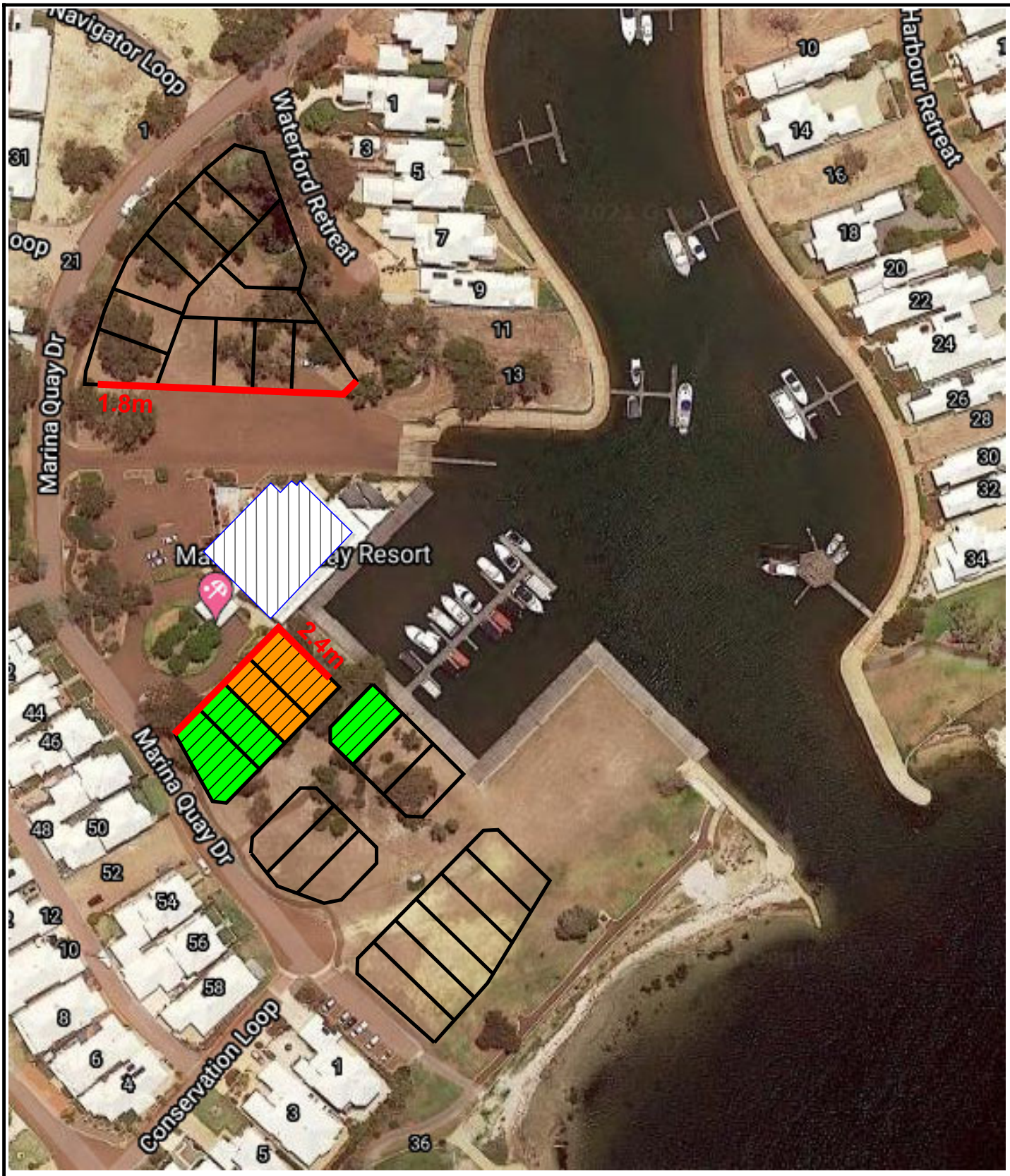
With regard to Scenario 1, the highest predicted level at an existing residence (#50) is 43 dB(A), with 40 dB(A) relating to the sundeck and music from inside and 38 dB(A) from children playing. At the closest proposed Lot 15, this relates to 54 dB(A) from children playing and 52 dB(A) from the sundeck and music (total level of around 55 dB(A) adjusting for distance). Compared to the most stringent assigned noise level of 42 dB(A), this represents an exceedance of 13 dB(A). This would be expected to progressively reduce to a 4 dB exceedance at proposed Lot 12 and also 4 dB exceedance at proposed Lot 16.

To the north, the results at existing 7 Waterford Retreat can be used where the predicted level is reported as 29 dB(A). On this basis, the predicted level at proposed Lots 8-11 is around 37 dB(A), which would be considered compliant during the day and evening. It is also noted that these lots will also adjoin the car park where some noise can be expected.

For Scenario 4, the highest predicted level to the south is 33 dB(A) at #50, which is estimated to relate to 43 dB(A) at proposed Lot 15, representing a 6 dB exceedance at night. By proposed Lot 12, this is expected to reduce to 36 dB(A) and therefore be compliant. To the north, the worst-case calculated level is 28 dB(A) at an existing residence, which is expected to relate to 34 dB(A) at proposed Lots 8-11, which would comply with the night assigned level of 37 dB(A).

Using the estimated exceedances at the proposed lots, *Figure 4-1* and *Figure 4-2* provide the recommended architectural packages (refer *Appendix A*) to be adopted for the ground and upper floor respectively, of dwellings on affected lots. These packages have been adopted from the Guidelines[2] associated with *State Planning Policy No. 5.4*. Also included are the recommended noise walls as well as notifications on title. Note any noise wall shall be solid, free of gaps and have a minimum surface mass of 15 kg/m^2 or acoustically rated at R_w 28.

[2] *Road and Rail Noise Guidelines*, September 2019



Marina Quay Drive, Erskine
Proposed Subdivision

Noise Mitigation to Ground Floor

9 September 2021

Signs and symbols

- Proposed Brewery
- Proposed Subdivision
- Noise Wall
- Package A
- Package B
- Package C

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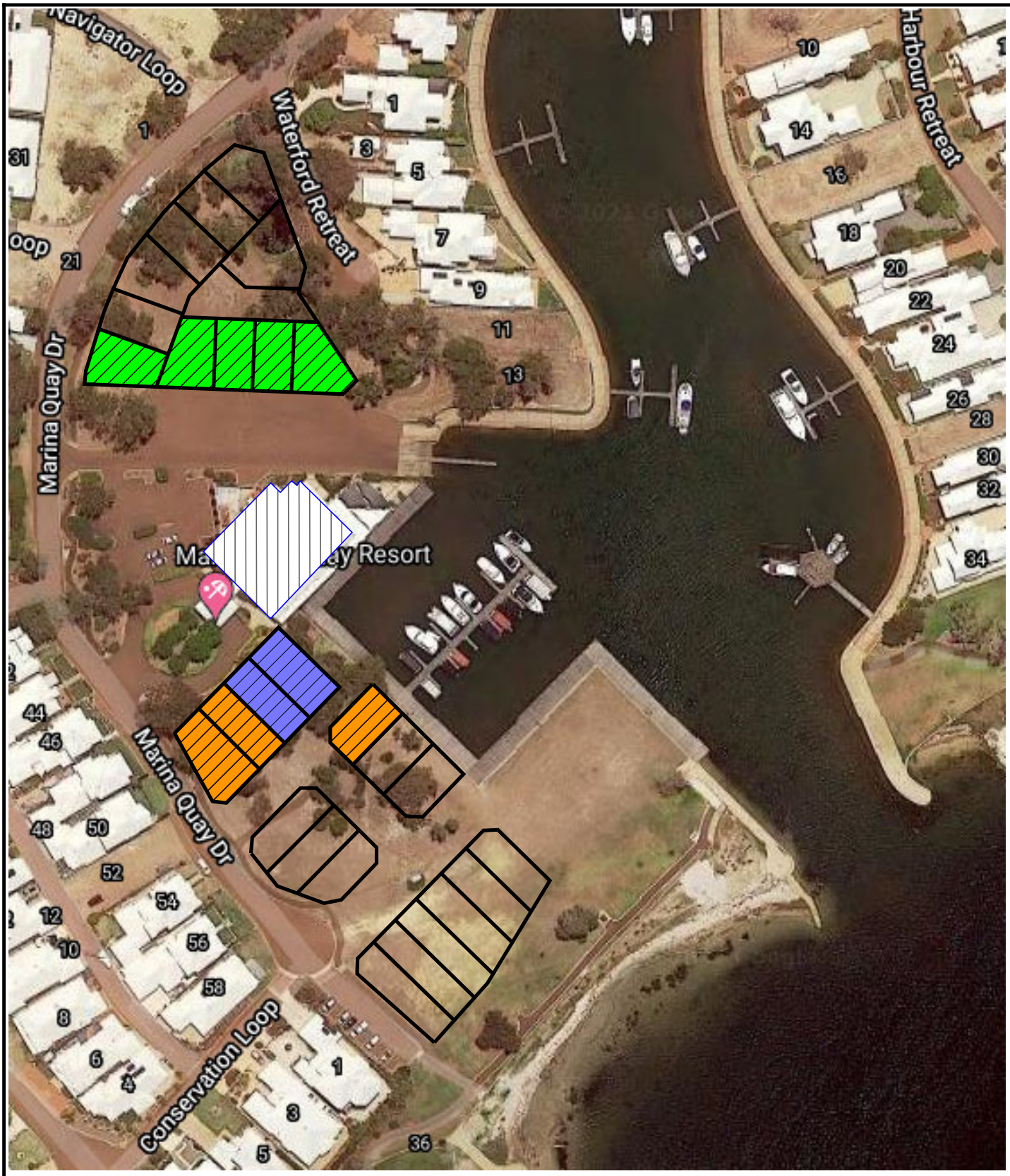
Length Scale 1:1500

0 7.5 15 30 45 60 m

Figure 4-1



Marina Quay Drive, Erskine
Proposed Subdivision

Noise Mitigation to Upper Floor

9 September 2021

Signs and symbols

- Proposed Brewery
- Proposed Subdivision
- Noise Wall
- Package A
- Package B
- Package C

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Length Scale 1:1500

0 7.5 15 30 45 60 m

Figure 4-2

5 CONCLUSION

With regard to compliance with the *Environmental Protection (Noise) Regulations 1997*, the onus is on the noise emitter. In this case it is acknowledged that the subdivision is encroaching on an existing buffer to the proposed brewery and therefore a combination of notifications on title, noise walls and architectural upgrades have been recommended to assist in minimising the noise impacts.

Appendix A

Quiet House Packages

The packages and information provided on the following pages are taken from *Road and Rail Noise Guidelines* (September 2019).

Where outdoor and indoor noise levels received by a noise-sensitive land-use and/or development exceed the policy's noise target, implementation of quiet house requirements is an acceptable solution.

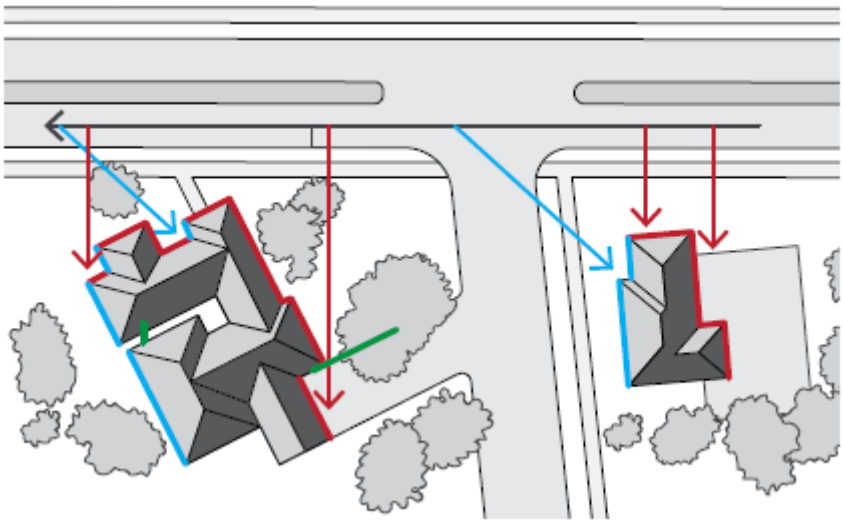
The quiet house packages are not the only solution to achieving acceptable internal transport noise levels. A suitably qualified acoustical engineer or consultant may also determine more tailored acoustic design requirements for buildings in a transport noise corridor by carrying out acoustic design in accordance with relevant industry standards. This includes the need to meet the relevant design targets specified in AS/NZS 2107:2016 for road traffic noise.

With regards to the packages, the following definitions are provided:

- **Facing** the transport corridor (red): Any part of a building façade is 'facing' the transport corridor if any straight line drawn perpendicular (at a 90 degree angle) to its nearest road lane or railway line intersects that part of the façade without obstruction (ignoring any fence).

- **Side-on** to transport corridor (blue): Any part of a building façade that is not 'facing' is 'side-on' to the transport corridor if any straight line, at any angle, can be drawn from it to intersect the nearest road lane or railway line without obstruction (ignoring any fence).

- **Opposite** to transport corridor (green): Neither 'side on' nor 'facing', as defined above.



Quiet House Package A

Element	Orientation	Room	
		Bedroom	Indoor Living and Work Areas
External Windows	Facing	• Up to 40% floor area ($R_w + C_{tr} \geq 28$): ○ Sliding or double hung with minimum 10mm single or 6mm-12mm-10mm double insulated glazing; ○ Sealed awning or casement windows with minimum 6mm glass. • Up to 60% floor area ($R_w + C_{tr} \geq 31$): ○ Sealed awning or casement windows with minimum 6mm glass.	• Up to 40% floor area ($R_w + C_{tr} \geq 25$): ○ Sliding or double hung with minimum 6mm single or 6mm-12mm-6mm double insulated glazing; • Up to 60% floor area ($R_w + C_{tr} \geq 28$); • Up to 80% floor area ($R_w + C_{tr} \geq 31$).
	Side On	As above, except $R_w + C_{tr}$ values may be 3 dB less or max % area increased by 20%.	
	Opposite	No specific requirements	
External Doors	Facing	• Fully glazed hinged door with certified $R_w + C_{tr} \geq 28$ rated door and frame including seals and 6mm glass.	• Doors to achieve $R_w + C_{tr} \geq 25$: ○ 35mm Solid timber core hinged door and frame system certified to R_w 28 including seals; ○ Glazed sliding door with 10mm glass and weather seals.
	Side On	As above, except $R_w + C_{tr}$ values may be 3 dB less.	
	Opposite	No specific requirements	
External Walls	All	• $R_w + C_{tr} \geq 45$: ○ Two leaves of 90mm thick clay brick masonry with minimum 20mm cavity; or ○ Single leaf of 150mm brick masonry with 13mm cement render on each face; or ○ One row of 92mm studs at 600mm centres with: ▪ Resilient steel channels fixed to the outside of the studs; and ▪ 9.5mm hardboard or fibre cement sheeting or 11mm fibre cement weatherboards fixed to the outside; ▪ 75mm thick mineral wool insulation with a density of at least 11kgkg/m^3; and ▪ 2 x 16mm fire-rated plasterboard to inside.	
Roofs and Ceilings	All	• $R_w + C_{tr} \geq 35$: ○ Concrete or terracotta tile or metal sheet roof with sarking and at least 10mm plasterboard.	

Quiet House Package B

Element	Orientation	Room	
		Bedroom	Indoor Living and Work Areas
External Windows	Facing	• Up to 40% floor area ($R_w + C_{tr} \geq 31$): ○ Fixed sash, awning or casement with minimum 6mm glass or 6mm-12mm-6mm double insulated glazing. • Up to 60% floor area ($R_w + C_{tr} \geq 34$): ○ Fixed sash, awning or casement with minimum 10mm glass or 6mm-12mm-10mm double insulated glazing.	• Up to 40% floor area ($R_w + C_{tr} \geq 28$): ○ Sliding or double hung with 6mm-12mm-10mm double insulated glazing; ○ Sealed awning or casement windows with minimum 6mm glass. • Up to 60% floor area ($R_w + C_{tr} \geq 31$); • Up to 80% floor area ($R_w + C_{tr} \geq 34$).
	Side On	As above, except $R_w + C_{tr}$ values may be 3 dB less or max % area increased by 20%.	
	Opposite	As above, except $R_w + C_{tr}$ values may be 6 dB less or max % area increased by 20%.	
External Doors	Facing	• Fully glazed hinged door with certified $R_w + C_{tr} \geq 31$ rated door and frame including seals and 10mm glass.	• Doors to achieve $R_w + C_{tr} \geq 28$: ○ 40mm Solid timber core hinged door and frame system certified to R_w 32 including seals; ○ Fully glazed hinged door with certified $R_w + C_{tr} \geq 28$ rated door and frame including seals and 6mm glass.
	Side On	As above, except $R_w + C_{tr}$ values may be 3 dB less or max % area increased by 20%.	
	Opposite	As above, except $R_w + C_{tr}$ values may be 6 dB less or max % area increased by 20%.	
External Walls	All	• $R_w + C_{tr} \geq 50$: ○ Two leaves of 90mm thick clay brick masonry with minimum 50mm cavity between leaves and 25mm glasswool or polyester (24kg/m^3). Resilient ties used where required to connect leaves. ○ Two leaves of 110mm clay brick masonry with minimum 50mm cavity between leaves and 25mm glasswool or polyester insulation (24kg/m^3). ○ Single leaf of 220mm brick masonry with 13mm cement render on each face. ○ 150mm thick unlined concrete panel or 200mm thick concrete panel with one layer of 13mm plasterboard or 13mm cement render on each face. ○ Single leaf of 90mm clay brick masonry with: ▪ A row of 70mm x 35mm timber studs or 64mm steel studs at 600mm centres; ▪ A cavity of 25mm between leaves; ▪ 50mm glasswool or polyester insulation (11kg/m^3) between studs; and ▪ One layer of 10mm plasterboard fixed to the inside face.	
Roofs and Ceilings	All	• $R_w + C_{tr} \geq 35$: ○ Concrete or terracotta tile or metal sheet roof with sarking and at least 10mm plasterboard ceiling with R3.0+ fibrous insulation.	

Quiet House Package C

Element	Orientation	Room	
		Bedroom	Indoor Living and Work Areas
External Windows	Facing	• Up to 20% floor area ($R_w + C_{tr} \geq 31$): ○ Fixed sash, awning or casement with minimum 6mm glass or 6mm-12mm-6mm double insulated glazing. • Up to 40% floor area ($R_w + C_{tr} \geq 34$): ○ Fixed sash, awning or casement with minimum 10mm glass or 6mm-12mm-10mm double insulated glazing.	• Up to 40% floor area ($R_w + C_{tr} \geq 31$): ○ Fixed sash, awning or casement with minimum 6mm glass or 6mm-12mm-6mm double insulated glazing. • Up to 60% floor area ($R_w + C_{tr} \geq 34$): ○ Fixed sash, awning or casement with minimum 10mm glass or 6mm-12mm-10mm double insulated glazing.
	Side On	As above, except $R_w + C_{tr}$ values may be 3 dB less or max % area increased by 20%.	
	Opposite	As above, except $R_w + C_{tr}$ values may be 6 dB less or max % area increased by 20%.	
External Doors	Facing	• Not recommended.	• Doors to achieve $R_w + C_{tr} \geq 30$: ○ Fully glazed hinged door with certified $R_w + C_{tr} \geq 31$ rated door and frame including seals and 10mm glass; ○ 40mm Solid timber core side hinged door, frame and seal system certified to R_w 32 including seals. Any glass inserts to be minimum 6mm.
	Side On	As above, except $R_w + C_{tr}$ values may be 3 dB less or max % area increased by 20%.	
	Opposite	As above, except $R_w + C_{tr}$ values may be 6 dB less or max % area increased by 20%.	
External Walls	All	• $R_w + C_{tr} \geq 50$: ○ Two leaves of 90mm thick clay brick masonry with minimum 50mm cavity between leaves and 25mm glasswool or polyester insulation (24kg/m^3). Resilient ties used where required to connect leaves. ○ Two leaves of 110mm clay brick masonry with minimum 50mm cavity between leaves and 25mm glasswool or polyester insulation (24kg/m^3). ○ Single leaf of 220mm brick masonry with 13mm cement render on each face. ○ 150mm thick unlined concrete panel or 200mm thick concrete panel with one layer of 13mm plasterboard or 13mm cement render on each face. ○ Single leaf of 90mm clay brick masonry with: ▪ A row of 70mm x 35mm timber studs or 64mm steel studs at 600mm centres; ▪ A cavity of 25mm between leaves; ▪ 50mm glasswool or polyester insulation (11kg/m^3) between studs; and ▪ One layer of 10mm plasterboard fixed to the inside face.	
Roofs and Ceilings	All	• $R_w + C_{tr} \geq 40$: ○ Concrete or terracotta tile roof with sarking, or metal sheet roof with foil backed R2.0+ fibrous insulation between steel sheeting and roof battens; ○ R3.0+ insulation batts above ceiling; ○ 2 x 10mm plasterboard ceiling or 1 x 13mm sound-rated plasterboard affixed using steel furring channel to ceiling rafters.	

Mechanical Ventilation requirements

In implementing the acceptable treatment packages, the following mechanical ventilation / air-conditioning considerations are required:

- Acoustically rated openings and ductwork to provide a minimum sound reduction performance of R_w 40 dB into sensitive spaces;
- Evaporative systems require attenuated ceiling air vents to allow closed windows;
- Refrigerant based systems need to be designed to achieve National Construction Code fresh air ventilation requirements;
- Openings such as eaves, vents and air inlets must be acoustically treated, closed or relocated to building sides facing away from the corridor where practicable.

Notification

Notifications on title advise prospective purchasers of the potential for noise impacts from major transport corridors and help with managing expectations.

The Notification is to state as follows:

This lot is in the vicinity of a transport corridor and is affected, or may in the future be affected, by road and rail transport noise. Road and rail transport noise levels may rise or fall over time depending on the type and volume of traffic.

Appendix B

EcoAcoustics Report

Mandurah Quay Resort - Boundary Island Brewery Redevelopment

40 Marina Quay Drive, Erskine

Noise Impact Assessment

23 June 2021

Report Number: 21050950 - 01

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Revision History				
Revision	**Description**	**Date**	**Author**	**Checked**

Table of Contents

Executive Summary

EcoAcoustics Pty Ltd was commissioned to conduct a noise impact assessment of a proposed Hotel License Application for the Boundary Island Brewery Microbrewery, located at 40 Marina Quay Drive, Erskine.

The purpose of this report was to assess the noise emissions from the site in accordance with the prescribed standards contained in the *Environmental Protection (Noise) Regulations 1997*.

Four separate scenarios have been examined for this site to determine the impact that the reconfigured site will have on the surrounding residential premises. The results of the predictions outlined in this report show that the noise from the proposed site can comply with the *Environmental Protection (Noise) Regulations 1997*.

The noise level prediction results presented in each scenario are lower than the average measured ambient L_{A10} and L_{A90} under all situations.

It is recommended that following management tools be adopted by the site:

- When doors and windows are open, internal music restricted to a level whereby it does not dominate the soundscape but enhances the ambience of the space only such that patrons can converse at a normal to raised vocal effort for people talking at a distance of 600mm inside the building;
- Doors and windows are to be closed after 10pm and all external speakers (on the sundeck) to be shut down;
- Children's play area to be closed after 10pm;
- Speakers to be installed in the sundeck area in the wall structure, facing back toward the site at a height no more than 1 metre from the floor of the deck;
- On nights where music is required to be played at a higher level, all windows and doors to the venue are closed and remain closed for the duration of the event.

1 Introduction

EcoAcoustics Pty Ltd was commissioned to conduct a noise impact assessment of a proposed Hotel License Application for the Boundary Island Brewery Microbrewery, located at 40 Marina Quay Drive, Erskine.

The purpose of this report is to assess the noise emissions from the site in accordance with the prescribed standards contained in the *Environmental Protection (Noise) Regulations 1997*.

Appendix A contains a description of some of the terminology used throughout this report.

1.1 Site Locality & Surroundings

The site is located on Marina Quay Drive in Erskine. The site and surroundings are shown in an aerial photo in Figure 1.1**Error! Reference source not found.**.

Figure 1.1: Site and Surroundings (Source: Google Earth)

The nearest noise sensitive premises are located across Marina Quay Drive to the southwest, to the northeast and also across the canal to the east and north east of the site. Figure 1.2 presents the cadastre showing the locations of the noise sensitive receivers (shown in Red).

Figure 1.2: Noise Sensitive Premises (Source: City of Mandurah IntraMaps)

1.2 Proposed Development

It is proposed to reconfigure the existing restaurant building into a microbrewery. The brewery will comprise:

- The existing restaurant/function area will be retained and refurbished to include seating. The existing dance floor will be removed and replaced with dining areas;
- Seating will be provided on the terrace area fronting onto the canal;
- A sundeck will be added to the north eastern corner of the site to allow for outdoor dining and very low level music;
- Music will be generally by played through in-house speaker systems only with the exception of an occasional "acoustic act" to be played within the building;
- A new childrens play area will be located at the Marina Quay Drive frontage of the site;
- Air conditioning and mechanical plant will remain insitu and has not been considered further in this report;

Figure 1.3 presents a copy of the proposed plans for the site.

Car parking will utilise the existing spaces, no additional parking bays will be added. As such, car parking has not been considered further in this report.

It is understood that the hours of operation will be 10am to 12am.

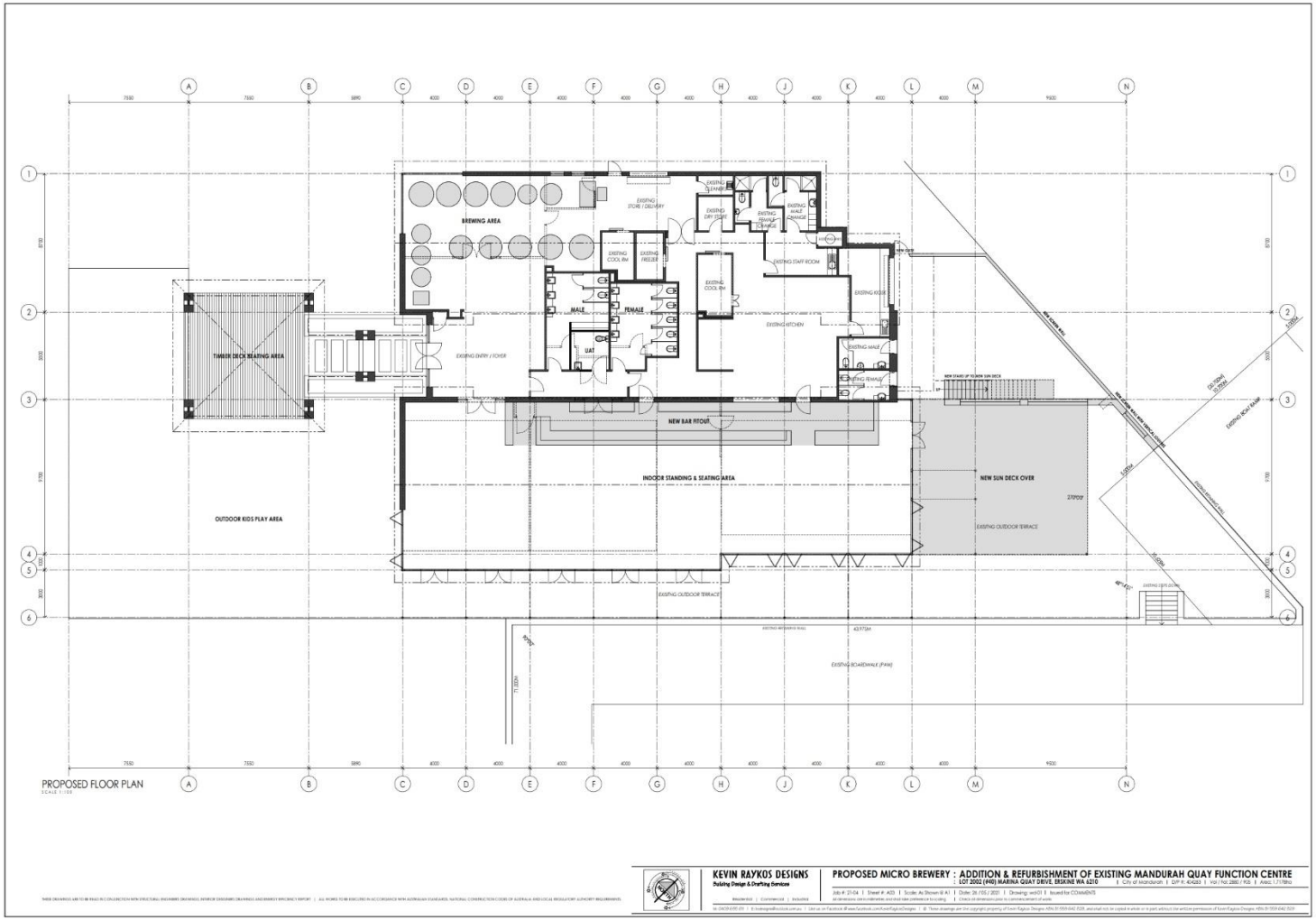


Figure 1.3: Floor Site Layout (source: Kevin Raykos Designs)

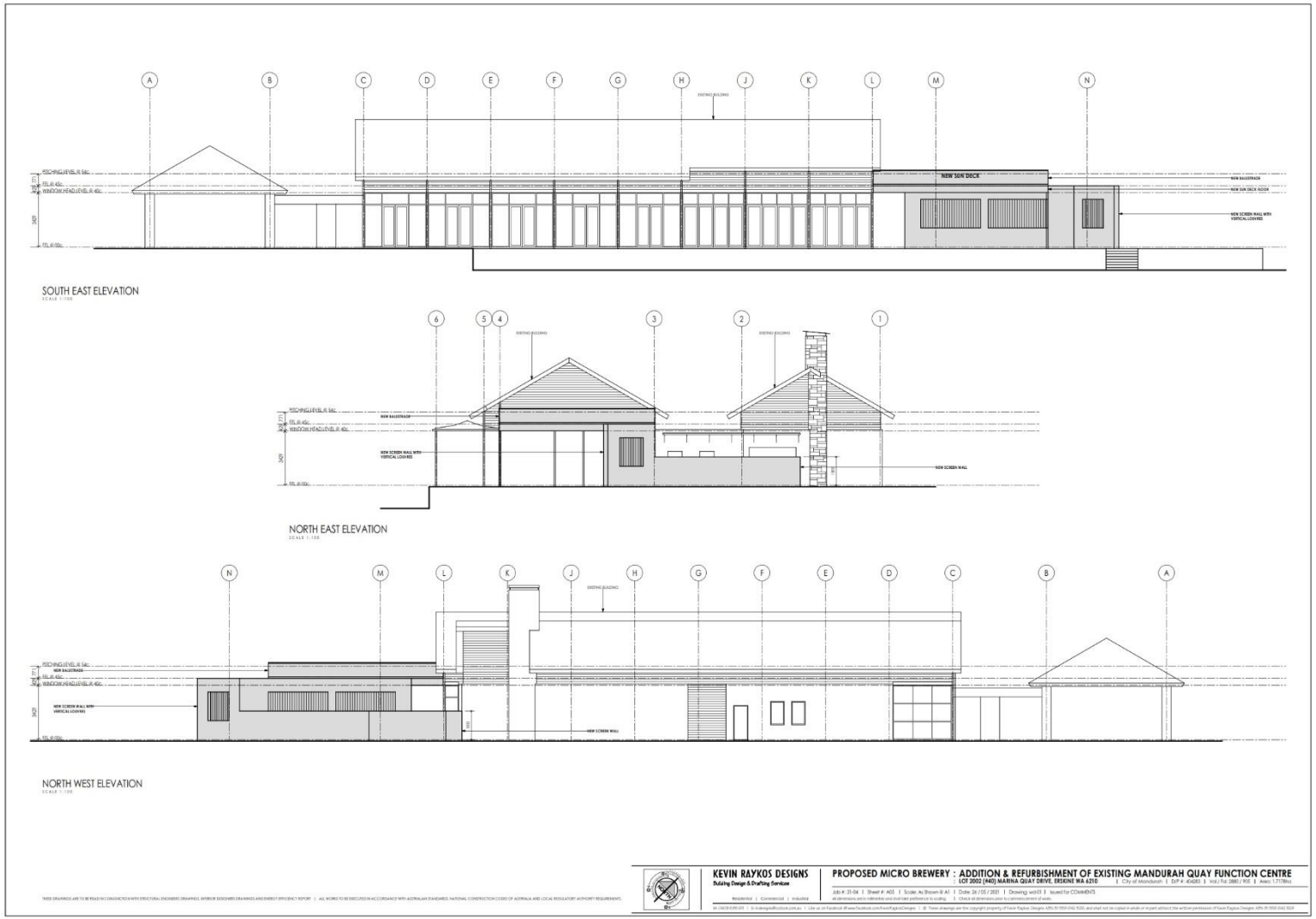


Figure 1.4: Elevations (source: Kevin Raykos Designs)

2 Criteria

2.1 Environmental Protection (Noise) Regulations 1997

In Western Australia all Environmental noise is regulated by the *Environmental Protection Act 1986* and the *Environmental Protection (Noise) Regulations 1997*. Noise emissions from the microbrewery are required to satisfy the assigned noise levels specified in Regulations 7, 8 and 9.

The standard stipulated in Regulation 7 states:

7. (1) Noise emitted from any premises or public place when received at other premises –

a) Must not cause or significantly contribute to, a level of noise which exceeds the assigned level in respect of noise received at premises of that kind; and

b) Must be free of –

- *Tonality;*
- *Impulsiveness; and*
- *Modulation.*

A... noise emission is taken to significantly contribute *to a level of noise if the noise emission exceeds a value which is 5dB below the assigned level...*

Regulation 9 defines tonality, impulsiveness and modulation. It is regarded that noise is free of these characteristics if:

a) Tonality, impulsiveness and modulation cannot be equitably removed by means other than decreasing the overall level of noise emission; and

b) Subsequent to any adjustments as displayed in Table 2.1, noise emissions remain compliant with the required standards when measured at the point of reception.

Table 2.1:Adjustments for Intrusive Characteristics

Adjustment Where Noise Emission is not Music (cumulative to maximum of 15 dB)			Adjustment Where Noise Emission is Music	
Tonality	**Modulation**	**Impulsiveness**	**Where impulsiveness is not present**	**Where impulsiveness is present**
+ 5dB	+ 5dB	+ 10dB	+10dB	+15dB

The baseline assigned levels (prescribed standards) are specified in Regulation 8 and are shown below in Table 2.2.

Table 2.2: Baseline Assigned Noise Levels

Premises Receiving Noise	Time of Day	Assigned Level (dB)[1]		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive at locations within 15m of a building directly associated with a noise sensitive use	0700 to 1900 hours Monday to Saturday **(Day)**	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sunday and public holidays **(Sunday)**	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days **(Evening)**	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays **(Night)**	35 + influencing factor	45 + influencing factor	55 + influencing factor
Commercial	All hours	60	75	80

1. The assigned noise level is based on a free field scenario ie does not include façade reflection

Table 2.3 shows the calculations used in determining the influencing factor at the nearest residential premises.

Table 2.3: Calculation of Influencing Factor

Premises Receiving Noise (ref Figure 1.1)	Description	Within 100 metre Radius	Within 450 metre Radius	Total
R1 – R3	Industrial Land	0	0%	0dB
	Commercial Land	28%	2%	2dB
	Major Road	0dB	0dB	0dB
	Minor Road	0 dB	0	0dB
	Total Influencing Factor			**2 dB**

Based on the influencing factors contained in Table 2.3, the assigned noise levels are shown in Table 2.4.

Table 2.4: Assigned Noise Levels

Premises Receiving Noise	Time of Day	Assigned Level (dB)[1]		
		L_{A10}	L_{A1}	L_{Amax}
R1 – R3	0700 to 1900 hours Monday to Saturday **(Day)**	47	57	67
	0900 to 1900 hours Sunday and public holidays **(Sunday)**	42	52	67
	1900 to 2200 hours all days **(Evening)**	42	52	57
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays **(Night)**	37	47	57

1. The assigned noise level is based on a free field scenario ie does not include façade reflection

2.2 Current Liquor License Conditions

The site currently has specific Noise requirements noted in their *Special Facility License (No. 6220048686)*, specifically:

> *7. Live entertainment may be provided in the Restaurant and adjacent decking and alfresco area provided it does not exceed 60dB(A) at 1m from the Restaurant doors and is restricted to acoustic style with no drums and with any amplification to be low level and via a centralised controlled music system.*
>
> *8 Live entertainment in the Restaurant and adjacent decking and al fresco areas is prohibited after 3pm unless this area is being used for a pre-arranged function as defined by section 3 of the Act.*
>
> *9. Entertainment may be provided in the Restaurant and adjacent decking and al fresco area after 3pm provided it is the form of background type music which does not exceed 60dB(A) at 1m from the doors.*

3 Noise Methodology

3.1 Noise Measurements

3.1.1 Measurement Methodology

As part of the previous assessment conducted at this site, noise measurements were completed to determine the existing background noise levels in the vicinity of the site. In accordance with the Regulations, as defined in Regulations 19, 20, 22 and 23 and Schedule 4 sets out noise measurement requirements. The earlier site noise measurements have satisfied these requirements, with the following detailed:

- Measurements were completed on the site using a Type 1 Sound Level Meter, Norsonic 140 (S/N 1405472).
- The sound level meter holds current laboratory certificate of calibration, available upon request;
- The meter records both slow and fast time weighted sound levels, allowing relevant data to be collected;
- The microphone was fitted with standard wind screen;
- During the measurements, the microphone was at least 1.3 metres above the ground level and at least 3 metres from reflecting facades (other than the ground plane); as such no adjustments have been applied for reflected noise.

Noise level measurements were completed on 25th November 2017 between 7pm and 11pm. Meteorological conditions at the time, recorded at the Bureau of Meteorology's Mandurah site, were:

- Temperature: 25°C
- Relative Humidity: 52%
- Wind Speed: 5 m/s
- Wind Direction: SSW

3.1.2 Noise measurement results

Background noise levels were measured over a 60-minute period commencing at 9:30pm without any noise intrusion from the Mandurah Quay restaurant. Each measurement was taken over a 15-minute duration. The resultant noise levels are presented in Table 3.1.

Table 3.1: Summary of Background Noise Levels

Time	Measured L_{A10} dB(A)[1]	Measured Background L_{A90}dB(A)
9:30 to 9:45pm	52	47
9:45 to 10:00pm	48	45
10:00 to 10:15pm	52	46
10:15 to 10:30pm	45	43
Average level	**49**	**45**

These background noise levels were measured during the evening and nighttime period.

3.2 Noise Modelling

Computer modelling software, SoundPlan 8.2 has been used to calculate the noise levels associated with the microbrewery at the nearby residential premises. Noise modelling is used as it is not affected by background noise sources and can provide the noise level for various weather conditions.

The software incorporates the algorithms enabling the modelling to include the influence of wind and atmospheric stability. Input data required in the model are:

- Meteorological Information;
- Topographical data;
- Ground Absorption; and
- Source sound power levels.

Figure 3.1 presents a 3-dimensional render of the site and surroundings.

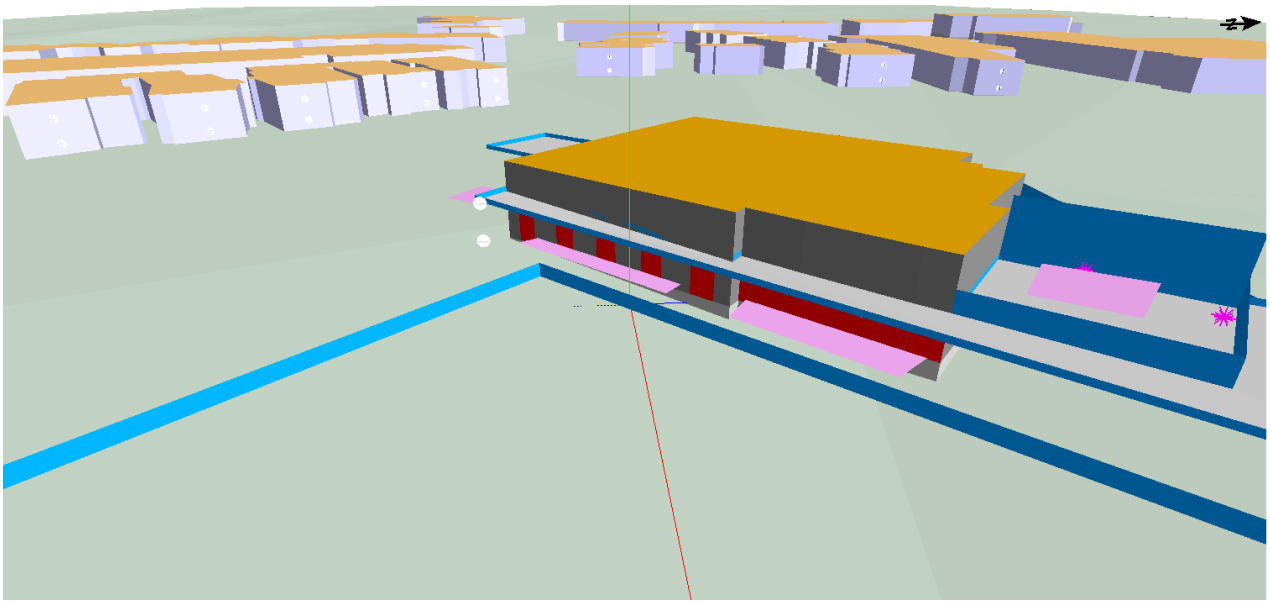


Figure 3.1: 3-dimensional Render of Site for Worst Case Summer Scenario (source EcoAcoustics Pty Ltd)

3.2.1 Meteorological Information

Meteorological information utilised is based on data specified in the May 2021 draft EPA *Guidance for the Assessment of Environmental Noise Emissions* and are shown below in Table 3.2.

Table 3.2: Modelling Meteorological Conditions

Parameter	Night (1900-0700)	Day (0700-1900)
Temperature (°C)	15	20
Humidity (%)	50	50
Wind Speed (m/s)	3	4
Wind Direction*	All & Prevailing	All & Prevailing
Pasquil Stability Factor	F	E

Note that the modelling package used allows for all wind directions to be modelled simultaneously.

The above conditions approximate the typical worst-case for enhancement of sound propagation. The EPA policy is that compliance with the assigned noise levels needs to be demonstrated for 98% of the time, during the day and night periods, for the month of the year in which the worst-case weather conditions prevail. In most cases, the above conditions occur for more than 2% of the time and therefore must be satisfied.

At wind speeds greater than those shown above, sound propagation may be further enhanced, however background noise from the wind itself and from local vegetation is likely to be elevated and dominate the ambient noise levels.

3.2.2 Topographical Data

Topographical data was based on information provided by the client. Surrounding topographical data has been obtained from Landgate and Open Street Maps.

3.2.3 Ground Absorption

Ground absorption varies from a value of 0 to 1, with 0 being for an acoustically reflective ground (e.g. water or bitumen) and 1 for acoustically absorbent ground (e.g. grass). In this instance value of 0.6 has been used for the land areas, and 0 has been used for the water and bitumen as this is appropriate this environment.

3.2.4 Source Sound Levels

Table 3.3 shows the sound power levels used in the modelling. The sound power levels have been based on file data and measurements taken by EcoAcoustics Pty Ltd. Reference has also been made to Hayne et. Al *Prediction of Noise from Small to Medium Sized Crowds*, and the Association of Australasian Acoustical Consultants *Licensed Premises Noise Assessment Technical Guidelines*. Noise from children playing has been based on the Australasian Acoustical Consultants *Child Care Centre Noise Assessment Technical Guidelines*.

Table 3.3: Source Sound Power Levels

Description	Parameter	Octave Band Centre Frequency, dB (Hz)							Overall dB(A)
		63	125	250	500	1k	2k	4k	
Music playing inside bar at a level dominating the soundscape with music at a level whereby loud vocal effort is required within close proximity to listeners ears	L_{A10}	100	104	107	105	104	105	103	**95**
Music playing at a background level, so as not to dominate the soundscape but to enhance the ambience of the space only. Normal to raised vocal effort is required at 600mm.	L_{A10}	83	74	78	76	71	75	69	**80**
Patrons Dining no music (based on 20 patrons talking with a slightly raised voice)	L_{A10}	70	79	72	73	76	74	67	**80**
Background music and patrons talking (based on 20 patrons in beer garden style scenario)	L_{A10}	83	85	83	79	78	76	71	**83**

Description	Parameter	Octave Band Centre Frequency, dB (Hz)							Overall dB(A)
		63	125	250	500	1k	2k	4k	
10 children playing	L_{A10}	23	42	60	72	81	81	74	**85**

4 Assessment of Noise Emissions

Noise emissions have been assessed based on four separate scenarios, each of these are discussed below:

- Scenario 1: normal summer operating conditions, windows and doors all open, patrons dining on the sundeck and terrace areas;
- Scenario 2: normal winter operating conditions, windows and doors closed, patrons dining on the sundeck with low level music playing;
- Scenario 3: higher level music playing inside venue, windows and doors closed, patrons dining on the sundeck only;
- Scenario 4: normal operations after 10pm with windows and doors closed, and no music on the sundeck. Includes patrons dining externally on the sundeck and terrace areas.

Each of these scenarios have been discussed in detail in the following section, with noise level predictions provided.

4.1 Scenario 1 – Normal Summer Operating Conditions

Table 4.1 presents the predicted noise levels from the site configured as Scenario 1 at the nearby residential locations shown on Figure 1.2. The predictions are based on the sound power levels presented in Table 3.3. The Scenario 1 predictions include:

- a +10dB penalty adjustment has been shown for music sources for the point calculations presented in Table 4.1, however, this may not be required due to the measured background noise levels (shown in Table 3.1) being significantly higher than the predicted levels;
- Music playing at levels so as not to dominate the soundscape but to enhance the ambience of the space only, as presented in Table 3.3, with the overall a-weighted noise levels associated with music playing inside the building at 80dB(A) – this equates to a normal to raised vocal effort for people talking at 600mm inside the building;
- Attenuation of Rw 45 for the roof/ceiling structure;
- All windows and doors facing the canal open;
- Patrons dining on the Terrace Area without music;
- Patrons dining on the Sundeck with low level music playing within speakers set into the walls of the deck, facing back toward the building (based on the noise levels presented in Table 3.3);
- Children playing in the outdoor play area (based on the noise levels presented in Table 3.3);

Table 4.1: Predicted Noise Levels – All Windows and Doors Open

Address of Receiver (worst case façade) (ref Figure 1.2)	Floor Height	Predicted Music Noise Levels (including sundeck and music from inside) L_{A10}, dB(A)[1]	Predicted Noise from Children Playing L_{A10} dB(A)	Predicted Noise from Patrons Dining Externally, L_{A10} dB(A)	Overall Noise Level Predictions, L_{A10} dB(A)[1]
42 Marina Quay	Ground	32 (42)	38	13	39 (44)
	1st floor	33 (43)	38	14	39 (44)
44 Marina Quay	Ground	35 (45)	39	26	41 (46)
	1st floor	35 (45)	40	26	41 (46)
46 Marina Quay	Ground	33 (43)	38	16	39 (44)
	1st floor	33 (43)	38	17	40 (45)
48 Marina Quay	Ground	37 (47)	39	31	42 (48)
	1st floor	38 (48)	39	32	42 (48)
50 Marina Quay	Ground	40 (50)	38	31	42 (50)
	1st floor	40 (50)	38	32	43 (51)
54 Marina Quay	Ground	37 (47)	37	28	39 (47)
	1st floor	38 (48)	37	31	40 (48)
56 Marina Quay	Ground	38 (48)	33	29	40 (48)
	1st floor	39 (49)	33	30	41 (49)
58 Marina Quay	Ground	36 (46)	35	30	38 (46)
	1st floor	37 (47)	35	31	39 (47)
1 Conservation Loop	Ground	35 (45)	32	28	37 (45)
	1st floor	36 (46)	32	29	38 (46)
7 Waterford Retreat	Ground	25 (35)	30	27	27 (35)
	1st floor	27 (37)	30	28	29 (37)
9 Waterford Retreat	Ground	26 (36)	21	10	27 (36)
	1st floor	28 (38)	24	10	29 (37)
20 Harbour Retreat	Ground	35 (45)	16	11	35 (45)
	1st floor	34 (44)	19	12	35 (44)
24 Harbour Retreat	Ground	35 (45)	22	26	35 (45)
	1st floor	34 (44)	24	26	35 (44)

Address of Receiver (worst case façade) (ref Figure 1.2)	Floor Height	Predicted Music Noise Levels (including sundeck and music from inside) L_{A10}, dB(A)[1]	Predicted Noise from Children Playing L_{A10} dB(A)	Predicted Noise from Patrons Dining Externally, L_{A10} dB(A)	Overall Noise Level Predictions, L_{A10} dB(A) [1]
26 Harbour Retreat	Ground	35 (45)	21	26	36 (45)
	1st floor	34 (44)	21	26	35 (44)
30 Harbour Retreat	Ground	35 (45)	23	26	36 (45)
	1st floor	34 (44)	24	26	35 (44)
32 Harbour Retreat	Ground	35 (45)	25	27	36 (45)
	1st floor	34 (44)	26	26	35 (44)
34 Harbour Retreat	Ground	35 (45)	24	27	36 (45)
	1st floor	35 (45)	25	26	36 (45)

1. Includes penalty adjustment of +10dB for the music component of the noise shown in brackets if required.

The results presented in Table 4.1 show the predicted noise levels from all sources operating simultaneously. The predictions without the inclusion of a penalty adjustment generally show compliance with the Regulatory noise levels during the day and evening time periods. In addition, these predictions are all significantly lower than the measured background levels presented in Table 3.1. provides a comparison of the resultant noise levels with the Regulations during the day and evening time periods to represent a worst case.

4.2 Scenario 2 – Normal Winter Operating Conditions

Table 4.2 presents the predicted noise levels from the site configured as Scenario 2 at the nearby residential locations shown on Figure 1.2. The predictions are based on the sound power levels presented in Table 3.3. The Scenario 2 predictions include:

- a +10dB penalty adjustment has been shown for music sources for the point calculations presented in Table 4.2, however, this unlikely to be required due to the measured background noise levels (shown in Table 3.1) are significantly higher than the predicted levels;
- Music playing at levels so as not to dominate the soundscape but to enhance the ambience of the space only, as presented in Table 3.3, with the overall a-weighted noise levels associated with music playing inside the building at 80dB(A) – this equates to a normal to raised vocal effort for people talking at 600mm inside the building;
- Attenuation of Rw 45 for the roof/ceiling structure;
- All windows and doors facing the canal closed;

- Patrons dining on the Sundeck with low level music playing within speakers set into the walls of the deck, facing back toward the building (based on the noise levels presented in Table 3.3);
- Children playing in the outdoor play area (based on the noise levels presented in Table 3.3);

Table 4.2: Predicted Noise Levels – All Windows and Doors Closed

Address of Receiver (worst case façade) (ref Figure 1.2)	Floor Height	Predicted Music Noise Levels (including sundeck and music from inside) L_{A10}, dB(A)[1]	Predicted Noise from Children Playing L_{A10} dB(A)	Predicted Noise from Patrons Dining Externally, L_{A10} dB(A)	Overall Noise Level Predictions, L_{A10} dB(A) [1]
42 Marina Quay	Ground	13 (23)	38	13	38 (38)
	1st floor	14 (24)	38	14	38 (38)
44 Marina Quay	Ground	14 (24)	39	26	40 (40)
	1st floor	15 (25)	40	26	40 (40)
46 Marina Quay	Ground	13 (23)	38	16	38 (38)
	1st floor	14 (24)	38	17	38 (38)
48 Marina Quay	Ground	15 (25)	39	31	40 (40)
	1st floor	16 (26)	39	32	40 (40)
50 Marina Quay	Ground	18 (28)	38	31	39 (39)
	1st floor	19 (29)	38	32	39 (40)
54 Marina Quay	Ground	19 (29)	37	28	35 (36)
	1st floor	19 (29)	37	31	35 (36)
56 Marina Quay	Ground	19 (29)	33	29	36 (37)
	1st floor	19 (29)	33	30	36 (37)
58 Marina Quay	Ground	20 (30)	35	30	34 (35)
	1st floor	23 (33)	35	31	34 (37)
1 Conservation Loop	Ground	20 (30)	32	28	32 (35)
	1st floor	21 (31)	32	29	33 (34)
7 Waterford Retreat	Ground	24 (34)	30	27	26(34)
	1st floor	26 (36)	30	28	28 (36)
9 Waterford Retreat	Ground	25 (35)	21	10	26 (35)
	1st floor	28 (38)	24	10	28 (38)
20 Harbour	Ground	24 (34)	16	11	29 (34)

Address of Receiver (worst case façade) (ref Figure 1.2)	Floor Height	Predicted Music Noise Levels (including sundeck and music from inside) L_{A10}, dB(A)[1]	Predicted Noise from Children Playing L_{A10} dB(A)	Predicted Noise from Patrons Dining Externally, L_{A10} dB(A)	Overall Noise Level Predictions, L_{A10} dB(A) [1]
Retreat	1st floor	24 (34)	19	12	30 (34)
24 Harbour Retreat	Ground	24 (34)	22	26	29 (34)
	1st floor	25 (35)	24	26	29 (35)

1. Includes penalty adjustment of +10dB for the music component of the noise shown in brackets.

The results presented in Table 4.2 show the predicted noise levels from all sources operating simultaneously. The predictions with the inclusion of a penalty adjustment show compliance with the Regulatory noise levels during the day and evening time periods. In addition, these predictions are all significantly lower than the measured background levels presented in Table 3.1.

4.3 Scenario 3 – Music Playing at a Higher Level Inside the Venue

Table 4.3 presents the predicted noise levels from the site configured as Scenario 3 at the nearby residential locations shown on Figure 1.2. The predictions are based on the sound power levels presented in Table 3.3. The Scenario 3 predictions include:

- a +10dB penalty adjustment has been shown for music sources for the point calculations presented in Table 4.3, however, this unlikely to be required due to the measured background noise levels (shown in Table 3.1) are significantly higher than the predicted levels;
- Music playing inside bar at a level dominating the soundscape whereby loud vocal effort is required within close proximity to listeners ears as presented in Table 3.3, with the overall a-weighted noise levels associated with music playing inside the building at 95dB(A);
- Attenuation of Rw 45 for the roof/ceiling structure;
- All windows and doors facing the canal closed;
- Patrons dining on the Sundeck with low level music playing within speakers set into the walls of the deck, facing back toward the building (based on the noise levels presented in Table 3.3);
- Children playing in the outdoor play area (based on the noise levels presented in Table 3.3);

Table 4.3: Predicted Noise Levels – All Windows and Doors Closed Music at 95dB(A) Inside

Address of Receiver (worst case façade) (ref Figure 1.2)	Floor Height	Predicted Music Noise Levels (including sundeck and music from inside) L_{A10}, dB(A)[1]	Predicted Noise from Children Playing L_{A10} dB(A)	Predicted Noise from Patrons Dining Externally, L_{A10} dB(A)	Overall Noise Level Predictions, L_{A10} dB(A) [1]
42 Marina Quay	Ground	23 (33)	38	13	38 (39)
	1st floor	24 (34)	38	14	38 (40)
44 Marina Quay	Ground	26 (36)	39	26	40 (41)
	1st floor	26 (36)	40	26	40 (41)
46 Marina Quay	Ground	24 (34)	38	16	38 (40)
	1st floor	24 (34)	38	17	39 (40)
48 Marina Quay	Ground	28 (38)	39	31	40 (42)
	1st floor	28 (38)	39	32	40 (42)
50 Marina Quay	Ground	31 (41)	38	31	39 (43)
	1st floor	31 (41)	38	32	40 (43)
54 Marina Quay	Ground	28 (38)	37	28	35 (40)
	1st floor	29 (39)	37	31	36 (40)
56 Marina Quay	Ground	29 (39)	33	29	37 (41)
	1st floor	30 (40)	33	30	37 (41)
58 Marina Quay	Ground	28 (38)	35	30	34 (39)
	1st floor	29 (39)	35	31	35 (40)
1 Conservation Loop	Ground	27 (37)	32	28	33 (38)
	1st floor	28 (38)	32	29	33 (39)
7 Waterford Retreat	Ground	24 (34)	30	27	26(34)
	1st floor	26 (36)	30	28	28 (38)
9 Waterford Retreat	Ground	25 (35)	21	10	26 (38)
	1st floor	28 (38)	24	10	28 (38)
20 Harbour Retreat	Ground	27 (37)	16	11	31 (38)
	1st floor	27 (37)	19	12	31 (38)
24 Harbour Retreat	Ground	27 (37)	22	26	30 (38)
	1st floor	28 (38)	24	26	30 (38)

2. Includes penalty adjustment of +10dB for the music component of the noise shown in brackets.

The results presented in Table 4.3 show the predicted noise levels from all sources operating simultaneously to represent a worst case. The predictions with the inclusion of a penalty adjustment show compliance with the Regulatory noise levels during the day and evening time periods with windows and doors closed. In addition, these predictions are all significantly lower than the measured background levels presented in Table 3.1.

4.4 Scenario 4: Normal Operations after 10pm with Windows and Doors closed, and No Music on the Sundeck

Table 4.4 presents the predicted noise levels from the site configured as Scenario 4 at the nearby residential locations shown on Figure 1.2. The predictions are based on the sound power levels presented in Table 3.3. The Scenario 4 predictions include:

- a +10dB penalty adjustment has been shown for music sources for the point calculations presented in Table 4.4, however, this may not be required due to the measured background noise levels (shown in Table 3.1) being significantly higher than the predicted levels;
- Music playing at levels so as not to dominate the soundscape but to enhance the ambience of the space only, as presented in Table 3.3, with the overall a-weighted noise levels associated with music playing inside the building at 80dB(A) – this equates to a normal to raised vocal effort for people talking at 600mm inside the building;
- Attenuation of Rw 45 for the roof/ceiling structure;
- All windows and doors facing the canal closed;
- Patrons dining on the Terrace Area and Sundeck without music;
- No children playing in the outdoor play area;

Table 4.4: Predicted Noise Levels – All Windows and Doors Open

Address of Receiver (worst case façade) (ref Figure 1.2)	Floor Height	Predicted Music Noise Levels L_{A10}, dB(A)[1]	Predicted Noise from Patrons Dining Externally, L_{A10} dB(A)	Overall Noise Level Predictions, L_{A10} dB(A)[1]
42 Marina Quay	Ground	9 (19)	15	16 (20)
	1st floor	9 (19)	16	17 (21)
44 Marina Quay	Ground	12 (22)	26	26 (27)
	1st floor	12 (22)	27	27 (28)
46 Marina Quay	Ground	10 (20)	17	18 (22)
	1st floor	10 (20)	18	19 (22)
48 Marina Quay	Ground	14 (24)	31	31 (32)
	1st floor	14 (24)	32	32 (32)

Address of Receiver (worst case façade) (ref Figure 1.2)	Floor Height	Predicted Music Noise Levels L_{A10}, dB(A)[1]	Predicted Noise from Patrons Dining Externally, L_{A10} dB(A)	Overall Noise Level Predictions, L_{A10} dB(A)[1]
50 Marina Quay	Ground	16 (26)	31	32 (33)
	1st floor	17 (27)	32	33 (34)
54 Marina Quay	Ground	13 (23)	28	29 (30)
	1st floor	14 (24)	31	30 (31)
56 Marina Quay	Ground	14 (24)	29	30 (31)
	1st floor	15 (25)	30	31 (32)
58 Marina Quay	Ground	12 (22)	30	29 (30)
	1st floor	13 (23)	31	30 (31)
1 Conservation Loop	Ground	11 (21)	28	28 (28)
	1st floor	12 (22)	29	29 (29)
7 Waterford Retreat	Ground	5 (15)	27	24 (24)
	1st floor	5 (15)	28	26 (26)
9 Waterford Retreat	Ground	5 (15)	10	25 (25)
	1st floor	5 (15)	10	28 (29)
20 Harbour Retreat	Ground	10 (20)	11	28 (29)
	1st floor	10 (20)	12	28 (29)
24 Harbour Retreat	Ground	10 (20)	26	28 (29)
	1st floor	10 (20)	26	28 (29)
26 Harbour Retreat	Ground	11 (21)	26	28 (29)
	1st floor	10 (20)	26	28 (29)
30 Harbour Retreat	Ground	11 (21)	26	28 (29)
	1st floor	10 (20)	26	28 (29)
32 Harbour Retreat	Ground	11 (21)	27	28 (29)
	1st floor	10 (20)	26	28 (29)
34 Harbour Retreat	Ground	11 (21)	27	29 (29)
	1st floor	11 (21)	26	28 (29)

1. Includes penalty adjustment of +10dB for the music component of the noise shown in brackets if required.

The results presented in Table 4.4 show the predicted noise levels from all sources operating simultaneously as a worst-case scenario. The predictions with the inclusion of a penalty adjustment show compliance with the Regulatory noise levels during the night time period with the doors closed after 10pm. In addition, these predictions are all significantly lower than the measured background levels presented in Table 3.1, thus the penalty adjustment is unlikely to be required.

5 Assessment of License Conditions

With windows and doors open, the predicted noise levels based on music laying at levels so as not to dominate the soundscape but to enhance the ambience of the space only equating to a normal to raised vocal effort for people talking at 600mm apart inside the building results in a noise level of approximately 63dB(A) at 1 metre outside of the building. With the windows and doors closed, this level reduces significantly to approximately 40dB(A).

It is recommended that the current license conditions be update to align with the requirements of the Regulations. Ensuring compliance with the Regulations, the site can still operate a vibrate site allowing an enhanced ambience inside the venue and within the sundeck area.

6 Discussion and Recommendations

The noise level prediction results presented in each scenario are lower than the average measured ambient L_{A10} and L_{A90} under all situations. The 10dB penalty adjustment is required if the music is audible above the background.

It is recommended that following management tools be adopted by the site:

- When doors and windows are open, internal music restricted to a level whereby it does not dominate the soundscape but enhances the ambience of the space only such that patrons can converse at a normal to raised vocal effort for people talking at a distance of 600mm inside the building;
- Doors and windows are to be closed after 10pm and all external speakers (on the sundeck) to be shut down;
- Children's play area to be closed after 10pm;
- Speakers to be installed in the sundeck area in the wall structure, facing back toward the site at a height no more than 1 metre from the floor of the deck;
- On nights where music is required to be played at a higher level, all windows and doors to the venue are closed and remain closed for the duration of the event.

7 Conclusions

Four separate scenarios have been examined for this site to determine the impact that the reconfigured site will have on the surrounding residential premises. The results of the predictions outlined in this report show that the noise from the proposed site can comply with the *Environmental Protection (Noise) Regulations 1997*.

Appendix A

Terminology

Terminology

Ambient Noise

Ambient noise refers to the level of noise from all sources, including background noise as well as the source of interest.

A-Weighting

An A-weighted noise level is a noise level that has been filtered as to represent the way in which the human ear distinguishes sound. This weighting indicates the human ear is more sensitive to higher frequencies than lower frequencies. The A-weighted sound level is described as dB L_A.

Background Noise

Background noise is the noise level from sources other than the source of interest. Background may originate from such things as traffic noise, wind induced noise, industrial noise etc.

Decibel (dB)

The decibel is the unit that characterises the sound power levels and sound pressure of a noise source. It is a logarithmic scale with regard to the threshold of hearing.

Impulsive Noise

An impulsive noise source is a short-term impact noise which may originate from such things as banging, clunking or explosive sound.

Influencing factor

$=1/10$ (% Type A_{100} + % Type A_{450}) + $1/20$(% Type B_{100} + % Type B_{450})

Where:

% Type A_{100} = The percentage of industrial land within a 100m radius of the premises receiving noise

% Type A_{450} = The percentage of industrial land within a 450m radius of the premises receiving noise

% Type B_{100} = The percentage of commercial land within a 100m radius of the premises receiving noise

% Type B_{450} = The percentage of commercial land within a 450m radius of the premises receiving noise

+ Traffic factor (maximum 6dB)

= 2 for each secondary road within 100m

= 2 for each major road within 450m

= 6 for each major road within 450m

L_{A1}

An L_{A1} level is the A-weighted noise level which is overreached for one percent of a measurement period. It represents the average of the maximum noise levels measured.

L_{A1} assigned level

An assigned L_{A1} level which is not to be exceeded for more than 1% of a delegated assessment period.

L_{A10} assigned level

An assigned L_{A10} level which is not to be exceeded for more than 10% of a delegated assessment period.

L_{A10}

An L_{A10} level is the A-weighted noise level which is exceeded for 10 percent of the measurement period and is considered to represent the "*intrusive*" noise level.

L_{A90}

An L_{A90} level is the A-weighted noise level which is overreached for 90 percent of the measurement period. It is represents the "*background*" noise level.

L_{Aeq}

L_{Aeq} refers to the comparable steady state of an A-weighted sound which, over a specified time period, contains the same acoustic energy as the time-varying level during the specified time period. It represents the "*average*" noise level.

L_{AFast}

The noise level in decibels, obtained using the A frequency weighting and the F time weighting as specified in AS1259.1-1990. L_{AFast} is used when examining the presence of modulation.

L_{Amax}

The L_{AMax} level is the maximum A-weighted noise level throughout a specified measurement.

L_{Amax} assigned level

The L_{Amax} assigned level describes a level which is not to be exceeded at any time.

L_{APeak}

TheL_{APeak} level is the maximum reading (measured in decibels) during a measurement period, using the A frequency weighting and P time weighting AS1259.1-1990.

L_{ASlow}

A L_{ASlow} level is the noise level (measured in decibels) obtained using the A frequency weighting and S time weighting as specified in AS1259.1-1990

Major Road

A Major road has an estimated average daily traffic count of more than 15,000 vehicles.

Maximum Design Sound Level

Maximum Design Sound Level is the level of noise beyond hearing range of most people occupying the space start, become dissatisfied with the level of noise.

Modulating Noise

A modulating source is an audible, cyclic and regular source. It is present for at least 10% of a measurement period. The quantitative definition of tonality is:

a fluctuation in the discharge of noise which;

a) is more than 3 dB $L_{A\ Fast}$or is more than 3 dB $L_{A\ Fast}$in any one-third octave band;

b) is present for at least 10% of the representative

One-Third-Octave Band

One-Third-Octave-Band are frequencies that span one-third of an octave which have a centre frequency between 25 Hz and 20 000 Hz inclusive.

Representative Assessment Period

Representative Assessment Period describes a period of time not less than 15 minutes, and not surpassing four hours. It is determined by an inspector or authorised person to be suitable for the assessment of noise emissions.

Reverberation Time

Reverberation time refers to an enclosure for a sound of a specified frequency or frequency band as well as the time that would be necessary for the reverberantly decaying sound pressure level in the enclosure to decrease by 60 decibels.

RMS

The root mean square level is used to represent the average level of a wave form such as vibration.

Satisfactory Design Sound Level

Satisfactory Design Sound Level refers to the level of noise that has been found to be acceptable for the environment in question, which is also to be non-intrusive.

Secondary / Minor Road

A Secondary / Minor road has an estimated average daily traffic count of between 6,000 and 15,000 vehicles.

Sound Pressure Level (L_p)

Sound Pressure Level refers to a noise source which is dependent upon surroundings, and is influenced by meteorological conditions, topography, ground absorption; distance etc. Sound Pressure Level is what the human ear actually hears. Noise modelling predicts the sound pressure level from the sound power levels whilst taking into account the effect of relevant factors (meteorological conditions, topography, ground absorption; distance etc).

Sound Power Level (L_w)

A sound power level of a noise source cannot be directly measured using a sound level meter. It is calculated based on measured sound pressure levels at recognised distances. Noise modelling includes source sound power levels as part of the input data.

Specific Noise

Specific Noise relates to the component of the ambient noise of interest. It can be specified as the noise of interest or the noise of concern.

Tonal Noise

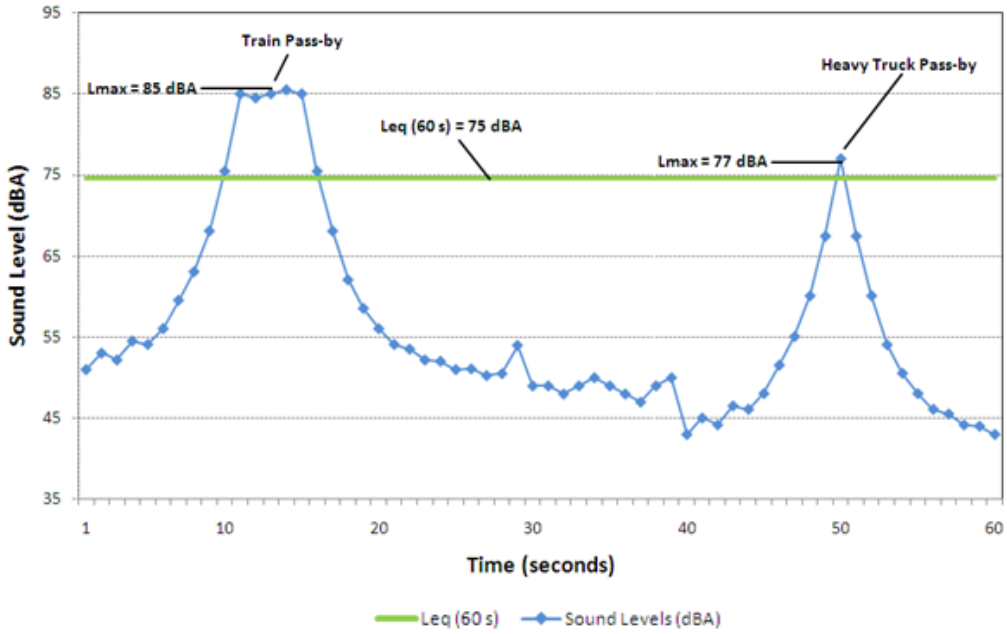
A tonal noise source can be designated as a source that has a specific noise emission over one or several frequencies, such as droning. The quantitative definition of tonality is:

the presence in the noise emission of tonal characteristics where the difference between —

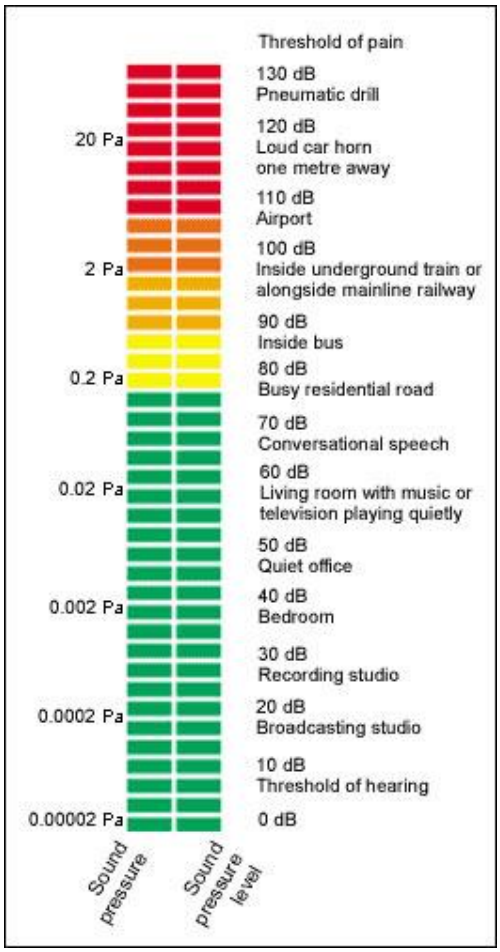
a) the A-weighted sound pressure level in any one-third octave band; and

b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands, is greater than 3 dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as $L_{A\ Slow}$ levels.

Chart of Noise Level Descriptors



Typical Noise Levels



Appendix C

Terminology

The following is an explanation of the terminology used throughout this report.

Decibel (dB)
The decibel is the unit that describes the sound pressure and sound power levels of a noise source. It is a logarithmic scale referenced to the threshold of hearing.

A-Weighting
An A-weighted noise level has been filtered in such a way as to represent the way in which the human ear perceives sound. This weighting reflects the fact that the human ear is not as sensitive to lower frequencies as it is to higher frequencies. An A-weighted sound level is described as L_A dB.

Sound Power Level (L_w)
Under normal conditions, a given sound source will radiate the same amount of energy, irrespective of its surroundings, being the sound power level. This is similar to a 1kW electric heater always radiating 1kW of heat. The sound power level of a noise source cannot be directly measured using a sound level meter but is calculated based on measured sound pressure levels at known distances. Noise modelling incorporates source sound power levels as part of the input data.

Sound Pressure Level (L_p)
The sound pressure level of a noise source is dependent upon its surroundings, being influenced by distance, ground absorption, topography, meteorological conditions etc and is what the human ear actually hears. Using the electric heater analogy above, the heat will vary depending upon where the heater is located, just as the sound pressure level will vary depending on the surroundings. Noise modelling predicts the sound pressure level from the sound power levels taking into account ground absorption, barrier effects, distance etc.

L_{ASlow}
This is the noise level in decibels, obtained using the A frequency weighting and the S (Slow) time weighting as specified in IEC 61672-1:2002. Unless assessing modulation, all measurements use the slow time weighting characteristic.

L_{AFast}
This is the noise level in decibels, obtained using the A frequency weighting and the F (Fast) time weighting as specified in IEC 61672-1:2002. This is used when assessing the presence of modulation only.

L_{APeak}
This is the greatest absolute instantaneous sound pressure in decibels using the A frequency weighting as specified in IEC 61672-1:2002.

L_{Amax}
An L_{Amax} level is the maximum A-weighted noise level during a particular measurement.

L_{A1}
An L_{A1} level is the A-weighted noise level which is exceeded for one percent of the measurement period and is considered to represent the average of the maximum noise levels measured.

L_{A10}
An L_{A10} level is the A-weighted noise level which is exceeded for 10 percent of the measurement period and is considered to represent the "*intrusive*" noise level.

L_{Aeq}
The equivalent steady state A-weighted sound level ("equal energy") in decibels which, in a specified time period, contains the same acoustic energy as the time-varying level during the same period. It is considered to represent the "average" noise level.

L_{A90}
An L_{A90} level is the A-weighted noise level which is exceeded for 90 percent of the measurement period and is considered to represent the "*background*" noise level.

One-Third-Octave Band
Means a band of frequencies spanning one-third of an octave and having a centre frequency between 25 Hz and 20 000 Hz inclusive.

L_{Amax} assigned level
Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded at any time.

L_{A1} assigned level
Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 1% of the representative assessment period.

L_{A10} assigned level
Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 10% of the representative assessment period.

Tonal Noise
A tonal noise source can be described as a source that has a distinctive noise emission in one or more frequencies. An example would be whining or droning. The quantitative definition of tonality is:

the presence in the noise emission of tonal characteristics where the difference between -

(a) the A-weighted sound pressure level in any one-third octave band; and

(b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3 dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as $L_{A\ Slow}$ levels.

This is relatively common in most noise sources.

Modulating Noise
A modulating source is regular, cyclic and audible and is present for at least 10% of the measurement period. The quantitative definition of modulation is:

a variation in the emission of noise that —

(a) is more than 3 dB $L_{A\ Fast}$ or is more than 3 dB $L_{A\ Fast}$ in any one-third octave band;

(b) is present for at least 10% of the representative.

Impulsive Noise
An impulsive noise source has a short-term banging, clunking or explosive sound. The quantitative definition of impulsiveness is:

a variation in the emission of a noise where the difference between $L_{A\ peak}$ and $L_{A\ Max\ slow}$ is more than 15 dB when determined for a single representative event;

Major Road
Is a road with an estimated average daily traffic count of more than 15,000 vehicles.

Secondary / Minor Road
Is a road with an estimated average daily traffic count of between 6,000 and 15,000 vehicles.

Influencing Factor (IF)

$$= \frac{1}{10}(\%\ \text{Type A}_{100} + \%\ \text{Type A}_{450}) + \frac{1}{20}(\%\ \text{Type B}_{100} + \%\ \text{Type B}_{450})$$

where:

$\%\ \text{Type A}_{100}$ = the percentage of industrial land within a100m radius of the premises receiving the noise

$\%\text{TypeA}_{450}$ = the percentage of industrial land within a 450m radius of the premises receiving the noise

$\%\ \text{Type B}_{100}$ = the percentage of commercial land within a100m radius of the premises receiving the noise

$\%\text{TypeB}_{450}$ = the percentage of commercial land within a 450m radius of the premises receiving the noise

+ Traffic Factor (maximum of 6 dB)

= 2 for each secondary road within 100m

= 2 for each major road within 450m

= 6 for each major road within 100m

Representative Assessment Period
Means a period of time not less than 15 minutes, and not exceeding four hours, determined by an inspector or authorised person to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission.

Background Noise
Background noise or residual noise is the noise level from sources other than the source of concern. When measuring environmental noise, residual sound is often a problem. One reason is that regulations often require that the noise from different types of sources be dealt with separately. This separation, e.g. of traffic noise from industrial noise, is often difficult to accomplish in practice. Another reason is that the measurements are normally carried out outdoors. Wind-induced noise, directly on the microphone and indirectly on trees, buildings, etc., may also affect the result. The character of these noise sources can make it difficult or even impossible to carry out any corrections.

Ambient Noise
Means the level of noise from all sources, including background noise from near and far and the source of interest.

Specific Noise
Relates to the component of the ambient noise that is of interest. This can be referred to as the noise of concern or the noise of interest.

Peak Component Particle Velocity (PCPV)

The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and in one of the three orthogonal directions (x, y or z) measured as a peak response. Peak velocity is normally used for the assessment of structural damage from vibration.

Peak Particle Velocity (PPV)

The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and is the vector sum of the PCPV for the x, y and z directions measured as a peak response. Peak velocity is normally used for the assessment of structural damage from vibration.

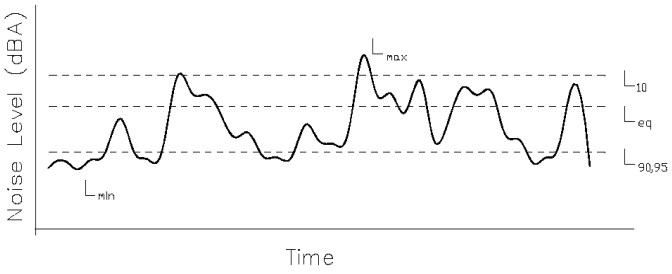
RMS Component Particle Velocity (PCPV)

The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and in one of the three orthogonal directions (x, y or z) measured as a root mean square (rms) response. RMS velocity is normally used for the assessment of human annoyance from vibration.

Peak Particle Velocity (PPV)

The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and is the vector sum of the PCPV for the x, y and z directions measured as a root mean square (rms) response. RMS velocity is normally used for the assessment of human annoyance from vibration.

Chart of Noise Level Descriptors



Typical Noise Levels