APPENDIX I
Environmental Assessment Report
ENVIRONMENTAL ASSESSMENT REPORT

Lots 460, 461, 462, 463 North Baldivis
Local Structure Plan
Document Status

<table>
<thead>
<tr>
<th>Version</th>
<th>Purpose of Document</th>
<th>Orig</th>
<th>Review</th>
<th>Review Date</th>
<th>Format</th>
<th>RPS Release</th>
<th>Issue Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rev 0</td>
<td>Final for Issue</td>
<td>RebDaw</td>
<td>JohHal</td>
<td>23.02.15</td>
<td>SN 24.02.15</td>
<td>J. Halleen</td>
<td>25.02.15</td>
</tr>
<tr>
<td>Rev 1</td>
<td>Final for Issue</td>
<td>RebDaw</td>
<td>JohHal</td>
<td>05.03.15</td>
<td>SN 06.03.15</td>
<td>J. Halleen</td>
<td>06.03.15</td>
</tr>
<tr>
<td>Rev 2</td>
<td>Final for Issue</td>
<td>JohHal</td>
<td>JohHal</td>
<td>22.10.15</td>
<td>DC 28.10.15</td>
<td>J. Halleen</td>
<td>28.10.15</td>
</tr>
<tr>
<td>Rev 3</td>
<td>Final for Issue</td>
<td>RebDaw</td>
<td>JohHal</td>
<td>03.02.17</td>
<td>SN 07.02.17</td>
<td>J. Halleen</td>
<td>08.02.17</td>
</tr>
</tbody>
</table>

Disclaimer

This document is and shall remain the property of RPS. The document may only be used for the purposes for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised copying or use of this document in any form whatsoever is prohibited.
EXECUTIVE SUMMARY

The North Baldivis Local Structure Plan (LSP) (the site) includes Lots 460, 461, 462 and 463 and extends over 67.8 hectares (ha) (Figure 1). The site is bound by Kwinana Freeway to the east, Baldivis Road to the west and is located approximately 40 kilometres (km) south of the Perth Central Business District (Figure 1).

Historically, the site has been extensively cleared for agricultural purposes. The site consists largely of grassed open paddocks with planted trees along the fence line, which act as windbreaks for the livestock. Horses are currently being kept on the site.

Historical Planning and Environmental Assessment Context

State Approval Background

In 2009, a Metropolitan Region Scheme (MRS) Amendment rezoned approximately 383 ha in Baldivis (including the site) from “Rural” to “Urban Deferred”. This rezoning was endorsed by the Western Australian Planning Commission (WAPC) and subsequently promulgated by parliament.

This “Urban Deferred” zoning was incrementally lifted by WAPC, with the initial rezoning of a large portion of the site from “Urban Deferred” to “Urban” approved by WAPC in December 2013. The remaining portion of the site was subsequently rezoned to “Urban” in November 2014. A small portion of Lot 462 to the east and Lot 463 to the east and south remain “Urban Deferred” pending future acquisition by Main Roads for a planned freeway interchange.

The Environmental Protection Authority (EPA) assessed the MRS Amendment in 2006. The EPA advised that the appropriate level of assessment was “Scheme Not Assessed – Advice Given”. During its assessment, the EPA provided advice in relation to wetlands, specifically advising that the Resource Enhancement (RE) Wetland (UFI 15410) located in Lot 462 be retained within an area of “public open space”. The mechanism for protecting this wetland and its buffer will be identified through a Local Structure Plan (LSP).

East Baldivis District Structure Plan

A District Structure Plan (DSP) for the 383 ha area was prepared to provide further definition of the intended land uses, urban design and environmental management against the zonings set out in the MRS (Figure 3).

A District Water Management Strategy (DWMS) (Parsons Brinckerhoff 2007) was prepared in October 2007 in support of the DSP. The DWMS defined the water management objectives at the district level for the East Baldivis DSP. The DWMS was approved by the Department of Water (DoW) in November 2007. The management objectives from the DWMS have been incorporated into the site specific Local Water Management Strategy (LWMS) supporting the LSP.
Local Structure Plan

The LSP design is shown in Figure 4. The LSP design promotes the following land uses:

- residential
- movement network
- Public Open Space (POS)
- primary school site
- Core Resource Enhancement wetland conservation area and water management areas
- future freeway on-ramp area.

Main Roads WA (MRWA) and the WAPC have advised it will require an area of 7.57 ha from the LSP (specifically within Lots 463 and 462) to accommodate the future upgrade of Mundijong Road and an on ramp to the freeway.

Purpose of this Report

The City of Rockingham Town Planning Scheme (TPS) No. 2 requires a LSP to be prepared and submitted for “Residential Development Zones” prior to granting and/or recommending approval of any development within this zone.

The purpose of this Environmental Assessment Report (EAR) is to address the following:

1. The key factors outlined in the EPA assessment of the MRS Amendments.
2. Facilitate the approval of the LSP with the City of Rockingham.

EAR Objectives

This EAR describes the relevant environmental characteristics of the site and presents management and mitigation strategies in response to potential environmental impacts. These management and mitigation strategies aim to minimise the potential impact on the environmental values within the site.

Key Environmental Issues

Consistent with the EPA’s assessment of the MRS, the following were considered the key environmental factors within the site that required further consideration and management as part of the structure plan and subdivision process:

- wetlands
- noise
- acid sulfate soils
- water management
- vegetation and flora
- potential land use conflict
- site contamination
- fire management.

**Key Environmental Outcomes**

The key environmental outcomes of the proposed LSP include:

- providing an improvement in groundwater and surface water quality through residential development and implementation of water sensitive urban design and best stormwater drainage management practices
- landscaping and enhancing the existing vegetation within the Tramway Reserve and retaining existing trees where practical in areas of POS
- incorporation of the Resource Enhancement (RE) Wetland (UFI 15410) located on Lot 462 within the LSP to protect the environmental attributes of the wetland
- implementation of management measures to reduce potential noise impacts on future residences.

**Management Commitments**

Table 1 summarises the key environmental issues and the proposed management commitments.
### Table 1: Key Environmental Issues and Proposed Management Commitments Summary

<table>
<thead>
<tr>
<th>Environmental Issue</th>
<th>Objective</th>
<th>Potential Impacts</th>
<th>Management Mechanism</th>
<th>Timing</th>
</tr>
</thead>
</table>
| Wetlands                | To maintain the integrity and ecological functions of any wetlands within the LSP site. | - Earthworks may directly or indirectly impact the RE Wetland and associated vegetation.  
- Weed invasion  
- Drainage, which may alter wetland function and hydrology. | - A Wetland Management Plan will be prepared, which will detail management of the RE Wetland to the satisfaction of the City of Rockingham. | Subdivision design  
Prior to subdivision approval |
| Acid Sulfate Soils (ASS)| To ensure that ASS are not disturbed during earthworks and construction activities. | According to existing Department of Environmental Regulation (DER) mapping, the risk of ASS occurring within 3 m of the surface is moderate to low. | - A preliminary site assessment for ASS will be undertaken across the site, and a subsequent management plan will be prepared (if required) to the satisfaction of Department of Environmental Regulation (DER). | Prior to subdivision |
| Site Contamination      | To ensure previous land uses within and surrounding the sites do not impact on proposed development of the site. | The majority of the site has been used for grazing and agricultural purposes and there is very little likelihood of any potential contamination. However, there is potential for contamination on Lot 460 from sheds and machinery on site. | - The site has historically been used for agricultural purposes consistent with the TPS zoning. Prior to the subdivision (on a staged basis) the 2005 PSI will be updated in accordance with Contaminated Sites Act 2003 and if required areas identified within the site will be remediated to a standard suitable for residential development, to the satisfaction of the DER. | Prior to clearance of title |
| Water Management        | To maintain the quantity and quality of water so that existing and potential environmental values, including ecosystem function, are protected. To ensure stormwater run-off is adequately contained within the development, so as not to impact on the Peel–Harvey Catchment. | - Change in hydrological regime because of changed landforms (from earthworks), which may alter natural flows.  
- Discharge of stormwater, which may affect water quality and alter the natural keyhole surface topography and landform. | - The LWMS details the integrated water management strategies to facilitate future urban water management planning. The LWMS will achieve integrated water management through the following design objectives  
  - Effectively manage the risk to property damage and environmental degradation from water contamination, flooding and waterlogging.  
  - Maintain and if possible improve water quality (surface and groundwater) within the development in relation to pre-development water quality.  
  - Reduce potable water consumption within both public and private spaces using practical and cost-effective measures. | LWMS: at local structure plan stage  
UWMP: Prior to subdivision approval |
<table>
<thead>
<tr>
<th>Environmental Issue</th>
<th>Objective</th>
<th>Potential Impacts</th>
<th>Management Mechanism</th>
<th>Timing</th>
</tr>
</thead>
</table>
| Vegetation and flora| To maintain the abundance, species diversity, geographic distribution and productivity of flora and fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge. | • Clearing  
• Degradation of retained vegetation through uncontrolled public access and weed invasion | • Vegetation will be retained within the Tramway Reserve, with limited road crossings into the LSP area to allow retention and natural regeneration of vegetation within the Tramway Reserve.  
• Rehabilitation will be undertaken within the RE wetland as detailed in the Wetland Management Plan.  
• All site staff should participate in site inductions informing them about the Environment, Health and safety aspects of the site. The induction should include, but not be limited to  
  – significant fauna species on the site  
  – reporting procedures for environmental incidents. | Subdivision design  
Construction |
| Fauna               | To maintain the abundance, diversity, geographic distribution and productivity of native fauna at the species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge. | • Clearing  
• Degradation of retained vegetation through uncontrolled public access and weed invasion | • The RE wetland will be retained within the LSP and the core area rehabilitated which will improve the quality of habitat available.  
• All site staff should participate in site inductions informing them about the Environment, Health and safety aspects of the site. The induction should include, but not be limited to  
  – significant fauna species on the site  
  – reporting procedures for environmental incidents. | Subdivision design  
Construction |
<p>| Kwinana Freeway     | To ensure surrounding land uses do not impact future development of the site. | Freeway noise | Noise received at residences located adjacent to the Kwinana Freeway, Mundijong and Baldivis Road in the year 2025 will exceed the “Noise Limits” as outlined in the WAPC Planning Policy 5.4 “Road and Rail Transport Noise and Freight Considerations in Land Use Planning”. However, the level of exceedance would only be minor i.e. up to 2 dB(A), therefore reduction of noise received by residences can be reduced so that it is compliant with Planning Policies “Noise Limits” by the implementation of noise walls. | Subdivision design |</p>
<table>
<thead>
<tr>
<th>Environmental Issue</th>
<th>Objective</th>
<th>Potential Impacts</th>
<th>Management Mechanism</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential land use conflicts</td>
<td>To ensure surrounding land uses do not impact future development of the site.</td>
<td>Potential impacts from the sand quarry:</td>
<td>Lot 1355 Sand Quarry</td>
<td>Subdivision design</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• noise</td>
<td>• Lot 1355 landowners Metropolitan Cemeteries Board (MCB) have confirmed they will have exhausted the sand resource within approximately the next two years (or late 2015).</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• dust</td>
<td>• The active area of sand quarry is located in the north-west corner of Lot 1355, which is over 300 m from the site.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Acknowledging the location of the sand mining activities and the two-year time frame before the sand resource is exhausted it is not likely the sand quarry will pose any significant issue for future residents of the site.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Lot 800 Kerosene Lane and Lot 2170 Millar Road</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• The site is located approximately 910 m from the Lot 800 limestone quarry.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Lot 2170 is predominately used as a sand quarry. The sand quarry is located approximately 455 m from the site. A cemetery, vegetated buffer in privately owned lots, Baldivis Road and the Tramway reserve separate the site from the WA Limestone sand quarry.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Lot 1 Mundijong Road</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Communications with the City of Rockingham indicates that clay extraction from Lot 1 is unlikely to be frequent (if at all) due to the new regulations and specifications on landfill cell construction which have led to replacing clay linings with plastic linings.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Noise levels from extraction activities on Lot 1 would be indistinguishable from noise produced by the adjacent freeway.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• In addition to this, noise barriers will be constructed between the development and freeway, which will reduce any potential noise disturbance from the clay quarry.</td>
<td></td>
</tr>
<tr>
<td>Fire</td>
<td>To reduce the risk of bushfire to people, property and infrastructure in accordance with Draft SPP 3.7: Planning for Bushfire Risk Management (WAPC 2014).</td>
<td>People, property and infrastructure situated within the site being impacted by potential bushfires from areas of remnant bushland – e.g. Tramway Reserve.</td>
<td>A Fire Management Strategy has been prepared for the area affected by the Bushfire Prone Area as designated by the City of Rockingham to support this LSP.</td>
<td>Complete</td>
</tr>
</tbody>
</table>
# TABLE OF CONTENTS

## EXECUTIVE SUMMARY

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXECUTIVE SUMMARY</td>
<td>i</td>
</tr>
</tbody>
</table>

## 1.0 INTRODUCTION

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 INTRODUCTION</td>
<td>1</td>
</tr>
</tbody>
</table>

## 1.1 Background

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1.1 Previous Environmental Assessment and Approval</td>
<td>1</td>
</tr>
</tbody>
</table>

## 1.2 Current Zoning

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2.1 Metropolitan Region Scheme</td>
<td>2</td>
</tr>
<tr>
<td>1.2.2 East Baldivis District Structure Plan (DSP)</td>
<td>2</td>
</tr>
</tbody>
</table>

## 1.3 Purpose of this EAR

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3.1 EAR Objectives</td>
<td>3</td>
</tr>
</tbody>
</table>

## 1.4 Associated Reports

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4 Associated Reports</td>
<td>3</td>
</tr>
</tbody>
</table>

## 2.0 LOCAL STRUCTURE PLAN

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0 LOCAL STRUCTURE PLAN</td>
<td>5</td>
</tr>
</tbody>
</table>

## 2.1 Description

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Description</td>
<td>5</td>
</tr>
</tbody>
</table>

## 2.2 Environmental Aspects of LSP Design

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2.1 Engineering Philosophy</td>
<td>6</td>
</tr>
</tbody>
</table>

## 2.3 Land Use

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3.1 Surrounding Land Use</td>
<td>8</td>
</tr>
</tbody>
</table>

## 3.0 EXISTING ENVIRONMENT

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0 EXISTING ENVIRONMENT</td>
<td>11</td>
</tr>
</tbody>
</table>

## 3.1 Topography, Soils and Geology

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Topography</td>
<td>11</td>
</tr>
<tr>
<td>3.1.1 Topography</td>
<td>11</td>
</tr>
<tr>
<td>3.1.2 Geology</td>
<td>11</td>
</tr>
<tr>
<td>3.1.3 Acid Sulfate Soils</td>
<td>11</td>
</tr>
</tbody>
</table>

## 3.2 Surface Hydrology and Wetlands

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2 Drainage</td>
<td>12</td>
</tr>
<tr>
<td>3.2.1 Drainage</td>
<td>12</td>
</tr>
<tr>
<td>3.2 Wetlands</td>
<td>12</td>
</tr>
<tr>
<td>3.2.2 Wetlands</td>
<td>12</td>
</tr>
<tr>
<td>3.2.3 Flood Plain</td>
<td>14</td>
</tr>
</tbody>
</table>
### 3.3 Groundwater

- **Groundwater Levels and Flow** .................................................. 15
- **Regional Vegetation** ................................................................. 15
- **Site Flora and Vegetation** ....................................................... 16
- **Vegetation Condition** .............................................................. 17
- **Tramway Reserve** ................................................................. 17

### 3.4 Fauna

- ........................................................................................................ 17

### 3.5 Contamination

- ........................................................................................................ 18

### 3.6 Social Surroundings

- **Noise** ....................................................................................... 19
- **Heritage** .................................................................................. 19

### 4.0 Relevant Environmental Policies and Guidelines

- ........................................................................................................ 21

### 4.1 Environmental Guidance Documents

- **City of Rockingham Local Bushland Strategy** .......................... 21
- **Baldivis Tramway Master Plan** ............................................... 23

### 5.0 Potential Impacts and Management

#### 5.1 Wetlands

- **Relevant Policies, Guidelines and Standards** .......................... 25
- **Potential Impacts** ................................................................. 25
- **Environmental Management and Mitigation** ...................... 26
- **Predicted Outcome** ............................................................... 27

#### 5.2 Acid Sulfate Soils (ASS)

- **Relevant Policies, Guidelines and Standards** .......................... 28
- **Potential Impacts** ................................................................. 29
- **Environmental Management and Mitigation** ...................... 29
- **Predicted Outcome** ............................................................... 29

#### 5.3 Water Management

- **Relevant Policies, Guidelines and Standards** .......................... 29
- **Potential Impacts** ................................................................. 30
- **Environmental Management and Mitigation** ...................... 30
- **Predicted Outcome** ............................................................... 35
TABLES
(contained within report text)

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1</td>
<td>Key Environmental Issues and Proposed Management Commitments Summary</td>
<td>iv</td>
</tr>
<tr>
<td>Table 2</td>
<td>Compliance of the LSP Baldivis Tramway Master Plan Precinct 1 Objectives</td>
<td>23</td>
</tr>
<tr>
<td>Table 3</td>
<td>Distances from Surrounding Land Uses and Generic Buffer Requirements</td>
<td>39</td>
</tr>
</tbody>
</table>

FIGURES
(contained within the report text)

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure A</td>
<td>Potential Retention Trees (Subject to Detailed Engineering Design at Subdivision Stage)</td>
</tr>
</tbody>
</table>

(compiled at rear of report)

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1</td>
<td>Site Location</td>
</tr>
<tr>
<td>Figure 2</td>
<td>Metropolitan Region Scheme Zoning</td>
</tr>
<tr>
<td>Figure 3</td>
<td>East Baldivis District Structure Plan</td>
</tr>
<tr>
<td>Figure 4</td>
<td>North Baldivis Local Structure Plan</td>
</tr>
<tr>
<td>Figure 5</td>
<td>Surrounding Land Uses</td>
</tr>
<tr>
<td>Figure 6</td>
<td>Geology</td>
</tr>
<tr>
<td>Figure 7</td>
<td>Acid Sulfate Soils Risk Mapping</td>
</tr>
<tr>
<td>Figure 8</td>
<td>Geomorphic Wetland Mapping</td>
</tr>
<tr>
<td>Figure 9</td>
<td>Flood Mapping</td>
</tr>
<tr>
<td>Figure 10</td>
<td>Vegetation Complexes</td>
</tr>
<tr>
<td>Figure 11</td>
<td>Vegetation Condition</td>
</tr>
</tbody>
</table>
PLATES
(contained within report text)

<table>
<thead>
<tr>
<th>Plate</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate A</td>
<td>Paddocks, Existing Livestock and Fencing</td>
<td>8</td>
</tr>
<tr>
<td>Plate B</td>
<td>Remnant <em>Melaleuca rhaphiophylla</em> Stands in the RE Wetland</td>
<td>13</td>
</tr>
</tbody>
</table>

APPENDICES

APPENDIX 1: EPA Assessment of MRS Amendment No. 1127/41, 1128/41 and 1129/41 – East Baldivis and TPS Amendment No. 122

APPENDIX 2: Metropolitan Cemeteries Board Correspondence on Sand Resource Extraction Timing (May 2013)

APPENDIX 3: OEPA Letter (October 2013) – North Baldivis Local Structure Plan – Proposed Wetland Management

APPENDIX 4: City of Rockingham correspondence on the Clay Quarry on Lot 1 Mundijong Road (June 2013)
This page is intentionally blank.
1.0 INTRODUCTION

The North Baldivis Local Structure Plan (LSP) (the site) consists of Lots 460, 461, 462 and 463 and is located approximately nine kilometres (km) south-east of Rockingham and 42 km south of the Perth Central Business District. The site is approximately 68 hectares (ha) in area (Figure 1).

Historically, the site has been extensively cleared for agricultural purposes; and currently consists of grassed paddocks with planted trees along the fence line to act as windbreaks for the livestock. Horses are currently being kept on the site.

1.1 Background

1.1.1 Previous Environmental Assessment and Approval

Following initiation, the Western Australian Planning Commission (WAPC) referred the three original Metropolitan Region Scheme (MRS) Amendments (Amendment No. 1127/41, 1128/41 and 1129/41 – East Baldivis) to the Environmental Protection Authority (EPA) in 2006 for its consideration. The EPA advised that following consideration of the information provided, it set the level of assessment at “Scheme Not Assessed – Advice Given”.

The EPA advised the following key environmental factors required further consideration and management as part of the structure plan and subdivision process:

- wetlands
- noise
- acid sulfate soils (ASS)
- water management
- vegetation and flora
- potential land use conflict
- site contamination
- high-pressure natural gas pipeline.

The EPA’s assessment and advice in relation to the three MRS Amendments is provided in Appendix 1.
1.2 Current Zoning

1.2.1 Metropolitan Region Scheme

In June 2009, the MRS Amendment No. 1127/41, 1128/41 and 1129/41 – East Baldivis was rezoned from “Rural” to “Urban Deferred” under the MRS. This “Urban Deferred” zoning has since been incrementally lifted by WAPC, with the initial rezoning of a large portion of the site from “Urban Deferred” to “Urban” approved by WAPC in December 2013. The remaining portion of the site was subsequently rezoned to “Urban” in November 2014.

A small portion of Lot 462 to the east and Lot 463 to the east and south remain “Urban Deferred” pending future acquisition by Main Roads for a planned freeway interchange (Figure 2).

1.2.2 East Baldivis District Structure Plan (DSP)

The site is located within the northern portion of the East Baldivis District Structure Plan (DSP), which comprises approximately 383 ha (Figure 3).

A DSP for East Baldivis site was prepared to provide further definition for land use, urban design and environmental management against the zonings as set out in the MRS.

RPS prepared an Environmental Assessment Report (EAR) for the DPS (RPS 2010). The DSP EAR addressed the key environmental factors and provided management commitments in accordance with local, state and federal environmental policies and guidelines.

1.2.2.1 DSP Key Commitments

1. An ASS investigation will be undertaken across the DSP site, and a subsequent management plan will be prepared (if required) to the satisfaction of the Department of Environmental Regulation (DER) prior to ground disturbing activities.

2. Local Water Management Strategies and Urban Water Management Plans will be prepared at appropriate planning and development stages in accordance with Better Urban Water Management Guidelines (WAPC 2008).

3. Native vegetation will be retained where possible across the site. Additionally, vegetation will be retained within the Tramway Reserve, with limited access crossings into the DSP area to allow retention and natural regeneration of vegetation within the Tramway Reserve.

4. A Preliminary Site Investigation (PSI) will be undertaken to confirm the presence/absence of contamination at the site prior to ground disturbing activities.
1.3 Purpose of this EAR

The City of Rockingham TPS No. 2 requires a LSP to be prepared and submitted for “Residential Development Zones” prior to granting and/or recommending approval of any development within this zone.

The purpose of this EAR is to address the following:

1. The key factors outlined in the EPA assessment of the MRS Amendments.
2. Facilitate the approval of the LSP with the City of Rockingham.

1.3.1 EAR Objectives

The objective of the EAR is to describe the relevant environmental characteristics of the site and present management and mitigation strategies in response to potential environmental impacts. These management and mitigation strategies aim to minimise the potential impact on the environmental values within the site.

1.4 Associated Reports

Previous reports produced for the site (and adjacent landholdings) include:

- East Baldivis District Water Management Strategy (DWMS) by Parsons Brinckerhoff (October 2007). This report defined the water management strategy at the district level for the East Baldivis Structure Plan area

- Environmental Assessment Report, Baldivis East District Structure Plan (draft) (RPS 2010)

- Local Water Management Strategy (LWMS) undertaken by RPS in 2014. The LWMS details the integrated water management strategies which will be implemented at the site and demonstrates that the land is capable of facilitating urban development whilst achieving sustainable, water and environmental outcomes

- Geotechnical and Preliminary Acid Sulfate Soil Investigation.
This page is intentionally blank.
2.0 LOCAL STRUCTURE PLAN

2.1 Description

The LSP has been developed to guide the subdivision and development of 67.78 ha of undeveloped land within the East Baldivis DSP. The LSP for the site is shown in Figure 4.

The LSP promotes the following land uses:

- residential
- movement network
- Public Open Space (POS)
- primary school site
- Core Resource Enhancement (RE) wetland conservation area and water management areas.

Main Roads WA (MRWA) and the WAPC have advised it will require an area of 7.57 ha from the LSP (specifically within Lots 463 and 462) to accommodate the future upgrade of Mundijong Road and an on ramp to the freeway (Figure 4).

This EAR identifies the measures proposed to mitigate and manage the environmental features of the site, and focuses on the natural areas to be retained within the LSP. This is discussed in more detail in the following sections.

2.2 Environmental Aspects of LSP Design

The site does not have a high level of ecological integrity. The site has been historically cleared of native vegetation and was used for agricultural purposes, e.g. livestock farming.

From an environmental perspective the key influences of the LSP were:

- RE Wetland
- water management
- retaining the Tramway Reserve
- noise from the freeway.

The following values have been accounted for as part of the process of identifying POS areas in the LSP:
recreation opportunities

- maintaining fauna habitat values within POS (e.g. retaining existing trees within POS areas) and the Tramway Reserve.

2.2.1 Engineering Philosophy

A central engineering and water management design component of the LSP requires that approximately 1.5 m to 2 m of engineering fill will be required across the site in order to provide an appropriate separation distance from the flood level of the Serpentine River and adequate separation from the maximum groundwater levels to the future residential dwellings.

In this context, the LSP has been designed to meet the following key environmental objectives:

- incorporate best practice water management into the urban design
- provide the required separation from groundwater
- minimise excavation works (e.g. sewer lines) and therefore potential impacts from ASS
- meet Better Urban Water Management guideline stormwater design and water quality objectives
- incorporating, protecting and enhancing the RE Wetland within the LSP design consistent with the Office of the Environmental protection Authority’s (OEPA) advice
- retaining existing trees in areas of POS (Figure A) subject to detailed engineering design at subdivision
- managing ASS in accordance with DER ASS guidelines.
Figure A: Potential Retention Trees (Subject to Detailed Engineering Design at Subdivision Stage)
2.3 **Land Use**

There is very little native vegetation within the site (planted flooded gum trees and melaleucas within the RE wetland). The majority of the site is cleared horse paddocks (Plate A).

A review of historical aerial photography from 1953 to 2013 shows that the site has been cleared of native vegetation since 1953 or before, then it was used for agriculture and broad-scale farming.

Potential retention trees have been identified in areas of POS (Figure A). These trees will be incorporated into the detailed engineering design which occurs at the subdivision stage. A tree survey of the mature trees across the site will be undertaken at the subdivision stage.

![Plate A: Paddocks, Existing Livestock and Fencing](image)

2.3.1 **Surrounding Land Use**

The key land uses surrounding the LSP are outlined below and in Figure 5.

2.3.1.1 **Extractive Industries**

*Clay Quarry*

This is located within Lot 1 Mundijong Road. The quarry is located approximately 149 m from the site. The Kwinana Freeway separates the site from the clay quarry.
**Sand Quarry**

The sand quarry is located within Lot 1355 Baldivis Road. The sand quarry is located (at the closest point) approximately 95 m from the site. The site is separated from the sand quarry by the Tramway Reserve and Baldivis Road. The active sand extraction area is focused in the north-western portion of Lot 1355, which is approximately 300 m from the site boundary at the closest point. The Lot 1355 landowners Metropolitan Cemeteries Board (MCB) have confirmed they will have exhausted the sand resource within approximately the next two years (Appendix 2).

**Limestone and Sand Quarry**

WA Limestone has a lease agreement with the City of Rockingham for Lot 800 Kerosene Lane and Lot 2170 Millar Road. Lot 800 Kerosene Lane is a limestone quarry located in the centre of Lot 800 and has a 50 m vegetated buffer along the southern border of Lot 800. Lot 2170 is predominately used as a sand quarry. The sand quarry is located approximately 455 m from the site. A cemetery, vegetated buffer in privately owned lots, Baldivis Road and the Tramway reserve separate the site from the WA Limestone sand abstraction works.

2.3.1.2 **Major Roads**

The Kwinana Freeway borders the site immediately east.

The south-east corner of the site (7.57 ha) has been removed from the LSP after negotiations with MRWA and WAPC identified that this land would be required for the future upgrade of Mundijong Road and an on-ramp to Kwinana Freeway.
3.0 EXISTING ENVIRONMENT

3.1 Topography, Soils and Geology

3.1.1 Topography

The topography of the site is low-lying with areas subject to seasonal inundation. The site is generally flat, ranging from 4.4 metres Australian Height Datum (m AHD) within the area associated with the RE Wetland to 6.0 m AHD on the eastern boundary and approximately 5 m AHD across the remainder of the site and towards the western boundary.

3.1.2 Geology

3.1.2.1 Regional

Geological mapping identifies the following geology across the site (Figure 6):

- M4 across the majority of the site – very pale brown silt, soft when moist, firm when dry, low clay content, of alluvial origin

- S8 at the western border – very light grey at surface, yellow at depth, fine to medium grained, sub-rounded quartz, moderately well sorted, of eolian origin as relatively thin veneer.

3.1.2.2 Local

On-site investigations indicate the site is not underlain by silt as regional mapping suggests. Douglas Partners (2008) carried out a Geotechnical and Preliminary Acid Sulphate Soil Investigation across the site in June 2008. Seventy-seven test pits were excavated to a maximum depth of three metres below ground level (mbgl). Additionally, geological information has been obtained from nine monitoring bores installed within the site to a maximum depth of 5 mbgl (B1 to B5, B6, B6 (south), B7 and B8).

The on-site investigations indicate the site is predominantly underlain by Bassendean Sand to a depth of at least 5 mbgl, with a thin surface layer of low permeability clay along the eastern edge of the site and in the location of the wetland. Coffee rock was also encountered in four of the test pits.

3.1.3 Acid Sulfate Soils

Based on DER’s regional ASS risk mapping, the site has been identified as having a “moderate to low” risk of ASS occurring within 3 m of the natural soil surface (Figure 7).
Douglas Partners carried out a geotechnical and preliminary acid sulfate soil investigation across the site in June 2008. Based upon the results of this investigation it was concluded that the risk of encountering ASS above the action criteria ($S_{CR} 0.03\%$) is high within 3 m of the existing surface (Douglas and Partners 2008). Further detailed investigations for ASS were recommended in the report, particularly for the proposed excavations and dewatering being undertaken prior to commencement of works, the results of which should form the basis of an ASS Management Plan.

A detailed site assessment and subsequent ASS and Dewatering Management Plan will be prepared for the site prior to subdivision.

### 3.2 Surface Hydrology and Wetlands

#### 3.2.1 Drainage

The site is located within the Peel Estuary–Serpentine River Catchment and Peel Main Drain (PMD) Sub-catchment. The PMD is situated to the east of the site, adjacent to the eastern side of the Kwinana Freeway and drains stormwater run-off from the catchment into the Serpentine River and ultimately the Peel–Harvey Estuary.

Several small open “agricultural” drains traverse the site, which convey surface water to one of four culverts that pass beneath the Kwinana Freeway and discharge into the PMD. Surface water not conveyed via the open drains, would otherwise sheet flow off the site until it reaches these culverts.

The PMD is a major drainage system that is owned and managed by the Water Corporation. The PMD was constructed in the 1930s to facilitate agricultural development within the surrounding water logged land. The PMD currently flows alongside the eastern side of the Kwinana Freeway, into Folly Pool and then reforms into the PMD after Folly Road.

The site is within the Mundijong Surface Water Catchment, which is one of the six Rural Drainage Districts owned and operated by the Water Corporation.

#### 3.2.2 Wetlands

Multiple Use (MU) (UFI 15591 and UFI 15409) and Resource Enhancement (RE) (UFI 15410) Category Wetlands are located on the site. The MU mapping covers most of the landholdings with one small RE wetland located within Lot 462 Baldivis Road (Figure 8).

The MU wetland on site is in an extremely degraded state due to its historical use for agricultural purposes. The EPA Guidance Statement 33 describes MU wetlands as:
Wetlands with few important ecological attributes and functions remaining and use, development and management should be considered in the context of ecologically sustainable development and best management practice catchment planning.

3.2.2.1 Resource Enhancement Wetland (UFI 15410)

The RE wetland consists of remnant *Melaleuca rhaphiophylla* stands in a cleared paddock as illustrated in Plate B.

![Plate B: Remnant Melaleuca rhaphiophylla Stands in the RE Wetland](image)

The following features were noted for Lot 462 and the RE Wetland (UFI 15410):

- The site is currently being utilised for grazing by horses.
- The topography of the site is essentially flat with minimal relief, lying between 4.5 and 6 m AHD.
- UFI 15410 is a palusplain wetland with an area of approximately 1.4 ha according to the Department of Parks and Wildlife (DPaW) (formerly the Department of Environment and Conservation) geomorphic wetland database.
- A number of small drainage channels have been excavated throughout and along the western edge of the wetland.
A site survey was undertaken by specialist botanist Dr Eleanor Bennett in April 2012 as part of a wetland reclassification application which assessed the flora and vegetation of the RE wetland. The field survey concluded that:

- Three vegetation types occur within the site, though only one unit is present within the wetland area subject of this assessment (Open Low Forest A to Low Forest A of *Melaleuca rhaphiophylla* over Dense Herbs dominated by the weed *Polygonum aviculare*).

- The vegetation condition associated with wetland UFI 15410 was determined to be “Degraded to Completely Degraded”.

- The *Melaleuca rhaphiophylla* within the wetland appeared to be in poor health and stunted in growth.

- The wetland vegetation has been highly modified with no understorey vegetation remaining.

- No Threatened or Priority Flora (listed under the DPaW database of Threatened and Priority Flora Species) was recorded during the vegetation and flora survey.

Consultation has been undertaken with the OEPA regarding management of the RE wetland within the LSP. The OEPA is satisfied that the wetland buffer incorporated into the LSP and the following management measures will protect the environmental values of the wetland (Appendix 3):

- provision of a buffer from the mapped edge of the wetland, primarily to retain the *Melaleuca rhaphiophylla* trees

- maintaining the ecological water requirements of the *Melaleuca rhaphiophylla* trees by incorporating the infiltration of surface waters within the wetland buffer, as it currently occurs

- weed management

- revegetation of the core wetland area

- surface water retention swales planted using endemic species

- interface treatments between conservation areas and recreation areas.

### 3.2.3 Flood Plain

Flood mapping indicates a large portion of the site is within the flood plain of the PMD during major river flows (Figure 9).
SKM was commissioned by the Department of Water (DoW) to develop the Serpentine River Floodplain Management Study (2010) for the Serpentine, Baldivis, Karnup and Keralup area. In early 2014, the DoW revised it’s flood plain mapping for the broader area, however the recommended flood plain management strategies to ensure proposed development in flood prone areas are acceptable with regard to major flooding, have remained the same. The revised flood mapping relevant to the site was provided by DoW and indicates that the 100 year ARI flood level on the site is now estimated to be between 4.5 and 5.0 m AHD.

3.3 Groundwater

The site is located within the Stakehill Groundwater Area and more specifically the Tamworth Swamp and Stakehill Confined sub-areas. The aquifers within each respective groundwater sub-area comprise the superficial Swan (unconfined), Cattamarra, Leederville and Yarragadee North formations.

3.3.1 Groundwater Levels and Flow

The AAMGL is calculated to range from approximately 4 m AHD at the north-east corner of the site to 5.4 m AHD along the western boundary, with groundwater migrating to the east towards the Peel Main Drain.

The local groundwater elevation is significantly higher than regional monitoring shows and the local flow direction is towards the east, not the west as is indicated in the regional mapping (DoW 2013a). This is due to local groundwater mounding, with discharge being particularly impeded to the east due to the presence of low permeability soils adjacent to the Peel Main Drain.

Based on the AAMGL and MGL method of calculation, the AAMGL and MGL exceed the topography over large areas of the site. On this basis, groundwater levels will need to be controlled by a combination of fill material and subsurface drainage.

3.3.2 Regional Vegetation

Due to historical land uses, particularly agricultural activities, the site has been extensively cleared of native vegetation.

The site’s vegetation would originally have been comprised of the Serpentine River Complex and Bassendean Complex – Central and South as described below (Heddle et al. 1980) (Figure 10):
Serpentine River Complex – closed scrub of *Melaleuca* spp. and fringing woodland of *E. rudis* – *M. rhaphiophylla* along streams (Heddle et al. 1980)

Bassendean Complex – Central and South – vegetation ranging from woodlands of *Eucalyptus marginata* – *Casuarina fraseriana* – *Banksia* spp. to low woodland of *Melaleuca* spp. and sedgelands on the moister sites.

The Bassendean Complex meets the state government target of at least 10% of the original extent proposed for protection (Bush Forever protection area of the Perth Metropolitan region); however, the Serpentine River Complex is under this target at 9%. As discussed in Section 4.4.3, the site is mainly cleared from past land uses and therefore proposed development of the site will not involve clearing either of the complexes discussed above.

### 3.3.3 Site Flora and Vegetation

Previous flora and vegetation surveys undertaken within the site include:

- a reconnaissance survey of Lots 460 – 463 (RPS 2010)
- Flora and Vegetation Survey of Lot 462 (Bennett Environmental Consulting 2012).

These surveys did not identify any Threatened, Rare or Priority Flora Species within the site. There was little or no native annual or understorey flora (apart from the common species *Juncus pallidus* and *Cotula coronopifolia*) within the site.

The remnant native vegetation in the site was identified as:

- Mature *Eucalyptus rudis* (flooded gum) forest to closed forest over alien grasses and herbs (including *Zantedeschia aethiopica*, the arum lily). The structure of canopy layer of this vegetation was more or less intact and the trees were healthy but there was no native understorey remaining in this area.

- *Melaleuca rhaphiophylla* (freshwater paperbark) patchy low open woodland to low forest over alien grasses and herbs in a sumpland. This vegetation was in a degraded condition. The structure of canopy layer of this vegetation was degraded over most of this area and there was no native understorey remaining. The drainage of this area is currently modified by shallow drains.

The majority of the site is cleared farmland and pasture consisting of alien grasses and herbs.
3.3.4 Vegetation Condition

The majority of the site is devoid of native vegetation because of historical agricultural land uses. The basic vegetation structure in areas of remnant vegetation has been impacted by this and other disturbance reducing the understorey significantly.

The vegetation condition within the site ranges from “Completely Degraded” to “Degraded” due to historical clearing and agricultural land uses (Figure 11).

3.3.5 Tramway Reserve

The Tramway Nature Reserve runs parallel to Baldivis Road along the western boundary of the site (Figure 5).

The vegetation within the Tramway Reserve consists of patches of *Eucalyptus rudis* with the occasional *Melaleuca rhaphiophylla* and *Corymbia calophylla*. There a groups of trees particularly in the southern end of the Tramway Reserve in “Good” condition, however the Tramway is largely dominated by large open areas supporting weed growth.

The City of Rockingham has requested the number of access point through the reserve to be limited with the objective of minimising the impact to the vegetation within the reserve.

3.4 Fauna

The majority of the site has been historically cleared and consequently significant fauna habitat has been largely removed.

A search of the Commonwealth Department of Environment (DoE) website for matters of National Environmental Significance (NES) protected under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) highlighted a number of listed fauna species that potentially may utilise this habitat.

Of this list, the key species that could potentially be impacted through development of the site, (based on the fauna habitats remaining) are listed below.

Scattered stands of or individual *Eucalyptus rudis* trees:

- forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*)
- Carnaby’s Black-Cockatoo (*Calyptorhynchus latirostris*)
- Baudin’s black cockatoo (*Calyptorhynchus baudinii*).

Resource Enhancement Wetland (stand of *Melaleuca rhaphiophylla* and perched water in winter):
- cattle egret (*Ardea ibis*)
- great egret (*Ardea alba*)
- Australian painted snipe (*Rostratula australis*)
- red necked stint (*Calidris ruficollis*)
- sharp tailed sandpiper (*Calidris acuminata*)
- Australian bittern (*Botaurus poiciloptilus*)
- marsh sandpiper (*Tringa stagnatilis*).

Waterbirds have been known to forage opportunistically in the open paddock areas adjacent to the core RE wetland during periods of seasonal inundation. However, waterbirds are known to and have been observed foraging in areas of standing water, in open paddocks across the broader Peel region, particularly adjacent to the PMD or in nearby lakes such as Lake Cooloongup and Lake Walyungup.

The proposed management and use of the wetland and surrounding buffer proposes to replicate the pre-development conditions associated with both surface and groundwater availability to the existing *Melaleuca rhaphiophylla* within the RE wetland. Therefore, waterbirds can continue to utilise the core RE wetland area and the surrounding buffer after seasonal rain events.

The RE wetland will be retained and protected within the LSP consistent with the OEPA advice. It is anticipated that in retaining and rehabilitating the RE wetland, more suitable waterbird habitat will be created.

Potential habitat on the site for black cockatoo species comprises of 0.15 ha of poor quality *Eucalyptus rudis* trees which are scattered across the site and do not comprise a consolidated stand of vegetation. There is no roosting or breeding habitat within the site.

It was an objective of the LSP to maintain as many mature trees within the site as possible. Therefore, although the LSP site has limited fauna habitat values due to historical clearing, the maintaining of these trees where possible and Tramway Reserve will assist in preserving avifauna habitat in the area.

### 3.5 Contamination

A review of the DER’s Contaminated Sites Database determined there are no registered contaminated sites within the site.

In 2010, Preliminary Site Investigation (PSI) was undertaken identify possible areas and sources of potential contamination at the site.

The PSI identified that the majority of the site has been used for grazing and agricultural purposes and there is little likelihood of any potential contamination sources.
3.6 Social Surroundings

3.6.1 Noise

An Acoustic Assessment for the East Baldivis DSP project area (Herring Storer Acoustics 2009), which included the site was undertaken due to the project area’s proximity to the Kwinana Freeway and local arterial routes of Mundijong Road.

The results of the acoustic assessment indicate that noise received at residences located adjacent to the Kwinana Freeway and Baldivis Road in the year 2025 will exceed the “Noise Limits” as outlined in State Planning Policy 5.4: Road and Rail Transport Noise and Freight Considerations in Land Use Planning (WAPC 2009). However, the level of exceedance would only be minor.

Given the possible level of exceedance, Herring Storer Acoustics (2009) concluded that compliance with the WAPC (2009) “Noise Limits” could be achieved through a combination of construction of noise walls, building design and notification on titles.

Further noise assessments were then undertaken as part of the LSP design process, with a Transportation Noise Assessment undertaken in 2015 by Lloyd George Acoustics Pty Ltd for Mundijong Road and the Kwinana Freeway. As part of this assessment, noise monitoring was undertaken near the Kwinana Freeway to quantify existing noise levels and to assist in calibrating a noise model for the site. Based on the noise monitoring and modelling undertaken as part of the noise assessment, the below was recommended:

- A solid noise wall with a height of 2.4 to 2.7 m will be required to ensure minimal impacts to future residents. This noise wall will be refined as part of future more detailed design processes.

- As part of more detailed design processes, it is recommended that lots are identified which may require further noise treatments. Details of these treatments are provided in the Transportation Noise Assessment report.

- Any affected lots should have notifications on the titles.

3.6.2 Heritage

3.6.2.1 Aboriginal Heritage

A search of the Department of Aboriginal Affairs (DAA) Database showed no registered Aboriginal heritage sites within the site.
3.6.2.2 European Heritage

A search of the Heritage Council’s inHerit database and the City of Rockingham’s Municipal Heritage Inventory was undertaken in March 2014 with no matches found for the site.
4.0 RELEVANT ENVIRONMENTAL POLICIES AND GUIDELINES

4.1 Environmental Guidance Documents

4.1.1 City of Rockingham Local Bushland Strategy

The City of Rockingham’s Planning Policy 7.2 – Local Bushland Strategy aims to:

Provide Council with guidance in the assessment of proposals to rezone, subdivide and develop land in the City where remnant bushland is present.

The policy guides the assessment of the ecological value of remnant bushland on the subject site to assist in determining the suitability of development over the land proposed to be developed. In line with the policy directives, the bushland on site has been assessed in accordance with the Policy’s following criteria:

4.1.1.1 Presence of Rare Species or Threatened Ecological Communities

The site has very limited remnant vegetation, with the only example of pre-European vegetation within the site consisting of scattered pockets of native trees. In addition, remnant understorey across the site has been cleared, indicating a very low likelihood for any rare flora species or threatened ecological communities being present on the site.

4.1.1.2 Rarity of the Vegetation Complex Present (i.e. is the Complex Present One of Those Where Less Than 10% Remains in Secure Conservation Reserves, Either in a Regional or Locally Representative Context)

The remnant vegetation is mapped by Heddle et al. (1980) as belonging to the Serpentine River Complex and Bassendean Complex – Central and South. However, the basic vegetation structures typically associated with the mapped regional complexes have been severely impacted from the historical clearing and agricultural land use; in particular, there has been high disturbance to the understorey vegetation.

The Serpentine River Complex is described as closed scrub of Melaleuca spp. and fringing woodland of E. rudis – M. rhaphiophylla along streams (Heddle et al. 1980). The Bassendean Complex – Central and South is described as vegetation ranging from woodlands of Eucalyptus marginata – Casuarina fraserana – Banksia spp. to low woodland of Melaleuca spp. and sedgelands on the moister sites.

Bush Forever (Government of Western Australia 2000) shows 9% of the Serpentine River Complex exists in the Perth Metropolitan region of the Swan Coastal Plain. Approximately two per cent of the original Serpentine River Complex extent is located in areas with existing protection (e.g. Parks and Recreation Reserves).
The Bassendean complex meets the state’s target of at least 10% of the original extent proposed for protection.

4.1.1.3 Vegetation Diversity

Remnant vegetation has been vastly cleared due to historical agricultural activities, with limited diversity in the vegetation remaining, which primarily consists of scattered larger trees and a “Completely Degraded” (pasture) understorey.

4.1.1.4 Vegetation Condition (Level of Degradation, Structure Retained)

The vegetation condition within the site ranges from “Completely Degraded” to “Degraded” due to its agricultural history.

4.1.1.5 Connectivity as a Wildlife Corridor

Review of aerial photography and through undertaking a site visit indicates that surrounding landholdings contain very limited ecological value. The landholdings to the south and north have been historically used for agriculture and are in similar degraded condition to the LSP site.

Retention of the vegetation within the Tramway Reserve will be undertaken, in accordance with the City of Rockingham’s objectives for this area. In addition, significant trees and areas of bushland within the site will be retained wherever possible. Access points to the subdivision will also be minimised to prevent adverse impacts on the connectivity of the Tramway Reserve for transient fauna.

4.1.1.6 Significant Because it is Isolated and is the Only Remaining Bushland in that Area ( Particularly Important in Developed Areas)

The remnant vegetation on the site is very limited. There are properties and Bush Forever sites within less than 2 km that contain more intact areas of native vegetation that better represent the bushland locally.

4.1.1.7 Social Value (e.g. Educational Resource, Recreational Area, Locally Admired for Rural or Visual Amenity)

The site historically and is currently being used for small-scale agricultural activities, and it does not represent a significant social value in respect to the environmental values of the site.

4.1.1.8 Acts as a Buffer Between Potentially Conflicting Land Uses

The vegetation within the site does not contain any value as a buffer to conflicting land uses. The Tramway Reserve vegetation separates the future residential land use from Baldivis Road and temporarily the sand quarry located within Lot 1355 Baldivis Road.
4.1.1.9 Impact from Removal or Modification on Other Parts of the Environment

Given the limited environmental value attributed to the remaining vegetation on site, there will likely be negligible impacts to other parts of the environment.

The RE wetland is being retained within the LSP and will not be impacted by the proposed development.

4.1.1.10 Other Significant Attributes

The Melaleuca vegetation within the RE wetland provides potential habitat for waterbirds. This vegetation will be retained and protected within the LSP. There are no other significant values or attributes of the limited remnant vegetation on site.

Given the limited ecological value of the remnant vegetation on site, and in consideration of the responses to each of the criteria outlined above, the LSP design and management commitments outlined in this document meet the City of Rockingham’s objectives for bushland retention as outlined in the Planning Policy 7.2 – Local Bushland Strategy.

4.1.2 Baldivis Tramway Master Plan

The LSP is located within Precinct 1 of the Baldivis Tramway Master Plan (City of Rockingham 2014). The master plan sets out management objectives for Precinct 1. Table 2 below summarises these objectives and details how those portions of the LSP abutting the Tramway are in accordance with relevant objectives.

**Table 2: Compliance of the LSP Baldivis Tramway Master Plan Precinct 1 Objectives**

<table>
<thead>
<tr>
<th>Precinct 1 Management Objectives</th>
<th>LSP Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintain and protect all existing vegetation</td>
<td>Vegetation within the Tramway Reserve will be retained, with the only vegetation impacted for the construction of an access road to the proposed subdivision.</td>
</tr>
<tr>
<td>Manage priority weed species</td>
<td>Weeds will be managed as part of any landscaping works undertaken for the proposal.</td>
</tr>
<tr>
<td>Focus revegetation on native species in key feature nodes and primary access points</td>
<td>It is proposed that as part of any landscaping works, native vegetation will be used where possible.</td>
</tr>
<tr>
<td>Utilise designated offset areas for future revegetation of native species to improve landscape connectivity</td>
<td>NA</td>
</tr>
<tr>
<td>Ensure adequate fire safety measures, such as fire breaks and slashing</td>
<td>All activities and development will be undertaken in accordance with the Bushfire Management Strategy which has been prepared for the LSP</td>
</tr>
<tr>
<td>Establish an integrated dual use path network</td>
<td>NA</td>
</tr>
<tr>
<td>Precinct 1 Management Objectives</td>
<td>LSP Details</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Provide a safe pedestrian detour around the Kulija Road intersection</td>
<td>NA</td>
</tr>
<tr>
<td>Create a Wetland Concept Area for nature appreciation and interpretation</td>
<td>NA</td>
</tr>
</tbody>
</table>
5.0 POTENTIAL IMPACTS AND MANAGEMENT

The key environmental factors are considered applicable to the site include:

- wetlands
- ASS
- water management
- vegetation and flora
- fauna
- site contamination
- surrounding land uses.

5.1 Wetlands

The EPA wetland objective is to maintain and where possible enhance the integrity, ecological function and environmental values of wetlands.

5.1.1 Relevant Policies, Guidelines and Standards

The key policy and guidance relating to Swan Coastal Plain wetlands include:

- EPA Position 4: Environmental Protection of Wetlands
- EPA Guidance 33: Draft environmental guidance for planning and development
- Environmental Protection (Swan Coastal Plain Lakes) Policy 1992.

5.1.2 Potential Impacts

Wetlands across the site include the following:

- Multiple Use wetlands (UFI 15591 and UFI 15409)
- Resource Enhancement wetland (UFI 15410).

5.1.2.1 Multiple Use Wetland

The impacts to the MU wetlands within the site are minimal as these wetlands are in a “Completely Degraded” condition and are considered suitable for development.

5.1.2.2 Resource Enhancement Wetland

The RE wetland will be retained and protected within the LSP design and it is anticipated that impacts to the wetland will be minimal. However, potential impacts to this wetland due to the proposed surrounding development include:

- accidental clearing of wetland vegetation
- erosion and sedimentation as a result of earthworks
- ASS impacts resulting from earthworks or dewatering
- changes to hydrology through changes in surface water flows and subsoil drains.

### 5.1.3 Environmental Management and Mitigation

The key RE wetland considerations in the LSP design include:

- maintaining ecological water requirements to the *Melaleuca rhaphiophylla* trees. This outcome will be detailed in the LWMS.
- improving the limited environmental values within the identified RE wetland core area of *Melaleuca rhaphiophylla*, which would be achieved through the implementation of an approved Wetland Management Plan (including revegetation).
- integrate the RE wetland within the POS and surrounding urban development. This outcome would be achieved through a Wetland Management Plan and a landscape design plan.

The key considerations and proposed responses are detailed further below.

#### 5.1.3.1 Ecological Water Requirements

In order to mimic pre-development conditions associated with both surface and groundwater availability to the existing *Melaleuca rhaphiophylla* within the RE wetland, it is proposed to use areas within the buffer for the purpose of surface water retention and detention.

It is envisaged that by maintaining pre-development surface and groundwater flows to the buffer area, the vegetation will be provided with similar water needs after development, whilst experiencing improved water quality through the use of constructed vegetated bioretention areas (swales) and other suitably designed and best practice water sensitive urban design techniques.

It has been calculated by the project engineers that surface water flows generated from rainfall events up to and including the 5-year Average Recurrence Interval (ARI) will be retained and infiltrated into bioretention swales within the buffer. The bioretention swales will be designed to ensure only shallow excavation is required, and will be planted with endemic plant species within an amended soil medium, to achieve maximum treatment of surface water before localised infiltration.

The remaining portion of buffer area will include landscaped public open space, consistent with the management requirements of cleared wetland buffer areas, and will accommodate up to and including the 5-year ARI events.
It is important to acknowledge the current surface water flow through the RE wetland, which includes the nutrient run-off from the surrounding horse paddock, is not treated. The proposed water management strategy seeks to improve significantly this outcome through incorporating best stormwater quality management practice consistent with Better Urban Water Management principles.

5.1.3.2 RE Wetland Rehabilitation

As well as managing post-development water flows to protect the core RE wetland vegetation, it is proposed that rehabilitation of the core RE wetland area will be undertaken. This will be detailed in a Wetland Management Plan and it will include the following in accordance with the OEPA advice (Appendix 3):

- weed management within the core wetland area and buffer area
- revegetation of the core wetland area using endemic riparian species
- revegetation of the key surface water management areas (e.g. bio-retention swales) using endemic plant species.

5.1.3.3 Integration with Surrounding Residential Development

It is proposed the RE wetland buffer and associated POS will accommodate the following uses:

- re-vegetation
- bio-retention swales
- paths
- recreation space.

Interface treatments proposed for protection of the RE wetland will be detailed in a Wetland Management Plan and a landscape plan.

5.1.4 Predicted Outcome

It is anticipated that as the above management mechanisms will improve the current condition of the wetland as well as providing suitable waterbird habitat.

The OEPA was consulted regarding the use of the wetland buffer to maintain pre-development surface water flows and drainage function within the immediate vicinity of the wetland. RPS identified that the maintenance of the pre-development ground and surface water regime was critical to the ongoing support of the vegetation associated with the RE wetland. In light of this information, the OEPA has advised it is satisfied the above proposed management measures, including a buffer will protect the environmental values of the RE wetland. The key management measures include:
1. Provision of a buffer from the edge of the wetland primarily to retain the *Melaleuca rhaphiophylla* trees.

2. Maintaining ecological water requirements to the *Melaleuca rhaphiophylla* trees.

3. Weed management.

4. Revegetation of the core wetland area and surface water retention swales using endemic species.

5. Interface treatments between conservation areas and recreation areas.

The Wetland Management Plan will be prepared and implemented to the satisfaction of the City of Rockingham.

Appendix 3 provides the OEPA’s Wetland Management Plan letter.

A Local Water Management Strategy (LWMS) detailing the following in accordance with WAPC’s 2008 Better Urban Water Management guidelines will ensure water quality entering the wetland is maintained or improved:

- the adoption of a treatment train approach to run-off, through the use of Water Sensitive Urban Design (WSUD) Best Management Practices (BMPs) such as permeable pavements, buffer strips, bio-retention swales, rain gardens, bio-filtration pockets, median swales, gross pollutant traps and infiltration basins, where appropriate

- adopting a maintenance plan for the upkeep of the treatment train.

### 5.2 Acid Sulfate Soils (ASS)

The EPA ASS objectives are to:

- Maintain the integrity, ecological function and environmental values of the soil and landform.

- Ensure that emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.

- Ensure that rehabilitation achieves an acceptable standard compatible with the intended land use, and consistent with appropriate criteria.
5.2.1 Relevant Policies, Guidelines and Standards

The DER has published a number of guidelines relating to the identification, reporting and management of contaminated sites and ASS in WA, including the Contaminated Site Management Series report and Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes (DER 2009).

5.2.2 Potential Impacts

According to existing DER mapping, the risk of ASS occurring within 3 m of the surface is moderate to low (Figure 7).

In an undisturbed state below the water table, these soils remain benign and non-acidic. However, if these soils are exposed to the atmosphere through drainage, excavation or dewatering, the sulfides may react with oxygen and form sulfuric acid.

5.2.3 Environmental Management and Mitigation

An ASS investigation will be undertaken on the LSP site prior to subdivision to confirm the ASS risk. A DER guideline compliant ASS and Dewatering Management Plan will, if required, then be developed and implemented to manage:

- all proposed dewatering proposed in association with residential development (in accordance with subdivision and servicing layout)
- any excavation in actual or potential ASS areas.

5.2.4 Predicted Outcome

The excavation of ASS and dewatering for the project will be managed in accordance with DEC Guidelines to result in no adverse impacts to the environment.

5.3 Water Management

The EPA water management objectives include:

- Maintain the quantity of water (surface and ground) so that existing and potential environmental values are protected.
- Ensure that the quality of water emissions (surface and ground) do not adversely affect environmental values or the health, welfare and amenity of people and land uses, and meets statutory requirements and acceptable standards.
5.3.1 Relevant Policies, Guidelines and Standards

The key water and nutrient management policies are outlined below.

5.3.1.1 Environmental Protection (Peel Inlet–Harvey Estuary) Policy 1992

The objective of the Environmental Protection (Peel Inlet–Harvey Estuary) Policy 1992 (Peel–Harvey EPP) is to reduce the input of nutrients, particularly phosphorus, into the Peel Inlet–Harvey Estuary System through a number of means including appropriate land management by landowners in the policy area.

5.3.1.2 Statement of Planning Policy 2.1 (Peel–Harvey Coastal Plain Catchment) 2003

The objectives of Statement of Planning Policy (SPP) 2.1 reflect the environmental objectives of the Peel–Harvey EPP and aim to ensure that changes to land use within the catchment are controlled to avoid and minimise environmental damage.

The SPP contains a number of general and specific policy provisions relating to drainage. The policy states that subdivision proposals shall make provision for a drainage system that maximises the consumption and retention of drainage on site. Biological wetland filters or other means of drainage water retention or treatment approved by the EPA are to be incorporated into drainage designs, possibly by amendment of the soils in drainage basins or by the provision of wetland filters with nutrient-retentive soil amendments.

5.3.1.3 Peel–Harvey Water Sensitive Urban Design (WSUD) Local Planning Policy

The Peel–Harvey WSUD Local Planning Policy (Peel Development Commission 2006) was developed through the federal government’s Coastal Catchments Initiative Project and endorsed by the EPA. It aims to assist local government in integrating catchment management objectives with land and resource planning in urban landscapes.

This policy identifies broad objectives against which strategic and statutory proposals can be assessed. WSUD principles in order of priority are provided to:

- Provide protection to life and property from flooding that would occur in a 100-year ARI flood event.

- Manage rainfall events to minimise run-off as high in the catchment as possible. Use multiple low cost “in-system” management measures to reduce run-off volumes and peak flows (for example, maximise infiltration from leaky pipes and stormwater pits installed above pollutant retentive material).

- Retain and restore existing elements of the natural drainage system, including waterway, wetland and groundwater features and processes, and integrate these elements into the urban landscape, possibly through a multiple use corridor.
Minimise pollutant inputs through implementation of appropriate non-structural source controls (such as town planning controls, strategic planning controls, pollution prevention procedures, education and participation programs and regulatory controls) and structural controls (that manage the quantity and quality of stormwater run-off and prevent or treat stormwater pollution).

Maximise water use efficiency, reduce potable water demand, and maximise the reuse of water harvested from impermeable surfaces.

Water quantity management principles and objectives are provided based on post-development discharges being maintained relative to pre-development levels. Criteria are provided for both ecological protection (1 in 1 year events), and flood protection (1 in 100 year events). Water quality management principles and objectives are based on maintaining or improving water quality relative to existing conditions.

Specific water quality guidelines are provided in the document including limitations on developments where average input rates of nutrients exceed 15 kg/phosphorus/ha per annum or 150 kg/nitrogen/ha per annum.

In addition, stormwater management is stated as having to provide (as compared to a development that does not actively manage stormwater quality) at least:

- 80% reduction of total suspended solids
- 60% reduction of total phosphorus
- 45% reduction of total nitrogen
- 70% reduction of gross pollutants.

The policy is consistent with the Decision Process for Stormwater Management in WA (DoE and SRT 2005) which is appended to the policy, and is consistent with the objectives of the Peel–Harvey EPP.

5.3.1.4 Water Quality Improvement Plan for the Rivers and Estuary of the Peel–Harvey System

The development of the Water Quality Improvement Plan (WQIP) for the Rivers and Estuary of the Peel–Harvey System (WQIP) (EPA 2008) is a result of the Commonwealth Government’s Coastal Catchments Initiative (CCI). Seven CCI projects contributed to and assisted in the preparation of the draft WQIP.

These CCI projects were as follows and their reports are included as appendices in the WQIP:

- Decision Support System for Water Quality Protection
- Support System for the Phosphorus Reduction Decisions
- Water Quality Monitoring Program
- Water Sensitive Urban Design
- Regulation/Licensing Review
- Targeted Assistance to Intensive Agricultural Industries
- Stock Exclusion from Catchment Waterways.

The aim of the draft WQIP is to improve water quality by changing land use planning, agricultural and urban practices in order to reduce phosphorus being discharged from the catchment.

The draft WQIP identifies the following:

- current status of phosphorus loads
- identifies the environmental values of water bodies
- the water quality objectives that will protect the environmental values and identifies a set of management measures and control actions to achieve and maintain those environmental values and water quality objectives.

The Water Quality Objectives of the WQIP are:

- median loadings of total phosphorus to estuarine waters should be less than 75 tonnes per annum in an average year
- the median load of total phosphorus flowing in the estuary from the Serpentine River being less than 21 tonnes
- the median load of total phosphorus flowing in the estuary from the Murray River being less than 16 tonnes
- the median load of total phosphorus flowing in the estuary from the Harvey River being less than 38 tonnes.

In order to meet these Water Quality Objectives, the WQIP proposes the following management measures and control actions across the coastal section of the Peel–Harvey Catchment:

1. Use a slow-release, low water soluble fertiliser, applied after the break of season, preferably in spring and at reduced rates, on sandy soils in rural areas.
2. Undertake soil amendment on sandy soils in rural areas.
3. Use low water soluble fertiliser in urban areas.
4. Connect all existing homes to infill sewerage.
5. Zero discharge from licensed agricultural premises.
6. Improve other agricultural practices to reduce phosphorus discharges.


8. Connect to sewerage all homes and properties for new urban developments.

9. Undertake soil remediation in all new urban developments with sandy soils.


11. Incorporate water sensitive urban design in all new developments.

12. Improve the agricultural and urban drainage system.

5.3.2 Potential Impacts

The identified key potential impacts include:

- Groundwater at the site flows towards the Peel Main Drain, which then drains into Folly Pool, which is an environmentally sensitive receptor (Parsons Brinckerhoff 2008). Therefore, impacts to groundwater quality on site may also impact sensitive receptors downstream.

- The use of subsoil drainage to control pre-development groundwater levels may impact the RE wetland within the site.

5.3.3 Environmental Management and Mitigation

5.3.3.1 Overview

A number of management/design measures will be implemented to reduce the impact of the development on groundwater flows, levels or quality, the function and environmental values of the site, or its interconnected areas. Management measures relevant to construction and the residential-living phase are described under the relevant headings below.

5.3.3.2 Urban Water Management

The LWMS been prepared in accordance with East Baldivis DWMS and has been developed with reference to the following guidance documents:

- draft Murray Drainage and Water Management Plan (DoW 2010)
- Serpentine River Floodplain Management Study and Modelling Report (SKM 2010)
- Interim: Developing a Local Water Management Strategy (Department of Water 2008a)
- Better Urban Water Management (WAPC 2008)
- District Water Management Strategy East Baldivis (Parsons Brinkerhoff 2007)
- Western Australian State Water Plan (Government of Western Australia 2007)
- Stormwater Management Manual for Western Australia (Department of Water 2004–2007)

The LWMS details the integrated water management strategies to facilitate future urban water management planning. The LWMS will achieve integrated water management through the following design objectives:

- Effectively manage the risk to human life, property damage and environmental degradation from water contamination, flooding and waterlogging.
- Maintain and if possible improve water quality (surface and groundwater) within the development in relation to pre-development water quality.
- Reduce potable water consumption within both public and private spaces using practical and cost-effective measures.
- Promote infiltration of surface water on site to minimise the risk of further water quality degradation in the Peel Harvey Catchment.
- Implement best management practices in regards to stormwater management.
- Incorporate where possible, low maintenance, cost-effective landscaping and stormwater treatment systems.

5.3.3.3 Stormwater Management

The LWMS has incorporated the following structural Best Management Practices (BMPs) will be used to address water quality for the LSP:

- A conceptual drainage strategy demonstrates that the land is capable of retaining the 100 ARI event while providing an indicative location of stormwater detention.
- Structural and non-structural controls will be used to improve stormwater quality, as compared to a development that does not actively manage stormwater.

- Rainfall from 1 year ARI events will be retained and infiltrated as close to the source as possible.

- All residential lots will confine run-off from roofs and paving within the property boundary.

- Large rainfall events (10 ARI to 100 ARI) will be conveyed and retained through a network of roads, drainage reserves and POS within each catchment.

- It is anticipated that there will be no impacts from stormwater run-off to downstream ecosystems.

5.3.4 Predicted Outcome

It is expected that development of the site will have a positive impact on groundwater quality through BMPs and the treatment of stormwater prior to infiltration as discussed below:

- The stormwater structural controls will improve infiltrating stormwater water quality through reducing water velocities, biological uptake and increasing infiltration areas.

- Water quality will be improved through minimising and controlling the levels of fertilisers and pesticides applied to the site through appropriate plant selection and operation and maintenance.

The management of stormwater and nutrients is in accordance with State Planning Policy No. 2.1: Peel Harvey Coastal Plain Catchment, WQIP for the Rivers and Estuary of the Peel–Harvey System – Phosphorus Management and Better Urban Water Management practices. Based on the investigations undertaken and the management measures proposed, it is not expected that any changes to groundwater flows, levels or quality will have an adverse impact on the function and environmental values of the site.

5.4 Flora and Vegetation

The EPA flora and vegetation objective is to maintain the abundance, diversity, geographic distribution and productivity of flora at the species and ecosystem levels through the avoidance or management of adverse impacts and through improvement in knowledge.
5.4.1 Applicable Policies, Guidelines and Standards

EPA Position Statement No. 2: Environmental Protection of Native Vegetation in Western Australia provides an overview of the EPA position on the clearing of native vegetation in Western Australia.

City of Rockingham Planning Policy 7.2 – Local Bushland Strategy.

5.4.2 Potential Impacts

The site’s historical use for agriculture and grazing has completely degraded the vegetation on site and reduced the native vegetation cover to minimal areas containing scattered trees including those located along fence lines, with no or very limited native understorey. The Melaleucas within the RE wetland are being maintained and protected and will therefore not be impacted.

Consequently, it is anticipated that the proposed development would have very little impact on native vegetation.

5.4.3 Environmental Management and Mitigation

The following management measures have been developed and incorporated into the LSP to reduce the likelihood of impacts to vegetation and flora. These measures have been developed with the aim of retaining the key existing biological values of the LSP site:

- Potential retention trees within areas of POS have been identified. The retention of the trees will be subject to detailed engineering design at subdivision.

- A tree survey of the mature trees across the site will be undertaken at the subdivision stage.

- Within the RE wetland, the LSP has kept approximately 30 melaleuca trees in the POS.

5.4.4 Predicted Outcome

The proposal is very unlikely to have any impact on flora or vegetation due to the lack of native vegetation within the site. Any potential impacts will be reduced through the following:

- Retention and replanting of areas of POS and within the Tramway Reserve will be undertaken, in accordance with the City of Rockingham’s objectives for this area. This will be detailed in a future Landscape Plan.

- Wetland Management Plan will be finalised for the RE wetland. The re-vegetation of the RE wetland and its buffer will be detailed in the Wetland Management Plan.
5.5 **Fauna**

The EPA fauna objective is to maintain the abundance, diversity, geographic distribution and productivity of native fauna at the species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.

5.5.1 **Applicable Policies, Guidelines and Standards**

For the LSP site, the key EPA policies and guidelines relating to the identification and management of potential impacts on fauna are:

- EPBC Act 1999
- Guidance Statement No 33: Environmental Guidance for Planning and Development
- City of Rockingham Planning Policy 7.2 – Local Bushland Strategy.

5.5.2 **Potential Impact**

Disturbance to waterbirds using the RE wetland habitat during the construction phase.

Clearing of vegetation at the site may result in a reduction in available fauna habitat.

However, noting the majority of the site has been historically cleared and as a result, fauna habitat has largely been removed. The only potentially significant fauna habitat on site is:

- There is 0.15 ha of potential and poor quality foraging habitat within the site for black cockatoos. There are no roosting or breeding habitats.
- The RE wetland provides foraging and roosting habitat to waterbird species.

5.5.3 **Environmental Management and Mitigation**

The following management measures have been developed and incorporated into the LSP to reduce the likelihood of impacts to native fauna:

- Regional fauna corridors will be retained through the Tramway Reserve.
- The RE wetland will be retained and revegetated and provide potential habitat to waterbirds.
- Wetland Management Plan will be finalised for the RE wetland. The revegetation of the RE wetland and its buffer will be detailed in the Wetland Management Plan.
5.5.4 Predicted Outcome

The proposal may result in a very minor disturbance at a local scale, which is likely to impact on individual animals, e.g. transient avifauna (given the historically cleared nature of the LSP site) rather than a population.

The only significant habitat on the site consists of waterbird habitat within the RE wetland. The RE wetland and buffer has been protected within the LSP.

5.6 Site Contamination

The EPA objective is to ensure previous land uses within and surrounding the site, do not impact on proposed development of the site.

5.6.1 Applicable Policies, Guidelines and Standards

The applicable Contaminated Sites policies and standards include:

- Contaminated Sites Act 2003
- assessment levels for soil, sediment and water
- DER guidance on managing Acid Sulfate Soils (DEC 2009).

5.6.2 Potential Impact

The PSI that has previously been undertaken across the site identified that the majority of the site has been used for grazing and agricultural purposes and there is little likelihood of any potential contamination.

5.6.3 Environmental Management and Mitigation

The PSI shows the site is largely free from significant contamination and is suitable for residential development. Prior to the subdivision however, a contamination assessment in accordance with Contaminated Sites Act 2003 may be required on Lot 460 to confirm the absence of contamination to the satisfaction of the DER.

5.7 Potential Land Use Conflicts

Nearby land uses have the potential to impact on proposed development of the site. The site is in close proximity to industries that have been identified as having the potential to cause conflict between the land use and sensitive land uses such as residential developments.

The key surrounding land uses which has the potential to influence the LSP site includes (Figure 5):
1. Extractive industries in the local area.
2. Kwinana Freeway.

These land uses are discussed in further detail below.

### 5.7.1 Extractive Industries

The following extractive industries are within approximately 1 km of the site:

- Clay Quarry – Lot 1 Mundijong Road
- Sand Quarry – Lot 1355 Baldivis Road
- Limestone and Sand Quarry – Lot 800 Kerosene Lane and Lot 2170 Millar Road.

EPA Guidance Statement No. 3 Separation Distances between Industrial and Sensitive Land Uses (EPA 2005) provides generic separation distances. Site-specific studies are only required if a reduction of the buffer is required. The generic distance is not intended to be absolute separation distance; rather they are a default distance for the purposes of:

- identifying the need for specific separation distance or buffer definition studies
- providing general guidance on separation distances in the absence of site-specific technical studies (EPA 2005).

The generic buffer distances for the surrounding land uses that may influence the development of the site and the distance from the site are outlined in Table 3.

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Distance from Site</th>
<th>Recommended Generic Buffer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clay Quarry (Lot 1)</td>
<td>149 m</td>
<td>500–1000 m depending on size and processing</td>
</tr>
<tr>
<td>Sand Quarry (Lot 1355) – active quarry area</td>
<td>304 m</td>
<td>300–500 m</td>
</tr>
<tr>
<td>Limestone Quarry (Lot 800) – active quarry area</td>
<td>910 m</td>
<td>300–500 m</td>
</tr>
<tr>
<td>Sand Quarry (Lot 2170)</td>
<td>455 m</td>
<td>300–500 m</td>
</tr>
</tbody>
</table>

Further context to the nearby extractive industries and the implications for the LSP are outlined below.

#### 5.7.1.1 Clay Quarry

Clay excavation is currently undertaken at Lot 1 Mundijong Road by the City of Rockingham for lining landfill cells.
Communications with the City of Rockingham indicates that clay extraction from Lot 1 is unlikely to be frequent (if at all) due to the new regulations and specifications on landfill cell construction which have led to replacing clay linings with plastic linings. However, if extraction is undertaken, the City of Rockingham has confirmed that this will not impact on proposed development due to the following points (Appendix 4):

- Due to the moisture content of the clay, the City of Rockingham has never had any dust issues and therefore it is highly unlikely that dust from activities at Lot 1 would impact the site.

- Noise levels from extraction activities on Lot 1 would be indistinguishable from noise produced by the adjacent freeway.

- Noise barriers will be constructed between the development and freeway that will reduce any potential noise disturbance from the clay quarry.

The quarry is located approximately 149 m from the site. The Kwinana Freeway separates the site from the clay quarry.

5.7.1.2 Sand Quarry

The sand quarry is located within Lot 1355 Baldivis Road and is separated from the site by the Tramway Reserve and Baldivis Road (Figure 5). Sand extraction at the site is currently undertaken under a City of Rockingham licence, with operation house occurring between Monday and Saturday, from 8.30 am to 5.00 pm.

The sand quarry is located (at the closest point) approximately 95 m from the site. However, due to the exhaustion of sand resources on Lot 1355, sand extraction activities are only being undertaken on a small portion of the site as indication in Figure 5. The active sand extraction area is focused in the north-western portion of Lot 1355, which is approximately 304 m from the site boundary at the closest point.

Consequently, active sand extraction activities are over the EPAs generic buffer of 300 m and therefore unlikely to impact the proposed development. Any potential impacts due to sand extraction activities will be further minimised to best practice activities undertaken on the site (consistent with their extractive industry licensing requirement) to manage dust within the site boundary through implementing management measures such as the use of a water cart.

Additionally, the Lot 1355 landowner, Metropolitan Cemeteries Board (MCB) has confirmed they will have exhausted the sand resource within approximately the next two years (or late 2015) (Appendix 2). The final build out of housing and residents living in the LSP site is not going to occur within the next two years. In conclusion, the sand extraction activities are unlikely to impact the LSP, subdivision and future residential development.
5.7.1.3 Limestone and Sand Quarry

WA Limestone has a lease agreement with the City of Rockingham for Lot 800 Kerosene Lane and Lot 2170 Millar Road. Lot 800 Kerosene Lane is a limestone quarry located in the centre of Lot 800 and has a 50 m vegetated buffer along the southern border of Lot 800.

The limestone quarry is located approximately 910 m from the site at the closest point.

The sand quarry is at eastern end of Lot 2170 and is located (at the closest point) approximately 455 m from the site. A cemetery, vegetated buffer in privately owned lots, Baldivis Road and the Tramway Reserve separate the site from the WA Limestone sand abstraction works.

5.7.2 Kwinana Freeway

The EPA in its assessment of the proposed MRS amendment for the East Baldivis area identified noise impacts from the adjacent Kwinana Freeway as a potential constraint to future development of the site.

A Transportation Noise Assessment was undertaken for the North Baldivis LSP in 2015 by Lloyd George Acoustics Pty Ltd. As part of this assessment, noise monitoring was undertaken near the Kwinana Freeway to quantify existing noise levels and to assist in calibrating a noise model for the site. Based on the noise monitoring and modelling undertaken as part of the noise assessment, the below was recommended:

- A solid noise wall with a height of 2.4 to 2.7m will be required to ensure minimal impacts to future residents. This noise wall will be refined as part of future more detailed design processes.

- As part of more detailed design processes, it is recommended that lots are identified which may require further noise treatments. Details of these treatments are provided in the Transportation Noise Assessment report.

- Any affected lots should have notifications on the titles.

5.7.2.1 Environmental Management and Mitigation

LSP design has accommodated the following noise management measures (for the first row of houses within the development adjacent to the freeway only):

- construction of a noise wall or other mitigation measures e.g. bund along the length of the LSP site adjacent to the freeway.

Subdivision controls include:
- implementation of a “Quiet House” design for those houses adjacent to the freeway

- Notifications on Title are placed on those houses located adjacent to the freeway regarding likely vehicle noise.

### 5.8 Fire

#### 5.8.1 Environmental Objectives

To reduce the risk of bushfire to people, property and infrastructure.

#### 5.8.2 Policy and Standards

Draft SPP 3.7: Planning for Bushfire Risk Management (WAPC 2014).

#### 5.8.3 Potential Impacts

The implementation of the LSP will result in an increased risk to people, property and infrastructure being impacted by potential bushfires in the Tramway Reserve.

#### 5.8.4 Management Response

In accordance with WAPC Draft SPP 3.7, a Fire Management Plan has been prepared for the areas within 100 m of the Bushfire Prone Area as identified by the City of Rockingham.

#### 5.8.5 Predicted Outcome

The proposed development will have the appropriate level of bushfire protection, relative to the surrounding land use context, to manage the risk to people, property and infrastructure posed by bushfire.
6.0 MANAGEMENT COMMITMENTS AND CONCLUSIONS

Table 1 in the executive summary details the key environmental issues and the proposed management commitments. These include:

- wetlands
- noise
- ASS
- water management
- vegetation and flora
- potential land use conflict
- site contamination
- fire management.

The proposed LSP recognises the importance of the key environmental and landscape attributes of the area, and incorporates these in an urban form, that creates an environmentally responsive urban development that meets the EPA and City of Rockingham’s environmental requirements. Consequently, the environmental outcomes of the proposed LSP are considerable and include:

- providing an improvement in groundwater and surface water quality through residential development and implementation of water sensitive urban design and best stormwater drainage management practices
- landscaping and enhancing the existing vegetation within the Tramway Reserve
- incorporation of the RE wetland (UFI 15410) located on Lot 462 within the LSP to protect the environmental attributes of the wetland. A Wetland Management Plan will be undertaken and include (but not be limited to the following)
  - interface treatments between the wetland and proposed development and any POS areas
  - proposed rehabilitation/revegetation of the main RE wetland area
  - best practice water management
- implementation of management measures to reduce potential noise impacts from the adjacent freeway and Mundijong Road on future residences
- potential retention trees have been identified in areas of POS (Figure A). These trees will be incorporated into the detailed engineering design which occurs at the subdivision stage
- limiting access points through the tramway reserve to the subdivision to prevent adverse impacts particularly for transient fauna.
This page is intentionally blank.
7.0 REFERENCES

Cardno BSD. 2006. Lot 3 Folly Road and Lot 921 and Lot 922 Baldivis Road, Baldivis; Metropolitan Region Scheme Rezoning Environmental Review. Report Prepared for Watson Property Group Investments Ltd.

Cardno BSD. 2006. Metropolitan Region Scheme Rezoning Environmental Review; Lot 3 Folly Road and Lot 921 and Lot 922 Baldivis Road, Baldivis. Report prepared for Watson Property Group Investments Ltd and Watson Property Group Baldivis Ltd.


Coffey Geosciences Pty Ltd. 2006. Residential Subdivision; Baldivis Gardens Private Estate; Lots 921, 922 Baldivis Road and Lot 3 Folly Road, East Baldivis; Geotechnical Investigation. Report prepared for Watson Property Group.


Douglas Partners. 2008c. Report on Geotechnical and Preliminary Acid Sulfate Soil Investigation; Proposed Residential Subdivision; Zig Zag Road, Baldivis, WA. Report prepared for OSWAL Developments Pty Ltd.

Environmental Protection Authority. 2005. Guidance for the Assessment of Environmental Factors (in accordance with the Environmental Protection Act 1986); Separation Distances between Industrial and Sensitive Land Uses; No. 3. Environmental Protection Authority, Perth, Western Australia.


Lloyd George Acoustics. 2015. Transportation Noise Assessment; North Baldivis Local Structure Plan – North of Mundijong Road.


1. Further investigation of the Resource Enhancement Wetland & Buffers to be undertaken as part of the preparation of Local Structure Plans.
2. Further investigation of the Noise Attenuation along Mundijong Road to be undertaken as part of the preparation of Local Structure Plans.
3. Further investigation of the Damper to Sunbury pipeline buffer to be undertaken as part of the preparation of Local Structure Plans.
4. Bush Fire Strategy shall be prepared as part of the preparation of Local Structure Plans.
**LEGEND**

- **Site Boundary**
- **Cadastre**

**Environmental Geology**

- **C2** - CLAY - strong brown and dark grey clay, plastic in places, soft when wet, variable silt content in matrix, of alluvial origin
- **Cps** - PEATY CLAY - dark grey and black, soft, variable organic content, some quartz sand in places, of lacustrine origin
- **LS1** - LIMESTONE - pale yellowish brown, fine to coarse-grained, sub-angular to well rounded, quartz, trace of feldspar, shell debris, variably lithified, surface kankar, of eolian origin
- **M4** - SILT - very pale brown silt, soft when moist, firm when dry, low clay content, of alluvial origin
- **Ms5** - SANDY SILT - dark brownish grey silt, with disseminated fine-grained quartz sand, firm, variable clay content, of lacustrine origin
- **S10** - SAND - as S8 as relatively thin veneer over C2, M4 and Mc2
- **S7** - SAND - pale yellowish brown, medium to coarse-grained, sub-angular to well-rounded quartz, trace of feldspar, shell debris, variably lithified, surface kankar, of eolian origin
- **S8** - SAND - very light grey at surface, yellow at depth, fine to medium-grained, sub-rounded quartz, moderately well sorted, of eolian origin as relatively thin veneer over C2, M4 and Mc2

---

Figure 6

Geology

GDA 1994 MGA Zone 50

Job Number: L1309901
Doc Number: 017
Date: 17.11.14
Source: Orthophoto, Cadastre - Landgate, 2013, Geology - DiOR, 1999

Scale: 1:15,000 @ A3

Station Street, Subiaco | T +61 8 92111111 | F +61 8 92111122 | www.rpsgroup.com.au

---

38 Station Street, Subiaco | T +61 8 92111111 | F +61 8 92111122 | www.rpsgroup.com.au
LEGEND
- Site Boundary
- Cadastre
- Vegetation Condition
- D-CD - Degraded to Completely Degraded
- CD - Completely Degraded

Figure 11
Vegetation Condition

GDA 1994 HGA Zone 50

38 Station Street, Subiaco | T +61 8 92111111 | F +61 8 92111122 | www.rpsgroup.com.au

Job Number: L1309901
Doc Number: 022
Date: 17.11.14
Created by: MR
Source: Orthophoto, Cadastre - Landgate 2013, Veg Units - RPS 2013
Scale: 1:5,000 @ A3
APPENDIX I

EPA Assessment of MRS Amendment No. 1127/41, 1128/41 and 1129/41 – East Baldivis and TPS Amendment No. 122
Environmental Protection Authority

Director General
Department for Planning & Infrastructure
469-469 Wellington Street
PERTH WA 6000

Our Ref CRN220595
Enquiries Glen McLeod-Thorpe

SCHEME AMENDMENT TITLE: MRS Amendment 1127/41 Baldivis Urban Area Expansion - Area 1
SCHEME AMENDMENT LOCATION: Lots 3 & 4 Zig Zag Road; 459-463, 510-513, 520, 521 & 709 Baldivis Road; 515-518 Sabrina Road and 447 Telephone Lane
LOCALLY: Baldivis
RESPONSIBLE AUTHORITY: Western Australian Planning Commission
LEVEL OF ASSESSMENT: Scheme Amendment Not Assessed - Advice Given Under Section 48a(1)(A) (no appeals)

The above scheme amendment has been referred to the Environmental Protection Authority (EPA) for assessment.

Please find enclosed a copy of the EPA's letter to the Western Australian Planning Commission dated 23 October 2006 for your information and records.

[Signature]
W H Tacey
A/Director
Environmental Impact Assessment
23 October 2006
Enc.
SCHEME AMENDMENT TITLE: MRS Amendment 1127/41 Baldivis Urban Area Expansion - Area 1

SCHEME AMENDMENT LOCATION: Lots 3 & 4 Zig Zag Road; 459-463, 510-513, 520, 521 & 709 Baldivis Road; 515-518 Sabrina Road and 447 Telephone Lane

LOCALITY: Baldivis

RESPONSIBLE AUTHORITY: Western Australian Planning Commission

LEVEL OF ASSESSMENT: Scheme Amendment Not Assessed - Advice Given Under Section 48a(1)(A) (no appeals)

Thank you for your letter of 26 September 2006 referring the above proposed scheme amendment.

After consideration of the information provided by you, the Environmental Protection Authority (EPA) considers that the proposed scheme amendment should not be assessed under Part IV Division 3 of the Environmental Protection Act 1986 (EP Act) but nevertheless provides the following advice and recommendations.

ADVICE AND RECOMMENDATIONS

1. Environmental Issues

   - Wetlands
   - Acid Sulfate Soils
   - Water Management
   - Vegetation and Flora
   - Noise
   - Potential Land Use Conflict
   - Site Contamination
   - High Pressure Natural Gas Pipeline

2. Advice and recommendations regarding Environmental Issues

Wetlands
The majority of the subject site is identified as a Multiple Use wetland on the Department of Environment and Conservation's (DEC) Geomorphic Wetlands Swan Coastal Plain dataset. To the far north of the site and in the central portion of the site (Lot 462 Baldivis Road) are a number of wetlands identified as Resource Enhancement on the DEC's Geomorphic Wetlands Swan Coastal Plain dataset. Whilst no structure plan has been included in this referral, it is understood that the Resource Enhancement Wetlands on site are to be retained within areas of public open space. This is supported and it is expected that mechanisms for protecting these wetlands and their buffers will be identified as part of the further structure planning and rezoning process. Buffers should be identified using a methodology acceptable to both the DEC and Department for Planning and Infrastructure (DPI), for example the DPI's Guideline for the Determination of...
Wetland Buffer Requirements, and it is recommended that a management plan be developed and implemented for the wetlands on site.

Acid Sulfate Soils
According to the Western Australian Planning Commission’s (WAPC) Planning Bulletin No. 64 – Acid Sulfate Soils the subject land is mapped as having a moderate to low risk of Actual Acid Sulfate Soils and Potential Acid Sulfate Soils at depths greater than 3 metres. Regardless of the generic mapping provided, please note that investigation of local site characteristics is needed, and if these lead to the view that there is a risk of disturbing acid sulfate soils, then more detailed site investigations and management in accordance with Planning Bulletin No. 64 and the DEC’s Acid Sulfate Soils Management Series are appropriate.

Water Management
The subject land is within the Peel-Harvey catchment and therefore the provisions of the Environmental Protection (Peel Inlet-Harvey Estuary) Policy 1992 and the Statement of Planning Policy No 2.1 - The Peel-Harvey Coastal Plain Catchment shall apply. It is also recommended that stormwater management should be consistent with the DEC’s Stormwater Management Manual for Western Australia.

Water management is an important issue for the locality, and the broader Peel-Harvey catchment, and the subject site contains areas of low lying land. It is recommended that site planners keep abreast of the initiatives to protect water quality in the Peel-Harvey catchment and the urban water management framework being developed for the Perth metropolitan area. The next stages of planning should be accompanied by water management plans/strategies based on adequate site monitoring and modelling consistent with the urban water management framework and advice of the DEC. In particular, it is expected that there will be negligible nutrient export. There is also an expectation that the site can be serviced by reticulated sewer.

Vegetation and Flora
Aerial photography of the site indicates the subject land is sparsely vegetated. The proponent has previously advised that existing vegetation of good condition will be retained where possible. As discussed, the subject land is located within the Peel Harvey Catchment where remaining areas of native vegetation are very important for protecting water quality and biodiversity. Under the provisions of the Statement of Planning Policy No 2.1 - The Peel-Harvey Coastal Plain Catchment, the proponent is encouraged to retain all areas of native vegetation and to protect them from further degradation.

All native vegetation should be preserved so far as practicable during and after clearing for site works and services to accommodate the proposed subsequent urban development. Measures should be taken to ensure the identification, protection and management of any significant vegetation on site worthy of retention prior to the commencement of site works.

Noise
The subject site abuts the Kwinana Freeway and future noise-sensitive land uses may be subject to excessive noise levels. Noise issues should be addressed at the subsequent stages of planning through compliance with the WAPC’s Draft Statement of Planning Policy Road and Rail Transport Noise and Draft Statement of Planning Policy Metropolitan Freight Network.

It is also expected that appropriate studies be carried out to determine noise insulation requirement within future mixed use zones or residential zones adjacent to commercial and/or transport nodes. It should be noted that the accepted methodology for prediction of noise impacts and attenuation due to noise barriers is currently under review by Main Roads WA, and studies should be carried out in accordance with their new guidelines expected to be issued in 2006.

Potential Land Use Conflict
It is noted that the site is located in close proximity to several potentially conflicting land uses such as sand quarries, horse stables, a crematoria and poultry farms. It is considered that the resolution of potential land use conflicts is a key planning issue that planning authorities are best positioned to resolve, having regard for local planning directions and knowledge and the results of accredited technical studies, on advice from appropriate government agencies. In the absence of site specific technical studies, the Environmental Protection Authority’s (EPA) Guidance Statement No. 3 Separation Distances Between Industrial and Sensitive Land Uses should be utilised as a guide for generic separation distances.

Site Contamination
A previously submitted report regarding the subject land indicates that there may be a possibility of soil and/or groundwater contamination as a result of historical land use. As noted in the report,
a Preliminary Site Investigation (PSI) should be carried out prior to detailed planning. If as a result of the site investigation the site is found to be contaminated, a Site Remediation and Validation Report is to be produced in consultation with the DEC.

Preliminary and detailed site investigation and subsequent management plans should be prepared and implemented in accordance with the DEC's *Contaminated Sites Management Series* and to the satisfaction of the DEC's Land and Water Quality Branch.

**High Pressure Natural Gas Pipeline**

The Dampier to Bunbury high pressure natural gas pipeline traverses the subject land. Detailed risk assessment and planning should be undertaken in consultation with the Department of Consumer and Employment Protection, who is the lead agency for the consideration of public risk.

3. **General Advice**

- For the purposes of Part IV of the EP Act, the scheme amendment is defined as an assessed scheme amendment. In relation to the implementation of the scheme amendment, please note the requirements of Part IV Division 4 of the EP Act.
- There is no appeal right in respect of the EPA's decision on the level of assessment of scheme amendments.
- A copy of this advice will be sent to the relevant authorities and will be available to the public on request.

W H Tacey  
AV/Director  
Environmental Impact Assessment

23 October 2006

cc: Department for Planning & Infrastructure
Baldivis (East) - South of Zig Zag Road
as advertised

12 September 2006

Proposed:

Legend

urban zone
Dear [Name],

I am writing to inform you about the scheme amendment referred to the Environmental Protection Authority (EPA) for assessment.

The above scheme amendment has been referred to the EPA for assessment.

Please find enclosed a copy of the EPA’s letter to the Western Australian Planning Commission dated 23 October 2006 for your information and records.

Sincerely,

W H Tacey
A/Director
Environmental Impact Assessment

23 October 2006

Enc.
Thank you for your letter of 26 September 2006 referring to the above proposed scheme amendment.

After consideration of the information provided by you, the Environmental Protection Authority (EPA) considers that the proposed scheme amendment should not be assessed under Part IV Division 3 of the Environmental Protection Act 1986 (EP Act) but nevertheless provides the following advice and recommendations.

**ADVICE AND RECOMMENDATIONS**

1. **Environmental Issues**
   - Noise
   - Acid Sulfate Soils
   - Water Management
   - Vegetation and Fora
   - Potential Land Use Conflict
   - Site Contamination
   - High Pressure Natural Gas Pipeline

2. **Advice and recommendations regarding Environmental Issues**

**Noise**

The subject site abuts the Kwinana Freeway and future noise-sensitive land uses may be subject to excessive noise levels. Noise issues should be addressed at the subsequent stages of planning through compliance with the WAPC’s Draft Statement of Planning Policy Road and Rail Transport Noise and Draft Statement of Planning Policy Metropolitan Freight Network.

It is also expected that appropriate studies be carried out to determine noise insulation requirements within future mixed use zones or residential zones adjacent to commercial and/or transport nodes. It should be noted that the accepted methodology for prediction of noise impacts and attenuation due to noise barriers is currently under review by Main Roads WA, and studies should be carried out in accordance with their new guidelines expected to be issued in 2006.
Acid Sulfate Soils
According to the Western Australian Planning Commission's (WAPC) Planning Bulletin No. 64 – Acid Sulfate Soils the subject land is mapped as having a moderate to low risk of Actual Acid Sulfate Soils and Potential Acid Sulfate Soils at depths greater than 3 metres. Regardless of the generic mapping provided, please note that investigation of local site characteristics is needed, and if these lead to the view that there is a risk of disturbing acid sulfate soils, then more detailed site investigations and management in accordance with Planning Bulletin No. 64 and the DEC’s Acid Sulfate Soils Management Series are appropriate.

Water Management
A large portion of the subject site is identified as a Multiple Use wetland on the DEC’s Geomorphic Wetlands Swan Coastal Plain dataset and is relatively low-lying and subject to seasonal inundation.

The subject land is within the Peel-Harvey catchment and the provisions of the Environmental Protection (Peel Inlet-Harvey Estuary) Policy 1992 and the Statement of Planning Policy No 2.1 - The Peel-Harvey Coastal Plain Catchment shall apply. Careful management of stormwater, nutrients, other contaminants and retention of native vegetation is expected consistent with these policies. There shall not be any direct stormwater discharge into any rural drains or wetlands. Stormwater management should be consistent with the DEC’s Stormwater Management Manual for Western Australia.

Water management is an important issue for the locality, and the broader Peel-Harvey catchment, and the subject site contains areas of low lying land. It is recommended that site planners keep abreast of the initiatives to protect water quality in the Peel-Harvey catchment and the urban water management framework being developed for the Perth metropolitan area. The next stages of planning should be accompanied by water management plans/strategies based on adequate site monitoring and modelling consistent with the urban water management framework and advice of the DEC. In particular, it is expected that there will be negligible nutrient export. There is also an expectation that the site can be serviced by reticulated sewer.

Vegetation and Flora
Aerial photography of the site indicates the subject land is sparsely vegetated. Existing vegetation, including mature trees, of good condition should be retained within the proposed development where possible. As discussed, the subject land is located within the Peel Harvey Catchment where remaining areas of native vegetation are very important for protecting water quality and biodiversity. Under the provisions of the Statement of Planning Policy No 2.1 - The Peel-Harvey Coastal Plain Catchment, the proponent is encouraged to retain all areas of native vegetation and to protect them from further degradation.

All native vegetation should be preserved so far as practicable during and after clearing for site works and services to accommodate the proposed subsequent urban development. Measures should be taken to ensure the identification, protection and management of any significant vegetation on site worthy of retention prior to the commencement of site works. It is noted that the proponent proposes to maintain existing hollow-bearing trees as potential habitat for the Carnaby’s Black Cockatoo.

Potential Land Use Conflict
It is noted that the site is located in close proximity to several potentially conflicting land uses including a poultry farm and nursery. It is considered that the resolution of potential land use conflicts is a key planning issue that planning authorities are best positioned to resolve, having regard for local planning directions and knowledge and the results of accredited technical studies, on advice from appropriate government agencies. In the absence of site specific technical studies, the EPA’s Guidance Statement No. 3 Separation Distances Between Industrial and Sensitive Land Uses should be utilised as a guide for generic separation distances.

It is noted that the subject site is located within the generic separation distances for both the poultry farm and the nursery. With regard to managing potential adverse impacts from the poultry farm, the WAPC’s Statement of Planning Policy No 4.3 – Poultry Farms Policy should be utilised. Assumptions regarding the size and intended operations of the poultry farm should not be relied upon however, and an assessment should be carried out to demonstrate that any potential impacts can be managed. It is considered that any potential impacts from the nursery can be adequately managed and addressed at the next stages of planning.

Site Contamination
A previously submitted report regarding the subject land indicates that there may be a possibility of soil and/or groundwater contamination as a result of historical land use. It is noted that
a Preliminary Site Investigation (PSI) has been carried out which indicates that samples from the site contain zinc at concentrations greater than the environmental investigation levels and petroleum hydrocarbons at a concentration greater than the human health investigation levels. Accordingly, the proponent should be advised to liaise with the DEC’s Land and Water Quality Branch and a Site Remediation and Validation Report should be produced in consultation with the DEC’s Land and Water Quality Branch.

Preliminary and detailed site investigation and subsequent management plans should be prepared and implemented in accordance with the DEC’s Contaminated Sites Management Series and to the satisfaction of the DEC’s Land and Water Quality Branch.

High Pressure Natural Gas Pipeline
It is noted that the Dampier to Bunbury high pressure natural gas pipeline is located in close proximity to the subject land. Further advice should be sought from the Department of Consumer and Employment Protection, who is the lead agency for the consideration of public risk.

3. General Advice

- For the purposes of Part IV of the EP Act, the scheme amendment is defined as an assessed scheme amendment. In relation to the implementation of the scheme amendment, please note the requirements of Part IV Division 4 of the EP Act.
- There is no appeal right in respect of the EPA’s decision on the level of assessment of scheme amendments.
- A copy of this advice will be sent to the relevant authorities and will be available to the public on request.

Yours faithfully

[Signature]

W. Tacey
A/Director
Environmental Impact Assessment

23 October 2006

cc: Department for Planning & Infrastructure
Baldivis (East) - Lots 3 and 10 Folly Road

12 September 2006

as advertised

Figure 1

Proposed:

Legend

urban zone

Base information supplied by DAFA 13-2003
Director General  
Department for Planning & Infrastructure  
469-489 Wellington Street  
PERTH WA 6000

Our Ref CRN220604  
Enquiries Glen McLeod-Thorpe

SCHEME AMENDMENT TITLE: MRS Amendment 1129/41Baldivis Urban Area Expansion - Area 3  
SCHEME AMENDMENT LOCATION: Lot 3 Folly Road and Lot 10 Baldivis Road  
LOCALITY: Baldivis  
RESPONSIBLE AUTHORITY: Western Australian Planning Commission  
LEVEL OF ASSESSMENT: Scheme Amendment Not Assessed - Advice Given Under Section 48a(1)(A) (no appeals)

The above scheme amendment has been referred to the Environmental Protection Authority (EPA) for assessment.

Please find enclosed a copy of the EPA's letter to the Western Australian Planning Commission dated 23 October 2006 for your information and records.

W H Tacey  
A/Director  
Environmental Impact Assessment

23 October 2006  
Enc.
Secretary
Western Australian Planning Commission
469 Wellington Street
PERTH WA 6000

Our Ref CRN220604
Enquiries Glen McLeod-Thorpe

SCHEME AMENDMENT TITLE: MRS Amendment 1129/41 Baldivis Urban Area Expansion - Area 3
SCHEME AMENDMENT LOCATION: Lot 3 Folly Road and Lot 10 Baldivis Road
LOCALITY: Baldivis
RESPONSIBLE AUTHORITY: Western Australian Planning Commission
LEVEL OF ASSESSMENT: Scheme Amendment Not Assessed - Advice Given Under Section 48a(1)(A) (no appeals)

Thank you for your letter of 26 September 2006 referring the above proposed scheme amendment.

After consideration of the information provided by you, the Environmental Protection Authority (EPA) considers that the proposed scheme amendment should not be assessed under Part IV Division 3 of the Environmental Protection Act 1986 (EP Act) but nevertheless provides the following advice and recommendations.

ADVICE AND RECOMMENDATIONS

1. Environmental Issues
   - Noise
   - Acid Sulfate Soils
   - Water Management
   - Vegetation and Flora
   - Site Contamination

2. Advice and recommendations regarding Environmental Issues
   
   **Noise**
   The subject site abuts the Kwinana Freeway and future noise-sensitive land uses may be subject to excessive noise levels. Noise issues should be addressed at the subsequent stages of planning through compliance with the WAPC's Draft Statement of Planning Policy Road and Rail Transport Noise and Draft Statement of Planning Policy Metropolitan Freight Network.

   It is also expected that appropriate studies be carried out to determine noise insulation requirement within future mixed use zones or residential zones adjacent to commercial and/or transport nodes. It should be noted that the accepted methodology for prediction of noise impacts and attenuation due to noise barriers is currently under review by Main Roads WA, and studies should be carried out in accordance with their new guidelines expected to be issued in 2006.

   **Acid Sulfate Soils**
   According to the Western Australian Planning Commission's (WAPC) Planning Bulletin No. 64 - Acid Sulfate Soils the subject land is mapped as having a moderate to low risk of Actual Acid Sulfate Soils and Potential Acid Sulfate Soils at depths greater than 3 metres. Regardless of the generic mapping provided, please note that investigation of local site characteristics is needed, and if these lead to the view that there is a risk of disturbing acid sulfate soils, then more detailed
site investigations and management in accordance with Planning Bulletin No. 64 and the DEC’s Acid Sulfate Soils Management Series are appropriate.

Water Management
The subject land is within the Peel-Harvey catchment and the provisions of the Environmental Protection (Peel Inlet-Harvey Estuary) Policy 1992 and the Statement of Planning Policy No 2.1 - The Peel-Harvey Coastal Plain Catchment shall apply. Careful management of stormwater, nutrients, other contaminants and retention of native vegetation is expected consistent with these policies. There shall not be any direct stormwater discharge into any rural drains or wetlands. Stormwater management should be consistent with the DEC’s Stormwater Management Manual for Western Australia.

Water management is an important issue for the locality, and the broader Peel-Harvey catchment, and the subject site contains areas of low lying land. It is recommended that site planners keep abreast of the initiatives to protect water quality in the Peel-Harvey catchment and the urban water management framework being developed for the Perth metropolitan area. The next stages of planning should be accompanied by water management plans/strategies based on adequate site monitoring and modelling consistent with the urban water management framework and advice of the DEC. In particular, it is expected that there will be negligible nutrient export. There is also an expectation that the site can be serviced by reticulated sewer.

Vegetation and Flora
Aerial photography of the site indicates the subject land is sparsely vegetated. Existing vegetation, including mature trees, of good condition should be retained within the proposed development where possible. As discussed, the subject land is located within the Peel Harvey Catchment where remaining areas of native vegetation are very important for protecting water quality and biodiversity. Under the provisions of the Statement of Planning Policy No 2.1 - The Peel-Harvey Coastal Plain Catchment, the proponent is encouraged to retain all areas of native vegetation and to protect them from further degradation.

All native vegetation should be preserved so far as practicable during and after clearing for site works and services to accommodate the proposed subsequent urban development. Measures should be taken to ensure the identification, protection and management of any significant vegetation on site worthy of retention prior to the commencement of site works.

Site Contamination
A previously submitted report regarding the subject land indicates that there may be a possibility of soil and/or groundwater contamination as a result of historical land use. It is noted that a Preliminary Site Investigation (PSI) has been carried out which indicates the absence of any contaminants, although it is not known if this has been reviewed by the DEC’s Land and Water Quality Branch. Preliminary and detailed site investigation and subsequent management plans should be prepared and implemented in accordance with the DEC’s Contaminated Sites Management Series and to the satisfaction of the DEC’s Land and Water Quality Branch.

3. General Advice

- For the purposes of Part IV of the EP Act, the scheme amendment is defined as an assessed scheme amendment. In relation to the implementation of the scheme amendment, please note the requirements of Part IV Division 4 of the EP Act.
- There is no appeal right in respect of the EPA’s decision on the level of assessment of scheme amendments.
- A copy of this advice will be sent to the relevant authorities and will be available to the public on request.

W H Tacey
A/Director
Environmental Impact Assessment

23 October 2006

cc: Department for Planning & Infrastructure
APPENDIX 2

Metropolitan Cemeteries Board
Correspondence on Sand
Resource Extraction Timing
(May 2013)
Dear Sir

Potential Sand Resource Extraction
Metropolitan Cemeteries Board Site – Lot 1355 Baldivis Road, Baldivis

I refer to the above matter and advise that the Metropolitan Cemeteries Board (MCB) currently operates a cemetery and a sand mine on Lot 1355 Baldivis Road, Baldivis referred to as the Rockingham Regional Memorial Park (RRMP).

We understand the Northern Cell of the Baldivis East Urban Corridor is located immediately east of Lot 1355 and is owned by BGC. The MCB has recently engaged in discussions with representatives from BGC in relation to the potential urbanisation of the BGC landholdings and the impediment raised by the Department of Mines and Petroleum regarding the potential extraction of sand from the MCB sand mine. This has been further queried by the Department of Planning in assessing the Lifting of Urban Deferment Request lodged by BGC representatives Greg Rowe and Associates.

We write to confirm that MCB is currently seeking consent from the Department of Environment and Conservation (DEC) to clear vegetation in order to facilitate extraction of the sand resource.

It is relevant to note that the sand resource is located in the north western corner of RRMP and hence extracting the sand will require the removal of trees that have previously been identified by the DEC as being worthy of retention. Should the DEC provide support for the removal of the trees, it would be the intention of the MCB to extract the sand resource as quickly as possible in order to mitigate any potential disruption to the existing cemetery operations and to allow implementation of the MCB master plan. It is anticipated the sand resource would be extracted well within the timeframe before residential development is likely to be occupied (understood to be approximately 2 years).
In the unlikely event that the sand resource is extracted after the development of the BGC residential area, we do not anticipate the removal of the sand would impact upon the future residents given the existing Muslim burial area in the north eastern portion of RRMP adjacent to Baldivis Road. Any extraction of sand will require stringent dust management and suppression to protect the current operation of the burial area. Given the MCB's desire to extract the sand resource in the short term and given the MCB's own desire to limit dust impact on its current cemetery operations, the MCB is of the view that the removal of the sand resource does not impact upon the BGC development.

If you wish to discuss this matter, please call me on 9383 5229.

Yours sincerely,

Tim Halls
Director Planning and Operations

Cc: Kim Kyle – Principal Urban Designer – Greg Rowe and Associates
APPENDIX 3

OEPA Letter (October 2013) – North Baldivis Local Structure Plan – Proposed Wetland Management
Dear Mr Halleen

NORTH BALDIVIS LOCAL STRUCTURE PLAN – PROPOSED WETLAND MANAGEMENT

I refer to your letter dated 15 August 2013 seeking the Office of the Environmental Protection Authority’s (OEPA) comments on the proposed management of the wetland within the North Baldivis Local Structure Plan.

The Environmental Protection Authority’s (EPA) environmental objectives for hydrological processes and environmental quality of inland waters (wetland) are to:

- maintain the hydrological regimes of groundwater and surface water so that existing and potential uses, including ecosystem maintenance, are protected; and

- maintain the quality of groundwater and surface water, sediment and biota so that the environmental values, both ecological and social are protected (Environmental Assessment Guideline No. 8 - Environmental factors and objectives).

The OEPA has reviewed your letter (dated 15 August 2013) and the Indicative Resource Enhancement Wetland Buffer attached to the letter. The OEPA is satisfied that the proposed management measures and buffer will protect the environmental values of the Resource Enhancement wetland within the proposed North Baldivis Local Structure Plan.
The management measures include:

- Provision of a 30m buffer from the edge of the wetland primarily to retain the *Melaleuca rhaphiophylla* trees.
- Maintaining ecological water requirements to the *Melaleuca rhaphiophylla* trees.
- Weed management.
- Revegetation of the core wetland area and surface water retention swales using endemic species.
- Interface treatments between conservation areas and recreation areas.

I trust this information is of assistance. Should you have any enquiries please contact Gary Williams on 6145 0821.

Yours sincerely

Darren Foster  
DIRECTOR

2nd October 2013

cc: Department of Planning  
City of Rockingham
APPENDIX 4

City of Rockingham
Correspondence on the Clay Quarry on Lot 1 Mundijong Road
(June 2013)
Hi Kim,

Please find comments below.

John-Paul MacDonagh - Planning Officer

PO Box 2142 Rockingham DC WA 6967
Civic Boulevard Rockingham Western Australia
telephone +61 8 9528 0424 facsimile +61 8 9592 1705
e-mail john.macdonagh@rockingham.wa.gov.au
web www.rockingham.wa.gov.au

Hi John-Paul,

You are correct in the fact that the regulation has changed regarding the specification on landfill cell construction and the use of clay in the future will be limited if at all. If we were to use any future clay from lot, 1 Mundijong road we would only be able to extract it through the summer months due to the moisture content and this being the case we have never had a dust issue to deal with. As for any impending noise levels, you would not be able to distinguish the extraction operation from the freeway general noise in any case.

I would safely be able to say there would not be an issue for the future under these circumstances.

Regards

Graham Rose - Manager Waste and Landfill Services
telephone +61 8 9528 8550

From: John-Paul MacDonagh
Sent: Thursday, 6 June 2013 12:43 PM
To: Graham Rose
Hi Graham,

An enquiry has come through to Planning regarding the operating details for the City's Clay Extraction Site at Lot 1 Mundijong Road, Baldivis adjacent to the freeway, on the eastern side.

The context of the enquiry is the design of the northern cell of the East Baldivis District Structure Plan adjacent to the freeway, on the western side.

I have talked to Scott Lambie who recommends I follow up the enquiry with yourself.

The planning consultants seek to address the concerns of the DEC that the Extractive Industry will not have a detrimental impact upon their land use planning and are investigating the relevance of a 500m buffer in place. More specifically, they are investigating how impacts such as dust and noise may be managed and given the adjacent freeway, I assume there must be some management practice in place to contain dust. At this stage I am unsure whether this is through the approval process or through an operational management plan(s) and any light you can shed on this matter would be much appreciated.

It is understood that clay extraction for the purpose of lining landfill cells has reduced given the change in practices replacing the clay lining with plastic lining. The consultants are seeking comment on the frequency of clay extraction. Do you know?

Thanks,

John-Paul MacDonagh - Planning Officer
telephone +61 8 9528 0424