Cardno
Shaping the Future

Wellard East

Local Structure Plan

Prepared for Armana Holdings

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1 Introduction

This report provides justification for the Local Structure Plan (LSP) prepared for land located east of the Kwinana Freeway, south of Mortimer Road, north of Millar Road and west of Woolcoot Road, referred to as Wellard East (refer to **Figure 1**). The report is prepared by Cardno (WA) Pty Ltd (Cardno) and other consultants (Roberts Day, McNally Newton, Wood & Grieve and Shawmac) on behalf of Armana Holdings Pty Ltd (Armana), the owners of Lot 201 Mortimer Road and Lot 379 Millar Road.

Whilst the LSP covers the whole Wellard East Cell in order to address planning (urban design), environmental and engineering issues in a holistic manner, the detailed technical reports (such as the Local Water Management Strategy) required at the LSP stage have been prepared for land owned or in the process of being acquired by Armana Holdings (ie. Lot 27). However, the technical reports demonstrate that recommendations for Armana landholdings will not adversely impact or prejudice future development/subdivision of adjoining land. If areas in the Wellard East Cell require additional more detailed technical information, then it is envisaged that such areas will be identified by the Town of Kwinana as "areas subject to further investigation". Areas subject to further investigation also includes land still zoned Urban Deferred under the Metropolitan Region Scheme (including Lot 379) due to livestock and basic raw material buffers and impacts from the jet ski park, which are covered in the following report. **On this basis, initial LSP approval is being sought for Lot 27 and a portion of Lot 201. This will enable subdivision to proceed in a timely manner, whilst other more detailed issues are addressed and resolved on adjoining land**.

The LSP recognises the opportunities and constraints of the Wellard East Cell, particularly in terms of the location, configuration, major Western Power Easement, topography and environmental features (wetlands) as well as the specific drainage requirements reflected in the Local Water Management Strategy (LWMS) for Lots 27 and 201. The following report also includes a review of the current planning framework, environmental investigations (such as a flora and vegetation survey and wetland assessment), transport assessment, servicing analysis and design rationale for the LSP. It should be noted that many of the reviews in the report, including servicing, environmental and planning cover the whole cell, whilst more specific site works have been undertaken for certain lots.

The LSP will guide the subdivision of the Wellard East Cell and ensure that development proceeds in a sustainable manner facilitating the objectives of the Western Australian Planning Commission (WAPC), as advocated through Liveable Neighbourhoods and in accordance with the objectives of the Town of Kwinana. The LSP reflects the intended use of the subject area for urban development as identified in the Jandakot Structure Plan and the Draft District Structure Plan, referred to as the Eastern Residential Intensification Concept (ERIC).

1.1 Background

The LSP has been prepared in accordance with Clauses 6.15 and 6.17 in the Town of Kwinana Town Planning Scheme No. 2 (TPS2), which requires an LSP to be prepared for land zoned Development (ie. the northern portion of the Wellard East Cell) prior to consideration and approval of an application for subdivision and development of the land. The LSP provides the planning framework for development of Wellard East and establishes a context for the consideration and eventual approval of subdivision applications for lots within the cell.

In January 2009, Cardno lodged a Metropolitan Region Scheme (MRS) amendment on behalf of Armana Holdings to transfer the Wellard East Cell (also referred to as the cell) from the Urban Deferred Zone to Urban. Due to outstanding buffer issues associated with the livestock holding facility, basic raw material resource (clay) and jet ski park, all uses located to the south of Millar Road,

only the northern part of the cell was zoned Urban. In accordance with Section 126 of the Planning and Development Act, the same portion of land was concurrently zoned Development under the Town of Kwinana Town Planning Scheme No. 2 (referred to as TPS 2).

Further investigations will be required into removing or reducing these buffers in order to progress the further lifting of the Urban Deferred Zone over the balance of the cell. Whilst the current status and background to these buffers is discussed in the following report, the further investigation work is currently being carried out by Cardno as part of a separate process under the MRS.

Armana is seeking planning (LSP and subdivision), environmental and engineering approvals for Lot 27 and part of Lot 201 by the end of 2010, so that construction of the first stage of development of the Cascades subdivision can commence by mid 2011. It is intended that development will progress from the north (Mortimer Road) moving in a southerly direction.

2 Site Description

2.1 Location

The LSP Area is located approximately 36 kilometres south of Perth's Central Business District and totals approximately 170 hectares (refer to **Figure 1**). The LSP Area, referred to as the Wellard East Cell, is situated in the South West Corridor of Perth and is bounded by Kwinana Freeway to the west, Mortimer Road to the north, Millar Road to the south and Woolcoot Road to the east. The LSP is situated wholly within the municipality of the Town of Kwinana.

2.2 Extent of Structure Plan Area

The LSP Area has been selected based on a logical urban cell (commonly referred to as "Wellard East"), which has been identified in various planning documents addressed in **Section 4**.

The LSP Area comprises predominantly cleared farmland, although there are some significant wetland areas and other physical constraints to development including existing drains and power lines. **Figure 2** provides an aerial photograph of the LSP Area.

Armana Holdings owns Lots 201, 379 and 27. It is recognised that the Town of Kwinana requires an LSP, which incorporates adjoining land within a defined or logical cell. Accordingly, the balance land not under the control of Armana has been included in the LSP Area, however the detailed technical investigations including in this report mostly focus on Lot 201, Lot 27 and to some extent Lot 379. It is considered that other areas within the cell requiring more detailed technical information, will be subject to further investigations.

2.3 Land Ownership

The LSP Area contains twenty two (22) land parcels, under varying ownership as outlined in **Table 1** below. The properties owned by Armana Holdings Pty Ltd are highlighted in bold.

Table 1: Lot Description, Ownership and Areas

Lot No. and Street	Owner	Land Area (ha)
Pt 27 Mortimer Road	**Armana Holdings**	**3.51**
Pt 28 Mortimer Road	C. Berry, D. Berry, K. Griffin, B. Munro	3.79
Pt 26 Mortimer Road	Main Roads Western Australia	2.39
126 Mortimer Road	Main Roads Western Australia	0.23
127 Mortimer Road	Main Roads Western Australia	0.67
128 Mortimer Road	Main Roads Western Australia	0.48
129 Mortimer Road	Main Roads Western Australia	0.50
201 Mortimer Road	**Armana Holdings Pty Ltd**	**39.93**
59 Woolcoot Road	Mary Donald Nominees (D.J. MacCormick Property Group)	12.48
61 Woolcoot Road	LM + C Morley	2.69
62 Woolcoot Road*	AB, MB + HJ Bombara and Robin	12.71

	Lodge Pty Ltd	
62 Woolcoot Road*	VN Nguyen & Thi Hoa Vo	9.84
64 Woolcoot Road	Silver Knight Holdings	11.77
89 Woolcoot Road	Bertolini	14.13
1219 Woolcoot Road	A George (Husker Holdings)	15.18
0 Johnson Road	Main Roads Western Australia	0.10
Pt 11 Johnson Road	Main Roads Western Australia	1.28
Pt 91 Johnson Road	Main Roads Western Australia	0.19
90 Millar Road	Mary Donald Nominees (D.J. MacCormick Property Group)	8.94
Pt 378 Millar Road	Mary Donald Nominees Pty Ltd	7.85
Pt 379 Millar Road	**Armana Holdings Pty Ltd**	**15.37**
Pt 380 Millar Road	S. Lang, J. W Wang, C. Ye	2.70
Closed Road Reserve	Landgate Update	0.15
Drainage Reserves	Water Corporation	3.87
TOTAL		**170.75**

Notes:* There are two lots known as Lot 62 Woolcoot Road

The location and area of each lot are reflected in **Figure 3.**

Table 1 highlights the extent of land owned by Armana Holdings Pty Ltd as the proponent of this LSP. Armana currently owns some 58ha or 34.4% of the LSP Area and is the largest single landowner in the Wellard East Cell.

3 Environmental Context

Cardno has completed a desktop investigation of the entire Wellard East Cell in order to determine the environmental values of the cell. This included a review of available information including regional environmental investigations, federal, state and local-level mapping, databases and investigations and any other information.

Initially, Cardno was engaged to conduct a number of site specific environmental investigations covering Lot 201 Mortimer Road and Lot 379 Millar Road. The environmental investigations that were conducted include the following:

- Preliminary Acid Sulphate Soils Assessment;
- Flora and Vegetation Survey and Wetland Assessment;
- Preliminary Site Contamination Investigation;
- Pre-development Hydrological Monitoring;
- District Water management Strategy; and
- Local Water Management Strategy.

These investigations, in addition to the desktop investigation have been used to understand and determine the environmental values of the Wellard East Cell, with particular reference to Lot 201 Mortimer Road and Lot 379 Millar Road. It is envisaged that further detailed investigations will be completed for the remaining lots as planning progresses.

The outcomes of the above investigations are detailed below.

3.1 Physical Description

3.1.1 Topography

Topographical contours based on a survey for the majority of the Wellard East Cell are shown in **Figure 4.** These indicate that the cell is generally flat to gently undulating. The northern portion of the Wellard East Cell has a generally eastern aspect while the southern portion of the cell has a generally south-westerly aspect.

The Wellard East Cell ranges in elevation from approximately 8 metres Australian Height Datum (mAHD) at the lowest elevated area in the south western portion of the Wellard East Cell and up to approximately 16mAHD through the south-central portion of the cell. The areas of lowest relief in the Wellard East Cell generally coincide with areas of wetlands and/or drains.

3.1.2 Landforms and Soils

The *Perth Metropolitan Region 1: 50,000 Environmental Geology Series, Rockingham (Sheet 2033 II and Part of 2033 III)* indicates that the Wellard East Cell is located on the degraded surface of the Bassendean dune system and is of aeolian origin (Gozzard 1986). Geological mapping indicates that the Wellard East Cell is predominantly comprised of the "Bassendean Dune and Sandplain System", with areas associated with the wetlands described as "marsh in interdunal swale".

The "Bassendean Dune and Sandplain System" is broadly described as very low relief, leached grey siliceous Pleistocene sand dunes with well drained grey sands, intervening sandy and clayey swamps and gently undulating plains. The geomorphic unit "marsh in interdunal swale" is broadly described as areas of former swamps which have been artificially drained, with uniform loamy or peaty soils.

The *Perth Metropolitan Region 1: 50,000 Environmental Geology Series, Rockingham (Part Sheets 2033 II and 2033 III)* shows the Wellard East Cell is largely comprised of "Sand" (S8) and in the wetland areas "Peaty Clay" (Cps). The general descriptions of these are provided below in **Table 2**.

Table 2: Environmental Geology Series Map Unit Descriptions

Map Unit	Description
S8	Sand, very light grey at surface, yellow at depth, fine to medium grained, sub rounded quartz, moderately well sorted and of eolian origin.
Cps	Peaty Clay, dark grey and black, soft, variable organic content, some quartz sand in places, of lacustrine origin.

3.2 Acid Sulfate Soils

Acid Sulfate Soils (ASS) is the name commonly given to naturally occurring soils and sediment containing iron sulphide (iron pyrite) materials. In their natural state ASS are generally present in waterlogged anoxic conditions and do not present a risk to the environment. ASS can present issues when they are oxidised, producing sulphuric acid, which can impart a range of impacts on the surrounding environment, infrastructure and human health. ASS that have been oxidised and resulted in the creation of acidic conditions are commonly termed "Actual ASS" (AASS) and those that have acid generating potential but remain in their naturally anaerobic state are termed "Potential ASS (PASS)".

Mapping prepared by the Department of Planning (DoP) to support the Western Australian Planning Commission's *Planning Bulletin No. 64: Acid Sulfate Soils* (WAPC, 2007) indicates that the Wellard East Cell has been classified as predominantly having a "*moderate to low risk of ASS occurring within 3 metres of natural soil surface (or deeper)*". In the area associated with a Conservation Category Wetland in the north-east portion of the cell and a resource enhancement wetland in the central-south portion of the cell, the risk of ASS occurring is "*high to moderate*". **Figure 5** shows broadly the areas depicted as 'moderate' or 'high' risk as interpreted from the DoP ASS mapping.

A Preliminary ASS Assessment was undertaken by Cardno for Lot 201 Mortimer Road and Lot 379 Millar Road, refer to **Appendix A.** The aim of this assessment was to determine the potential for ASS to occur within these two lots, based on environmental, soil and landform conditions specific to the lots. The field investigation found that broadly the soil conditions of the site are generally slightly acidic however disturbance of soil above the watertable is unlikely to result in ASS related-impacts (Cardno, 2009a). This is in line with the ASS mapping shown in **Figure 5**.

3.3 Hydrology

3.3.1 Surface Water

The Wellard East Cell is situated within the Serpentine River Catchment, which forms part of the Peel-Harvey Drainage Catchment.

The Peel-Harvey Drainage Catchment forms part of the Peel-Inlet Harvey Estuary which is protected under the EPA *Environmental Protection (Peel Inlet - Harvey Estuary) Policy 1992* and *State Planning Policy No. 2.1: The Peel-Harvey Coastal Plain Catchment*. The EPA policy aims to protect the estuary from nutrient enrichment by setting environmental quality objectives for the estuary, to enable rehabilitation and prevent further degradation *(Peel-Harvey Catchment Council, 2005)*. In the past nutrient enrichment has occurred as a result of a number of activities including the clearing of native

vegetation and land uses such as agriculture and associated fertiliser use, which can result in nutrients being leached into waterways.

The Wellard East Cell, contains a network of drains that were historically developed to support agricultural activities within the area. Three drains exist within the Wellard East Cell – Peel Sub N Drain, Peel Sub N1 Drain and Peel Sub N2 Drain (Cardno 2009b). The Peel Sub N2 Drain extends through the central portion of the Wellard East Cell, along the eastern boundary of Lot 201, and the Peel Sub N1 Drain occurs across the entire cell, parallel to the southern boundary. The Peel Sub N2 Drain discharges into the Peel Sub N drain along the eastern boundary of Lot 201 Mortimer Road and Peel Sub N is then joined by Peel Sub N1 at the westernmost point of the Wellard East Cell. Peel Sub N ultimately discharges beneath the Kwinana Freeway to the Peel Main Drain, located to the west of the Wellard East Cell. Locations of the surface drainage pathways within the Wellard East Cell are shown in **Figure 6**.

Surface water monitoring was undertaken as a part of a three year monitoring program completed by Cardno (2009b). Based on this monitoring it was determined that there is minimal surface runoff within the site. This is based on the high permeability of the sandy soils and observations made during and following rainfall events. The observations indicated that the drains described above were often dry following rainfall and water was not apparent within the drains until groundwater levels rose seasonally to intersect the base of the drains. Analysis of groundwater contours and comparison to drain inverts confirmed that water observed within the surface drainage pathways was an expression of groundwater, rather than direct surface runoff.

The surface water monitoring within the Peel Branch Drain indicated that nutrient concentrations were 'moderate' to 'high' (Total Nitrogen (TN)) or 'very high' (Total Phosphorous (TP)) in comparison to default trigger values for slightly disturbed ecosystems, outlined in the *National Water Quality Management Strategy* (ANZECC 2000). Surface water locations within the Peel Branch Drain generally recorded their greatest nutrient concentrations in early winter.

The full dataset of surface water quality is available within the detailed monitoring reports (Cardno BSD, 2005; Cardno BSD, 2007; and Cardno, 2009b).

3.3.2 Groundwater

The Perth Groundwater Atlas indicates groundwater underlying the site ranges between approximately 8mAHD in the north of the Wellard East Cell and approximately 4mAHD in the south, at its lowest level in the seasonal cycle (DoW 2007). This corresponds to a depth to groundwater ranging from approximately 12 metres below ground surface (mBGS) in the north-west to approximately 6mBGS in the south-east. These contours indicate a groundwater flow direction from south to south-west. Maximum groundwater levels are expected following the winter rainfall period and may be up to 1.5 metres higher than the minimum groundwater levels predicted in the Perth Groundwater Atlas (DoW 2007).

Site specific groundwater contours were developed by Cardno for the majority of the Wellard East Cell based on collected data from the three year investigation into underlying groundwater conditions. Groundwater depths were recorded by Cardno from the gauging of 10 shallow groundwater monitoring bores, five of which were initially installed by JDA Consultant Hydrologists in 2002, as part of a separate groundwater level investigation.

Measured groundwater depths recorded by Cardno ranged from approximately 11.5mAHD in the north of the Wellard East Cell to approximately 6.5mAHD in the south of the cell (Cardno 2009b). Within Lot 201, depth to groundwater ranged from approximately 1 mBGS in the north east corner

adjacent to the Mortimer Road wetland, to 7.5mBGS in the north-west, in-line with the Kwinana Freeway. Depth to groundwater in the south of the lot was generally less than 2mBGS.

A search of the Department of Water (DoW) Registered Groundwater Bore Database was requested and this identified 24 registered bores within a 1km radius of the site. One registered bore was identified within the Wellard East Cell and is located within Lot 201 Mortimer Road for the purposes of irrigation. Other bores located approximately 400 metres east of Lot 379 Millar Road reported groundwater depths between approximately 8mAHD and 10.5mAHD, all consistent with data obtained from the groundwater investigations and information from the Perth Groundwater Atlas.

An estimation of underlying maximum groundwater levels has been undertaken by correlating the trends in peak groundwater levels with the long-term records obtained from the DoW bore data. The estimated Annual Average Maximum Groundwater Level (AAMGL) contours derived by Cardno are shown in **Figure 6**.

Groundwater quality monitoring within the Wellard East Cell indicates that the majority of measured groundwater TN concentrations across Wellard East were 'low' to 'moderate' when compared to the National Water Quality Management Strategy (ANZECC 2000). Several bores reported 'high' or 'very high' TN concentrations at times throughout the year, although there did not appear to be a geographical pattern to the distribution of these results. TP concentrations across the site often exceeded the respective default trigger value, with bores that reported 'high' or 'very high' concentrations located predominantly in the southern and less elevated portions of Wellard East. Both of these results may be due to upstream sources.

3.3.3 Public Drinking Water Source Areas

Public Drinking Water Source Areas (PDWSA) are established by the DoW to protect the water quality of identified drinking water sources, and can be surface or groundwater (DoW, 2009). They are proclaimed under the *Metropolitan Water Supply, Sewerage and Drainage Act 1919* or the *Country Areas Water Supply Act 1947* as 'Water Reserves', 'Catchment Areas' or 'Underground Water Pollution Areas' (DoW, 2009)

PDWSAs provide the community of Western Australia with the majority of its drinking water supplies and can be vulnerable to contamination by a range of land uses and water based activities (DoW, 2009). PDWSAs are defined by "Priority Classification Areas", which provide three levels of water quality protection using the principles of risk avoidance (Priority 1), risk minimisations (Priority 2) and pollution limiting (Priority 3).

The Wellard East Cell is not located within any known PDWSAs.

3.4 Flora and Vegetation

The Wellard East Cell lies within the *Swan Coastal Plain Interim Biogeographical Regionalisation for Australia (IBRA) Region* (Thackway and Cresswell 1995) and is approximately equivalent to the *Drummond Botanical Subdistrict* within the Darling Botanical District and the Swan Coastal Plain subregion as described by Beard (1990).

Vegetation complex mapping undertaken by *Heddle et al.* (1980), which used a combination of landform, soil and rainfall parameters, indicates that the Wellard East Cell is part of the Bassendean Complex – Central and South. This complex is generally described as a range of woodland of *Eucalyptus marginata* (Jarrah), *Casuarina sp.* (Sheoak) and *Banksia sp.* on the low dunes, to low woodland of *Melaleuca spp.* and sedgelands in the swamps and depressions.

Cardno conducted a detailed flora and vegetation survey and wetland assessment in accordance with the EPA's *Guidance Statement No. 51 Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA, 2004a) for Lot 201 Mortimer Road and Lot 379 Millar Road, refer to **Appendix B**. This included three separate site visits in August, September and November 2008 by two experienced botanists to identify the presence of any Declared Rare Flora (DRF), Priority Flora (PF) and Threatened Ecological Communities (TECs) (Cardno, 2008a). The survey identified the flora species present within the two lots and the condition of the vegetation.

In addition, a wetland assessment was conducted over Lot 27 Mortimer Road in November 2009 and May, 2010.

Lot 201 Mortimer Road and Lot 379 Millar Road retain little remnant vegetation due to historic clearing and subsequent grazing of livestock. Areas that still retain remnant vegetation include the mapped Conservation Category Wetland (discussed further in **Section 3.6**) and a small portion of vegetation within the southern area of Lot 201 adjacent to the Kwinana Freeway.

Local remnant Plant Communities (PC) and plant associations found in Lot 201 Mortimer Road and Lot 379 Millar Road are described below and the location and extent of these communities is shown in **Figure 7:**

- **PC1** - Low lying forest (medium height 10-30m) of *Eucalyptus rudis* over *Taxandria linearifolia-Astartea scoparia* over *Pteridium esculentum* on sandy loam to sandy clay and areas of permanently inundated peaty clay. This community is part of the Conservation Category Wetland that occurs within the north-eastern portion of Lot 201;
- **PC2** - Low lying forest (medium height) of *Corymbia calophylla* over *Astartea scoparia – Taxandria linearifolia – Melaleuca teretifolia* over **Rubus anglocandicans – *Pennisetum clandestinum*. This community forms part of the Conservation Category Wetland within the north-eastern portion of Lot 201;
- **PC3 -** Low lying woodland (medium height) of *Eucalyptus rudis* over *Melaleuca teretifolia* over pasture grasses on grey sandy loam. This is a small remnant patch of *Eucalyptus rudis* along the eastern edge of Lot 201 with regrowth *Melaleuca teretifolia* and a heavily grazed and disturbed understorey of pasture grasses;
- **PC4 -** Low lying woodland-forest (medium height) of *Eucalyptus rudis - Melaleuca preissiana* over *Kunzea glabrescens - Pultenaea reticulata* over *Dielsia stenostachya - Opercularia hispidula - *Zantedeschia aethiopica* on grey sandy loam. PC4 is also a remnant piece of bushland within the south-western portion of Lot 201, however has a heavily disturbed understorey through the actions of grazing and weed introduction;
- **PC5 -** Low upland woodland (>10m) of *Corymbia calophylla - Eucalyptus marginata* over *Agonis flexuosa - Casuarina obesa - Banksia menziesii - Banksia grandis* over *Eremaea pauciflora - Calothamnus quadrifidus* over *Conostylis aculeata subsp. cygnorum - Kennedia prostrata - *Ehrharta longiflora - *Lolium rigidum - *Carpobrotus edulis* on grey sandy loam. This community occurs within Lot 379 and represents a drier open woodland community of *Eucalyptus* and *Banksia spp*. This area has been historically cleared, and has therefore has regrown with additional input from revegetation, particularly of Australian native species that have been planted within the lot, but are not endemic to the area including *Agonis flexuosa*, *Hakea corymbosa*, *Melaleuca sp.* and *Eucalyptus sp.*; and
- **PC6 -** Tall Scrub (to 10m) of *Kunzea glabrescens - Melaleuca teretifolia* over pasture grasses and **Carpobrotus edulis*. This community occurs within Lot 379 adjacent to PC 5.

In addition to the above described communities, scattered native trees were present within the open paddocks of Lot 201 Mortimer Road and Lot 379 Millar Road including Tuart, Jarrah, *Kunzea glabrescens*, *Banksia spp.* and *Corymbia calophylla* (in the drier areas) and *Eucalyptus rudis* and

Melaleuca preissiana in the seasonally damp and drainage areas. These remnant trees have been mapped on **Figure 7**.

As part of Cardno's survey (Cardno 2008a) vegetation condition has been determined in accordance with the vegetation condition scale commonly used in the Perth Metropolitan Region (Keighery 1994). Based on this, the majority of vegetation within Lot 201 Mortimer Road and Lot 379 Millar Road is predominantly 'Completely Degraded' due to historic clearing, high disturbance and weed invasion. The vegetation associated with the Conservation Category Wetland in the north-east portion of the Wellard East Cell is in 'Good' to 'Very Good' condition, although weed species are present and there are other disturbances including cleared tracks and evidence of grazing. A portion of remnant vegetation within the south-central portion of Lot 201 Mortimer Road is in 'Good' condition with a heavily disturbed understorey. Vegetation in the very northern portion of Lot 379 Millar Road is in a 'Degraded' condition. The mapped extent of vegetation condition across the lots is shown in **Figure 8**.

Further to the above, a flora and vegetation survey and wetland assessment was conducted over Lot 27 Mortimer Road in November 2009 and May, 2010.

Lot 27 Mortimer Road retains limited remnant vegetation with the majority of the lot described as cleared paddocks with isolated remnant trees. Six plant communities were described as occurring within Lot 27, these being

1. MpKgCc – low lying forest of *Melaleuca preissiana* and *Kunzea glabrescens* with some patches of *Corymbia calophylla* over *Pteridium esculentum*, *Melaleuca teretifolia*, *Astartea scoparia*, *Baumea articulata*, *Juncus pallidus* and *Lepidosperma longitudinale*;

2. AsBaLl – thicket of *Astartea scoparia* over *Baumea articulata* and *Lepidosperma longitudinale;*

3. ErMrKg – low lying forest of *Eucalyptus rudis* over *Melaleuca rhaphiophylla* and *Kunzea glabrescens* over *Pteridium esculentum* and **Briza maxima*; and

4. EgKgXp – low woodland of *Eucalyptus gomphocephala* over *Banksia attenuata*, *Kunzea glabrescens* over *Xanthorrhoea preissii*;

5. Paddocks with scattered native trees including *Melaleuca preissiana*, *Eucalyptus gomphocephala* and *Banksia attenuata*.

6. Revegetation area along the road reserves adjacent to the Kwinana Freeway and Mortimer Road intersection;

A total number of 21 weed species of the 63 flora were recorded, which is 33% of the total taxa recorded. Weed species included **Ehrharta calycina, *Lagurus ovatus, *Carpobrotus edulis* and **Bromusdiandrus*. Around the drain the noxious weed species **Rubus anglocandicans* was recorded and in the dampland to the north of Mortimer Road, **Typha orientalis* was recorded.

Vegetation condition across Lot 27 varied from 'Completely Degraded' across the majority of the lot to 'Degraded' to 'Very Good' in the vegetation associated with the man-made drain through the central portion of Lot 27.

3.4.1 Flora Species of Conservation Significance

Species of flora acquire DRF or PF conservation status where populations are restricted geographically or threatened by local processes. The DEC enforces provisions under the *Wildlife Conservation Act 1950* (WC Act) to conserve DRF species and protect significant populations. PF

species are potentially rare or threatened species and are classified in order of threat. DRF and PF category definitions are described in **Table 3**.

Table 3: Conservation Codes for Declared Rare and Priority Flora in Western Australia (Atkins, 2008)

Conservation Code	Description
R	Declared Rare Flora – Extant Taxa. Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.
X	Declared Rare Flora – Presumed Extinct Taxa Taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such.
P1	Priority One – Poorly Known Taxa Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat e.g. road verges, urban areas, farmland, active mineral leases etc, or the plants are under threat, e.g. from disease, grazing by feral animals etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P2	Priority Two – Poorly Known Taxa Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but urgently need further survey.
P3	Priority Three – Poorly Known Taxa Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but need further survey.
P4	Priority Four – Rare Taxa Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years.

The Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) promotes the conservation of biodiversity by providing statutory protection for plants at a species level. Sections 178 and 179 of the EPBC Act provides for the lists and categories of threatened species under the Act and is summarised in **Table 4**. Any action likely to have a significant impact on a species listed under the EPBC Act requires approval from the Commonwealth Minister for Environment, Heritage and the Arts.

Table 4: Categories of Threatened Species (EPBC Act, Section 178 & 179, 1999).

(Only categories marked with an * are matters of national environmental significance under the EPBC Act 1999)

Acronym	Description
E	Extinct Taxa which is known only to survive in cultivation, in captivity or as a naturalised population, well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame

	appropriate to its life cycle and form.
CE*	Critically Endangered Taxa which is facing a very high risk of extinction in the wild in the immediate or near future, as determined in accordance with the prescribed criteria.
E*	Endangered Taxa which are not critically endangered and is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
V*	Vulnerable Taxa which is not endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
CD	Conservation Dependant A species that is the focus of a specific conservation program; the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

A search of the DEC and federal Department of Environment, Water, Heritage and the Arts (DEWHA) threatened flora species database indicated that a number of DRF and PF species were listed as potentially occurring within the Wellard East Cell. A total of eleven species were listed and these are described in **Table 5**.

Table 5: Declared Rare and Priority Flora Potentially Occurring within the Site

*Note - Life Strategy: P=Perennial; Pg= Perennial geophyte; A=Annual

Species	Conservation Code		Habitat	Life Strategy	Flowering Period
Scientific Name	WA	Federal			
Aotus cordifolia	P3	-	Peaty Soils, Swamps	P	Aug-Jan
Aponogeton hexatepalus	P4	-	Mud, Freshwater	P	Jul-Oct
Boronia juncea subsp. juncea	P1	-	Brown sandy loam/mud	P	Apr
Caladenia huegelii	DRF	Endangered	Grey or brown deep sand	P	Sept-Oct
Cyathochaeta teretifolia	P3	-	Grey sand, sandy clay, swamps	P	
Diuris micrantha	DRF	Vulnerable	Brown loam clay, swampy flats	Pg	Sept-Oct
Dodonaea hackettiana	P4	-	Sand, outcropping limestone	P	Jul-Oct
Drakaea elastica	DRF	Endangered	White or grey sand, low lying	Pg	Oct-Nov
Stylidium longitubum	P3	-	Sandy clay, seasonal wetlands	A	Oct-Dec
Synaphea sp. Serpentine	P3	-	Brown loam, low lying	P	

No DRF or PF were recorded across Lot 27 and 201 Mortimer Road and Lot 379 Millar Road during the detailed surveys. Lot 201 Mortimer Road and Lot 379 Millar Road were specifically searched in September and November for the flora species *Drakaea elastica*, *Caladenia huegelii*, *Diuris micrantha* and *Stylidium longitubum,* however these species were not found within the surveyed area.

3.4.2 Threatened Ecological Communities (TEC)

In Western Australia, Threatened Ecological Communities (TECs) are defined by the Western Australian Threatened Ecological Communities Scientific Advisory Committee (within the DEC). Generally these can be described as vegetation communities that are assemblages of species that occur together in a particular type of habitat that are poorly represented within Western Australia. TECs are not afforded direct statutory protection at a state level, however their significance is acknowledged through other state environmental approval processes (i.e. environmental impact assessment pursuant to Part IV of the *Environmental Protection Act 1986* (EP Act)). The Environmental Protection Authority (EPA) recognises TECs as critical environmental assets, and as such they are afforded a high level of protection under the EP Act and associated clearing regulations.

Selected TECs are afforded statutory protection at a federal level pursuant to the EPBC Act. TEC are listed under Section 181 of the EPBC Act, and are defined as "Critically Endangered", "Endangered" or "Vulnerable" under Section 182.

A search was conducted of the DEC's TEC database for the Wellard East Cell and no occurrences of TECs were recorded. A search was then undertaken within a 5 km radius of the cell and three TECs were identified, these being:

- The 'Critically Endangered' '*Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands' (SCP 3c); and
- The 'Vulnerable' 'Dense shrublands on clay flats' (SCP 09).
- The 'Critically Endangered' SCP 3c is also listed as 'Endangered' at a Federal level pursuant to the EPBC Act.

No TECs were recorded within Lot 27 and 201 Mortimer Road and Lot 379 Millar Road during the surveys. The plant associations described in **Section 3.4** are not listed as TECs or 'Priority Ecological Communities' (PECs) at the federal or state level.

3.4.3 Bush Forever

The Government of Western Australia's Bush Forever Policy is a strategic plan for conserving regionally significant bushland within the Swan Coastal Plain portion of the Perth Metropolitan Region. The overarching objective of Bush Forever is to protect comprehensive representations of all original ecological communities by targeting a minimum of 10% of each vegetation complex for protection (Government of Western Australia, 2000). Bush Forever sites are representative of regional ecosystems and habitat and have a key role in the conservation of Perth's biodiversity.

No Bush Forever sites are located within the Wellard East Cell.

3.4.4 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are prescribed under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (EPA, 2004b). As a result, ESAs are applicable when a clearing permit is required under these regulations, however their presence also signifies environmental values that would need to be considered as part of any broader environmental assessment process. Where a clearing permit is required for an area that is situated within an ESA, then none of the exemptions pursuant to the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (EPA, 2004b) apply. ESAs have been identified to protect the native vegetation values of areas surrounding significant, threatened or scheduled ecosystems or communities.

A search of the DEC's Native Vegetation Mapping database revealed that a number of ESAs are located within the Wellard East Cell. These are associated with the wetlands that occur in the north-east, central and south-east portions of the Wellard East Cell. These wetland areas are further discussed in **Section 3.6**.

3.4.5 Biodiversity Linkages

Biodiversity linkages can be described as any area of remaining vegetation that provides a corridor or linkage between larger patches of vegetation, to allow for the movement of flora and fauna and their genetic material through the landscape.

A number of biodiversity linkages have been acknowledged by the State Government in *Bush Forever*, which was mentioned in **Section 3.4.3,** *Perth's Greenways* and the *System 6 Study*. These linkages are to conserve and enhance our regional biodiversity linkages and to reflect the on-ground linkages throughout the Perth Metropolitan Area.

Biodiversity linkage No. 75 encompasses the central southern portion of the Wellard East Cell, running east-west across the cell. This linkage aims to connect Bush Forever site 349, located to the west of the Wellard East Cell, to Bush Forever sites 360 and 70, located to the east of the Wellard East Cell.

3.5 Fauna

The conservation status of fauna species in Western Australia is assessed under the State administered WC Act. The WC Act utilises a set of schedules which are described in **Table 6**. In addition to this, the DEC also produces a list of priority species, which while not considered threatened under the WC Act there is some concern over their long-term survival. These categories are outlined below in **Table 7**.

As well as those species protected under the WC Act, the federal government also maintains a list of protected species under the EPBC Act. These species are listed in accordance with the categories described in **Table 4.**

Table 6: DEC Threatened Fauna Categories.

Category	Code	Description
Schedule 1	S1	Fauna which is rare or likely to become extinct
Schedule 2	S2	Fauna which is presumed extinct
Schedule 3	S3	Birds which are subject to an international agreement between the governments of Australia and other countries relating to the protection of migratory birds and birds in danger of extinction
Schedule 4	S4	Fauna that is otherwise in need of special protection

Table 7: DEC Priority Fauna Categories.

Category	Code	Description
Priority 1	P1	Taxa with few, poorly known populations on threatened lands.
Priority 2	P2	Taxa with few, poorly known populations on conservation lands.
Priority 3	P3	Taxa with several, poorly known populations, some on conservation lands.

Priority 4	P4	Taxa in need of monitoring (not currently threatened or in need of special protection but could be if present circumstances change).
Priority 5	P5	Taxa in need of monitoring (not considered threatened but are subject to specific conservation program, the cessation of which would result in the species becoming threatened within 5 years).

A search of the federal and state online resources indicated that a number of species with conservation significance may occur within or potentially use the Wellard East Cell. These are listed below in **Table 8**.

Table 8: Significant fauna species with potential to occur

Species		Conservation Code	
Scientific Name	**Common name**	**Western Australia**	**Federal**
BIRDS			
Calyptorhynchus latirostris	Carnaby's Cockatoo	Schedule 1	Endangered
Calyptorhynchus banksii naso	Forest Red-tailed Black Cockatoo	Schedule 1	Vulnerable
Calyptorhynchus baudinii	Baudin's Black Cockatoo	Schedule 1	Vulnerable
Merops ornatus	Rainbow Bee-eater	Schedule 3	Migratory
Falco peregrinus	Peregrine Falcon	Schedule 4	-
Ardea ibis	Cattle Egret	Schedule 3	Migratory
Ardea alba	Great Egret	Schedule 3	Migratory
Apus pacificus	Fork-tailed Swift	Schedule 3	Migratory
MAMMALS and MARSUPIALS			
Dasyurus geoffroii	Chuditch	Schedule 1	Vulnerable
Phascogale tapoatafa	Brush-tailed Phascogale	Priority 3	-
Isoodon obesulus fusciventer	Southern Brown Bandicoot	Priority 5	-
Macropus irma	Western Brush Wallaby	Priority 4	-
REPTILES and RODENTS			
Morelia spilota imbricata	Carpet Python	Schedule 4	Not applicable
Hydromys chrysogaster	Water Rat	Priority 4	Not Applicable
INSECTS			
Seynemon gratiosa	Graceful Sun Moth	Schedule 1	Endangered

There has been no formal fauna survey undertaken over the Wellard East Cell, however the fauna values have been inferred primarily through a search of available federal and state online information and an assessment of the habitat values offered by the native vegetation across the Wellard East Cell.

Any local native fauna species present are likely to use only the well vegetated wetlands, the partially vegetated rural drains and the limited patches of remnant vegetation across the Wellard East Cell.

The scattered areas of remnant vegetation and paddock trees that occur across the Wellard East Cell would have limited value as fauna habitat, due to the lack of intact understorey.

Almost all of the native vegetation within the Wellard East Cell has been historically cleared, with small patches of remnant vegetation (outside of the wetlands) showing a high level of degradation due to grazing of livestock and weed invasion. Most of the intact vegetation is associated with the Conservation Category Wetland area in the north-east and Resource Enhancement Wetlands in the central portion and south-east portion of the cell (discussed further in **Section 3.6**). The potential for terrestrial fauna movements between the Wellard East Cell and the broader region, and between the areas of potential habitat within the cell, is likely to be restricted due to the lack of adequately vegetated corridors.

Due to the lack of intact understorey, appropriate habitat species (for example *Lomandra spp.* for Graceful Sun Moth), declining health of sparse remnant vegetation and paddock trees in the Wellard East Cell and lack of connectivity between the remnant vegetation, it is considered unlikely that the majority of the species listed above would utilise the Wellard East Cell. Further consideration is given to the presence of fauna in **Section 6.4.3**.

3.6 Wetlands

The DEC maintains the *Geomorphic Wetlands of the Swan Coastal Plain* dataset which identifies wetland areas and categorises individual wetlands into specific management categories, as indicated in **Table 9.** This dataset is based on a study undertaken by *Hill et al.* (1996) in which wetlands on the Swan Coastal Plain were mapped and categorised according to their geomorphic classification (wetland type) and management category.

Table 9: Wetland management categories

Management Category	General Description	Management Objectives
Conservation (CCW)	Wetlands which support a high level of attributes and functions	Highest priority wetlands. Objective is to preserve and protect the existing conservation values of the wetlands through various mechanisms including: › Reservation in national parks, crown reserves and State owned land; › Protection under Environmental Protection Policies; and › Wetland covenanting by landowners. No development or clearing is considered appropriate. These are the most valuable wetlands and any activity that may lead to further loss or degradation is inappropriate.
Resource Enhancement (REW)	Wetlands which may have been partially modified but still support substantial ecological attributes and functions.	Priority wetlands. Ultimate objective is to manage, restore and protect in an effort to improve their conservation value. These wetlands have the potential to be restored to Conservation category. Protection is recommended through a number of mechanisms.
Multiple Use (MUW)	Wetlands with few remaining important attributes and functions.	Use, development and management should be considered in the context of ecologically sustainable development and best management practice catchment planning through landcare.

Source: *Environmental Protection Authority Guidance Statement No. 33 'Environmental Guidance for Planning and Development*.

A review of the dataset indicates that there are five wetlands present within the Wellard East Cell and these are listed in **Table 10**. This table lists the size and type of the wetland, as well as its management category and Unique Feature Identifier (UFI) number as reflected in the geomorphic wetland dataset. **Figure 9** depicts the wetlands as mapped within the Wellard East Cell.

Table 10: Wetland areas within the Wellard East Cell

UFI Number	Area (ha)	Wetland Type	Management Category
12918	21	Dampland	Conservation
12917	9	Sumpland	Resource Enhancement and Multiple Use*
6672	4.9	Sumpland	Resource Enhancement
12919	4.6	Dampland	Resource Enhancement
12921	49	Dampland	Multiple Use

*UFI 12917 was recently re-evaluated by the DEC.

Two of the wetlands occurring within the Wellard East Cell, in the northern (UFI 12918) and central (UFI 6672) portions of the cell are also protected under the *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992* (EPP) (EPA 1992). This EPP aims to protect the environmental values of lakes on the Swan Coastal Plain and was gazetted in 1992 with a plan which depicted the lakes/wetlands protected under the policy. The EPP made the filling, draining, excavating, polluting and clearing of these lakes an offence unless authorised by the EPA. Generally a 50 metre separation distance is required between an EPP lake/wetland and any form of development and is included within the mapped boundary shown in **Figure 9**. It is important that the boundaries of the wetlands under the EPP and the Geomorphic Wetlands series mapping are not the same, as the methodologies for how these were mapped differ.

A separate wetland assessment was completed for UFI 12918 and UFI 12917, to support the development of a Local Structure Plan. UFI 12918 is a Conservation Category Wetland, with the assessment determining that the boundaries of the wetland, as mapped by the *Geomorphic Wetlands of the Swan Coastal Plain* dataset, were accurate, with relatively minor differences between the mapped boundaries and the observed extent of wetland vegetation (Cardno, 2008a). The wetland assessment for UFI 12917 found that the management category for the wetland, being a Resource Enhancement Wetland was inaccurate, with the majority of the wetland, outside of the drain supporting characteristics generally associated with that of a Multiple Use Wetland category. This is further discussed in **Section 6.4.4**.

3.7 Existing and Historical Land Uses

Historically the Wellard East Cell has supported a range of rural and commercial land uses, some of which are described below and shown in **Figure 10**:

- Former market garden area within the central portion of Lot 201 Mortimer Road;
- Former dairy, located centrally along the very southern boundary of the Lot 379 Millar Road;
- Inert landfill located on Lot 59 Mortimer Road, in the south western corner of the intersection of Woolcoot Road and Mortimer Road. This facility is no longer in operation. During the operation of the facility, demolition material was likely the predominant input (Town of Kwinana 2007);
- 330kv Western Power transmission lines, which are contained in a 110 metre wide easement that extends from the north-west corner of the Wellard East Cell, along the western edge of the conservation category wetland and along the eastern edge of the remainder of the cell; and
- Animal Rehabilitation Centre in the south-east portion of Lot 379 Millar Road, which mainly supports the care of injured kangaroos.

A Preliminary Site Investigation (PSI) has been completed for Lot 201 Mortimer Road and Lot 379 Millar Road and is detailed below in **Section 3.8** (Cardno, 2008b). Based on the range of historical land uses noted as having occurred within the Wellard East Cell, further preliminary and detailed site investigations may be required to support subdivision within the other lots.

3.8 Potential Site Contamination

As stated in the previous section, a Preliminary Site Investigation (PSI) has been completed for Lot 201 Mortimer Road and Lot 379 Millar Road (refer to **Appendix C**). The information provided within this section addresses only these two lots. Further PSIs will be required for the other lots should contamination be considered to exist.

The State Government, through the Department of Environment and Conservation (DEC), has the overall responsibility for developing, administering and enforcing the *Contaminated Sites Act 2003* and its associated procedures. Part of this responsibility includes maintenance of the Contaminated Sites Database and Register. The Contaminated Sites Database and Register holds information on known, previously or potentially contaminated sites within Western Australia. A search of this database and register indicated that these two lots were not listed.

Based on the PSI, the locations within Lot 201 Mortimer Road and Lot 379 Millar Road that are likely to need further investigations to account for potential contamination are shown in **Figure 10** and include:

- A former market garden area within the central-eastern portion of the Lot 201 Mortimer Road. It is possible that this area may contain residual contamination as a result of chemical application associated with intensive agriculture; and
- A former dairy, located centrally along the very southern boundary of Lot 379 Millar Road, which may contain residual soil contamination associated with the treatment of cows, chemical treatment of building foundations and the possible storage of hydrocarbons.

Any potential soil and groundwater contamination associated with Lot 201 Mortimer Road and Lot 379 Millar Road is expected to be localised and associated with the activities outlined above (Cardno, 2008b).

3.9 Adjacent Land Uses

Within the vicinity of the Wellard East Cell, there are a number of different land uses which include predominantly agricultural (grazing and livestock) and other rural-type uses. Under the Metropolitan Region Scheme (MRS), the land surrounding the Wellard East Cell to the north is zoned Urban Deferred, to the east and south the land is zoned Rural and to the west, on the opposite side of the Kwinana Freeway the land is zoned Urban.

A number of adjacent land uses are considered to potentially generate emissions that at times may exceed amenity levels considered acceptable to residential areas and other sensitive land uses. These land uses are considered to be potentially incompatible with residential uses and include, a livestock holding facility, the Kwinana Freeway and Mundijong Freight Line, power boat facility and the Environmental Protection (Kwinana) (Atmosphere Wastes) Policy 1999 boundary. These are shown in **Figure 10** and discussed in more detail in the following sections.

3.9.1 Livestock Holding Facility

A livestock holding facility (LHF) is located on part of Lot 732 Telephone Lane, Baldivis, directly adjacent to the south-east corner of the Wellard East Cell. The LHF is licensed under Part V of the

EP Act, to operate as a 'livestock saleyard or holding pen'. This facility is owned, licensed and operated by Wellard Rural Exports Pty Ltd.

Under the associated regulations, a 'livestock saleyard or holding pen' is defined as a premise on which live animals are held pending their sale, shipment or slaughter. The LHF is used for holding sheep and under its current licence is permitted to hold up to 70,000 sheep at any time, with a total throughput of 800,000 sheep per year. The LHF holding sheds are located approximately 300 metres south-east of the Wellard East Cell boundary. The LHF contains 10 holding sheds, with the feedlot further east of these. It is likely that due to the inherent variability associated with livestock supply and shipment, livestock are likely to be held for variable periods of between 5 and 10 days and in the past Wellard Rural Exports Pty Ltd have indicated that the LHF is stocked for less than fifty per cent of the year (ECS 2006).

There is potential that the LHF may result in odour emissions that exceed the amenity levels considered acceptable in residential areas and is further discussed in **Section 6.4.5.1**.

3.9.2 Poultry Farm

The Jandakot Structure Plan documents the location of a poultry farm within the vicinity of the livestock holding facility located directly south-east of the Wellard East Cell.

In a reconnaissance search for the poultry farm, a farm was not located in the area surrounding the Wellard East Cell. ERIC, in detailing land uses within the broader area makes no mention of a poultry farm within the vicinity of Wellard East Cell either. In addition, the City of Rockingham, the locality in which the poultry farm is noted as being located, could not confirm the existence of the poultry farm. Therefore it is unlikely that a poultry farm is present.

3.9.3 Environmental Protection (Kwinana) (Atmospheric Wastes) Policy 1999

The Wellard East Cell is located within the Kwinana Atmosphere Policy Boundary where the provisions of the EPA's *Environmental Protection (Kwinana) (Atmospheric Wastes) Policy 1999 (Kwinana Atmospheric Wastes EPP)* apply. The policy aims to set sulphur dioxide and total suspended particle standards and limits for the Kwinana Industrial area. This policy describes three areas (A, B and C) each with ambient air quality standards and limits, increasing in stringency from area A (industrial) to C (largely residential).

The Wellard East Cell is found within Area C and is provided a level of protection under this policy in line with land uses for residential and rural purposes. Since the Kwinana Atmospheric Wastes EPP was enacted in 1992, the 1-hour averages used to measure ambient air quality have not been exceeded (EPA 2009). Therefore it is highly unlikely that future residents within the Wellard East Cell will be adversely affected by emissions as emission concentrations are required to remain within the levels prescribed in the Kwinana Atmospheric Wastes EPP.

3.9.4 Kwinana Freeway and Mundijong Freight line

The Kwinana Freeway is located directly to the west of the Wellard East Cell. The freeway is partly raised above the level of proposed residential development and carries significant volumes of traffic daily.

The Mundijong Railway line is located directly south of the Wellard East Cell. It is described as one of the most heavily used (in terms of tonnage) freight movement corridors in Western Australia.

Both these land uses, located within close proximity to the Wellard East Cell are likely to result in noise emissions which will need to be managed in accordance with *State Planning Policy 5.4 Road and Rail Transport Noise and Freight Considerations in Land Use Planning*. This is further discussed in **Section 6.4.5.**

3.9.5 Power Boat Facility

A power boat facility is located approximately 1 kilometre south of the Wellard East Cell, within the City of Rockingham. The power boat facility is known as Bonney's Water Ski Park and has operated in the area since 1983. This facility caters for a range of water-skiing related activities and is open most days of the week. Generally, the facility supports racing events which run from October to April each season, with events running until 2100 hours. The facility itself is comprised of a number of man-made lakes and recreational facilities, which support the needs of those utilising the facility.

In the past noise complaints have been received by the Town of Kwinana, the City of Rockingham and the DEC with regard to the operation of the facility. There is the potential for this land use to impact on the amenity and health of future residents within the Wellard East Cell. This is further discussed in **Section 6.4.5.**

3.9.6 Basic Raw Materials

No basic raw materials are currently extracted either within or in the vicinity of the Wellard East Cell however two areas are mapped under *State Planning Policy (SPP) No. 2.4 Basic Raw Materials* (SPP 2.4). These include a:

- Sand 'Extraction Area' on Lot 201 Mortimer Road; and
- Clay 'Priority Resource Area' directly south of the Wellard East Cell, extending for approximately 1,000 metres.
- The implications of these areas are further discussed in **Section 6.4.6.**

3.9.7 Indigenous Heritage

A search for relevant Aboriginal heritage information was performed using the Department of Indigenous Affairs (DIA) Aboriginal Heritage Inquiry System (DIA 2009), which incorporates both the heritage site register and the heritage survey database. The Aboriginal site register is held pursuant to *Section 38* of the state's *Aboriginal Heritage Act 1972* (AHA).

The majority of the Wellard East Cell has been subject to ethnographic and archaeological investigations of different extents since 1970. The most recent was in 1996, in support of the Kwinana Freeway extension.

The search revealed that no sites listed on the Permanent Register are located within the boundaries of the Wellard East Cell. However, two sites classified as 'Stored Data' were recorded as occurring within the cell (refer to **Figure 11**).

3.10 Non-indigenous Heritage

In order to assess the potential presence for places or features of European heritage significance, a review of readily available information was undertaken to determine if there were any of the following within the Wellard East Cell:

- World Heritage Sites;
- National Heritage Sites;

- Commonwealth Heritage Sites;
- Sites listed on the Register of the National Estate;
- Places listed on the Heritage Council of Western Australia database; and
- Places listed on the Town of Kwinana Municipal Heritage Inventory List.

Investigations involving searches of online databases revealed that there were no listed heritage sites occurring within the Wellard East Cell. A number of heritage sites are listed on the Municipal Heritage Inventory within the Town of Kwinana, predominantly to the west of the Kwinana Freeway. The closest is Bollard Bullrush Swamp which is located approximately 500 metres west of the Wellard East Cell, on the opposite side of the Kwinana Freeway. It is described as important for the conservation of flora and fauna and an important link in the wetland chain on the Swan Coastal Plain.

4 Statutory and Planning Considerations

4.1 State and Regional Planning

4.1.1 Metropolitan Region Scheme

The Wellard East Cell is zoned Urban in the northern portion as a result of the partial lifting of the Urban Deferred Zone in December, 2009 (refer to **Figure 12**). The Urban Zone includes Lot 27 and the majority of Lot 201. The balance of the cell (ie. southern portion) is still zoned Urban Deferred under the MRS.

The lifting of the Urban Deferred Zone over the southern portion of the cell (ie. Lot 379 and southern end of Lot 201) was not initially supported by the WAPC in December, 2009 as the land was affected by interim buffers from a basic raw material resource (clay extraction), jet ski park and livestock holding facility, all located to the south of Millar Road (outside the Wellard East Cell). These interim buffers are subject to further investigations as part of a separate process to the LSP, which will seek a further lifting of the Urban Deferred Zone. These further investigations have resulted in the removal of the jet ski park and raw material resource (clay) buffers over the cell (refer to **Section 6.4**).

This Wellard East Cell is surrounded by the following reservations and zones:

- Urban Deferred and Other Regional Roads to the north;
- Rural to the east and south; and
- Primary Regional Roads and Urban to the west.

4.1.2 Directions 2031 - Draft Spatial Framework for Perth and Peel (June 2009)

The WAPC recently released the *Direction 2031 – Draft Spatial Framework for Perth and Peel* in June 2009. The purpose of this framework is to establish a vision for future growth of the Perth and Peel Regions and provide a framework to guide detailed planning and the delivery of housing, infrastructure and services to accommodate that growth. It builds on from many of the principles in Network City.

The framework provides three growth scenarios:

1. **Linear City** – continuation of business as usual development patterns with the majority of growth occurring on the urban fringe;

2. **Connected City** – more balanced distribution of infill and greenfield development; and

3. **Compact City** – more consolidated pattern of growth with an emphasis on infill development.

To achieve the preferred "Connected City" scenario, the framework proposes that new growth occurs in a more balance way around a diverse activity centres network, which is linked by a robust movement network and supported by green network of parks, conservation and biodiversity areas. The framework identifies the "Activity Centres" hierarchy as follows:

- Perth central area
- Primary centres
- Strategic centres (e.g. city centres, specialised centres and industrial centres)
- Regional centres (e.g. town centres, specialised centres and industrial centres)
- District centres (e.g. town centres and industrial centres)
- Neighbourhood centres
- Local centres

There are six sub-regional areas identified within the framework and the Wellard East Cell is situated within the South-West Sub-Region. The South West Sub Region encompasses the cities of

Cockburn and Rockingham. Rockingham is the primary centre, providing a full range of services, facilities and activities necessary to the support the community within its catchment. In general accordance with Directions 2031, the LSP provides for residential development connected to movement network and supported by conservation and public open space areas, infrastructure provision and school facilities.

The South-West Sub-Region is also supported by major industrial locations such as Kwinana and Latitude 32 (Hope Valley-Wattleup), which will generate significant employment self-sufficiency (60% to 70%). Whilst there is limited employment opportunities within the Wellard East Cell due to its size and range of proposed land uses, there will be significant employment opportunities for future residents within the sub-region.

Directions 2031 also identifies a possible industrial area to the south of Millar Road. This possible industrial use is identified as an area under investigation. Whilst there are a range of existing and proposed land uses to the south of Millar Road, any industrial development should only accommodate light and service type industrial uses that do not impact on the residential growth in Wellard East. This industrial area under investigation is also identified in the Draft South Metropolitan and Peel Sub-Regional Structure Plan (refer to **Section 4.1.5**) and the Industrial Land Strategy – Perth and Peel 2009 (refer to **Section 4.1.4**). This possible industrial area would form an important employment node for Wellard East in the future.

Directions 2031 also recommends the preparation of the growth management strategies and structure plans for the sub-regional areas.

4.1.3 Outer Metropolitan Perth and Peel Sub-Regional Strategy

The Outer Metropolitan Perth and Peel Sub-Regional Strategy was released as a "follow-on" planning document to Directions 2031 and provides broad guidelines for implementation, particularly in terms of achieving housing needs. The Strategy also provides for a balance between greenfield and infill development consistent with Directions 2031. The Strategy also includes an urban management programme to retain a sufficient land supply for development on an ongoing basis to meet projected population growth.

The Strategy addresses each of the sub-regions including the South-West in which the Wellard East Cell is located. The cell is identified as *"urban deferred zone undeveloped",* which does not reflect the MRS zoning of land in the northern portion of the cell (ie. Urban). Land to the south of Millar Road is identified as a *"priority industrial site – subject to investigation".*

4.1.4 Industrial Land Strategy – Perth and Peel 2009

The Department of Planning released a draft Industrial Land Strategy for Perth and Peel for public comment in November 2009, which also identifies land south of Millar Road (referred to as North-East Baldivis) as a Priority Industrial site subject to further investigation. Liaison with the Department of Planning confirms that the site is subject to a number of constraints and industrial development, if it does progress, is likely to occur in the medium to long term. This is well behind the timeframe for residential development within Wellard East and therefore it is expected that any industrial development would need to consider the potential impacts on Urban and Urban Deferred zoned land in Wellard East.

The Industrial Land Strategy states that the majority of the North-East Baldivis site is envisaged to be used for general industrial uses that are not hazardous or offensive. According to the Strategy the site is well suited to the provision of producer services and has the potential for strategic export/knowledge based industry (ie. warehousing and distribution and transport logistics).

From a positive perspective, the potential industrial location to the south of Millar Road would provide a future employment node for residents within Wellard East, which is consistent with key principles in

Liveable Neighbourhoods. Eventually it may also trigger the removal or relocation of current incompatible uses such as the livestock holding facility.

4.1.5 South Metropolitan and Peel Sub-Regional Structure Plan

The Draft South Metropolitan and Peel Sub-Regional Structure Plan was released for public comment in June 2009. It is only a broad strategic guidance document that aims to guide more detailed planning. The plan outlines a range of key objectives including creation of vibrant and sustainable communities, efficient use of land and infrastructure, protection of natural assets, creation of reliable transport network, and provision of a range of housing densities.

The plan includes Wellard East, which is identified as "*Undeveloped Urban and Urban Deferred".* The area to the south of Millar Road is identified as *"Industrial Investigation*".

4.1.6 State Planning Policy No. 2.4 - Basic Raw Materials

The purpose of the *State Planning Policy (SPP) No. 2.4 Basic Raw Materials* (SPP 2.4) is to identify the location and extent of known 'basic raw materials' (sand, clay, hard rock, limestone, gravel and any other such material) close to major markets and to protect such areas from being developed for incompatible land uses, which could limit future exploitation (WAPC 2000).

Within SPP 2.4, basic raw materials are designated as either:

- Extraction Areas, which should be protected in the short-term but eventually replaced by other resources;
- Key Extraction Areas, which are regional resources providing long-term supply and should be protected in relevant town planning schemes; and
- Priority Resource Areas (PRAs), which are regionally significant and should not be constrained by incompatible land uses or development.

Under this policy, there is a presumption against the introduction of sensitive land uses (such as residential) within the vicinity of basic raw materials which could be adversely affected by existing or potential extractive industries. SPP 2.4 recommends that before the introduction of sensitive land uses within 1,000 metres of designated basic raw materials resource areas, the significance of the resource and the likely impacts of extracting the resource need to be considered during the land use planning process, and the compatibility of the proposed land use with this resource.

This matter is further considered in **Section 6.4.6.2**.

4.1.7 Jandakot Structure Plan

In August, 2007 the Western Australian Planning Commission (WAPC) released the final Jandakot Structure Plan (JSP) following on from the draft JSP released in October, 2001.

The purpose of the Structure Plan is to:

"plan and coordinate the development expectations of the area while balancing environmental issues following a number of reviews and studies of the area".

The JSP recognises potential development areas and proposed indicative road layouts and locations for commercial facilities, whilst retaining environmentally sensitive features such as wetlands. The plan is based on Liveable Neighbourhood principles and aims to accommodate the projected growth of the corridor. The overall intent is to create contained and environmentally responsive urban developments. **Figure 13** illustrates the JSP and shows Wellard East at the southern end of the plan.

The JSP acknowledges that a "Water Resource Management Strategy" will need to be prepared, together with more detailed Local Structure Plans for future development proposals within the JSP area. This requirement has been addressed by the Department of Water (DoW), through the recent release of the Jandakot Drainage and Water Management Plan. This Drainage Plan is addressed in **Sections 5.7 and 6.5** of this report and the Local Water Management Strategy for Lots 201 and 27 Mortimer Road.

According to the JSP, MRS and local scheme amendments are required prior to subdivision proceeding. This has now occurred over the northern portion of the Wellard East Cell.

The JSP proposes urban development in the Jandakot Region over three timeframes – short (0-5 years), medium (5-10 years) and long term (10+ years). Five urban precincts are identified in the Structure Plan area, with the Wellard East Cell included in Area 4.

Within Area 4, which contains an area of some 300ha, the estimated ultimate population was 8,190 of which 4,990 would be accommodated in the precinct by 2026. Area 4 was estimated to be the most occupied of the 5 precincts by 2026 with 60% of its land area developed by this time.

The JSP earmarks Area 4 for medium term urban development in the draft document when it was released in 2001 (i.e. within 5-10 years) on the basis the land was then zoned Rural. This timeframe was not updated when the JSP was finalised 6 years later. Following the partial lifting of the Urban Deferred Zone and the current LSP process, subdivision approval for Lots 27 and 201 (ie. only part of the Wellard East Cell) is not expected until 2011. This is consistent with the timeframe in the JSP.

Whilst a significant portion of the Wellard East Cell is shown as medium term urban, the JSP also shows indicative road layouts (key roads only), significant wetlands, commercial centres, primary school, power lines, drainage lines and urban transition areas along the eastern and southern boundaries of the cell. The JSP also shows notional walkable neighbourhoods focussed around commercial centres.

Many of these land uses are reflected in the LSP and are discussed further in **Section 6.1.1** of this report. It should be noted that the JSP states that the land use designations are indicative only and will guide the more detailed planning and other technical investigations at the LSP stage. Guidelines for urban design are required to be based on Liveable Neighbourhoods. In accordance with the JSP there will need to be a clear transition between rural and urban areas (ie. Woolcoot Road for Wellard East), linear road linkages between neighbourhoods located along the freeway, incorporation of green linkages within LSPs. The JSP also requires implementation of transition design principles from Liveable Neighbourhoods for urban development adjacent to conservation and reserved areas. In terms of Wellard East, urban design around wetlands and buffer areas will be a critical consideration, which is addressed in **Section 6** of this report.

4.1.8 Liveable Neighbourhoods

The LSP has generally been designed in accordance with the provisions and principles of Liveable Neighbourhoods, in particular the road design. Liveable Neighbourhoods encourages street networks that have a high level of internal connectivity and good external linkages to cycle, pedestrian and bus networks. The road design should also be legible and minimise car travel.

Another key provision in Liveable Neighbourhoods is the promotion of walkable access to activity nodes or destinations with a general requirement for 400 metre walkable catchments. In this case, the location of the primary school, community centre site, public open space and wetland conservation areas within the LSP area are of relevance. This is further addressed in **Section 6.1.1** of the report.

Liveable Neighbourhoods provides guidance on the location, distribution and amount of POS required. A Public Open Space (POS) table has been prepared for the LSP area in accordance with Liveable Neighbourhoods Table 11 (refer to **Figure 17**). Also a POS table has been prepared for the entire Wellard East Cell (refer to **Figure 18**).

Liveable Neighbourhoods require Local Structure Plans to specify residential densities and encourages diversity in residential densities and dwelling types thereby providing more choice for changing household types. Residential densities proposed in the LSP meet these objectives and are addressed in **Section 6.2** of this report.

Liveable Neighbourhoods also emphasises connections to adjoining development within and external to the Wellard East Cell.

According to Liveable Neighbourhoods it is important for the LSP design to respond to the site context and characteristics, such as wetlands, Western Power easement and the drainage line. This is also important in terms of achieving a Liveable Neighbourhoods objective of an urban structure that achieves a balanced outcome between urban and environmental sustainability.

4.2 Local Planning

Whilst the entire Wellard Cell is located within the Town of Kwinana, it does adjoin land located within the City of Rockingham (ie. south of Millar Road). This land is included in the City of Rockingham Town Planning Scheme No. 2 and is currently zoned Rural.

4.2.1 Town of Kwinana Town Planning Scheme No. 2

Under the Town of Kwinana Town Planning Scheme No. 2 (TPS2), the northern portion of the Wellard East Cell is zoned Development (including Lot 27 and the majority of Lot 201), which occurred concurrently with the lifting of the Urban Deferred Zone in accordance with Section 126(3) of the Planning and Development Act (refer to **Figure 14**).

The southern portion of Wellard East Cell (including Lot 379), which is still zoned Urban Deferred under the MRS, remains zoned Rural A and Cluster/Communal Rural Settlement. There is also a small portion of unzoned land. Another small portion of land (adjacent to the southern boundary of Lot 201) is reserved Park Recreation and Drainage and reflects the existing drainage line. It is expected that the southern portion of the Wellard East Cell will be zoned Development concurrently with further lifting(s) of the Urban Deferred Zone.

TPS2 Zoning Map also shows a number of landscape protection areas (ie. special control areas) that generally align with the wetlands and vegetation located in the cell. Under Clause 6.16 of the Scheme, the general intent is to protect areas of ecological value or landscape amenity whilst at the same timing allowing development. In this regard Council may require management plans in order to ensure that subdivisions minimise impact on natural ecological features or areas of landscape amenity. This issue is considered as part of the environmental assessment in **Sections 3 and 6.4**.

The whole of the cell is located in a Drainage Catchment Management Area. The implications of this are being dealt with through the Local Water Management Strategy for Lots 27 and 201 (refer to **Section 6.5**) and the overall Jandakot Drainage and Management Plan (refer to **Section 5.7**).

According to the Scheme, the purpose of the Development Zone is to:

"provide for orderly planning and development of larger areas of land in an integrated manner within a regional context whilst retaining flexibility to review planning with changing circumstances…Council will have due regard to the desirability of higher densities, transit related development and good pedestrian and vehicular access to stations in order to promote public transport usage.

The objective of this zone is to:

(a) Designate land for future development;
(b) Provide a planning mechanism for the identification and protection of areas of conservation value whilst facilitating the growth of the Town;

(c) Provide for the orderly planning of large areas of land for residential, commercial, industrial and associated purposes through a comprehensive structure planning process;
(d) Enable planning to be flexible and responsive to changing circumstances throughout the development stages of the area; and
(e) Provide sufficient certainty for demand forecasting by service providers".

According to Clause 6.15 of TPS 2, the Development Zone triggers the need for a local structure planning process to be completed prior to subdivision of the site. Clause 6.17 of the Scheme sets out the statutory process and the elements to be included in a local structure plan. The LSP has been designed to meet the intent and principles of the Development Zone and is generally consistent with the Structure Plan requirements in the Scheme. However, the focus of the technical reports is on Lots 27, 201 and to some extent Lot 379. Notwithstanding this, the LSP incorporates the balance of the cell, although landowners in these areas may be required to carry out further technical studies to justify the detailed planning and development of their land.

Under the Scheme, all of the Wellard East Cell is located in Policy Area 6. The provisions in the policy area are mostly outdated as it reflects that area's previous rural land uses.

Wellard East is also affected by two amendments to TPS2 (ie. Amendments 100 and 115), which deal with developer contributions towards various forms of infrastructure, including community facilities. The progress of both amendments and the implications for Wellard East are discussed in the next sections.

4.2.2 Town of Kwinana Town Planning Scheme No. 2 – Amendment No. 100

Town of Kwinana has prepared Amendment 100, which provides for developer contributions to "hard" infrastructure such as roads and regional drainage through a development contribution plan. Wellard East Cell is included in Developer Contribution Area 2. Amendment 100 requires developers in Wellard East and other cells to contribute to a range of infrastructure at the time of subdivision. Key infrastructure works (as advertised) include noise wall/bund along Millar Road, upgrading of Mortimer, Woolcoot and Millar Roads and regional drainage. The Amendment together with an indicative costs contribution schedule were advertised in late 2009. Numerous submissions were lodged, including one from Cardno on behalf of Armana Holdings, raising a variety of issues.

Discussions with Council confirms that officers are in the process of addressing issues raised in submissions. It is possible that Amendment 100 will be readvertised if Council recommends significant modifications to the previously advertised amendment.

Armana Holdings has already provided a written commitment to Council to contribute to the future provision of "hard" infrastructure. Council officers have confirmed that the progress of Amendment 100 will not hold up LSP and subdivision approvals as approvals will be subject to legal agreements between Council and the subdivider, if the Amendment is still not finalised.

4.2.3 Town of Kwinana Town Planning Scheme No. 2 – Amendment No. 115

Town of Kwinana has prepared Amendment 115, which provides for developer contributions to "soft" community infrastructure through a development contribution plan. Wellard East Cell is included in developer contribution area 11. Amendment 115 requires developers in Wellard East to contribute to a range of community type infrastructure at the time of subdivision that will be provided at the local level within the cell (eg. local community centre and local sporting ground with pavilion), the district level (eg. Anketell Branch Library and Casuarina Community Centre) and the regional level (eg. Kwinana Youth Facility and the Thomas Oval Recreation/Sporting Ground). The Amendment together with a Town of Kwinana Community Infrastructure Plan and indicative costs contribution schedule were advertised in late 2009. Numerous submissions were lodged, including one from Cardno on behalf of Armana Holdings, raising a variety of issues.

Town of Kwinana has addressed the submissions and resolved to support final approval of the Amendment subject to some modifications. The Amendment was forwarded to the Department of Planning/Western Australian Planning Commission in late 2010 and is still in the process of being assessed.

Armana Holdings has already provided a written commitment to Council to contribute to the future provision of community facilities. Similar to Amendment 100, Council officers have confirmed that the progress of Amendment 115 will not hold up LSP and subdivision approvals as approvals will be subject to legal agreements between Council and the subdivider, if the Amendment is still not finalised.

4.2.4 Eastern Residential Intensification Concept

In November 2005, the Town of Kwinana released for comment the Eastern Residential Intensification Concept, commonly referred to as ERIC (refer to **Figure 15).**

According to the Town of Kwinana, ERIC *"has been prepared to provide an overarching framework for the co-ordination of subdivision and development within the areas designated under the Jandakot Structure Plan area as having potential for urban development"*.

The plan aims to provide a greater level of detail than the JSP and is in effect a district structure planning framework within which to develop local structure plans.

ERIC has been advertised but has not been finalised by the Town of Kwinana. Council officers advised that ERIC is a guidance document only. The LSP contained within this report generally reflects the design principles in ERIC, as advertised. This is further discussed in **Section 6.1**.

In terms of land uses within Wellard East, ERIC shows the majority of land being developed for Residential R20 and R30/40 and conservation areas (ie. wetlands). Other land uses proposed in the cell include local primary school, POS, community centre and the marsupial rehabilitation clinic. ERIC also shows how the Wellard East Cell will connect to land directly to the north of Mortimer Road, which is via a collector road through Wellard East connecting with Nicolas Road in Casuarina.

4.2.5 Town of Kwinana Local Planning Policies

4.2.5.1 Local Planning Policy 4.3.3 – Public Open Space

The policy was last reviewed in 2006 and as such some parts of the policy are inconsistent with Liveable Neighbourhoods. Notwithstanding this, the POS design shown over Lot 201 within the LSP area is based on key principles in this policy, in particular preservation and enhancement of biodiversity values and preservation of significant trees and remnant vegetation. The policy requires the standard 10% of gross subdividable area as POS, which is consistent with Liveable Neighbourhoods. The policy also requires the provision of district recreational facilities, however the POS function within Wellard East will be largely limited to conservation and local recreational needs. This is consistent with Amendment 115 to TPS2, which proposes the location of district recreational facilities to the north of Wellard East such as the Casuarina District Sporting Ground. The policy also prescribes absolute minimum sizes of POS: 4000m^2 for public use and 1000m^2 for landscaped area and no POS shall have dimensions of less than 20m for public use and 10m for landscaping areas. However, the policy allows these provisions to be varied to preserve a significant natural feature or recreational asset. The amount and location of POS for the LSP area is discussed in **Section 6.3** of the report.

The policy allows for POS to be used for drainage provided Council is satisfied that the recreational and/or landscape function of the reserve are not adversely affected. The policy outlines that no more than 50% of the POS is to be inundated at any time. **Figure 17** includes the POS table and a portion of the drainage areas are included in the 10% POS contribution in accordance with Liveable Neighbourhoods. However, the 1 in 1yr drainage areas are excluded from the 10% POS contribution.

The policy also states that EPP and conservation category wetlands are excluded from POS, which is consistent with Liveable Neighbourhoods. However, buffers to these type of wetlands may be

included in POS as per the policy and Liveable Neighbourhoods. This matter is further addressed in **Section 6.3.**

4.2.5.2 Local Planning Policy 3.3.7 – Community Facilities Sites

This policy was also reviewed in 2006 and is based on the key objective of insuring that social infrastructure (ie. community facilities sites) are incorporated into the design of new residential areas. The policy discusses the provision of land for private community facilities such as medical centres, however no commercial or neighbourhood centres are being provided within the Wellard East LSP. Such uses may be more appropriately located near the commercial centre on Mortimer Road (just to the north of the Wellard East Cell).

The policy also addresses the provision of public community centres and allows for such sites to be included in 10% POS contribution as part of the residential subdivision. The sites are required to be at least 2000m^2. The Policy also recommends the community centre be located close to nodes of activity such as primary schools, in order to maximise co-location advantages (ie. shared parking and good access).

The LSP shows a community centre location within POS in the centre of the cell. The provision and use of community facilities within Wellard East has already been given detailed consideration by Town of Kwinana through preparation of the Community Infrastructure Plan and Amendment 115, which were publicly advertised in late 2009. Both documents, only recommend local community infrastructure being provided within the Wellard East Cell whilst district and regional community facilities are provided in other cells. The intention is for local community infrastructure (ie. local community centre and local sporting ground with a pavilion) to be located within POS and for the development of the built infrastructure to be subject to developer contributions. This recommendation is reflected on the LSP.

4.2.5.3 Local Planning Policy 4.3.1 – Conservation of Remnant Vegetation

This Policy addresses Council's objective of protecting remnant vegetation as part of residential subdivisions by giving a high priority to retaining existing trees and retaining representative samples of different vegetation complexes (ie. biodiversity) and ecological linkages. The Policy requires existing trees to be shown on structure plans and planting of local species occurring naturally in the area will be encouraged by Council. Detailed management measures and recommendations for protecting native flora and fauna for Lots 201 and 27 are discussed in **Section 6.4.2**. The rationale for locating POS within the LSP, in particular protection of existing trees, is addressed in **Sections 6.1 and 6.4**. Also a landscaping masterplan has been provided in **Appendix F**.

5 Infrastructure and Servicing Considerations

5.1 Reticulated Sewerage

The Water Corporation advises that the Wellard East Cell (ie. LSP Area) can be serviced off their existing network, however some extension of the system will be necessary. Servicing will be initially dependent on the construction of the proposed Kwinana D Pump Station (PS) located on Johnson Road to the west, within the Emerald Park development being undertaken by Cedar Woods. The catchment area for this pump station extends over the cell area. According to the current scheme design the PS catchment East of Kwinana Freeway is serviceable via a single DN375 gravity main crossing of the freeway adjacent to the proposed PS location.

The Corporation has provided preliminary advice that improvements to off-site existing downstream infrastructure west of the Freeway may be required to service the cell. Depending on the timing of surrounding development, upgrading of the pumping capacity of Bertram Road WWPS may be required ahead of schedule. If required, these works would be developer prefunded. The Corporation advises that the upgrade and associated design considerations do not pose any threat to the servicing of the LSP Area.

5.2 Reticulated Water

The Water Corporation has advised that the Medina Scheme, which currently extends eastwards to the Kwinana Freeway, is proposed to be extended further to the east in order to service the cell.

More detailed planning is currently being undertaken by the Corporation, and amplification of the Medina Scheme is likely to require a new reservoir at a higher level to boost pressures for the area, as well as a system of new distribution trunk mains, which will need to cross the Kwinana Freeway and feed into the additional Scheme Area.

The Corporation has advised that should a temporary supply be required ahead of these ultimate works, a temporary supply system can be established from the Johnson Road DN300 main via Mortimer Road to the north of the LSP Area or Millar Road to the south with the capability of servicing up to 400 lots to the south of Mortimer Road and west of Woolcoot Road. The Corporation has noted however, that a DN700 extension will be required to be brought from the Colchester Avenue/Sulphur Road Intersection in Kwinana Town Centre to the Holden Close/Johnson Road Intersection as per the Medina Scheme if and when development in the cell exceeds 400 lots, or if significant early development occurs in the southern areas within the cell. This headworks infrastructure would be developer prefunded if funds are unavailable from the Water Corporation.

Any freeway crossings will be bored to prevent any interruption to freeway traffic.

5.3 Power

The Wellard East Cell is currently bounded by 22kV overhead power lines on Johnson, Mortimer, Woolcoot and Millar Roads with a link across the centre of the area between Johnson and Woolcoot Roads. Any existing 22kV lines, which travel through any proposed urban area, will be located underground as part of providing underground power services to future residential lots.

Proposed urban development of the cell will initially have reasonable access to power supplies off existing facilities in Millar Road from the south only. The nearest feeder to the north of the LSP Area is the MED501.0 Ambercrombie Road feeder, which is currently at capacity. Ultimate development of the cell will require upgrading of this system by Western Power, which the developer may be required to contribute to. Western Power has advised that an additional feeder is to be installed from the new

Baldivis Substation, with a scheduled commissioning date of 2012. The load from the LSP Area may be transferred to the new feeder depending on network requirements at that time.

It is noted that Western Power transmission lines traverse the cell. Easement and transmission tower locations are indicated on the LSP.

5.4 Telecommunications

It is assumed that existing Telstra infrastructure is available in proximity to the Wellard East Cell. Some offsite works may be required to run cables to the LSP Area. Fibre to the home (FTTH) may be deployed if required under the National Broadband Network initiative.

5.5 Gas

Natural gas is available to residential developments at Bertram to the north-west. Westnet Energy has advised that there is sufficient capacity to service the Wellard Cell initially; however amplification may be required in the future depending on the timing of cell development.

Westnet advises that the development's serviceability, via an extension of gas mains under the freeway at Mortimer Road, will depend on approval from relevant stakeholders including Main Roads WA (MRWA), and advise that considerable approval risk exists for this extension.

Extension of gas mains will attract developer funded contributions, the scale of which is dependent on the location of the connecting subdivision.

5.6 Existing Movement Network

The LSP Area is located adjacent to Kwinana Freeway, which is the major north-south route connecting the Perth CBD to the southern suburbs, Mandurah and South-West WA, with an estimated traffic volume in the order of 39,000 vpd (vehicles per day). Mortimer Road to the immediate north of the LSP Area (ie. cell) is a District Distributor (B) with direct freeway access from both directions and an estimated 2,200 vpd. To the south and east of the cell are Miller and Woolcoot Roads respectively, with daily volumes estimated at 2,600 vpd and 500 vpd respectively, based on 2004 counts and catchment observations. Wake Way provides access to the cell off Mortimer Road from the north, with no through traffic function.

No pedestrian or cyclist facilities are provided adjacent to the cell, with the nearest facilities being the principal shared path running adjacent to the western side of Kwinana Freeway.

The nearest public transport route is the Transperth 543 bus route through Bertram to the west of Kwinana Freeway, connecting to the Kwinana Station on the Perth– Mandurah Train Line off Thomas Road.

Further details of the existing road and transport network are presented in the Transport Assessment Report by Shawmac (refer to **Appendix D**).

No emergency services are located within the Wellard East Cell.

5.7 Drainage

5.7.1 Jandakot Drainage and Water Management Plan

The Jandakot Drainage and Water Management Plan (JDWMP) forms a key part of the DoW's urban drainage initiative and was recently finalised. It has been developed as a guide for developers and stakeholders, to support development and to allow it to proceed in a timely manner, particularly with

regards to stormwater management. The JDWMP has been prepared in accordance with the Jandakot District Structure Plan, which was discussed in **Section 4.1.2**.

Broadly the JDWMP provides design criteria and management strategies to incorporate into District Water Management Strategies (DWMS) and the Local Water Management Strategies (LWMS), to be prepared in support of local structure planning. The areas of focus that the JDWMP include:

- Protection of environmental assets, including wetlands;
- Increasing water use efficiency and the use of non-drinking water resources;
- Stormwater management, in accordance with the *Stormwater Management Manual for Western Australia* (DoW 2007). This includes floodplain management, surface water quality and quantity, groundwater quality and quantity; and
- Key design criteria for stormwater and groundwater management.

The key design criteria are further explored in **Sections 5.7.2** and **5.7.3**.

5.7.2 District Water Management Strategy

A District Water Management Strategy (DWMS) was developed by Cardno for Lots 201 and 379 (Cardno, 2009b). The DWMS aims to put in place water management strategies that will protect downstream receiving environments and minimise any impacts. The key design criteria for the Wellard East Cell are based on those provided in the JDWMP and the *Stormwater Management Manual for Western Australia* (DoW 2007) and are outlined in **Table 11**.

Table 11: Key design criteria of DWMS

Design Criteria
Water Conservation
› Minimising water requirements in the establishment and maintenance of POS.
› Increasing community awareness of water conservation.
› Maximise surface aquifer recharge to minimise net use of water.
Surface Water
› Retain the 1-year 1-hour average rainfall interval at source or close to source as possible through storage or soakage devices.
› Post-development critical 1-year average reoccurrence interval (ARI) peak flow and volume and the 100-year ARI peak flow shall be consistent with pre-development flows at discharge points into waterways and discharge points into each sub-catchment.
› Post development flows must be discharged at flow rates that are consistent with pre-development flow rates for the same reoccurrence events.
› Development along the Peel Branch drains will have a finished floor level 0.5 metres above the 100-year average reoccurrence flood interval level.
› Existing hydraulic capacity of waterways must be maintained
› Public open space and retention basins operate as dry basins with a minimum clearance of 0.3 metres between controlled groundwater levels and the invert basin.
› Defined major arterial roads should remain passable in the 100-year ARI storm event.
› Minor roads should remain passable in the 5-year ARI storm event.
› Water quality treatment systems to be designed in accordance with the *Stormwater Management Manual for Western Australia* (DoW 2007) and *Australian Runoff Quality* (Engineers Australia 2006).
› Surface water quality targets are to be achieved through a treatment train approach.
› Surface water quality discharged must be in accordance with DEC requirements.

Groundwater

- Where the maximum groundwater level is close to the surface, the provision of a sub-surface drainage network and/or importation of fill will be required to manage the risk posed to infrastructure by high groundwater levels. In such instances, the subsurface drainage will need to be placed above the approved controlled groundwater level.
- Bioretention systems and drainage inverts are to be set at or above the controlled groundwater level.
- Subsurface drainage installed at or above controlled groundwater level.
- Subsurface drainage must be designed with free-draining outlets.
- Adopt management measures that actively reduce total nitrogen and phosphorus levels.
- Any clean fill imported onto the site is to incorporate a band of material that will reduce phosphorus exportation.
- Water quality discharged to groundwater must be in accordance with DEC requirements.

5.7.3 Local Water Management Strategy

A Local Water Management Strategy (LWMS) has been developed for Lots 201 and 27 Mortimer Road on behalf of Armana Holdings. The LWMS adopts the strategies outlined in the JDWMP and the DWMS, providing more detail on the management of water within the above lots. The LWMS is provided as in appendix to this Local Structure Plan, refer to **Appendix E**. The key outcomes of this document are outlined in **Table 12** below.

Table 12: Key outcomes of LWMS

- Provide a broad level stormwater management framework to support future urban development;
- Incorporate appropriate Best Management Practices (BMPs) into the drainage systems that address the environmental and stormwater management issues identified;
- Minimise development construction costs, which will result in reduced land costs for future home owners;
- Minimise ongoing operation and maintenance costs for the land owners and Town of Kwinana;
- Develop a water conservation strategy for the area that will accommodate existing groundwater allocation constraints for the area; and
- Gain support from the DoW and Town of Kwinana for the proposed method to manage stormwater within Lots 201 and 27 Mortimer Road and potential impacts on downstream areas.

As the Wellard East Cell is comprised of multiple landowners, further investigations will be required for the remainder of the Wellard East Cell, in order to develop suitable additions to this LWMS or preparation of a separate LWMS. These investigations will be undertaken at the discretion of the other landowners and/or developers and should be in line with the JDWMP and DWMS. This LWMS will not impede on the ability of other landowners to manage water, particularly stormwater, effectively and is in line with the key overarching documents, discussed above.

6 The Local Structure Plan

6.1 Design Rationale

A Local Structure Plan (LSP) has been prepared for the Wellard East Cell to facilitate the development of a vibrant community (refer to **Figure 16).** The starting points for the preparation of the LSP were the Jandakot Structure Plan (JSP) and the Eastern Residential Intensification Concept (ERIC). Both the JSP and ERIC recognise a linear urban form will result within the LSP Area (ie. Wellard East Cell) given the limited width of available land between the freeway and the rural wedge to the east.

The cell is heavily constrained by the existence of three (3) wetlands, two (2) drainage reserves traversing the developable area and the 110m wide Western Power 330kv easement. As recognised in ERIC, these constraints largely confine urban development to a linear configuration through the western and central sections of the cell as depicted in the LSP.

The heart of the design vision for the LSP is to integrate human activity and habitation with the natural environment in a respectful and responsive way. The design principles underpinning this are largely based on Liveable Neighbourhoods, and were guided by several influences. The LSP design endeavours to:

- maximise the proportion of lots with good solar orientation on the east-west axis to more easily facilitate solar passive housing designs;
- form a modified grid structure to provide strong permeability throughout the development;
- give appropriate consideration to the wetland and buffer areas by demarking the public realm and providing a management barrier; and
- establish strong view corridors through the road reserves terminating in vegetation.

Furthermore, the LSP offers a degree of flexibility to enable an innovative and creative response to any future unforseen issues or needs that may arise. As such, the LSP is intended to operate as a guiding framework for subdivision and development that can evolve and adapt over time, rather than functioning as a rigid and finalised design.

6.1.1 Land Uses

As previously mentioned, the LSP has been prepared in accordance with the principles of Liveable Neighbourhoods including optimising land efficiency, providing lot diversity, place activation and the integration of urban water management strategies.

As outlined in ERIC, the expansion of this broader development corridor will be predominantly for residential purposes and the principal land use within the LSP area is low density residential (nominally indicated as being R20 and R25). Medium density residential areas (nominally indicated as being R30 and R40) are proposed adjacent to public open space (POS), community centre and wetland buffers. In addition, two areas of R50 (medium density residential) are identified on Lot 201 directly opposite POS.

A community centre is proposed centrally within the Wellard East Cell in accordance with the provisions of ERIC. Similarly, a 4.0ha primary school is proposed within the LSP Area and this is discussed in greater detail in **Section 6.8**.

The LSP also makes reference to a 'marsupial rehabilitation clinic' situated at the southern end of the LSP Area on Millar Road. Armana Holdings understands the significant contribution this facility makes to the wider community and the LSP makes provision for the continuation of this land use activity indefinitely.

Whilst no neighbourhood centre is shown on the LSP, a local retail centre is proposed just to the north of the cell on Mortimer Road that will also service the Wellard East Cell. The projected population for the cell is relatively low due to wetlands and other constraints that reduce the developable land area. However, in response to Town of Kwinana comments, a potential home store (maximum floorspace of 100m^2) is shown on the LSP opposite the primary school site. This will allow residents to purchase daily convenience goods within the cell and therefore reduce car reliance for all daily retail needs.

A range of other uses shown on the LSP will provide an activity focus for the cell, in particular the primary school and public open space.

6.1.2 Vehicular Access and Transport Assessment

A transport assessment carried out primarily with respect to the proposed development of Lots 27, 201 and 379 (ie. study area) and with general reference to the remainder of the Wellard East Cell has been prepared by Shawmac (refer to **Appendix D**). It focuses on the following key transport issues:

- Local road capacity for additional traffic generated by the proposal (to develop the lots within the LSP);
- The extent that increased traffic loads can be safely managed on the adjacent current and future road networks;
- The provision of safe access to the proposed development area;
- Safe access to the school site; and
- Safety and efficiency of the internal road network including adequate provision for pedestrians and cyclists, and provision for public transport.

The assessment involved modelling of predicted traffic flows and the impact of the increased flows on existing and proposed roads and intersections. The assessment also provided recommendations on the intersection and road location and treatments required for upgrading of existing roads and design of proposed roads within the study area.

Findings of the assessment are summarised below. For detailed findings please refer to the Transport Assessment Report in **Appendix D**.

The proposed internal road layout consists of a main north-south link road running through the cell between Mortimer Road and Millar Road (ie. neighbourhood connector A). The remainder of the network is generally permeable with street design and layouts to reinforce the road hierarchy.

Proposed access to the cell will be provided through Lot 27 Mortimer Road as indicated on the Local Structure Plan. This is intended as a first stage access and is referred to as the Mortimer Road – Road A interim intersection and it allows for a temporary full movement intersection. The Shawmac Transport Assessment includes an assessment of the effect of the intersection on the performance of the road network (ie. Kwinana Freeway).

Ultimately the access will be via a realigned Road A connection which will be located to the east and will form a 4 way junction between Mortimer Road – Road A and Nicolas Drive. This intersection will be constructed as a roundabout and the Mortimer Road – Road A interim intersection will be modified to be a left in/left out only. As development progresses the performance of the Mortimer Road – Road A interim intersection at Lot 27 will be monitored. If performance deteriorates to an unacceptable level prior to the construction of the ultimate intersection at Nicolas Drive, the roundabout annulus will be constructed and the interim intersection will be modified to a left in/left out intersection. This requirement is included as a development principle on the LSP.

The transport assessment finds that proposed internal road reservations are able to adequately manage predicted ultimate traffic flows based on adoption of the recommended Liveable Neighbourhood road categories. Road reservations widths have been sized to reflect the recommended road categories. There are a variety of intersections shown on the LSP including staggered “T” intersections as well as four way intersections. However, the four way intersections

(three in total) are located on access streets (with lower traffic volumes) and are considered to be consistent with Liveable Neighbourhoods. It is also found that based on the recommended road profile, direct lot access will be acceptable for all roads within the study area, including the primary north-south road (ie. Road A). The only exception to this is direct lot access to Mortimer Road west of Nicolas Drive, which will not be permitted.

Pedestrian and cycle networks have been assessed within the transport report including dual use paths (or path and cycle lanes), footpaths, shared road facilities and crossing facilities. Recommendations have been incorporated into the LSP. Public transport possibilities identified include an extension of the 548 bus route from the current Bertram Service, with future stops located such that maximum dwelling to bus stop distance is 500m.

6.1.3 Landscape and Streetscape

The Landscape Masterplan prepared by McNally Newton (refer to **Appendix F**) highlights existing key features within the Wellard East Cell. The entry road via Lot 27 Mortimer Road passes through a resource enhancement area with a living stream and stand of existing trees. The first major public open space (POS) acts as a gateway into the estate with the towering existing trees framing the park. Shelters, BBQ facilities, kick-a-bout turf areas, and play equipment are envisioned in this area.

The Conservation Category Wetland on Lot 201 will have a buffer with native planting, trail networks, boardwalks, and interpretive signage. The existing drainage corridors are proposed to be transformed into “Living Streams” and multi-use corridors. These streams link the parks and the residents of the estate. All POS areas fall along this “Living Stream” and provide passive and active facilities for the public.

6.2 Residential Density

In the urban areas of the LSP it is proposed that lots will generally comply with an R Code average of R20 (ie 500m² lot size) and R25 (ie. 350m^2). Together with medium density residential lots, this is expected to produce a dwelling yield in the order of 1468, which is consistent with dwelling estimates calculated by Town of Kwinana for Amendment 100.

As detailed on the LSP, Detailed Area Plans (DAPs) will be provided for all medium density lots in order to guide built form.

The proposed density mixture is consistent with the principles in Liveable Neighbourhoods and Directions 2031.

6.2.1 Lot Layout

Recognising that the unique vegetation qualities of the cell is a key driver in the development of the LSP, together with the interconnected movement network and POS areas form the major structuring elements. These elements define the locations where neighbourhood development can proceed.

As such, the design outcome in the north of the LSP Area focuses on the high quality mature vegetation and the shape and configuration of both developable land and the POS has been heavily influenced by the desire to retain this vegetation.

In addition to locating development in the least environmentally sensitive areas, the design employs a number of elements to promote the retention of landform and maximise amenity, as follows:

- Maximising the number of lots with visual or physical access to areas of high amenity including POS areas, wetland buffers and cores and areas of retained vegetation;
- Integrating POS into a broader conservation and pedestrian movement network; and

- Providing a legible and permeable movement network for vehicles and pedestrians, with a strong entry experience to the development from the north.

Based on this the lot layout creates walkable precincts of diverse character with convenient access to areas of high amenity.

In summary, the design approach is consistent with the statutory requirements applicable to the cell detailed in Section 6.17 of Town Planning Scheme No. 2 (TPS2). These provisions require the LSP to provide for a form of subdivision and development that balances the retention of the site's key environmental features with the principles of Liveable Neighbourhoods.

Consideration has also been given to the careful extraction of sand around the existing trees within the central POS area. Whilst the detailed earthworks design for the layout has not yet been finalised, Wood and Grieve Engineers have identified in their designs a cut minimisation area including around the existing trees. In summary the required volumes will be achievable without any extensive cutting around the existing vegetation.

6.3 Public Open Space

The public open space (POS) is presented on plans and schedules for the LSP approval area and the overall cell in accordance with Liveable Neighbourhoods. The POS plans are shown on **Figures 17 and 18** and the schedules are included in **Appendix I**. The POS provision for the LSP approval area and the Wellard East Cell is 13.9% and 12%, respectively.

The allocation of Public Open Space (POS) has been based on the following principles:

- Provision of useable portions of POS in each proposed urban area;
- Linkage of POS networks;
- Provision of POS within a walkable catchment of all urban development;
- Enhancement of Western Power Easement for passive recreation (but not included in the 10% POS contribution);
- Retention of remnant vegetation in either multiple use corridors or parks where possible; and
- Dual use of multiple use corridors as drainage swales and POS in certain locations.

The northern areas of POS have been configured to maximise retention of existing vegetation, which is important given the clearance of the balance of the LSP Area with previous rural activities.

The LSP is consistent with the intent of Liveable Neighbourhoods as all lots are within 400 metres of POS.

The central area of POS is generously proportioned and despite performing a drainage role around the edges only, is still sufficiently large to facilitate and meet the needs of the local community in terms of being an active informal recreational area.

POS areas shown in the balance of the cell are indicative as they are subject to more detailed urban design, environmental and drainage investigations and POS calculations. The POS Schedule for the cell is also indicative as the location and size of REW wetlands may change and drainage calculations included in the schedule were estimates only. Individual LWMSs will determine the final drainage areas.

6.4 Environmental Considerations

6.4.1 Acid Sulphate Soils

The Department of Planning ASS risk mapping indicates that the majority of the Wellard East Cell has a "*moderate to low*" risk of ASS occurring. Only two areas associated with the conservation category wetland and one of the resource enhancement wetlands are mapped as having a "*high to moderate*" risk of ASS occurring.

Within the Local Structure Plan no spatial response is provided or required for the potential presence of ASS.

ASS is a naturally occurring soil or sediment often found and managed within the Swan Coastal Plain. The potential presence of ASS can be dealt with through the environmental and planning approval framework, particularly at the subdivision and/or development stages, in accordance with DEC guidelines. The extent of civil construction works is generally not defined until the development stage, and therefore the likely impacts of development on ASS cannot be fully determined until then. In addition the areas described as having a "*high to moderate*" risk of ASS occurring are unlikely to be disturbed as these areas are to be retained as public open space.

The preliminary ASS assessment completed for Lot 201 Mortimer Road and Lot 379 Millar Road indicate that the soil conditions over the majority of these lots was slightly acidic. Any potential risk and/or impact resultant from ASS disturbance can be appropriately managed during the subdivision works, through monitoring, soil treatment and well managed civil works.

Further detailed ASS investigations will be undertaken within the Wellard East Cell in support of subdivision works when the extent of civil construction works is known, in order to determine the presence of PASS or AASS and any management requirements.

6.4.2 Flora and Vegetation

Flora and vegetation surveys have not been completed for the entire Wellard East Cell, with aerial photography and available desktop information utilised to determine the values for the majority of the Wellard East Cell. However, a detailed flora and vegetation survey was conducted on Lot 201 Mortimer Road and Lot 379 Millar Road, with the outcomes of this survey described in **Section 3.6.**

No DRF, PF or TECs were found within Lot 201 Mortimer Road and Lot 379 Millar Road during the detailed survey. However, while these values were not identified within the Wellard East Cell, other remnant flora and vegetation values have been identified. These have been given spatial consideration in the LSP through the retention of wetland areas and creation of public open space in strategic locations over remnant vegetation. While no conclusive comments with regards to the presence or absence of particular DRF, PF or TECs can be made for the remainder of the Wellard East Cell, it is unlikely that DRF, PF or TECs will be present outside of those areas that are proposed to be retained. As part of the assessment of the LSP, the Department of Environment and Conservation has stated that further flora and vegetation and fauna investigations will be required for the remaining portions of the cell where vegetation is proposed to be removed.

As mentioned above, it is recognised that the Wellard East Cell contains important remnant vegetation which is predominantly associated with the wetlands or drains. The majority of the remnant vegetation is proposed to be retained within public open space, wetlands and the drainage reserves/multiple use corridors. The retention and protection of remnant vegetation as well as the revegetation of wetlands and drainage areas will enhance the potential for ecological/biodiversity corridors throughout the overall Cell that link with ones outside the Cell as mentioned in **Section 3.6.**.

6.4.3 Fauna

There has been no formal fauna survey completed within the Wellard East Cell, with the fauna values inferred primarily through a search of available federal and state online information and an assessment of the habitat values offered by the native vegetation found within the Wellard East Cell. Local fauna species are likely to primarily utilise the vegetated wetland areas and drains for habitat purposes. The remainder of the Wellard East Cell, outside of these areas has limited fauna values due to historical clearing and lack of intact understorey.

Spatial consideration in the LSP has been given to the retention of likely fauna habitat, through the protection and retention of the Conservation Category and Resource Enhancement Wetland areas and the drainage areas, as well as the retention of paddock trees where possible.

As the majority of remnant vegetation is proposed to be retained in the wetland areas and public open space, the Local Structure Plan is unlikely to have an impact on any fauna that may be present, but rather protect and enhance fauna habitat.

6.4.4 Wetlands

A number of wetlands are located within the Wellard East Cell. Of significance is a Conservation Category Wetland located in the north-central portion of the cell and three Resource Enhancement Wetlands found in the north-west corner, central portion and south-east corner of the Wellard East Cell. These were discussed in **Section 3.6**.

The Local Structure Plan shows spatial consideration for the presence of the four wetlands mentioned above, with the Conservation Category Wetland in the north-east portion of the Wellard East Cell to be retained fully within a designated wetland area. The Resource Enhancement Wetland area in the central portion of the Wellard East Cell and the south-east portion of the cell are proposed to be retained within a designated wetland area. This is shown on the LSP. A 50 metre buffer has been applied to the Conservation Category Wetland in accordance with state policy requirements.

The Resource Enhancement Wetland located in the north-west portion of the cell, was subjected to a wetland reclassification by the DEC in late 2010. This wetland reclassification modified degraded portions of the Resource Enhancement Wetland to a Multiple Use management category. The Resource Enhancement Wetland will be retained within a multiple use corridor, and will also support an entrance road into the cell and some urban development, however this is still to be finalised as a part of future planning and design.

No spatial consideration has been provided for the Multiple Use Wetland within the Local Structure Plan, apart from the existing drainage lines which are proposed to be retained as multiple use corridors. Multiple Use Wetland areas are afforded no statutory and limited policy protection by the EPA and the DEC. The prevailing policy framework focuses on ensuring that all reasonable measures are made to retain the wetlands hydrological and other wetland functions, primarily through the urban water management framework. There are limited ecological values associated with the Multiple Use Wetland areas within the Wellard East Cell, as these areas have been historically cleared and used for agricultural purposes.

Conservation Category Wetland and Resource Enhancement Wetland areas are afforded some protection through various state policies (WRC 2001; WAPC 2006; EPA 2008; WAPC 2009). There is a presumption that a minimum 50 metre buffer for both Conservation Category Wetland and Resource Enhancement Wetland areas would be provided through any development process. As part of the wetland assessment, a 50m buffer was determined as being adequate for CCW and this has been accommodated within the Local Structure Plan. The REW on Lot 27 has been provided

with a 15m buffer in order to protect the wetland values. As a part of subdivision, Wetland Management Plans will be developed for each of these wetlands, which will outline appropriate management actions and requirements, in order to ensure the long term protection of these areas. This will include detail on fencing, use of the areas for public open space purposes, signage, weed eradication and any revegetation that may occur.

6.4.5 Noise and Odour

6.4.5.1 Livestock Holding Facility

A livestock holding facility (LHF) is located directly adjacent to the south-east corner of the Wellard East Cell, with the holding sheds approximately 300 metres south-east of this. The LHF is licensed under the Part V of the EP Act to operate as a 'livestock saleyard or holding pen' and is permitted to hold up to 70,000 sheep at any time, with a total throughput of 800,000 sheep per year. There is potential for the LHF to emit odours that exceed amenity levels considered acceptable in residential areas and at other sensitive land uses.

Under the existing *EPA Guidance Statement No. 3 – Separation distances between industrial and sensitive land uses*, generic separation distances exist around such facilities to ensure no adverse impacts are experienced by sensitive land uses, such as residential developments. A generic 1,000 metre separation distance is currently the default distance applied in the absence of site-specific information. The minimum distance from the Wellard East Cell to the livestock holding sheds is approximately 300 metres with large areas of the Wellard East Cell considerably further away.

Within the Local Structure Plan spatial consideration has been given to the potential odour impacts with a 1,000 metre separation distance applied from the livestock holding sheds, as this is the source of the odour. This is in accordance with the partial lifting of the Urban Deferred Zone over the northern portion of the Wellard East Cell.

A number of odour investigations have been completed to date, these include:

- *Odour Impact Assessment of Wellard Livestock Holding Facility* (The Odour Unit 2009); and
- *Odour Impact Assessment for Proposed Residential Development Lot 89 Millar Road, Wellard* (ECS 2006)

These investigations indicate that the likely odour impact is less than 1,000 metres, at between 700 and 900 metres from the livestock holding sheds during the worst-case scenarios modelled. Additionally, discussions with the DEC have indicated that there have been few records of complaints in the area during the operation of the livestock facility despite the fact that there are established homesteads and special-rural dwellings within 1,000 metres of the LHF (*pers comm.* Chris Malley Department of Environment and Conservation, February 2009).

However, the 1,000 metre separation distance will be applied until further work is undertaken and agreement is reached with the DEC regarding an appropriate separation distance, or the facility is decommissioned.

The area of the Wellard East Cell currently zoned Urban, including Lot 201 is unlikely to be impacted by odour emissions from the livestock holding facility, as acknowledged by the process of lifting of the Urban Deferred Zone. While the areas still zoned Urban Deferred will be subject to future investigations and approval processes, the Local Structure Plan anticipates the future urban development of the remainder of the Wellard East Cell.

6.4.5.2 Kwinana Freeway

The Kwinana Freeway forms the western boundary of the Wellard East Cell. The Kwinana Freeway is the primary link between the south-west coastal region and the Perth Metropolitan Region.

No spatial consideration has been provided within the Local Structure Plan for the Kwinana Freeway as any potential noise impacts will be managed through appropriate noise mitigation measures and building design.

A preliminary noise assessment completed for the Wellard East Cell indicates that there is likely to be noise impacts from the Kwinana Freeway on the western and southern portions of the Wellard East Cell, within 150 metres of the Kwinana Freeway (Lloyd George Acoustics 2009) (refer to **Appendix G**). Based on the findings of this assessment, noise from the Kwinana Freeway can be managed through noise walls and/or quiet house design. Further detailed noise assessment will be completed in line with more detailed planning and civil engineering, when finished lot levels are determined. However, noise impacts from the Kwinana Freeway within the Wellard East Cell are considered manageable and will be in accordance with *State Planning Policy 5.4 Road and Rail Transport Noise and Freight Considerations in Land Use Planning (WAPC, 2009b).*

6.4.5.3 Mundijong Freight Line

The Mundijong Freight Line runs along the southern boundary of the Wellard East Cell. This freight line is described as one of the most heavily used (in terms of tonnage) freight movement corridors in Western Australia.

No spatial consideration for the freight line has been provided within the Local Structure Plan however it is recognised that there is the potential for noise impacts, which will be addressed through appropriate noise mitigation measures and building design.

A noise assessment completed for the Wellard East Cell, in support of urban development of the cell indicates that there is the potential for noise impacts on the very southern portion of the cell (Lloyd George Acoustics 2009). Based on this preliminary noise and vibration assessment, approximately 100 metres of the very southern portion of the cell is above the noise target but below the noise limit (as defined in the *State Planning Policy 5.4 Road and Rail Transport Noise and Freight Considerations in Land Use Planning (WAPC, 2009b)).*

Within the *Draft Eastern Residential Intensification Concept* a 3 metre earthen bund was proposed to manage noise impacts from the freight line. The noise assessment completed for the Wellard East Cell indicates that a 4.5 metre wall or bund and/or quiet house design is likely to be required to ameliorate noise impacts from the freight line (Lloyd George Acoustics 2009). Further noise assessments will be completed in line with more detailed planning and civil engineering, when lot levels are determined. Based on the preliminary findings, noise impacts in association with the freight line are manageable in line with *State Planning Policy 5.4 Road and Rail Transport Noise and Freight Considerations in Land Use Planning (WAPC, 2009b)*.

6.4.5.4 Power Boat Facility

A power boat facility, Bonneys Water Ski Park is located approximately 1 kilometre south of the Wellard East Cell within the City of Rockingham. This facility caters for a range of water-skiing related activities and is open most days of the week. Generally, the facility supports racing events which run from October to April each season, with events running until approximately 2100 hours during evening events. The power boat facility has the potential to exceed the *Environmental Protection (Noise) Regulations 1997 after 1900 hours*, subject to the noise having tonal characteristics.

Within the Local Structure Plan, no spatial consideration has been given to the potential noise impacts of the power boat facility. The potential noise impacts of this facility were investigated as a part of the lifting process of the Urban Deferred Zone, with the areas now zoned Urban considered unlikely to be impacted by noise from the power boat facility.

However, it is recognised that the power boat facility has the potential to exceed the *Environmental Protection (Noise) Regulations 1997* in the southern area of the Wellard East Cell, which is still zoned Urban Deferred. Further acoustic investigations have been undertaken by the City of Rockingham and Town of Kwinana to determine the nature of the noise and the likely impacts on future residents. It is anticipated that noise impacts from the power boat facility can be managed appropriately and that urban development will proceed in the future.

6.4.6 Other Land Use Buffers

6.4.6.1 Power Transmission Lines

A 330kv Western Power transmission line traverses the Wellard East Cell, extending from the north-west corner of the cell, along the western edge of the conservation category wetland and along the eastern edge of the remainder of the cell. The powerlines are contained within a 110 metre wide easement and shown in **Figure 10**.

The Local Structure Plan provides spatial consideration for the 110 metre wide easement, with no development located within the easement and public open space proposed along the central-east side of the easement.

Western Power has determined that the electromagnetic radiation produced as a result of the transmission lines is at a level acceptable for residential development to occur at the edge of the easement. However, Western Power has adopted a precautionary principle and does not support the location of sensitive uses (such as schools, child care centres etc) in close proximity to the power lines (Town of Kwinana 2007). With this in mind, no development is proposed within the transmission line easement. The transmission line easement is to be used to create open space linkages between the residential development and the Conservation Category Wetland, located on the eastern side of the transmission line easement as well as to store major drainage events (as already agreed to by Western Power). Any works completed within the easement will closely follow guidelines and direction from Western Power to ensure public safety and functionality of the easement for maintenance purposes.

6.4.6.2 Basic Raw Materials

As mentioned in **Section 3.9.6,** the Wellard East Cell contains a sand resource, found within Lot 201 Mortimer Road with this resource described as an Extraction Area. As stated, consideration has been given to the careful extraction of sand around the existing trees within the central POS area. Whilst the detailed earthworks design for the layout has not yet been finalised, Wood and Grieve Engineers have identified in their designs a cut minimisation area around the existing trees. In summary the required volumes will be achievable without any extensive cutting around the existing vegetation.

In addition, a Priority Resource Area (PRA) for clay is mapped to the south of the Wellard East Cell. The clay resource location boundary has been amended by the Department of Mines and Petroleum to be located 500m to the south of Millar Road. The DMP also confirmed that as a result of this modification, the 500 metre buffer for this clay resource now abuts Millar Road to the north and does not affect the Wellard East Cell Area (refer to **Appendix H** for the DMP letter plan).

Section 4.1.6 outlined the objectives of SPP 2.4 with regard to the protection of basic raw materials within the Perth Metropolitan Region. Extractive Areas should be protected in the short-term but

replaced by other land uses in the long term. With this in mind, based on the preliminary earthworks calculations (cut to fill) for the development of Armana's landholdings (which include Lot 201) the sand resource is likely to be fully utilised as a part of the development process. Therefore the use of this resource is unlikely to be restricted and will, in fact be fully utilised before residents occupy the area, thus no further consideration is required.

6.4.7 Contamination

Historically the Wellard East Cell has maintained a range of rural and commercial land uses, some of which are described in **Sections 3.9 and 3.10.** Of particular interest is the former market garden area within the central portion of Lot 201 Mortimer Road, the former dairy, located centrally along the very southern boundary of Lot 379 Millar Road and the inert landfill facility located on Lot 59 Mortimer Road, in the south western corner of the intersection of Woolcoot Road with Mortimer Road.

Limited spatial consideration has been given to the potential contamination within the Local Structure Plan, as it is expected that any contamination that may be present can be remediated for residential development. Of exception is the inert landfill facility located on Lot 59 Mortimer Road, which is designated as public open space within the LSP. This POS designation is consistent with the Draft Eastern Residential Intensification Concept (ERIC).

A Preliminary Site Investigation (PSI) has been completed for Lot 201 Mortimer Road and Lot 379 Millar Road and is detailed in **Section 3.8**. This investigation determined that further detailed site investigations will be required within these two lots, with particular consideration of the former market garden area and former dairy. These can be undertaken in parallel to future subdivision of the Wellard East Cell and is unlikely to impact on the potential for residential development of these areas.

Preliminary and detailed site investigations may be required over other areas of the Wellard East Cell, particularly the inert landfill facility on Lot 59 Mortimer Road. The landfill facility is unlikely to pose a significant threat to future residential development, however geotechnical and contamination investigations will need to be undertaken to confirm whether any localised soil or groundwater contamination has occurred and identify any remediation works that may be required prior to future urban development.

6.4.8 Heritage Significance

A desktop investigation found that the Wellard East Cell contained two aboriginal registered sites that are described as 'Stored Data' on the DIA Aboriginal Heritage Register and are not considered as sites for the purposes of the *Aboriginal Heritage Act 1972* (AHA). The majority of the Wellard East Cell has been surveyed previously. No non-indigenous sites were found within the Wellard East Cell.

No spatial consideration has been given to the presence of Aboriginal or non indigenous heritage within the Local Structure Plan.

With regard to the potential for other Aboriginal heritage sites to occur within the Wellard East Cell, planning does not physically disturb land and therefore the lack of knowledge associated with the presence of Aboriginal heritage sites should not limit the progression of this Local Structure Plan.

No Aboriginal heritage sites as defined under the AHA were found within the Wellard East Cell therefore no impacts are expected. In the instance that Aboriginal heritage sites are discovered as a part of future works, it is recognised that Section 18 approvals and associated investigations will be required.

6.5 Local Water Management Strategy

The development of a Local Water Management Strategy (LWMS) is the appropriate mechanism to establish broad-level designs and management measures for flood mitigation and effective stormwater management at the local structure planning stage.

The LWMS for Lots 27 and 201 is a key supporting document for the Local Structure plan (LSP) (refer to **Appendix E**). The development of the LWMS has been undertaken with the intention of providing a structure within which subsequent development can occur consistent with a 'total water cycle management' approach described in the document. It is also intended to provide overall guidance to the general stormwater management principles for the area and to guide future Urban Water Management Plans (UWMPs) that will support subdivision approval.

This LWMS for Lots 27 and 201 has been developed to:

- Provide a broad level stormwater management framework to support future urban development;
- Incorporate appropriate Best Management Practices (BMPs) into the drainage systems that address the environmental and stormwater management issues identified;
- Minimise development construction costs, which will result in reduced land costs for future home owners;
- Minimise ongoing operation and maintenance costs for the landowners and Council;
- Develop a water conservation strategy for the area that will accommodate existing groundwater allocation constraints for the area; and
- Gain support from the DoW (Department of Water) and Council for the proposed method to manage stormwater within Lots 27 and 201 (ie. study area) and potential impacts on downstream areas.

A number of broad level studies that include the Wellard East LSP Area provide a regional environmental context for the LWMS. These have been reviewed in order to provide suitable background information for the study area and also to provide an indication of the issues requiring further investigation. Further, a number of site-specific investigations into various aspects of the study area have recently been conducted as a part of the LSP preparation process. In summary, the investigations conducted to date indicate that:

- The study area receives an average of 745mm of annual rainfall with the majority of rainfall received between June and August;
- The study area ranges from 21mAHD to 9mAHD in elevation, with a generally southerly aspect;
- The soil types encountered during investigations were consistent with Bassendean Sand soil types;
- ASS risk maps suggest that the proposed development area of the study area has been classified as having a moderate to low risk of encountering ASS to depths of 3mBGS;
- The Peel Sub N Drain borders the south-east boundary of the study area;
- The long sections provided in the JDWMP provide peak flows for both the 10 year and 100 year ARI events at the discharge point of the Peel Sub N Drain of 0.75m^3/s and 1.07m^3/s respectively;
- Modelling conducted using XPSWMM resulted in peak discharges from the Peel Sub N Drain of 0.60m^3/s and 0.93m^3/s for the 10 and 100 year ARI events respectively;
- Surface water quality indicates that existing conditions exceed relevant default trigger values;
- Surface water flow is considered to be an expression of the groundwater and only flows at times of high groundwater;
- Groundwater underlying the site flows in a south to south easterly direction;
- Groundwater levels underlying the study area range between 7.5mBGS to less than 1.2mBGS. The depth to groundwater is less than 1.2m for the majority of Lot 27 and the south west portion of Lot 201;
- Groundwater quality underlying the majority of the study area has 'moderate' to 'high' nutrient concentrations;

- The *Geomorphic Wetlands of the Swan Coastal Plain* dataset indicates that there is a CCW within the study area boundary to the north-east of Lot 201, a REW across Lot 27 and a MUW within Lot 201 to the south-east;
- No portion of the proposed development area of the study area is classified as an environmentally sensitive area;
- The study area has historically been used for rural agricultural purposes; and
- There are no known sites of Aboriginal Heritage significance recorded within the study area.

The LWMS has determined appropriate stormwater management, groundwater management and water conservation design criteria based on overarching documents, requirements of the Town of Kwinana, Department of Water (DoW) and similar developments. The most relevant quality document is the Wellard East DWMS (Cardno, 2009a) which was approved by DoW in 2009.

The stormwater management objectives for Lots 27 and 201 is to mitigate post-development peak discharge rates to pre-developments rates and to retain (and treat) the 1 year – 1 hour ARI rainfall event. The LWMS document provides the location and size of all retention and detention storage areas.

Stormwater flows will be distributed to retention and detention storage areas via a conventional piped drainage network, design based on the 5 year ARI storm event. For major stormwater flows greater than the 5 year ARI storm event, stormwater will be directed to Flood Storage Areas (FSAs) via POS areas and the Western Power Easement. The FSAs would then provide detention storage of major flows, such that the ultimate post-development peak discharge is comparable to the pre-development peak discharge.

It is widely thought that Perth's climate is undergoing a drying trend, and that as the City's population grows and demands for potable water sources increase, significant attention should be focused on the manner in which the resources currently available are utilised. Therefore, it is recommended that demands for water within the LSP and subsequent subdivision of Lots 27 and 201 be managed by application of the following broad criteria:

- Ensure the efficient use of all water resources in newly developing urban form;
- Use water more efficiently; and
- Consumption target for potable water of 100kL/person/year for residential areas.

In addition, the development will aim to mimic the natural environment and will minimise the net use of water, by maximising surface aquifer recharge.

The preferred strategy to maintain groundwater levels throughout the study area will occur through localised recharge from drainage infrastructure that encourages lot scale infiltration.

While strategies have been provided within this LWMS that address planning for water management within Lots 27 and 201, several issues have been identified that will require additional investigation to ensure that the proposed subdivision designs are realistically achievable. The main areas that will require further clarification within future UWMPs include:

- Modelling of local road drainage network;
- Flood storage area configurations and outlet structures;
- Detailed geotechnical investigation;
- The need for ASS investigations;
- Implementation of water conservation strategies;
- Non-structural water quality improvement measures;
- Management and maintenance requirements;
- Construction period management strategy; and

- Monitoring and evaluation program.

Pre-development monitoring of hydrological conditions of Lots 27 and 201 has been undertaken and has been completed consistent with accepted industry standards. It is anticipated that the post-development monitoring of surface and groundwater conditions would be consistent with the pre-development monitoring in terms of sample density and parameters monitored. In addition to the existing monitoring program, it is expected that Best Management Practices will be maintained and monitored to ensure that they continue to serve their intended functions. These would be further detailed at UWMP stage.

The LWMS in **Appendix E** provides a framework that any future landowners of Lots 27 and 201 can follow to assist in establishing stormwater management methods that have been based upon site-specific investigations, are consistent with relevant State and Local Government Policies and have been endorsed by the Town of Kwinana. The responsibility for working within the framework established within the LWMS rests with the individual landowners, although it is anticipated that future UWMPs will be developed in consultation with the Town of Kwinana, DoW and in consideration of other relevant policies and documents as well as this LWMS.

6.6 Traffic Management

The Shawmac Transport Assessment Report in **Appendix D** finds that modifications to the surrounding external transport network including Mortimer, Millar and Woolcoot Roads are not required from a traffic load perspective, apart from intersection upgrades and entry points to the LSP Area. However, depending on regional development and land use changes, it is likely that the roads will be modified to better suit the surrounding land use (predominantly residential).

All intersections at access points to the study area (ie. Lots 27, 201 and 379) will be upgraded according to the findings of the Transport Assessment Report.

6.7 Services and Infrastructure

6.7.1 Reticulated Sewer

TABEC Consulting Engineers on behalf of the Water Corporation has prepared a catchment plan for the Kwinana D Pumping Station. Based on this plan, the Wellard East Cell will be fully serviceable via a DN375 gravity sewer crossing of Kwinana Freeway to the adjacent pump station. The Corporation has advised that the pump station is scheduled to be commissioned by July 2010 and will have capacity to accept effluent from the cell. Pump station construction is currently progressing and anticipated to be completed within the expected timeframe, however the final timing of the infrastructure is dependent on Cedar Woods, the developers of Emerald Park to the west of the Freeway.

Headworks items, including the bored freeway crossing and lengths of DN375 gravity sewer, will be developer prefunded and subject to a Customer Constructed Works Agreement (CCWA). All other elements of the scheme east of the freeway will be considered as reticulated sewer to be wholly developer funded. This will include a deep section of DN300 sewer approximately following the Peel Sub N Drain that transverses the cell.

The Corporation has advised there is currently capacity in the wider scheme to cater for initial development within the cell, however this may be subject to review depending on the actual timing of individual developments. We note that an upgrade of the Bertram Road PS by the Water Corporation may be necessary ahead of the current headworks program due to increased sewer flows within the catchment caused by elevated levels of recent development in the catchment.

6.7.2 Reticulated Water

The Water Corporation has advised that initial supply to the Wellard East Cell will be provided from the existing DN300 main within Johnson Road approximately 1.5km west of the site. For the proposed initial development of Lots 27 and 201 the service will be brought to site via a connecting DN250 main from the intersection of Johnson Road and Centennial Avenue via Mortimer Road, including a Freeway bore at the Mortimer Road interchange. This extension is not compliant with the Medina Scheme, however the Corporation has advised that it will be adequate as an interim measure prior to future development of the Medina Scheme to the north-east of the LSP Area. The Corporation advise that the DN250 interim extension will be wholly developer funded.

To service the southern reaches of the cell, a further extension of the Johnson Road DN300 main to the south will be required. The main will be extended along Johnson Road to Millar Road, where a Freeway crossing point has been identified as per the Medina Scheme, then along Millar to the southern cell frontage. Currently, the DN300 main has been constructed as far south as Bertram Road, however it is anticipated that at the time of commencement of development within the southern cell area, the main will be completed up to Jacobs Place at its southerly extent as part of the adjacent Cedar Woods development. We note that this assumption is dependent on extraneous factors relating to developers outside the cell area. The southern extension is consistent with the Medina Scheme and will be developer prefunded via a performance based Customer Constructed Works Agreement (CCWA).

Initial Water Corporation modelling suggests that the initial water extension works as described above are capable of providing approximately 400 residential services, over which further extension works will be required upstream within the scheme (subject to more detailed Water Corporation modelling), including a section of DN700 main (refer to **Section 5.2**). The extension will be developer prefunded and subject to a CCWA.

The ultimate supply to the cell will be completed by the Medina Scheme DN600 / DN500 main from the north. This future service will ultimately connect with the Millar Road DN 300 road from the east via Woolcoot Road providing adequate supply for the cell.

6.7.3 Power

Development of the LSP approval area will require upgrading of the surrounding network by Western Power, which the developer may be required to contribute to. Western Power has advised that an additional feeder is to be installed from the new Baldivis Substation, with a scheduled commissioning date of 2012. The load from the LSP approval area may be transferred to the new feeder depending on network requirements at that time.

Two feasibility studies have been completed by Western Power on behalf of Armana Holdings, covering Lots 27, 201 and 379. The first assumes development within Lots 27, 201 and 379 to occur from the south, the second assumes from the north. Both studies indicate that the proposed development will initially be supplied from one of the feeders from Medina Zone Substation located approximately 8km away. The nearest feeders available, MED501 Ambercrombie North feeder and MED 514 S/S RMU, have both reached capacity. Therefore, the next nearest feeder possible for this load is “MED 503 Brownwell Crescent”.

Western Power has provided two options for servicing the area. The first is to install a Ring Main Unit (RMU) at the corner of Wellard and Millar Roads and run the cable back to the development area via Johnson Road. The second is to install the RMU at Millar Road adjacent to the southern boundary of the Cell with a loop main back to Millar Road to service the development from the south.

6.7.4 Telecommunications

It is assumed that Telstra will reticulate standard telephony services within the cell at no cost to suit common trenching that will be provided as part of the subdivision works. It is also likely that some off-site trenching works will need to be provided by the developers to extend existing Telstra infrastructure from off-site, however, no detailed information has been received from Telstra Network Planning.

Furthermore, it is likely that the National Broadband Network affects on green fields subdivision will be formalised by the time development proceeds and delivery of communications infrastructure within the subdivision will need to be modified accordingly.

6.7.5 Gas

Westnet Energy has advised that reticulated gas for development in the northern areas of the Wellard East Cell will most likely be achieved through a 1.1km gas main extension from the Medium Pressure (MP) main in the vicinity of the Johnson Road/Bertram Road intersection. Westnet preliminary modelling indicates that the system will have capacity to service the LSP Area, with the possible requirement for future capacity reinforcement for the ultimate development of the area.

The notional route for the MP extension includes a crossing of Kwinana Freeway. Westnet has advised that approval complications have arisen in the past with respect to the crossing of a MRWA freeway, and gaining approval can be extremely problematic, costly, and in some cases not possible.

Westnet has advised that capital contributions will be required from developers for this extension; however due to uncertainty with regard to the Freeway crossing, these costs cannot be provided until further advice has been sought.

Westnet has previously provided advice concerning a potential development in the south-west of the cell, that a 2km gas extension would be required to take gas to the Millar Road frontage of the proposed development from Johnson Road to the north-west. They have suggested that a developer contribution would be required for the extension of the headworks infrastructure, the amount of which will be determined through an engineering investigation if requested. Space restrictions and approval constraints at the Millar Road freeway crossing point are a possible obstacle to the construction of this main.

6.8 Primary School

The LSP provides a primary school site in a location generally consistent with ERIC. However, due to the intended location of the primary school being within a Conservation Category Wetland Buffer area, the Department of Environment and Conservation (DEC) advised during the design process it would be necessary to relocate the primary school.

Accordingly, a 4.0ha primary school has been relocated in a south west direction to be wholly within Lot 379 Millar Road. It was necessary to situate the primary school adjacent to the western boundary of Lot 379 to overcome unfavourable drainage and topographical conditions.

Despite the necessity to relocate the primary school due to the aforementioned physical constraints, it is still located centrally within the LSP Area.

7 Conclusion

The LSP has been prepared for the entire Wellard East Cell to demonstrate that the proposed design is integrated and based on balancing the cell's environmental features with urban development. However, the majority of detailed technical reports and urban design has been undertaken for the northern portion of the cell (ie. Lots 27 and 201). The proposed structure plan design for these lots is based on recommendations from detailed investigations that support development of the land, including flora and vegetation assessments, wetland assessments, transport assessment, planning framework review, servicing analysis and local water management plan.

The LSP design for the whole cell is consistent with Liveable Neighbourhoods (including POS provision), Jandakot Structure Plan, ERIC and Town of Kwinana TPS2 and recognises the key constraints affecting the cell, in particular the various conservation and resource enhancement wetlands and associated buffers.

There are many areas within the cell that will be subject to further investigations, including lots not owned by Armana Holdings and/or lots that are still zoned Urban Deferred under the MRS. These investigations will include individual flora and vegetation assessments, wetland assessments, local water management strategies (consistent with overarching drainage strategies) and further assessments of the various buffers affecting the southern portion of the cell. The development of Urban zoned land should not be delayed until all of these investigations are undertaken. It is considered that this LSP provides sufficient detail to ensure that development throughout the cell is co-ordinated and can proceed in an orderly manner without prejudicing the development of adjoining land.

In order that subdivision can commence on land zoned both Urban and Development, it is requested that Council and the WAPC approve the LSP in respect of Lot 27 and part Lot 201. It is considered that the LSP provides an appropriate framework for the future subdivision and development of these lots.

8 References

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Figures

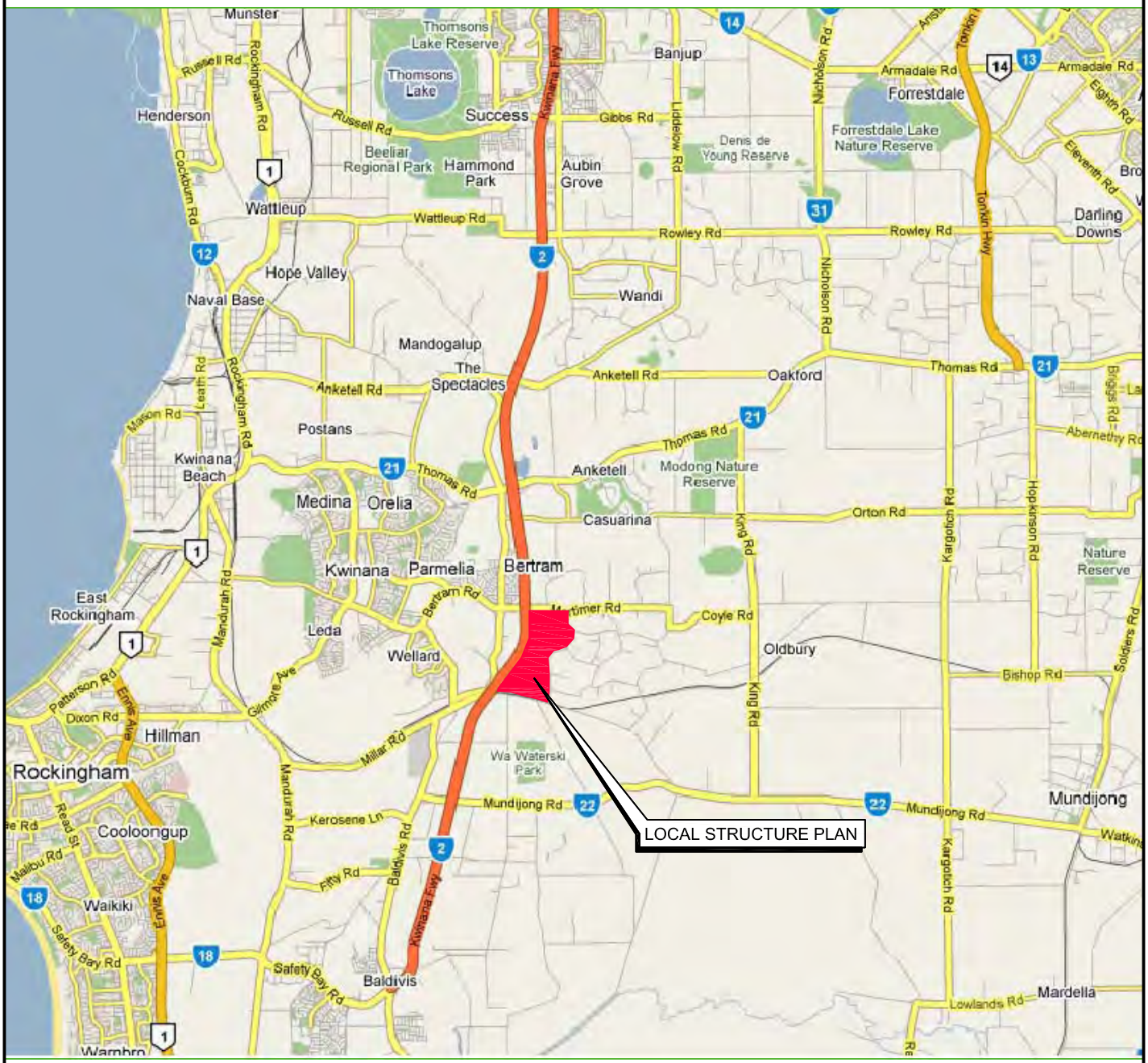

FIGURE. 1

PROJECT
LOCAL STRUCTURE PLAN – WELLARD EAST

DRAWING TITLE
LOCALITY PLAN

PRINCIPAL
ARMANA HOLDINGS PTY LTD

ORIGINAL A4

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Date 22.02.10	Scale	N.T.S
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Drawn DCD	Approved	LVE
Local Authority	Sheet	Of
Town of Kwinana	1	1

Project – Phase – Plan Number Revision
P02016-001 P702-SPF1

LOCAL STRUCTURE PLAN

FIGURE. 2

DATE	No.	ACTIVITY – REVISION DESCRIPTION	DES	DRN	CHK'D	APP'D

DATE	No.	ACTIVITY – REVISION DESCRIPTION	DES	DRN	CHK'D	APP'D

PROJECT: LOCAL STRUCTURE PLAN – WELLARD EAST

DRAWING TITLE: AERIAL PHOTOGRAPH OF THE LOCAL STRUCTURE PLAN

PRINCIPAL: ARMANA HOLDINGS PTY LTD

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Project – Phase – Plan Number: P02016–001 P702–SPF2

Revision

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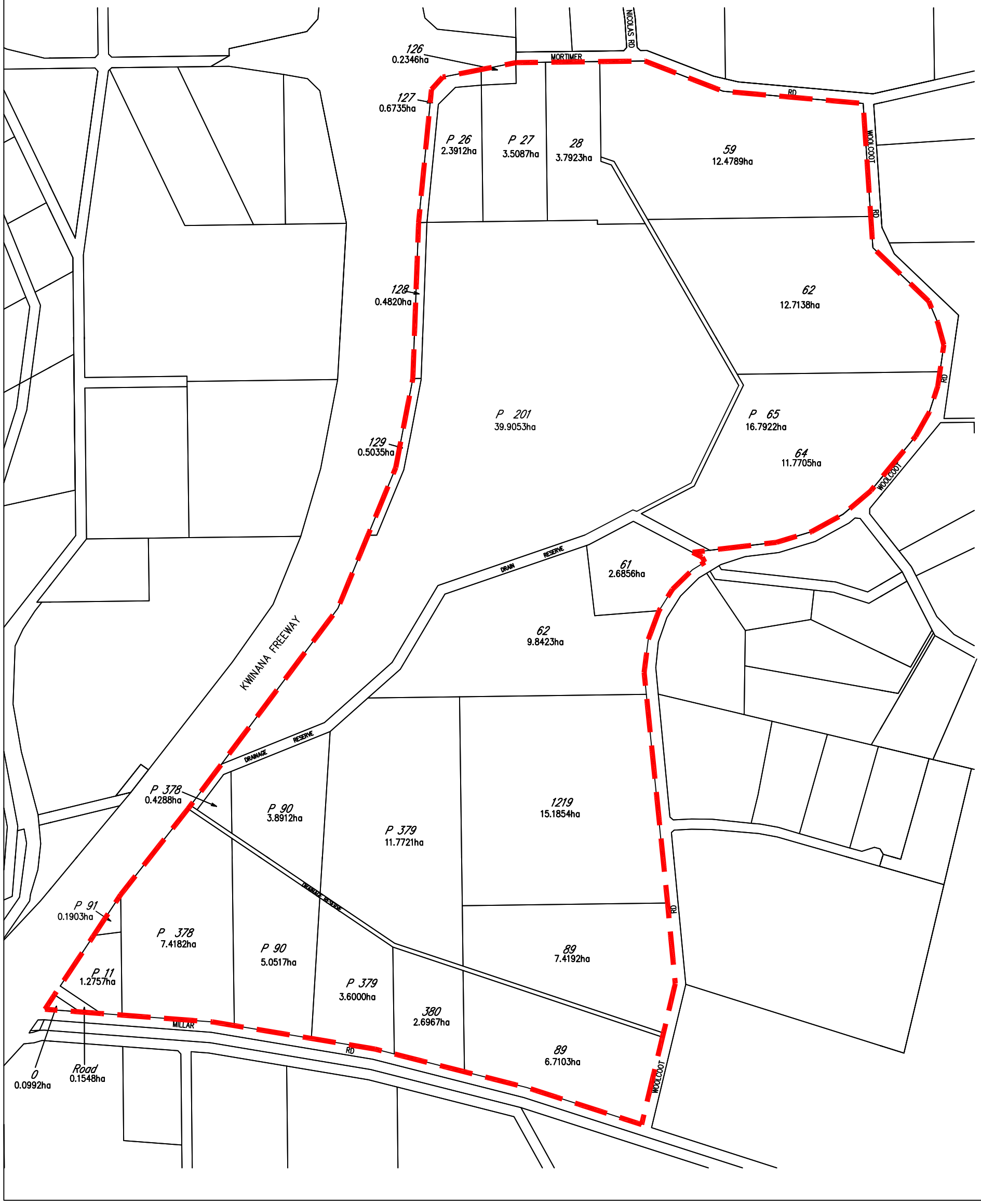

FIGURE. 3

DATE	No.	ACTIVITY – REVISION DESCRIPTION	DES	DRN	CHK'D	APP'D

DATE	No.	ACTIVITY – REVISION DESCRIPTION	DES	DRN	CHK'D	APP'D

PROJECT
LOCAL STRUCTURE PLAN – WELLARD EAST

DRAWING TITLE
EXISTING LOT CONFIGURATION AND AREAS

PRINCIPAL
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Project – Phase – Plan Number: P02016–001 P702–SPF3
Revision:

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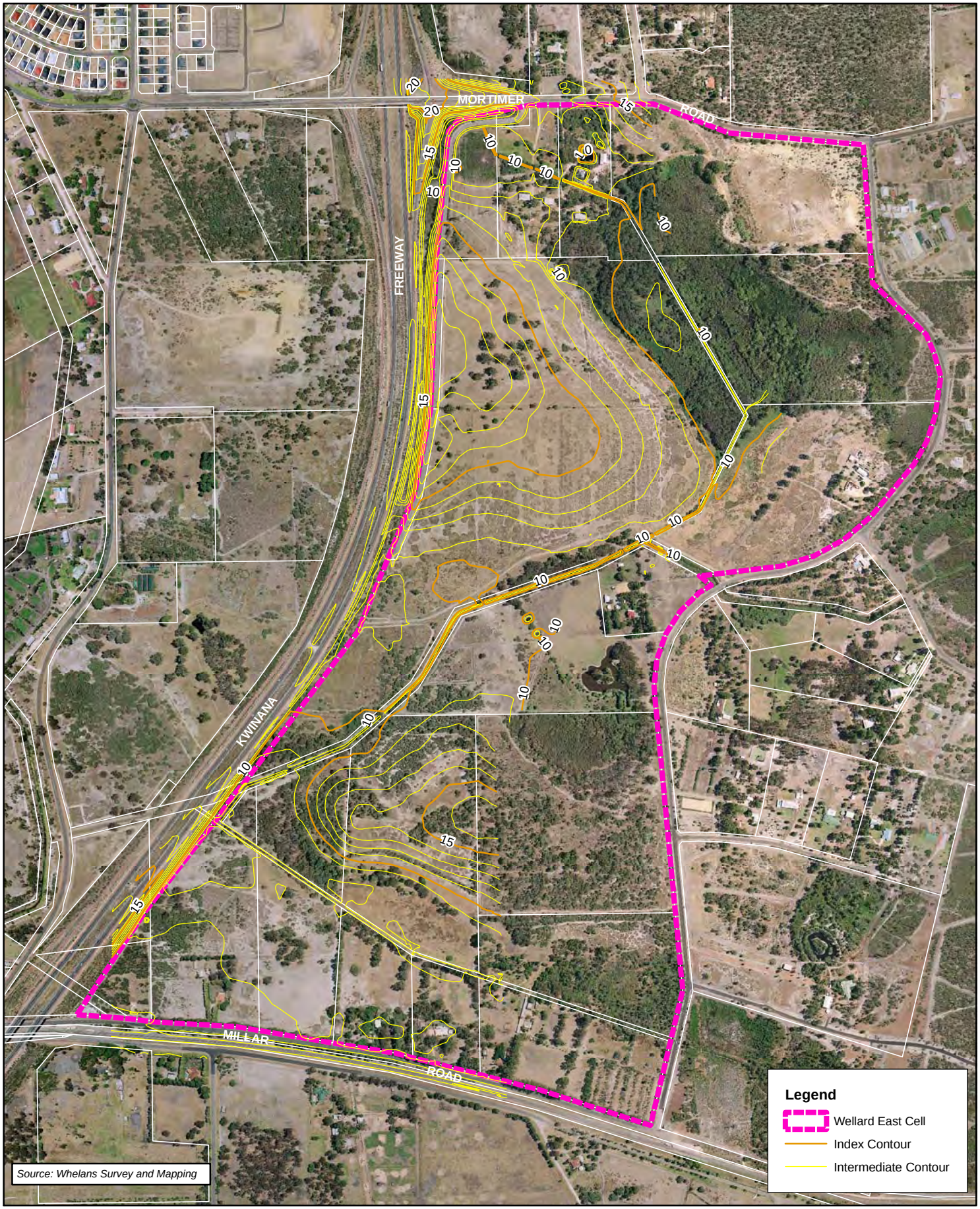

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PROJECT **Wellard East - Local Structure Plan**

DRAWING TITLE **FIGURE 4 : Topography**

PRINCIPAL **Armana Holdings Pty Ltd**

Project Number **V8041 009**

Original **A4**

Drawing Number **SK01**

Revision

Designed KK | Checked KK

Drawn MGW | Approved JDH

Local Authority Town of Kwinana

Sheet 1 of 1

Date 23/02/10

Legend

Wellard East Cell

Acid Sulfate Soil Risk Mapping

- High to moderate ASS disturbance risk (<3m from surface)
- Moderate to low ASS disturbance risk (<3m from surface)
- No known ASS disturbance risk (<3m from surface)

Source: DEC 2009

DATE	No.	ACTIVITY - REVISION DESCRIPTION	DES	DRN	CHK'D	APPD

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PROJECT **Wellard East - Local Structure Plan**

DRAWING TITLE **FIGURE 5: Acid Sulfate Soil Risk Mapping**

PRINCIPAL **Armana Holdings Pty Ltd**

Project Number **V8041 009**

Original **A3**

Drawing Number **SK02**

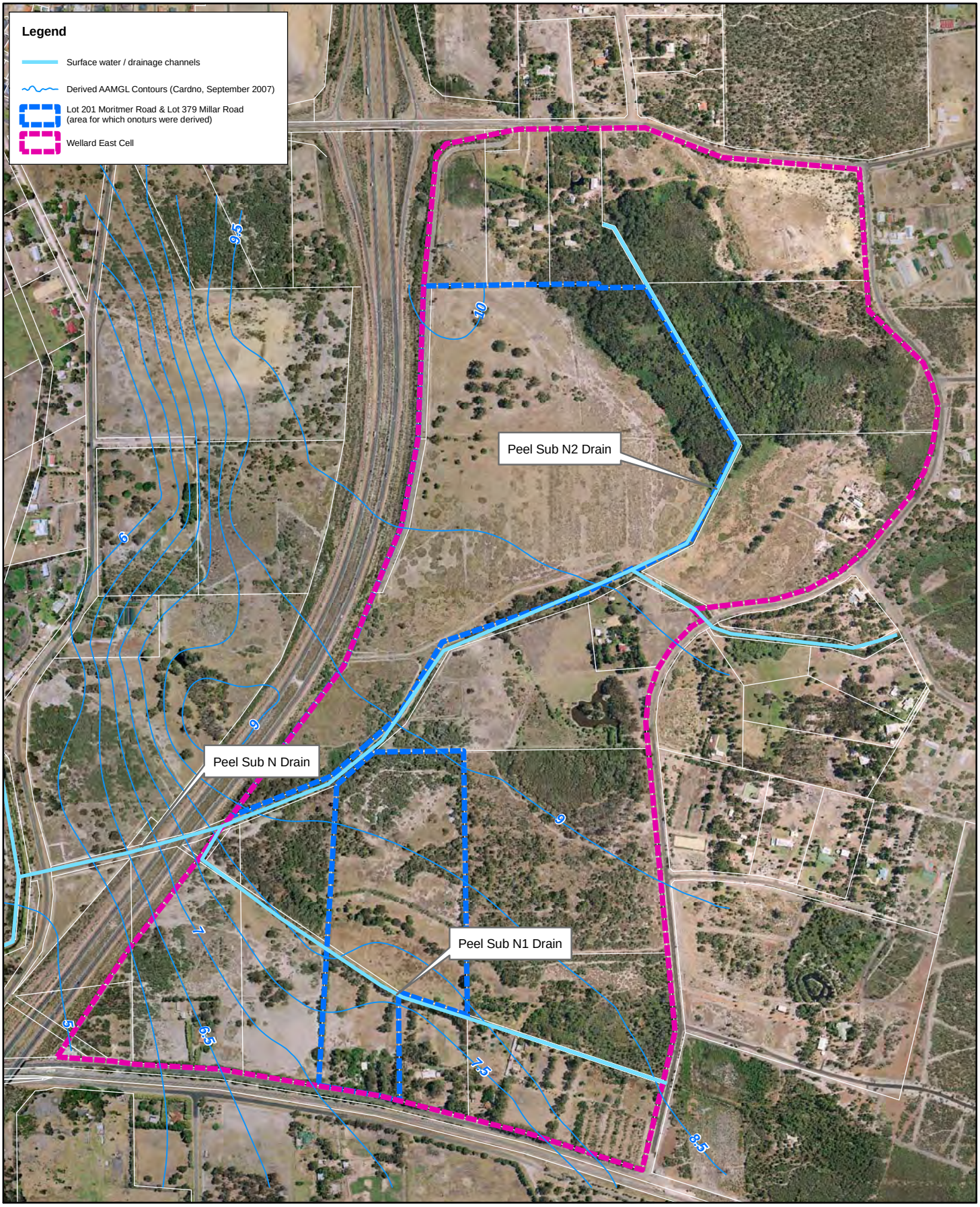
Revision **00**

Designed KK Checked KK

Drawn MGW Approved JDH

Local Authority Town of Kwinana

Sheet 1 of 1 Date 23/02/10



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PROJECT **Wellard East - Local Structure Plan**

DRAWING TITLE **Figure 6: Surface Water & Groundwater**

PRINCIPAL **Armana Holdings Pty Ltd**

Project Number **V8041 009**

Original **A4**

Drawing Number **SK03**

Revision **00**

Designed KK | Checked KK

Drawn MGW | Approved JDH

Local Authority Town of Kwinana

Sheet 1 of 1

Date 23/02/10

Legend

- Survey Point
- Wellard East Cell
- Lot 201 Mortimer Road & Lot 379 Millar Road

Remnent Tree Species Locations

- *Allocasuarina fraseriana*
- *Banksia menziessi*
- *Eucalyptus gomphocephala*
- *Eucalyptus marginata*
- *Eucalyptus rudis*
- *Kunzea glabrescens*

Vegetation Communities

Plant Community 1

PC1: Low lying forest of *Eucalyptus rudis* over *Taxandria linearifolia- Astartea scoparia* over *Pteridium esculentum* on sandy loam to sandy clay and areas of permanently inundated peaty clay.

Plant Community 2

PC2: Low lying forest of *Corymbia calophylla* over *Astartea scoparia-Taxandria linearifolia-Melaleuca teretifolia* over **Rubus anglocandicans-*Pennisetum cladestinum*.

Plant Community 3

PC3: Low lying woodland of *Eucalyptus rudis* over *Melaleuca teretifolia* over pasture grasses on grey sandy loam.

Plant Community 4

PC4: Low lying woodland-forest of *Eucalyptus rudis - Melaleuca preissiana* over *Kunzea glabrescens - Pultenaea reticulata* over *Dielsia stenostachya - Opercularia hispidula - *Zantedeschia aethiopica* on grey sandy loam.

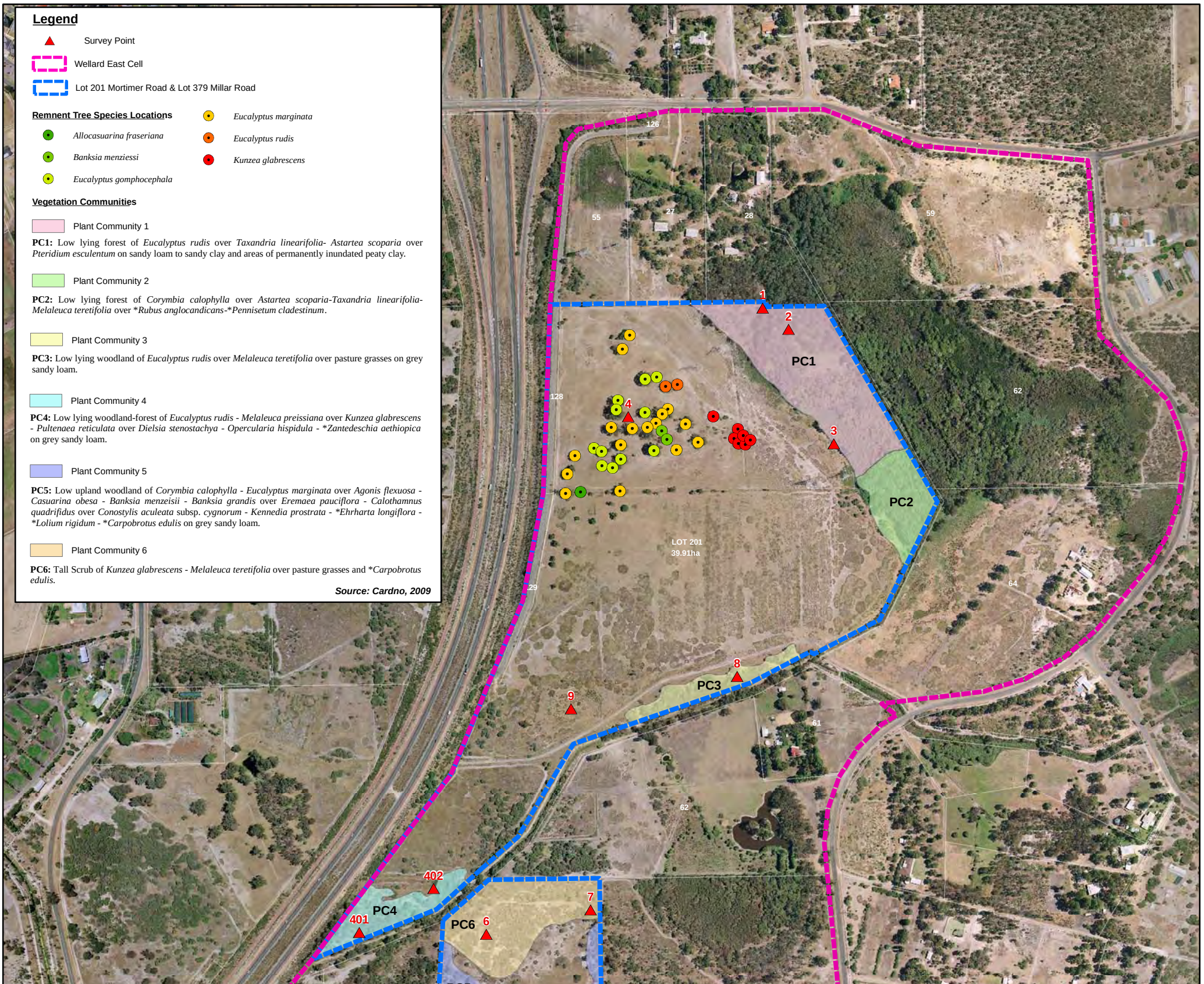
Plant Community 5

PC5: Low upland woodland of *Corymbia calophylla - Eucalyptus marginata* over *Agonis flexuosa - Casuarina obesa - Banksia menzeisii - Banksia grandis* over *Eremaea pauciflora - Calothamnus quadrifidus* over *Conostylis aculeata* subsp. *cygnorum - Kennedia prostrata - *Ehrharta longiflora - *Lolium rigidum - *Carpobrotus edulis* on grey sandy loam.

Plant Community 6

PC6: Tall Scrub of *Kunzea glabrescens - Melaleuca teretifolia* over pasture grasses and **Carpobrotus edulis.*

Source: Cardno, 2009



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PROJECT **Wetland East - Local Structure Plan**

DRAWING TITLE **FIGURE 7: Plant Communities & Remnant Trees**

PRINCIPAL **Armana Holdings Pty Ltd**

Project Number **V8041 009**

Original **A3**

Drawing Number **SK04**

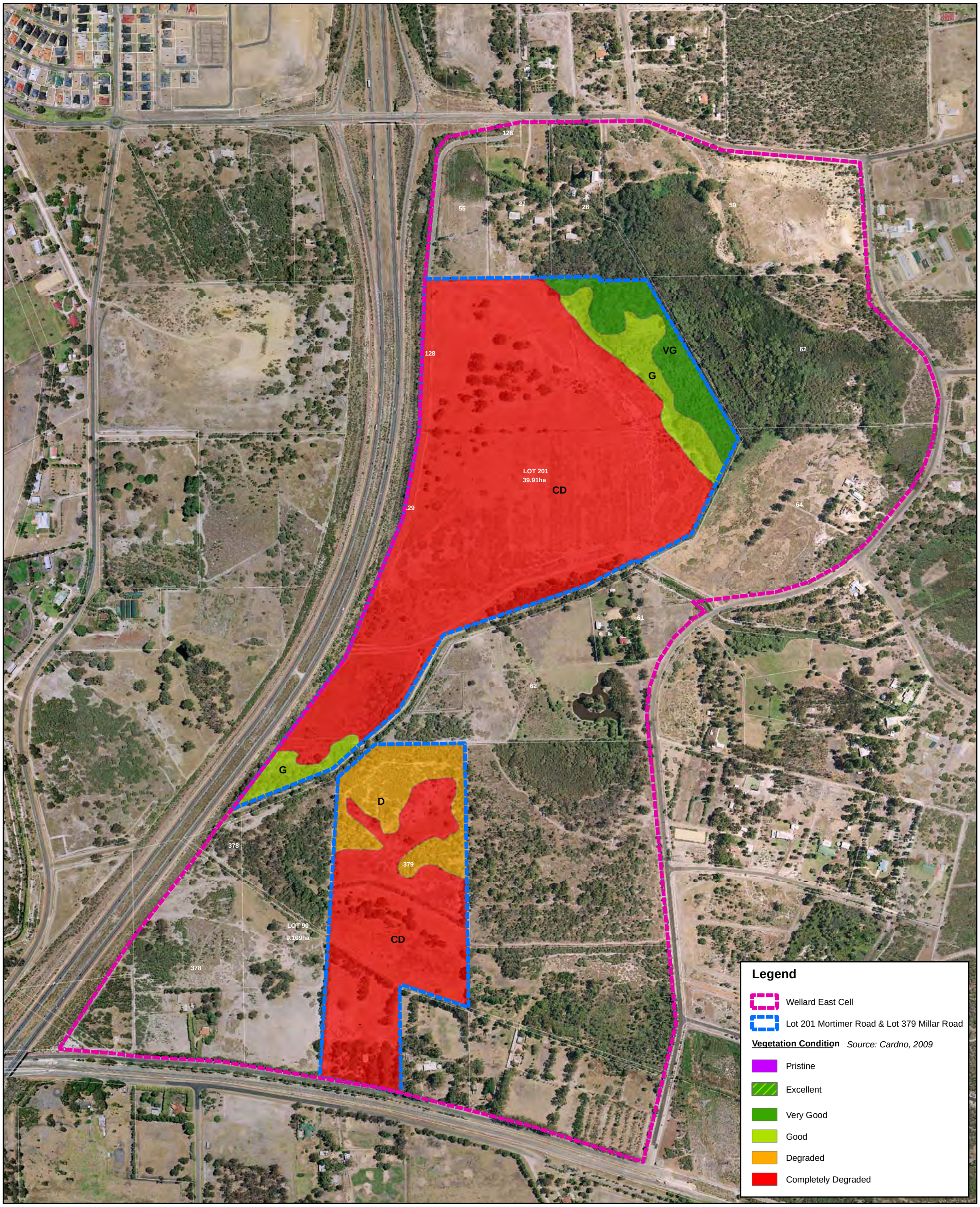
Revision **00**

Designed KK Checked KK

Drawn MGW Approved JDH

Local Authority Town of Kwinana

Sheet 1 of 1 Date 22/02/10



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PROJECT **Wellard East - Local Structure Plan**

DRAWING TITLE **FIGURE 8: Vegetation Condition**

PRINCIPAL **Armana Holdings Pty Ltd**

Project Number **V8041 009**

Original **A4**

Drawing Number **SK05**

Revision **00**

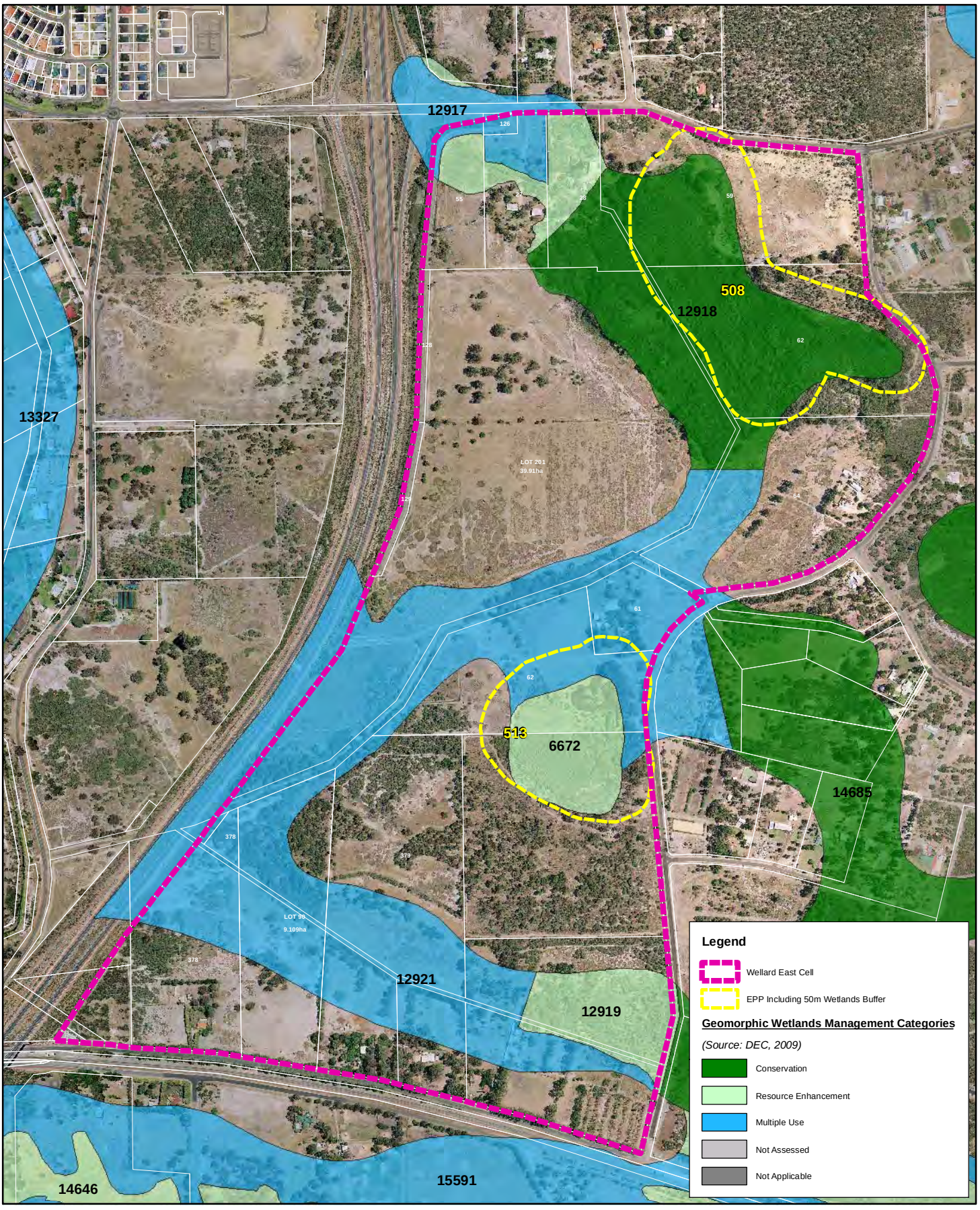
Designed KK | Checked KK

Drawn MGW | Approved JDH

Local Authority Town of Kwinana

Sheet 1 of 1

Date 20/11/08



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DATE	No.	ACTIVITY - REVISION DESCRIPTION	DES	DRN	CHK'D	APPD

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Scale: 1:10,000

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PROJECT **Wellard East - Local Structure Plan**

DRAWING TITLE **Figure 9: Wetland Mapping**

PRINCIPAL **Armana Holdings Pty Ltd**

Project Number **V8041 009**

Original **A4**

Drawing Number **SK09**

Revision **01**

Designed KK

Checked CKK

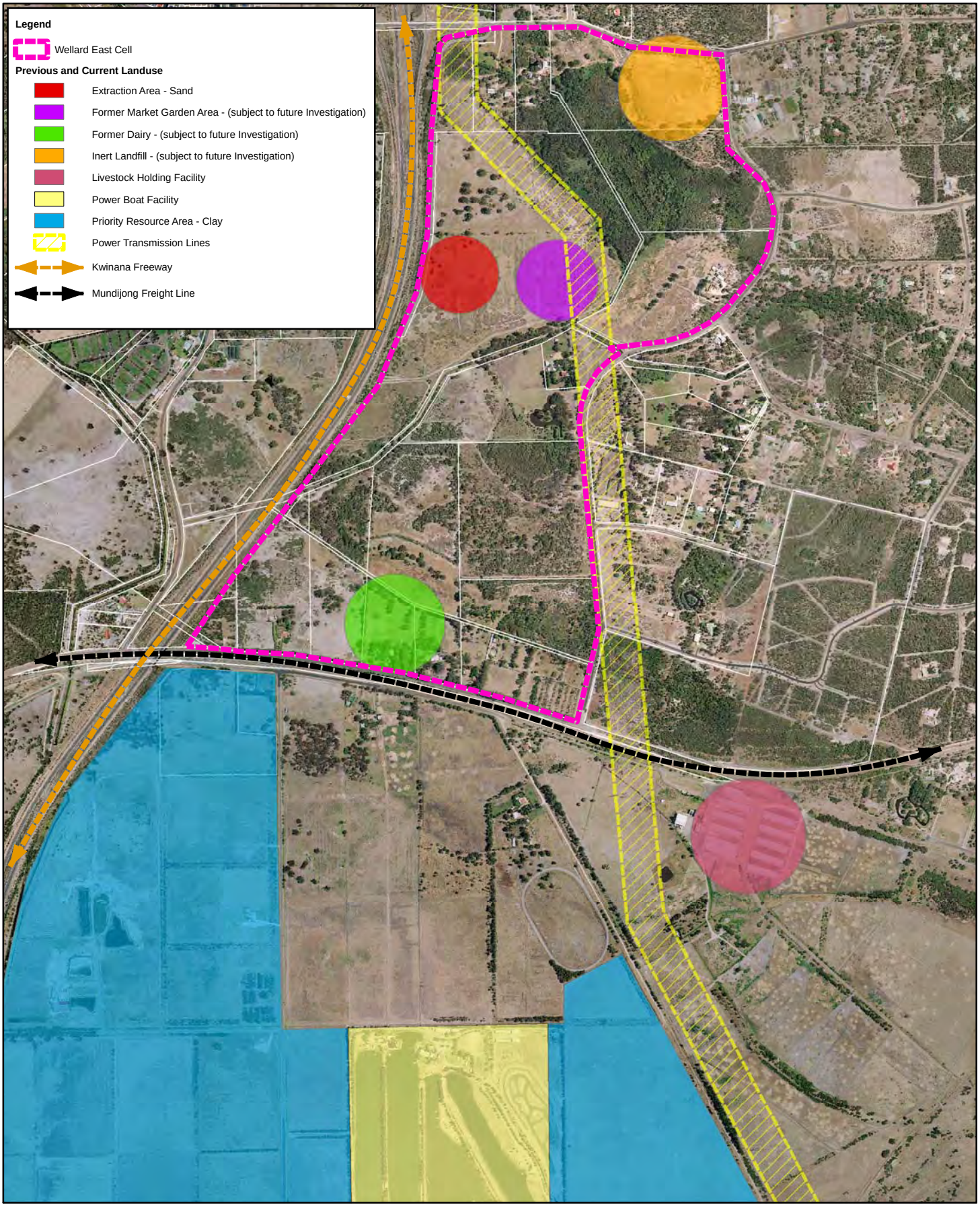
Drawn MGW

Approved BP

Local Authority Town of Kwinana

Sheet 1 of 1

Date 5/04/11



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DATE	No.	ACTIVITY - REVISION DESCRIPTION	DES	DRN	CHK'D	APPD

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Scale: 1:15,000

0 150 300 600 900 1,200 1,500 Metres

PROJECT **Wellard East - Local Structure Plan**

DRAWING TITLE **Figure 10: Land Uses within and Surrounding the Wellard East Cell**

PRINCIPAL **Armana Holdings Pty Ltd**

Project Number **V8041 009**

Original **A4**

Drawing Number **SK10**

Revision **00**

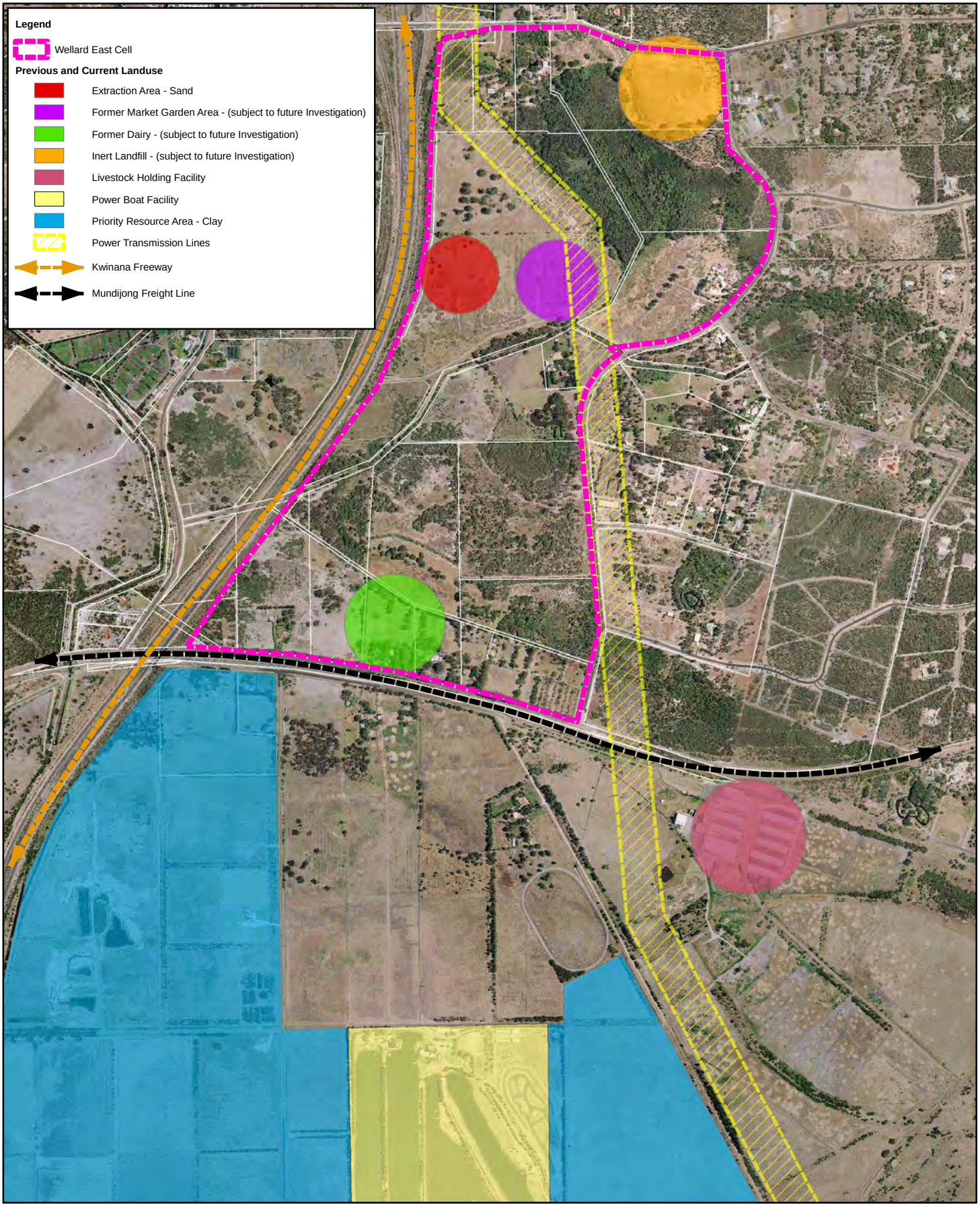
Designed KK | Checked KK

Drawn MGW | Approved JDH

Local Authority Town of Kwinana

Sheet 1 of 1

Date 24/02/10



DATE	No.	ACTIVITY - REVISION DESCRIPTION	DES	DRN	CHK'D	APPD

DATE	No.	ACTIVITY - REVISION DESCRIPTION	DES	DRN	CHK'D	APPD

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Western Australia 6904

Telephone (08) 9273 3888
Facsimile (08) 9388 3831

Scale: 1:15,000

0 150 300 600 900 1,200 1,500 Metres

PROJECT **Wellard East - Local Structure Plan**

DRAWING TITLE **Figure 10: Land Uses within and Surrounding the Wellard East Cell**

PRINCIPAL **Armana Holdings Pty Ltd**

Project Number **V8041 009**

Original **A4**

Drawing Number **SK10**

Revision **00**

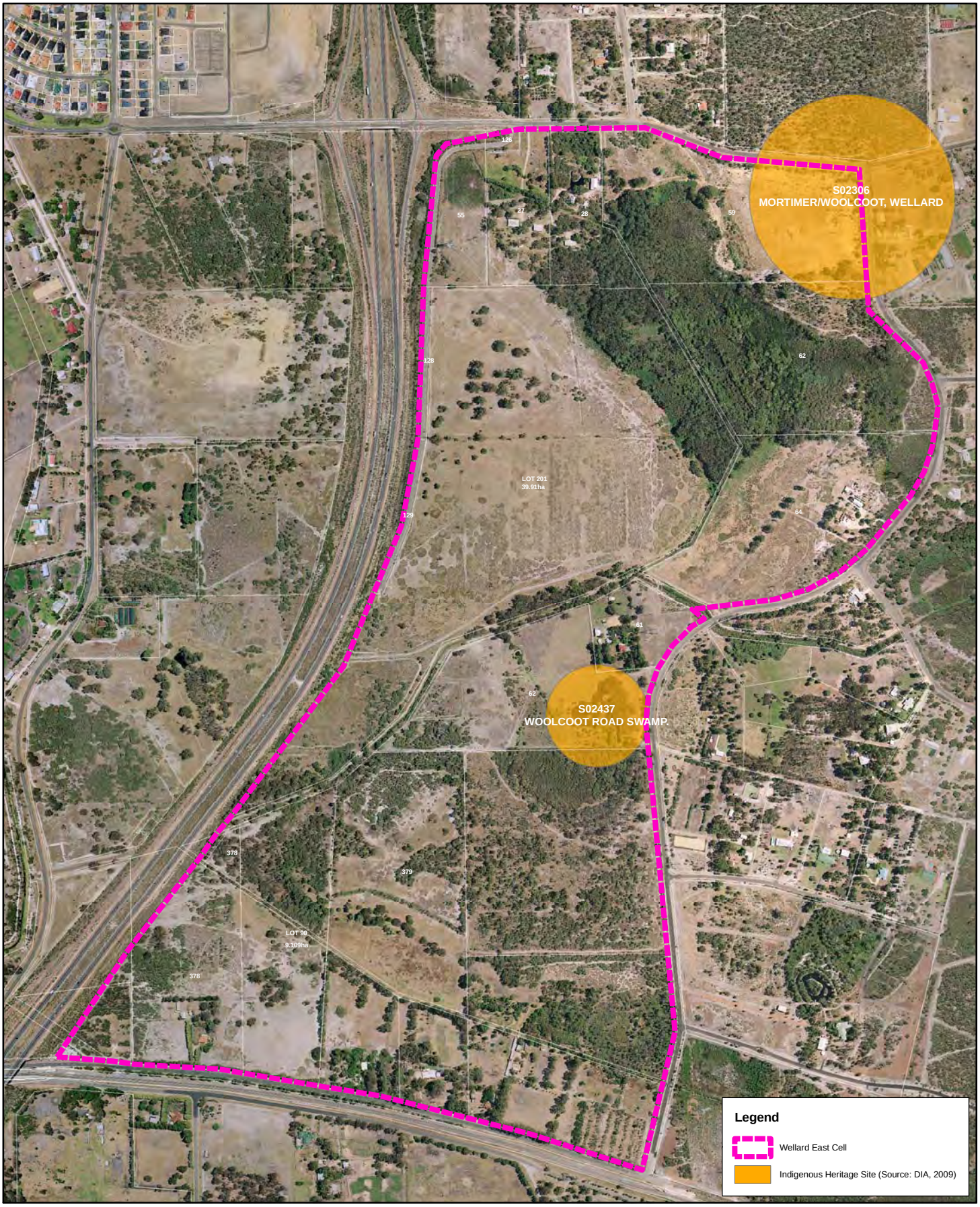
Designed KK | Checked KK

Drawn MGW | Approved JDH

Local Authority Town of Kwinana

Sheet 1 of 1

Date 24/02/10



DATE	No.	ACTIVITY - REVISION DESCRIPTION	DES	DRN	CHK'D	APPD

DATE	No.	ACTIVITY - REVISION DESCRIPTION	DES	DRN	CHK'D	APPD

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Scale: 1:10,000

0 100 200 400 600 800 1,000 Metres

PROJECT **Wellard East - Local Structure Plan**

DRAWING TITLE **Figure 11: Indigenous Heritage Sites**

PRINCIPAL **Armana Holdings Pty Ltd**

Project Number **V8041 009**

Original **A4**

Drawing Number **SK08**

Revision **00**

Designed KK | Checked KK

Drawn MGW | Approved JDH

Local Authority Town of Kwinana

Sheet 1 of 1

Date 20/11/08

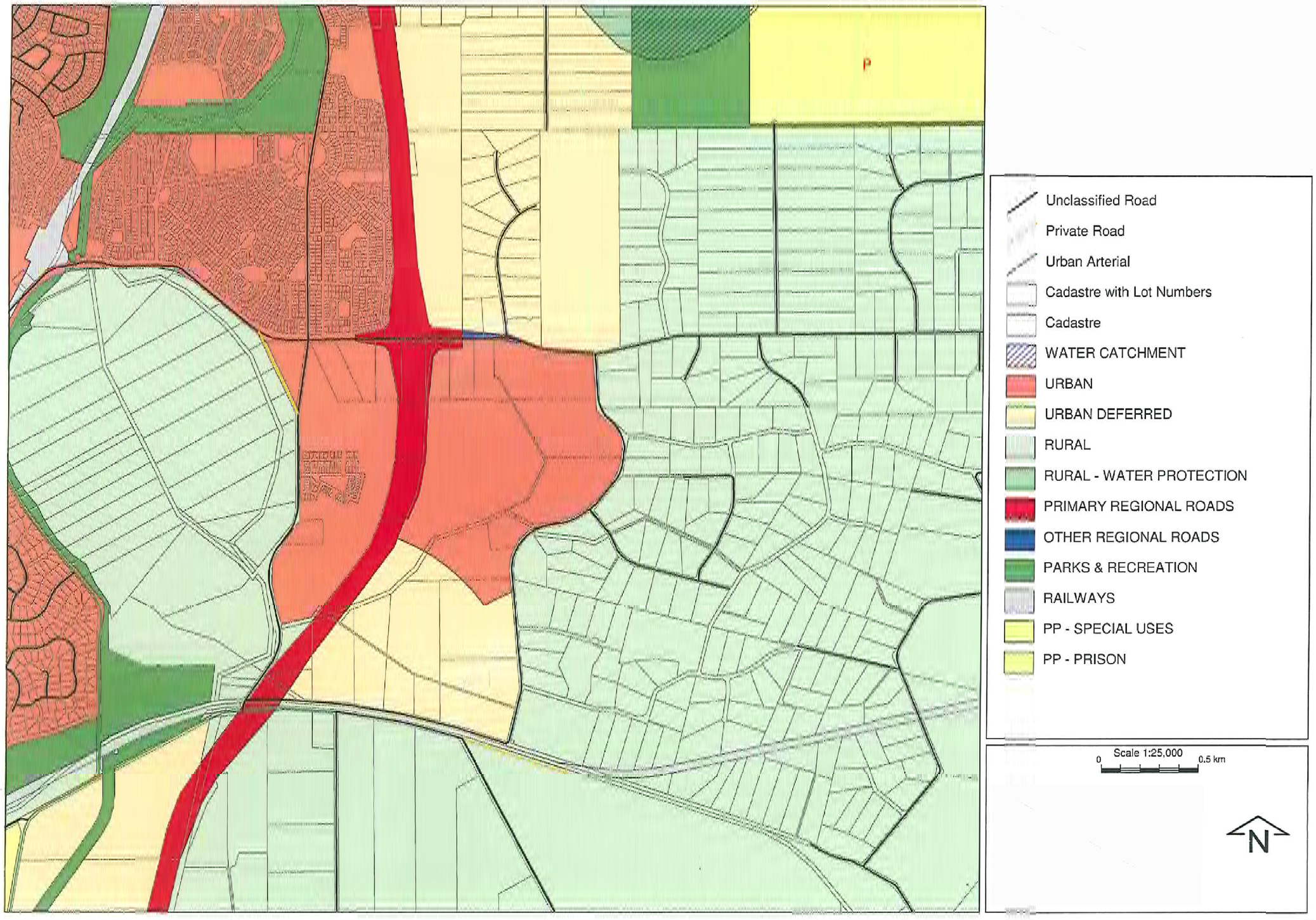

FIGURE. 12

DATE	No.	ACTIVITY – REVISION DESCRIPTION	DES	DRN	CHK'D	APP'D

PROJECT LOCAL STRUCTURE PLAN – WELLARD EAST

DRAWING TITLE METROPOLITAN REGION SCHEME

PRINCIPAL ARMANA HOLDINGS PTY.LTD.

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ENVIRONMENTAL CONSULTANTS
BUILDING DESIGN

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Date 17.6.11	Scale	1:20 000	
Designed FC	Checked	LE	
Drawn FC	Approved	LE	
Local Authority TOWN OF KWINANA	Sheet	Of	
Project – Phase – Plan Number P02016–001 12		Revision B	

ORIGINAL A3

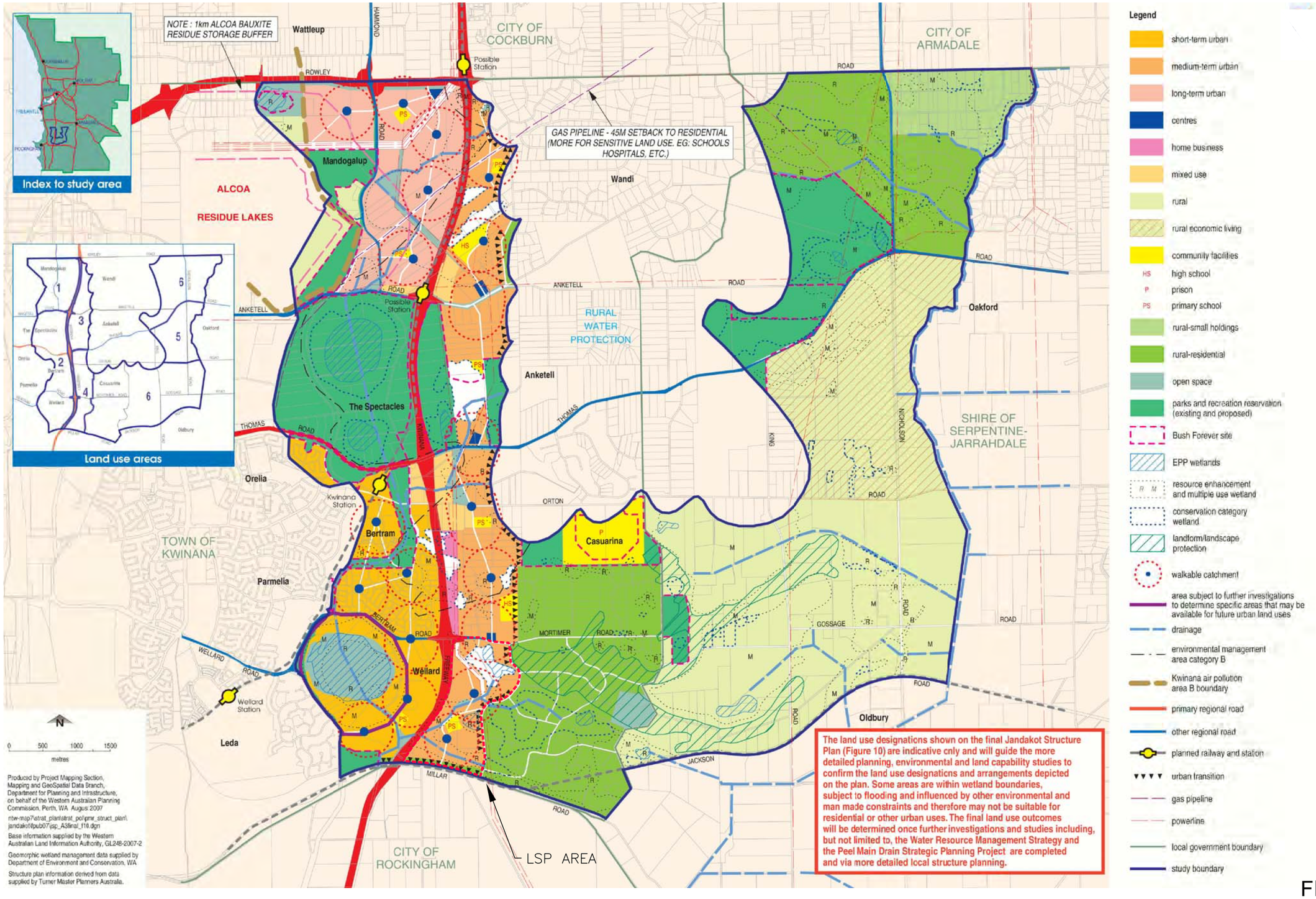

FIGURE 13

DATE	No.	ACTIVITY – REVISION DESCRIPTION	DES	DRN	CHK'D	APP'D

PROJECT LOCAL STRUCTURE PLAN – WELLARD EAST

DRAWING TITLE FINAL JANDAKOT STRUCTURE PLAN

PRINCIPAL ARMANA HOLDINGS PTY LTD

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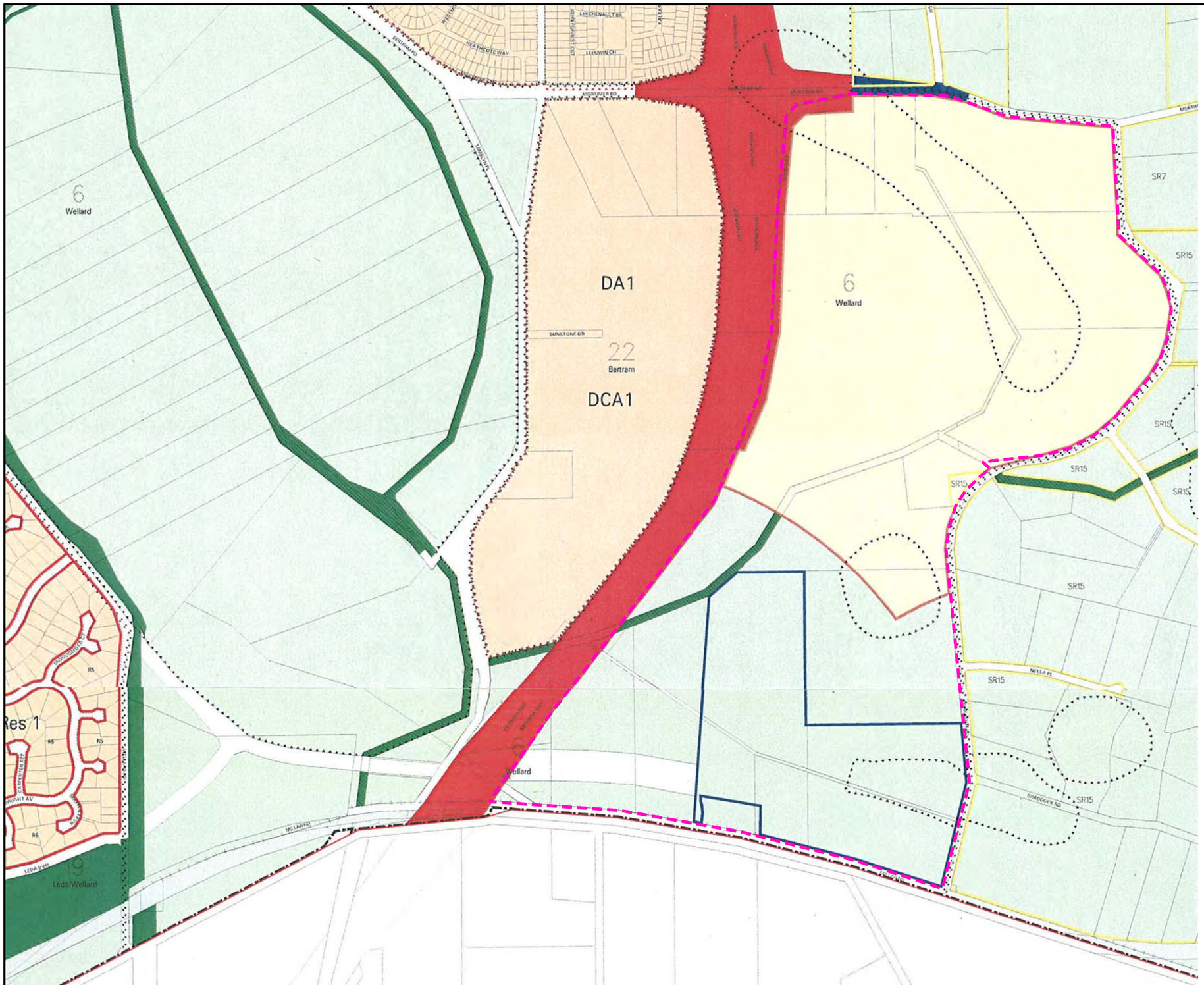
Facsimile (08) 9752 2471

Date	22.02.10	Scale	N.T.S
Designed	DCD	Checked	LVE
Drawn	DCD	Approved	LVE
Local Authority		Sheet	Of
Town of Kwinana		1	1

Project – Phase – Plan Number: P02016–001 P702–SPF13

Revision

ORIGINAL A3



LEGEND

METROPOLITAN REGION SCHEME RESERVES

- PARKS AND RECREATION
- RESTRICTED PUBLIC ACCESS
- RAILWAYS
- PORT INSTALLATIONS
- STATE FORESTS
- WATER CATCHMENTS
- CIVIC AND CULTURAL
- WATERWAYS
- PRIMARY REGIONAL ROADS
- OTHER REGIONAL ROADS
- PUBLIC PURPOSES - DENOTED AS FOLLOWS:
  - H HOSPITAL
  - HS HIGH SCHOOL
  - TE TECHNICAL SCHOOL
  - CP CAR PARK
  - U UNIVERSITY
  - CW COMMONWEALTH GOVERNMENT
  - SEC STATE ENERGY COMMISSION
  - SU SPECIAL USES
  - WSD WATER AUTHORITY OF WA
  - P PRISON

LOCAL SCHEME RESERVES

- PARK RECREATION & DRAINAGE
- PARK RECREATION & DRAINAGE DENOTED AS FOLLOWS:
  - CR CONSERVATION RESERVE
- PUBLIC PURPOSES
- PUBLIC PURPOSES DENOTED AS FOLLOWS:
  - CF COMMUNITY FACILITY
  - CG COMMONWEALTH GOVERNMENT
  - H HALL
  - K KINDERGARTEN
  - LG LOCAL GOVERNMENT
  - PS PRIMARY SCHOOL
  - SG STATE GOVERNMENT
- PUBLIC PURPOSES DENOTED AS FOLLOWS:
  - T TELECOM
  - WSD WATER SUPPLY SEWERAGE & DRAINAGE

ZONES

- DEVELOPMENT
- RESIDENTIAL
- SPECIAL RESIDENTIAL
- COMMERCIAL
- KWINANA TOWN CENTRE
- MIXED BUSINESS 1
- SERVICE COMMERCIAL
- SPECIAL USE
- SPECIAL USE DENOTED AS FOLLOWS:
  - APH AGED PERSONS HOME
  - CC CULTURAL CENTRE
  - F FUNERAL PARLOUR
  - H HOTEL
  - P PRE-PRIMARY
  - S SCHOOL
- SPECIAL USE DENOTED AS FOLLOWS:
  - SS SERVICE STATION
  - T TAVERN
  - TD TRANSPORT DEPOT
  - V VINEYARD
  - W WELFARE
- GENERAL INDUSTRY
- LIGHT INDUSTRY
- CLUSTER/COMMUNAL RURAL SETTLEMENT
- RURAL A
- RURAL B
- RURAL WATER RESOURCE
- SPECIAL RURAL

OTHER

- R20 R CODES
- A1 ADDITIONAL USES
- SCHEME BOUNDARY
- LOCAL GOVERNMENT BOUNDARY
- AREA OF LANDSCAPE PROTECTION
- 1 POLICY AREAS (SEE SCHEME TEXT)
- DRAINAGE CATCHMENT MANAGEMENT
- SR2 SPECIAL RURAL AREA (SEE SCHEME TEXT)
- SRes 1 SPECIAL RESIDENTIAL AREA (SEE SCHEME TEXT)
- DA1 DEVELOPMENT AREA (SEE SCHEME TEXT)
- DCA1 DEVELOPMENT CONTRIBUTION AREA (SEE SCHEME TEXT)
- PRESERVATION OF BUILDINGS, OBJECTS AND PLACE (SEE SCHEME TEXT)
- NO ZONE

VERSION No 1

TOWN OF KWINANA

TOWN PLANNING SCHEME NO. 2

(DISTRICT SCHEME)

LOCAL STRUCTURE PLAN

FIGURE 14

DATE	No.	ACTIVITY – REVISION DESCRIPTION	DES	DRN	CHK'D	APP'D

PROJECT: LOCAL STRUCTURE PLAN – WELLARD EAST

DRAWING TITLE: EXTRACT FROM TOWN OF KWINANA TPS No. 2

PRINCIPAL: ARMANA HOLDINGS PTY LTD

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Date 23.02.10	Scale	N.T.S	
Designed DCD	Checked	LVE	
Drawn DCD	Approved	LVE	
Local Authority	Sheet	Of	
Town of Kwinana	1	1	
Project – Phase – Plan Number		Revision	
P02016–001 P702–SPF14			

ORIGINAL A3

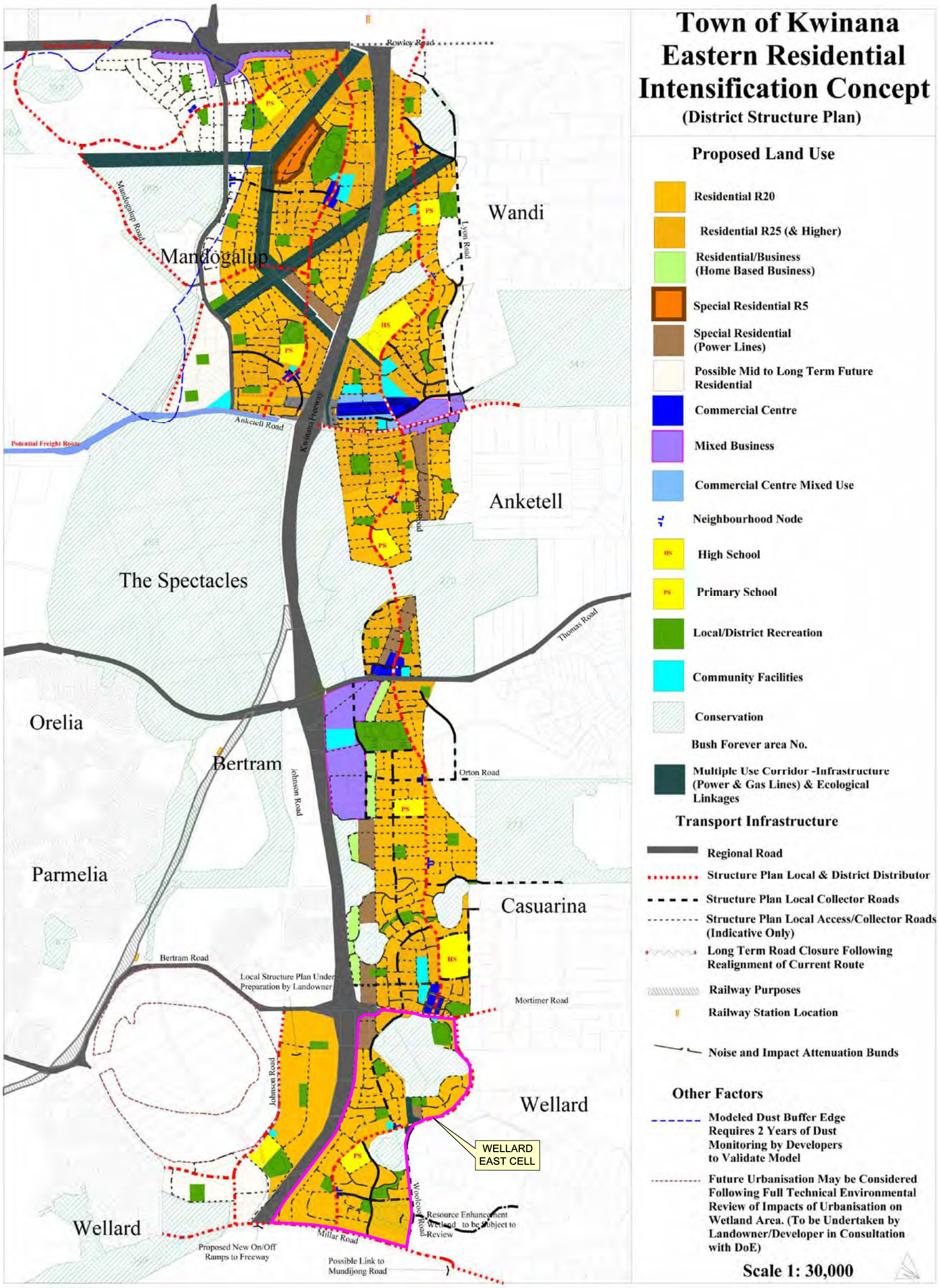

FIGURE 15

DATE	No.	ACTIVITY – REVISION DESCRIPTION	DES	DRN	CHK'D	APP'D

DATE	No.	ACTIVITY – REVISION DESCRIPTION	DES	DRN	CHK'D	APP'D

PROJECT: LOCAL STRUCTURE PLAN – WELLARD EAST

DRAWING TITLE: EASTERN RESIDENTIAL INTENSIFICATION CONCEPT

PRINCIPAL: ARMANA HOLDINGS PTY LTD

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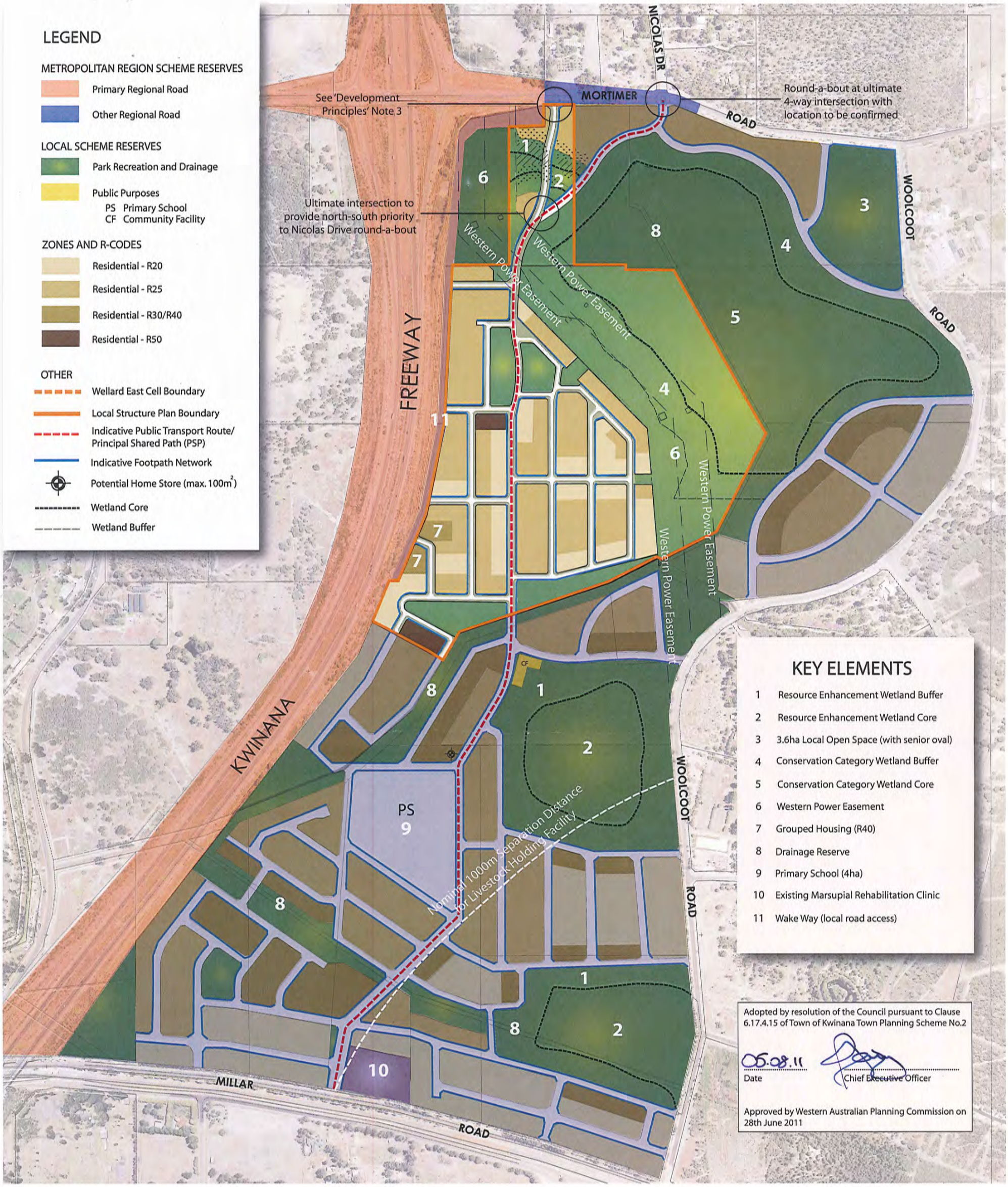
Facsimile (08) 9752 2471

Date 22.02.10	Scale	1:8000 @ A3	
Designed DCD	Checked	LVE	
Drawn DCD	Approved	LVE	
Local Authority	Sheet	Of	
Town of Kwinana	1	1	
Project – Phase – Plan Number		Revision	
P02016–001 P702–SPF15			

ORIGINAL A3



Development Principles

1. This LSP only relates to the design for Lots 27 and 201 Mortimer Road which are zoned 'Urban' under the Metropolitan Region Scheme (MRS) and zoned 'Development' under the Town of Kwinana Town Planning Scheme No. 2 (TPS2) within the solid orange line. The design shown over the balance of the Wellard East Cell is indicative only and generally consistent with the Eastern Residential Intensification Concept (ERIC) Plan. The balance of the Wellard East Cell is subject to further investigations.

2. Detailed Area Plans (DAPs) will be provided for all 'medium density'coded lots and all lots abutting the Western Power Easement.

3. As development progresses the performance of the Mortimer Road - Road A interim intersection at Lot 27 will be monitored. If performance deteriorates to an unacceptable level prior to the construction of the ultimate intersection at Nicolas Drive, the roundabout annulus will be constructed and the interim intersection will be modified to a left-in/left-out intersection.

4. The boundary of the Resource Enhancement Wetland (REW) on Lot 27 is indicative and is subject to the preparation of a Wetland Management Plan which requires approval by the Department of Environment and Conservation (DEC).

5. The land comprising the easement for Western Power, not within the Core Conservation Wetland (CCW) Buffer, being transferred free of cost to the Town of Kwinana at subdivision stage.

Wellard East
Local Structure Plan - Figure 16
Town of Kwinana

Issue	Description	Date
F	signature box update	110805
E	LSP	110620

PROJECT: Wellard East
CLIENT: Armana Holdings Pty Ltd
SCALE 1:5000 SHEET A2
DRAWING NUMBER: UD2 001 REV F
REFERENCE NUMBER: AMX WEL

robertsday
perth | sydney | melbourne
Level 1 | 130 Royal Street East Perth
Western Australia 6004 AUSTRALIA
T: 61 8 9218 8700 | F: 61 8 9218 8701
www.robertsday.com.au

Reference should be made to the attached Local Structure Plan Public Open Space Schedule outlining the provisions of POS for the LSP

LEGEND

A	Open Space	----------	Wetland Core	- - - - -	Wellard East Cell Boundary
		————	Wetland Buffer	———	Local Structure Plan Boundary

Wellard East

Public Open Space Plan for LSP - Figure 17

Town of Kwinana

E LSP — Issue Description
20.6.2011 — Date

PROJECT: Wellard East
CLIENT: Amsina Holdings Pty Ltd
DRAWING NUMBER: UD2 001
REV: E
REFERENCE NUMBER: AMX WEL
SCALE 1:2000
SHEET A2

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Level 1 | 132 Royal Street East Perth
Western Australia 6004 AUSTRALIA
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www.robertsday.com.au

Reference should be made to the attached overall Public Open Space Schedule outlining the provisions of POS for the Wellard East Cell

LEGEND

A	Open Space	----------	Wetland Core		Wellard East Cell Boundary
PS	Primary School	– – – – –	Wetland Buffer		Local Structure Plan Boundary

Wellard East

Overall Public Open Space Plan - Figure 18

Town of Kwinana

E LSP 20.6.2011
Issue Description Date

PROJECT: Wellard East
CLIENT: Armeni Holdings Pty Ltd
SCALE 1:5000 SHEET A2
DRAWING NUMBER UD2 001 REV E
REFERENCE NUMBER AMX WEL

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