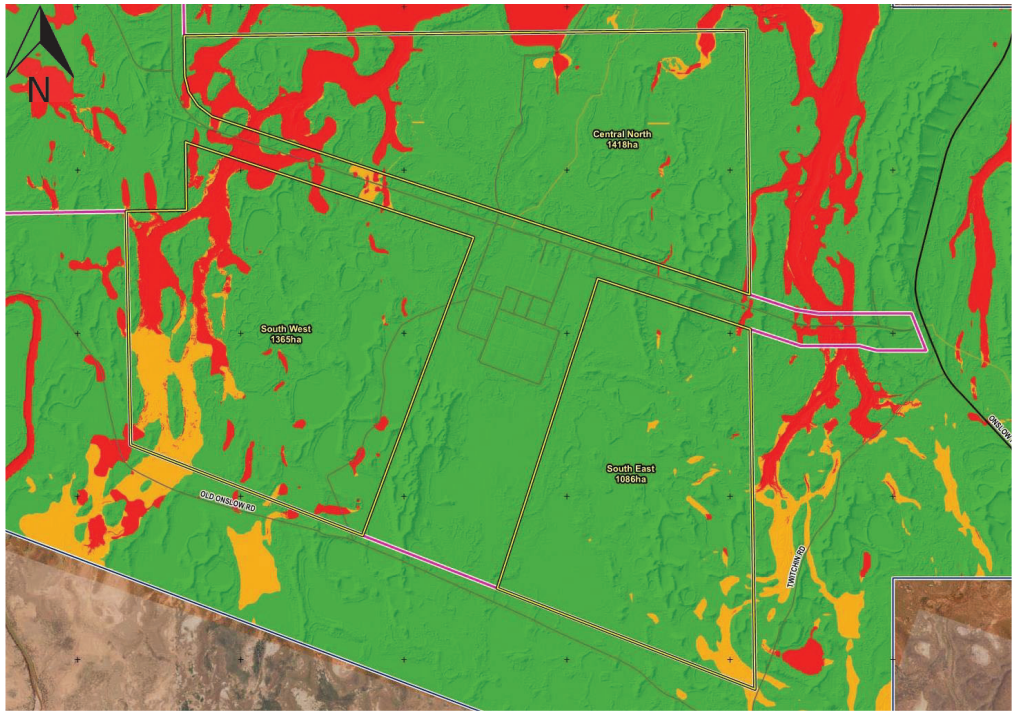


LandCorp

# Ashburton North Strategic Industrial Area – Stage 2

## Engineering Concept Report

256740-REP-001

Final | 27 April 2018



Job number 256740

Arup
Arup Pty Ltd ABN 18 000 966 165

**Arup**
Level 14 Exchange Tower
2 The Esplanade Perth
WA 6000
Australia
www.arup.com

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# Contents

## Abbreviations, Acronyms and Terms Used

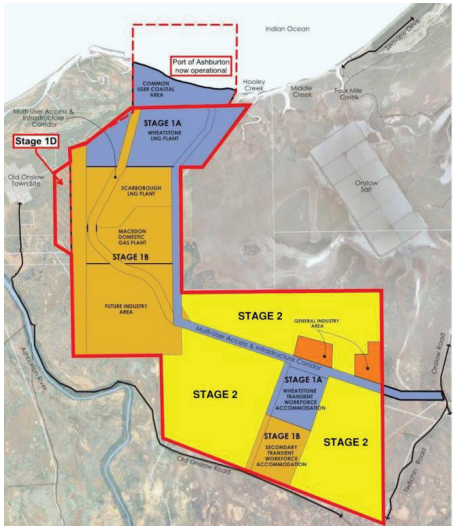
| | |
|---|---|
| AHD | Australian Height Datum |
| ANSIA | Ashburton North Strategic Industrial Area |
| ARI | Average Recurrence Interval |
| ASS | Acid Sulfate Soils |
| BHPBP | BHP Billiton Petroleum |
| CUCA | Common User Coastal Area |
| DoW | Department of Water |
| DPA | Dampier Port Authority |
| DSD | Department of State Development |
| DWMS | District Water Management Strategy |
| EPA | Environmental Protection Authority of Western Australia |
| FID | Final Investment Decision |
| FP | Foundation Proponent |
| FIA | Future Industry Area |
| GIA | General Industry Area |
| GIS | Geographic Information Systems |
| HIA | Heavy Industrial Area |
| JTSI | Department of Jobs, Tourism, Science and Innovation |
| LNG | Liquefied Natural Gas |
| LOS | Level of Service |
| LWMS | Local Water Management Strategy |
| MOF | Materials Offloading Facility |
| MRWA | Main Roads Western Australia |
| MUAIC | Multi-user Access and Infrastructure Corridor |
| NWCH | North West Coastal Highway |
| OPIUP | Onslow Power Infrastructure Upgrade Project |
| OWIUP | Onslow Water Infrastructure Upgrade Project |
| PASS | Potential Acid Sulfate Soils |
| Proponents | The developers of the initial facilities, i.e. Chevron (Wheatstone), BHP Billiton (Macedon). Also used to refer to future developers. |
| The Shire | The Council for the Shire of Ashburton |
| SIA | Strategic Industrial Area |
| UWMP | Urban Water Management Plan |
| WAPC | Western Australian Planning Commission |
| WWTP | Wastewater Treatment Plant |

# Executive Summary

In October 2009, the Western Australian State Government announced its support for the establishment of the Ashburton North Strategic Industrial Area (ANSIA), a hydrocarbon precinct that will allow for the development of natural gas projects, associated industry and downstream processing. The site, located approximately 16km south west of Onslow in Western Australia's Pilbara region, has been developed substantially since its inception and is currently home to Chevron's Wheatstone LNG Plant and BHP's Macedon Gas Processing Facility.

Arup have previously undertaken studies for the ANSIA including 2015's Engineering Gap Analysis Review and 2016's Improvement Scheme Engineering Concept Report. These reports reviewed numerous technical studies to establish engineering constraints. The reports made recommendations to guide future development and summarised the developable areas identified for Stages 1A, 1B, 1C and 1D of the ANSIA.

This report focuses on the engineering inputs into a Guide Plan amendment to provide further clarity on the development zones of the ANSIA **Stage 2 area**.




ANSIA Structure Plan layout showing the Stage 2 Area

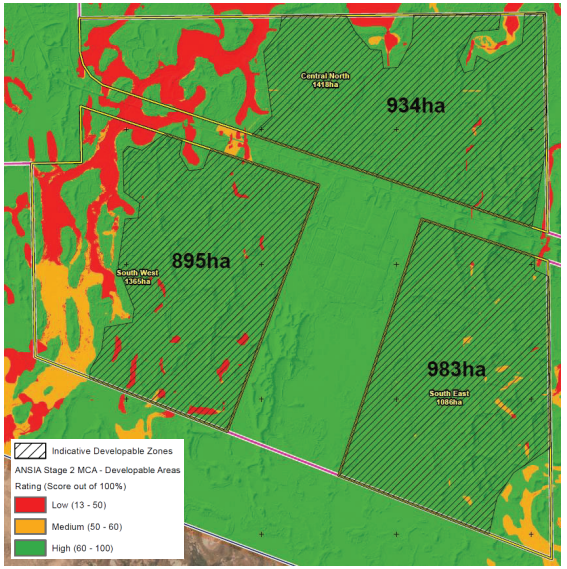
Key data was assessed in order assist with the Stage 2 site analysis. This included LiDAR data collected in January 2017, which was used to create a digital terrain model and allowed the site topography to be analysed. Flood modelling previously undertaken by URS in 2010 was also updated using MIKE Flood software to incorporate the updated DTM and identify flood levels and flow routes.

As part of this study Arup have undertaken Multi-Criteria Analysis using GIS spatial mapping software, which has considered the following disciplines to assess the suitability of the Stage 2 site for future development:

- Topography
- Slope
- Flooding
- Geology - Landform
- Soils
- Hydrology
- Environmental
- Infrastructure Proximity

An evaluation criteria was set for each of these disciplines to be used in the Multi-Criteria Analysis. This criteria was weighted to place more emphasis on the more onerous disciplines regarding future development, notably flooding and topography.

The Multi-Criteria Analysis computed a score out of 100 for each point within the Stage 2 site for suitability for future development and this has been used to establish future developable areas, as shown below:




Multi-Criteria Analysis output mapping showing indicative developable zones within the Stage 2 site

These recommendations for developable areas have been taken into account when updating the General Industry zoning in the updated Guide Plan mapping, undertaken by Taylor Burrell Barnett.

# 1 Introduction

## 1.1 Background

In October 2009 the Western Australian State Government announced its support for the establishment of the Ashburton North Strategic Industrial Area (ANSIA), a hydrocarbon precinct that will allow for the development of natural gas projects, associated industry and downstream processing. The site, located approximately 16km south west of Onslow in Western Australia's Pilbara region, has been developed substantially since its inception and is currently home to Chevron's Wheatstone LNG Plant and BHP's Macedon Gas Processing Facility.

The Department of Jobs, Tourism, Science and Innovation (JTSI) and LandCorp have developed the ANSIA Improvement Scheme, which aims to optimise planning for the future of the estate. The improvement scheme came into effect in September 2016 when it was included in the Western Australia Government Gazette (No. 179).

## 1.2 Site Context

The ANSIA Stage 2 site is the southernmost section of the ANSIA, shown in yellow in Figure 1. The site is split into three areas (Central North, South West and South East) and is separated by the existing Multi-User Access Infrastructure Corridor. The site is ~3869ha in total.

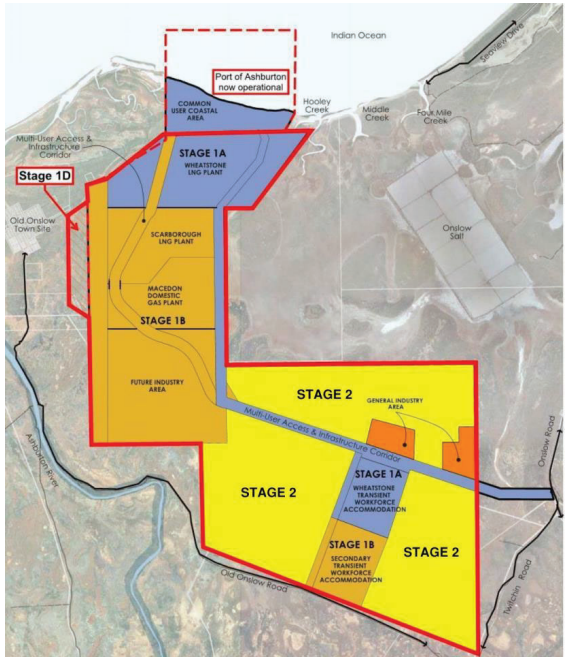



Figure 1 ANSIA Structure Plan layout

## 1.3 Purpose of this Report

As part of the Improvement Scheme, Arup Pty Ltd (Arup) was engaged by LandCorp, to provide engineering advice in the form of conceptual design to support rezoning of the ANSIA and guide development throughout the precinct. This focused on providing engineering advice on the Improvement Scheme Map and Guide Plan for the wider ANSIA, produced by Urbis in 2015.

This report focuses on the engineering inputs into a Guide Plan amendment to provide further clarity on the development zones of the ANSIA Stage 2 area. This report also aims to complement the previously undertaken studies, notably Arup's 2016 Improvement Scheme Engineering Concept Report and 2015 Engineering Gap Analysis Review.

Through considering a number of site characteristics and undertaking multi-criteria analysis the site has been rated for suitability, with each point within the site being assigned a computed percentage score for how suitable it is for future development based on a defined criteria. This criteria was developed in conjunction with LandCorp and JTSI.

## 1.4 Structure of this Report

Section 2 of this report outlines the information used to review the site characteristics of the ANSIA Stage 2 site.

Section 3 provides in depth analysis of the characteristics of the site and describes how they relate to the engineering criteria.

Section 4 describes the Multi Criteria Analysis undertaken for the site to determine the most viable areas of development within the Stage 2 site.

# 2 Information Used

## 2.1 Data

The following data has been assessed as part of this study:

- LiDAR data collected in January 2017 has been used to create a digital terrain model (DTM). This was used in understanding the site topography along with being input into the flood modelling;
- Flood data previously modelled in 2010 as part of the Wheatstone Hydro project. This flood model has been re-run using MIKE Flood software incorporating the updated DTM;
- Aerial imagery provided by LandCorp (received 21/07/2017);
- GIS Guide Plan Mapping provided by LandCorp (21/07/2017);
- Existing services data received via Landgate and various previously undertaken projects;
- Publicly available mapping data via Landgate; and
- Service provider correspondence (Horizon Power and Water Corporation).

## 2.2 Previous Studies

A review of previous engineering literature and reports relevant to the overall ANSIA has been undertaken. The key findings and design considerations have been outlined in the 2017 Arup Engineering Gap Analysis Review spreadsheet. Notable reports used in the ANSIA Stage 2 assessment include:

- URS, 2010, “Wheatstone Project Surface Water Studies”;
- Taylor Burrell Barnett, 2011, " Ashburton North Strategic Industrial Area Structure Plan";
- BG&E, 2011, "ANSIA Hydrological and Planning Study Summary";
- BG&E, December 2012, “Ashburton North Strategic Industrial Area – General Industrial Area Flood Study”;
- Galt Geotechnics, 2013, “Geotechnical Study Eastern General Industrial Area Ashburton North, Onslow”;
- Cossill & Webley, Aug 2013, “Ashburton North GIA (East) Outline Development Plan Engineering Report”;
- Arup, May 2014, “ANSIA Fill and Basic Raw Materials Study Fill Sourcing Study Assessment Report”;
- Water Corporation, March 2014, “Onslow Water Infrastructure Upgrade Project (OWIUP) Environmental Referral Supporting Document”;
- Horizon Power, Aug 2014, “Onslow Power Infrastructure Upgrade Project (OPIUP)” Supporting Documentation for Environmental Referral; and
- Urbis, October 2014, “Ashburton North Strategic Industrial Area Background Review”.

# 3 Site Characteristics

## 3.1 Topography

### 3.1.1 General

Topography will inform numerous engineering disciplines, particularly geotechnical, earthworks and flood modelling. Consequently, an understanding of the landform and topography can provide opportunities and constraints across other engineering fields.

Topographic data for the entire ANSIA was obtained by LandCorp in January 2017 in the form of LiDAR data (Light Detection and Radar). The data was captured by Photomapping Services using Airborne Laser Scanning. This data has been processed by Arup using GIS software to create a Digital Terrain Model (DTM), which has enabled Arup to interrogate the existing ground surface. GIS mapping displaying categorisation of site elevation is shown in Figure 2.

### 3.1.2 Elevation

Figure 2 below gives an indication of the mAHD surface level across the ANSIA Stage 2 site. The suitability of the categorised areas is largely governed by the fact that the most elevated locations will have the best natural flood protection, as discussed further in Section 3.2, and as such represent the most suitable locations for future infrastructure or development.

Examining Figure 2 it is observed that the majority of the Stage 2 area is within the 4-6m AHD (yellow) height range, representing moderate viability for development. In these areas earthworks will be required to raise building pads to a suitable level. Previous studies undertaken for the ANSIA have classified areas within the ANSIA with a topographic elevation of +7m AHD as being the most viable development areas, whilst areas of elevation +4-6m AHD are described as ‘viable’.

The 6-7m AHD range (green) and the >7m AHD range (dark green) represent the areas most suitable for development, where little to no earthworks will be required to raise building pads above flood levels. In contrast, the 2-4m AHD range (orange) is considered to have low suitability for development as significant earthworks will be required to protect buildings and infrastructure.

Areas of elevation <2m AHD (red) are low points within flowing waterways and would not be suitable for development. The topography is extensively linked to the flood characteristics of the site and this is discussed further in Section 3.2.

The categorisation of topography for the multi-criteria analysis is outlined in Section 4.

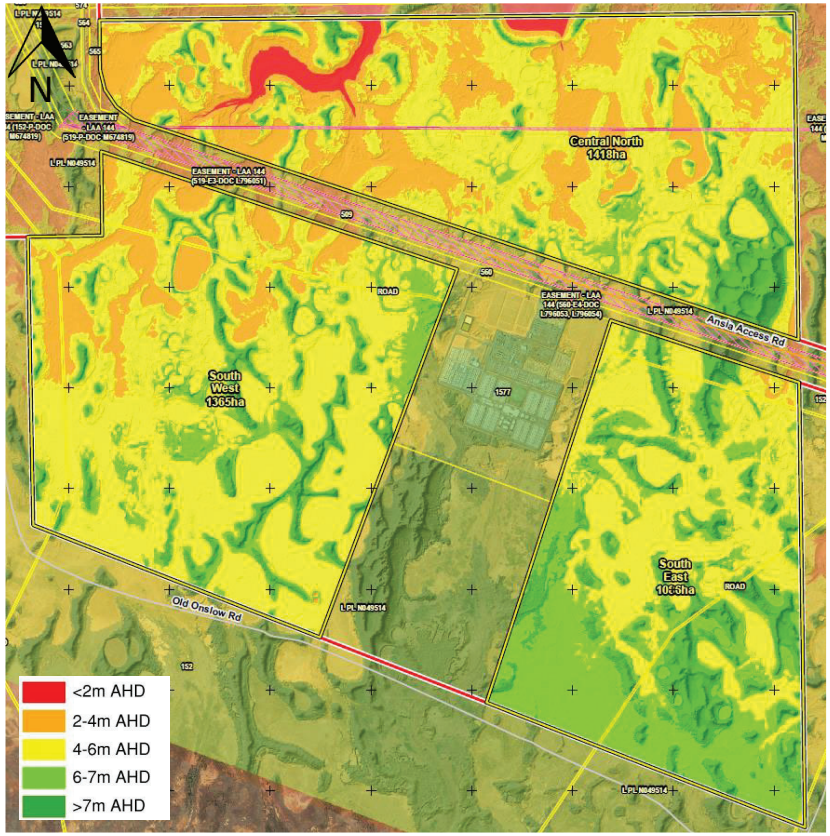



Figure 2 ANSIA Stage 2 Area displayed by AHD level

### 3.1.3 Slopes

Through interrogation of the DTM using GIS software, Arup have been able to define existing ground surface slope ,represented as a percentage fall, as illustrated on Figure 3 below.

The analysis shows that the majority of the Stage 2 site is comprised of a relatively flat surface (0 - 4 %), with steeper dunes and ridges (4 – 8 %) sparsely distributed throughout. Steep areas (8%+) represent either slopes down to existing water bodies or dune ridges and are most prominent at the south-east corner of the Central North area, the south-east corner of the south-east area and to the south west of the workforce accommodation.

The site was assessed for development suitability against the slope criteria on the merits of construction ease and Department of Water guidelines regarding erosion control at industrial sites located on steep land.

As a result, it was determined that locations of 0-4 % slope (green) represented the most developable areas, with increasing slope angle resulting in reduced suitability.

The categorisation of slopes for the multi-criteria analysis is outlined in Section 4, however it should be noted that the slope assessment criteria was awarded a very minor weighting in the overall site assessment given the existing ground surface material is believed to be mostly sand and as such levelling works will not be prohibitive to development.

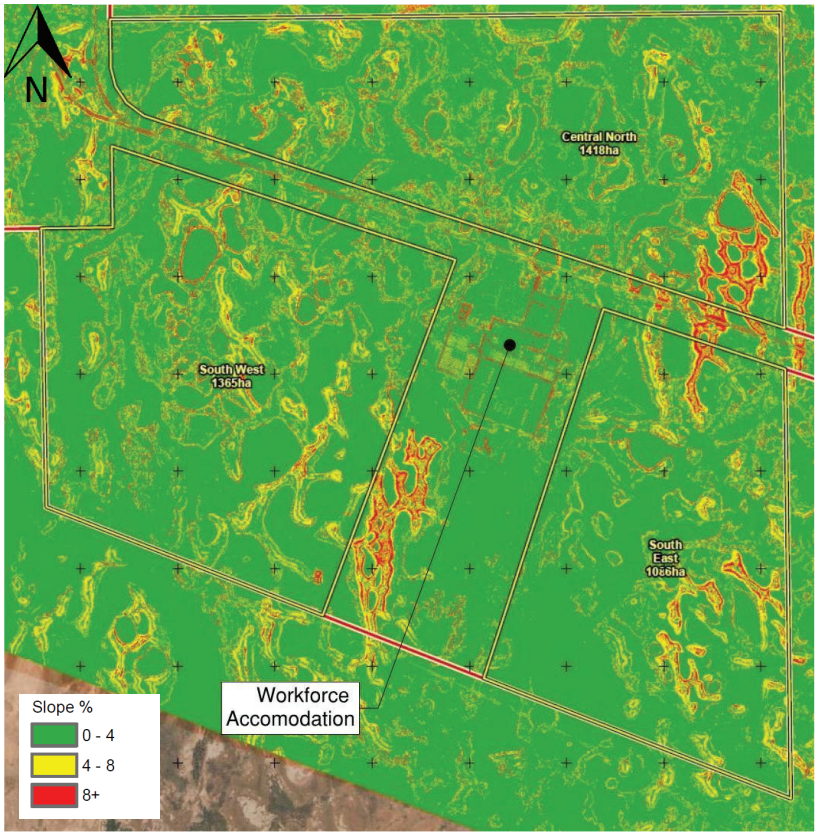



Figure 3 ANSIA Stage 2 existing slopes

## 3.2 Stormwater and Flooding

### 3.2.1 General

The ANSIA Stage 2 surface water hydrology is characterised by three main components (*URS, 2010*):

- Extreme events resulting from tropical cyclones typically cause a near-shore storm surge which raises the sea level;
- High intensity, widespread rainfall following this causes runoff from the local catchments; and
- Flows in the Ashburton River generated by the upper catchment result in breakout flows, which may influence a wide area due to the low separation between sub-catchment topography.

The combined impact of these mechanisms form the design flooding event to be mitigated by engineering solutions.

The area's hydrological system has a dynamic nature, making it adaptable to changes presented by the development. However, the large volumes of water involved in flooding events present stormwater management challenges. In response to this, the following measures are proposed (Taylor Burrell Barnett, 2011):

- Identify preferential surface water pathways, maintain existing major natural waterways; anticipated limited risk of post development flows and velocities increasing significantly; and
- Permit as much as possible natural regimes for 1 year and 100 year ARI event. Impacts on surface water regimes in adjoining project or common use areas to be avoided.

The Wheatstone Development Plan, adjacent to the Stage 2 site, implemented the above measures through rational use of engineered fill to raise vulnerable areas above flooding levels. The efficient approach involved focussing on the most viable development space at existing higher elevation.

A similar raised building pad development approach is identified as the most viable flood protection mechanism for the Stage 2 area. The explicit size and levels of the development pads will be determined during more detailed design stages by examining the adjacent design ARI modelled water levels and required freeboard criteria.

The criteria for setting raised pad levels based on flooding return periods is closely linked to earthworks requirements. This criteria for setting design levels should be reviewed for future stages, considering the vulnerability and resilience of different types of development and infrastructure. The objectives for this review would be appropriate and cost-effective earthworks and lot planning, assessing the potential to position any infrastructure identified as less vulnerable or resilient in lower areas thereby maximising the availability of viable land at higher elevation.

The above re-iterates the previous Arup study (2016 Improvement Scheme Engineering Concept Report) undertaken for the wider ANSIA area.

### 3.2.2 Revised Modelling & Analysis

In order to define the Stage 2 areas most viable for development, the existing ANSIA MIKE FLOOD model, produced by URS in 2010 and supplied to Arup by LandCorp, was updated and re-run utilising the latest LIDAR information available for the ANSIA. The new LIDAR accounts for landform changes and land developments which have taken place since the flood model was previously generated in 2010.

As a result, new 100 year ARI storm event (along with coastal storm surge and an allowance for climate change) water depths and velocities were determined and are illustrated on Figure 5 and Figure 6 respectively. A maximum flood depth of 3.91m was identified along with a maximum velocity of 7.55 m/s, both of these values were identified in locations considered to be existing floodways.

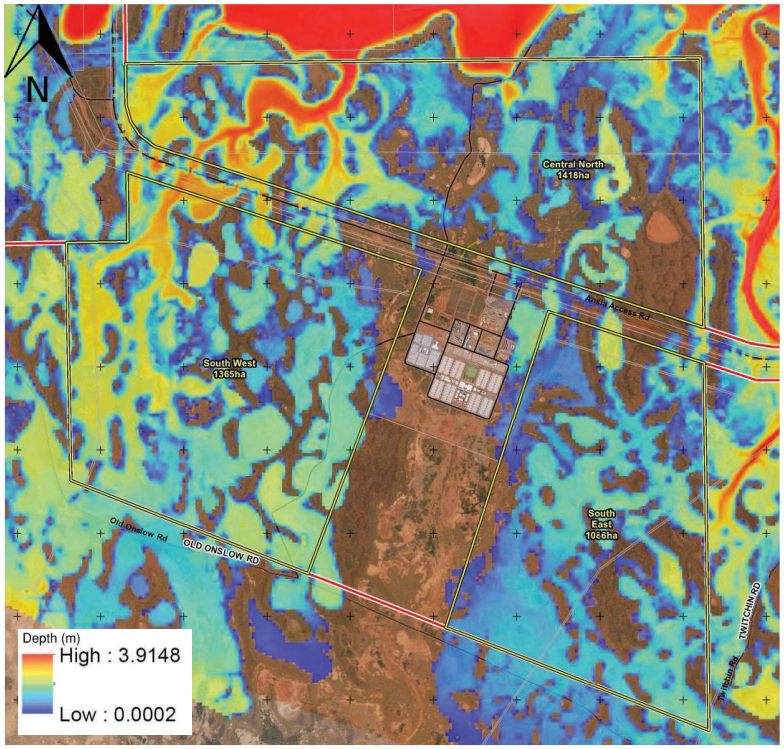



Figure 5 100 Year ARI Storm Event Water Depths

Examining Figure 5, it is apparent that flooding extents are influenced heavily by the topography, with surface water not being completely contained within the natural waterways for an event of this magnitude. The deeper blue colouring, corresponding to a reduced depth of flooding, gives a preliminary indication of areas likely to be more viable for development with minimal impact on the existing surface water regime.

Figure 6 below highlights areas where surface water will be moving the fastest in a 100 Year ARI storm event. Areas in red/orange represent high velocity flow paths. Isolated areas shown as red/orange are caused by localised steep slopes, whereas continuous areas of red/orange are caused by large contributing catchment areas and represent floodways which should be maintained.

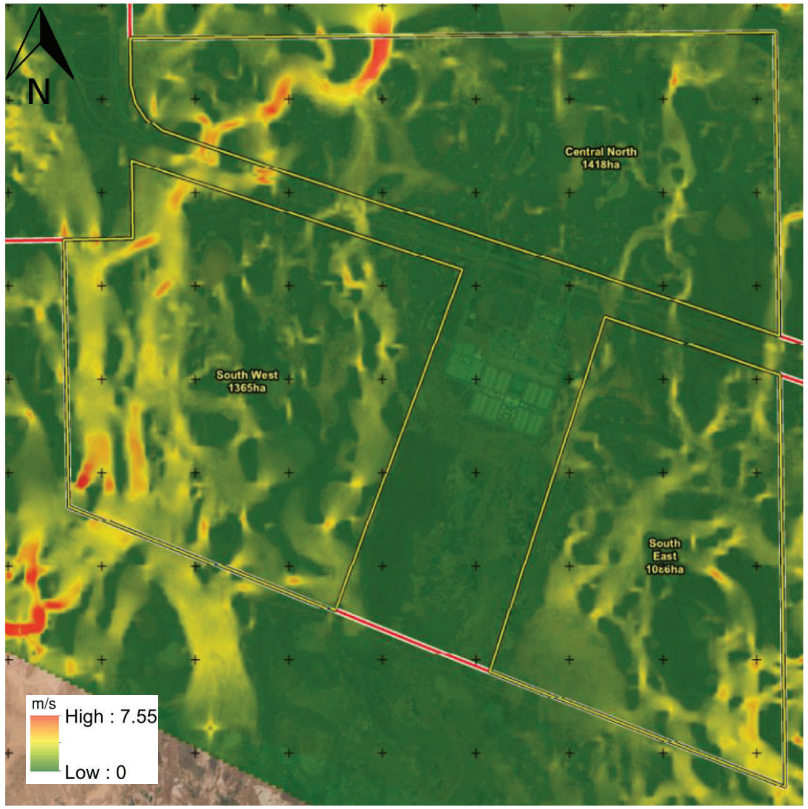



Figure 6 100 Year ARI Event Water Velocities

In order to better establish developable locations with respect to flooding, the flood hazard level for the ANSIA Stage 2 site has been classified using the Technical Flood Risk Management Guideline: Flood Hazard, by the Australian Emergency Management Institute (2014).

The classification considers both water depth and velocity to categorise the level of vulnerability. The general flood hazard vulnerability curves are shown in Figure 7 and their descriptions are given in Table 1.

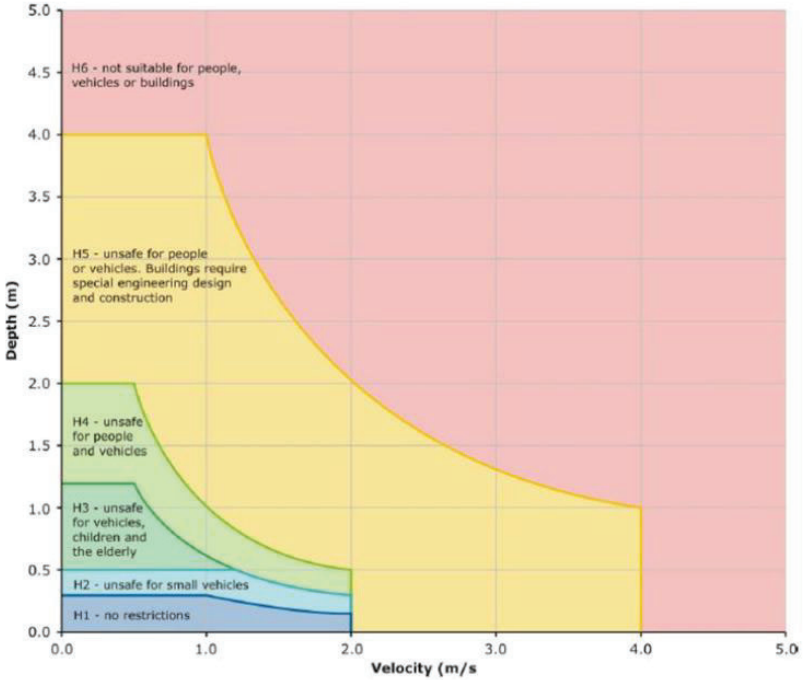



Figure 7 Flood hazard vulnerability curves (Australian Emergency Management Institute, 2014)

Table 1 Hazard Vulnerability Classification (Australian Emergency Management Institute, 2014)

| Hazard Vulnerability Classification | Description |
|---|---|
| H1 | Generally safe for vehicles, people and buildings. |
| H2 | Unsafe for small vehicles. |
| H3 | Unsafe for all vehicles, children and the elderly. |
| H4 | Unsafe for all vehicles and all people. |
| H5 | Unsafe for all vehicles and all people. All building types vulnerable to structural damage. Some less robust building types vulnerable to failure. Buildings require special design and construction. |
| H6 | Unconditionally dangerous. Not suitable for any type of development or evacuation access. All building types considered vulnerable to failure. |

Using the updated ANSIA MIKE FLOOD model, a flood hazard map was generated using the curves shown in Figure 7. The site flood hazard plot is shown in Figure 8 and indicates the locations most suitable for development if flooding was considered as the only constraint.

For the ANSIA Stage 2, hazard categories H1 to H4 (blue to green) are considered suitable for development with H1 being most suitable. It is recommended to avoid the areas classed as H6 entirely (red) and in some cases, H5 (yellow). Buildings in the H5 zone would require special design and construction, as advised by the Technical Flood Risk Management Guideline.

The categorisation of flooding for the multi-criteria analysis was based on surface water depth and velocity and is outlined in Section 4.

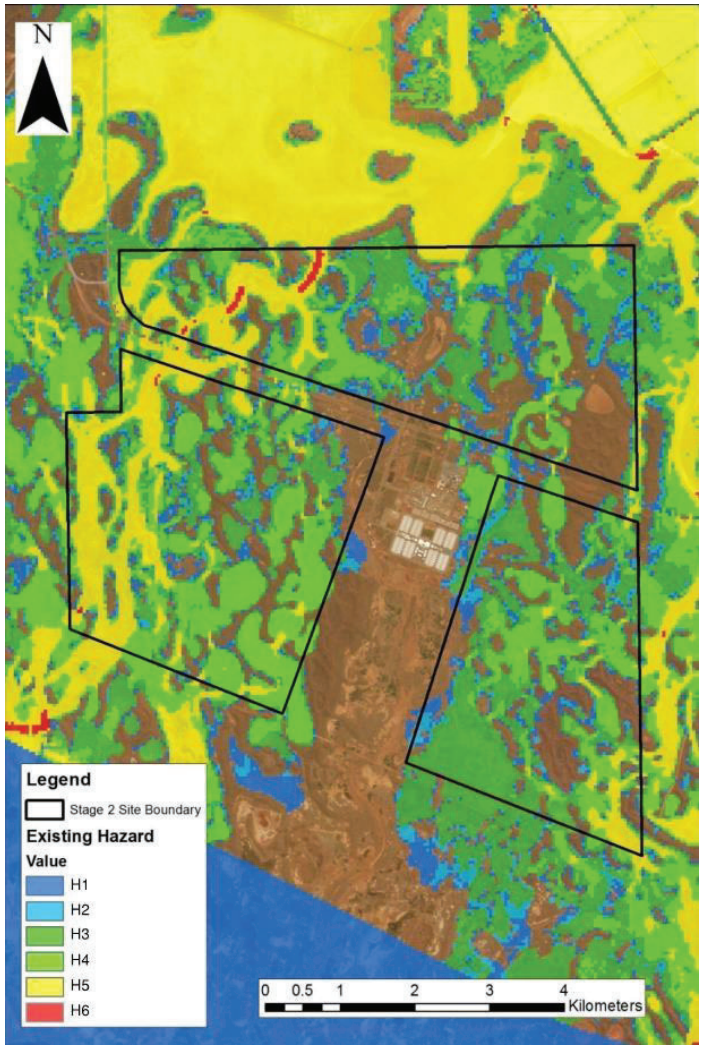



Figure 8 Hazard classification for Stage 2 site

### 3.2.3 Hydrology

The ANSIA Stage 2 site contains both perennial and non-perennial water bodies. Although modifications to the existing landscape would see future development possible in these areas, it is desirable to avoid development in close vicinity to existing water bodies where possible.

Landgate mapping showing existing water bodies is shown below in Figure 9. It is noted that modifications to the existing landscape such as the construction of the workforce accommodation and Multi-User Access Infrastructure Corridor (MUAIC) Roadway have occurred within areas mapped as water bodies. Significant earthworks and the construction of major culverts were required in order for these developments to be constructed.


Figure 9 Landgate mapping - Existing water bodies

The proximity to existing water bodies has been considered in the Multi-Criteria Analysis discussed in Section 4.

### 3.2.4 Future Considerations

Flooding analysis completed in future stages of design will need to include refined modelling of overland flow paths along the drainage areas identified, to determine depth and velocity of flow, road floodway/culverts, pad level/freeboard, and rock armouring/scour protection. This will enable the stormwater management measures to be fully implemented.

The consideration of natural, existing surface water pathways will be particularly important for areas of Stage 2 in proximity to breakout flows from the Ashburton River. To satisfy DoW requirements, main water flow channels from the Ashburton River to Hooley Creek will need to be included within detailed hydrological modelling supporting Development Plans/Planning Applications (*Urbis, 2014*).

The impacts of future climate relative to the lifetime of the development including decommissioning should be assessed within any future studies. It is estimated that due to future changes in rainfall patterns the project area may experience longer dry spells dispersed by more intense rainfall events (*URS, 2010*). An escalating number of severe category cyclone systems is also predicted in combination with a predicted increase in the West Australian coast sea level up to 0.9m by 2100.

Furthermore it has been identified that a LWMS accompanying future development plans will need to include storm surge modelling incorporating the revised sea level rise requirements of State Planning Policy 2.6 (*Urbis, 2014*). The consultant undertaking this modelling should evaluate the suitability of allowing for increase in rainfall intensity, in-line with current predictions and best practice.

The above future considerations are as previously outlined in the 2016 Arup study for the wider ANSIA area. These consideration will need to be addresed by future developers within the Stage 2 site.

## 3.3 Geological and Geotechnical

The geological and geotechnical profile of the ANSIA Stage 2 area has been assessed on the basis of data extracted from the Geological Survey of Western Australia, 1981. A more general geological and geotechnical assessment for the wider ANSIA area can be found in the 2016 'Arup ANSIA Improvement Scheme Engineering Concept Report'.

As indicated by Figure 10 below, three distinct geological profiles have been identified within the Stage 2 area:

- Czp – Claypan-dominant terrain – claypans with longitudinal and net dunes, and/or flat deflation-lag surfaces; clay, silt, sand and gravel;
- Qt – Supertidal Flats – calcareous clay, silt and sand with authigenic gypsum and superficial algal mats and salt crusts; and
- Qe – Longitudinal and network dunes and residual sand plains – reddish brown to yellowish quartz sand.

Each of the profiles have been assessed with respect to their suitability for development, and this has been used to inform the multi-criteria analysis discussed in Section 4.

It has been determined that the Qe - Longitudinal and network dunes and residual sand plains profile (light green), is the most viable for development. This is due to its typical quartz sand geology lending itself to ease of constructability for earthworks, and more specifically representing a suitable fill material to be used in the balance of cut and fill during building pad formation, further discussed in Section 3.5. Additionally, the Qe profile's characteristic elevated dune topography will work towards alleviating challenges associated with flood management as discussed in Section 3.1.2.

Czp – Claypan dominant terrain (dark green), has also been determined to be suitable for development given that Czp areas are expected to be interspersed with longitudinal and net dunes, representing areas suitable for development by virtue of previously discussed flood management and constructability benefits. Physical clay pans in these areas are expected to be sparsely distributed, and as such not present a significant constraint to development. It should be noted that for the ANSIA Stage 1 General Industry Areas (GIAs), it was found that development over a clay pan could be anticipated to require soil amendment (Urbis, 2014b). There is a manageable geotechnical/earthworks cost associated with development on clay pans which will form an engineering consideration for future more detailed stages of development.

Qt – Supertidal flats (yellow) have been determined to represent the geological profile least suitable for development. The Qt profile is typically representative of low lying flat waterway locations, as validated by examining aerial imagery against the yellow hatch illustrated on Figure 10. These areas have been determined to have a low suitability for development given that their low elevation presents flood protection challenges as discussed in Section 3.1.2 and 3.2.1. Additionally, the typical calcareous clay and silt profile of Qt areas may represent constructability issues given that clay/silt geological profiles are known to exhibit poor drainage characteristics, and as such may require surcharging and/or other ground improvement measures before development can take place. Furthermore, it should also be noted that for similar reasons to those above, clay/silt geologies do not represent a suitable fill material to be used in the balance of cut and fill during earthworks formation.

The scoring criteria used within the Multi-Criteria Analysis for the various geologies of the Stage 2 site is outlined in Section 4.

As noted in the 2016 Arup 'ANSIA Improvement Scheme Engineering Concept Report', soft and loose soils dominate the near-surface geologic profile across the ANSIA and rock material, albeit weak rock, is not expected to be widely encountered during site preparation of areas for future development.

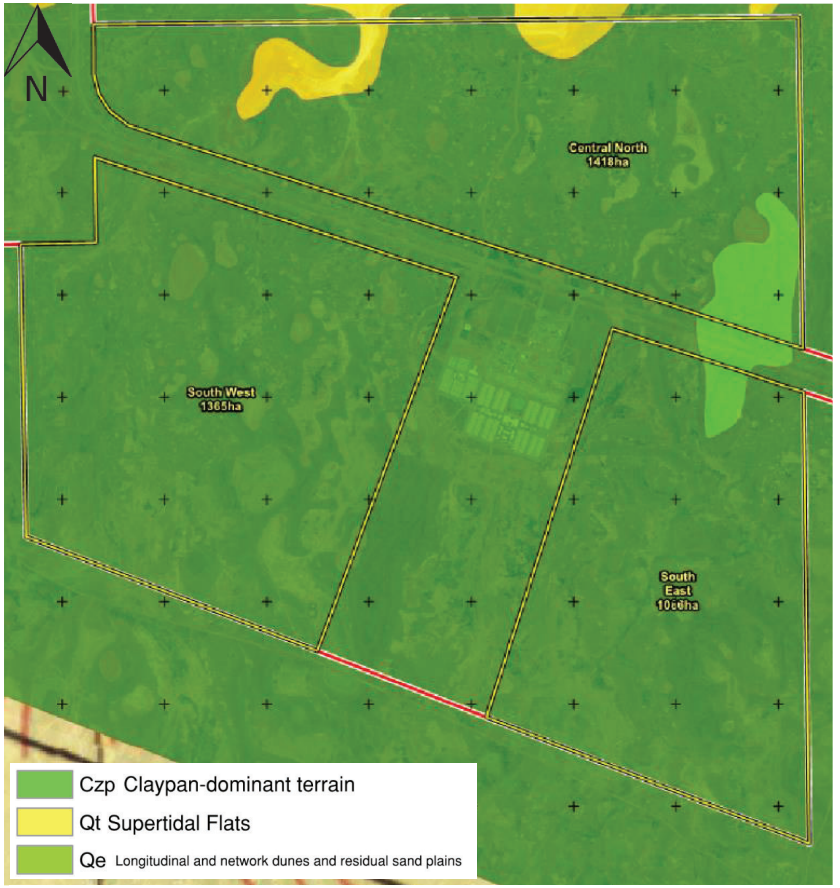



Figure 10 Geology of the ANSIA Stage 2 site (Source: Geological Survey of Western Australia, 1981)

## 3.4 Acid Sulfate Soils

The acid sulphate soil risk (ASSR) profile of the ANSIA Stage 2 has been assessed on the basis of data extracted from the Australian Soil Resource Information System, 2014, as well as a review of the 2009 "Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes" study from the Department of Environmental Conservation. The probability of occurrence ranges indicated on Figure 11 have been developed in accordance with CSIRO, 2016, "Acid Sulfate Risk Mapping".

It should be noted that a previously completed desktop assessment of ASSR for the overall ANSIA site, as detailed in the 2016 Arup 'ANSIA Improvement Scheme Engineering Concept Report', remains highly relevant to ANSIA Stage 2 areas, and should be read in conjunction with this report.

ASS is variably present across all geologic units at the ANSIA however it has been identified that ASSR is closely associated with the following geological landforms identified across the site:

- High to moderate risk – supratidal flats;
- Moderate to low risk – low lying clay pans; and
- No known risk - coastal dunes.

ANSIA Stage 2 areas have been assessed for development suitability as a function of ASSR as visually represented on Figure 11 below. Areas of low and extremely low probability of occurrence (orange and yellow) have been classed as suitable for development, whereas areas of high probability (red) have been classed as unsuitable for development. These inputs have again been used to inform the Multi Criteria Analysis described in Section 4.

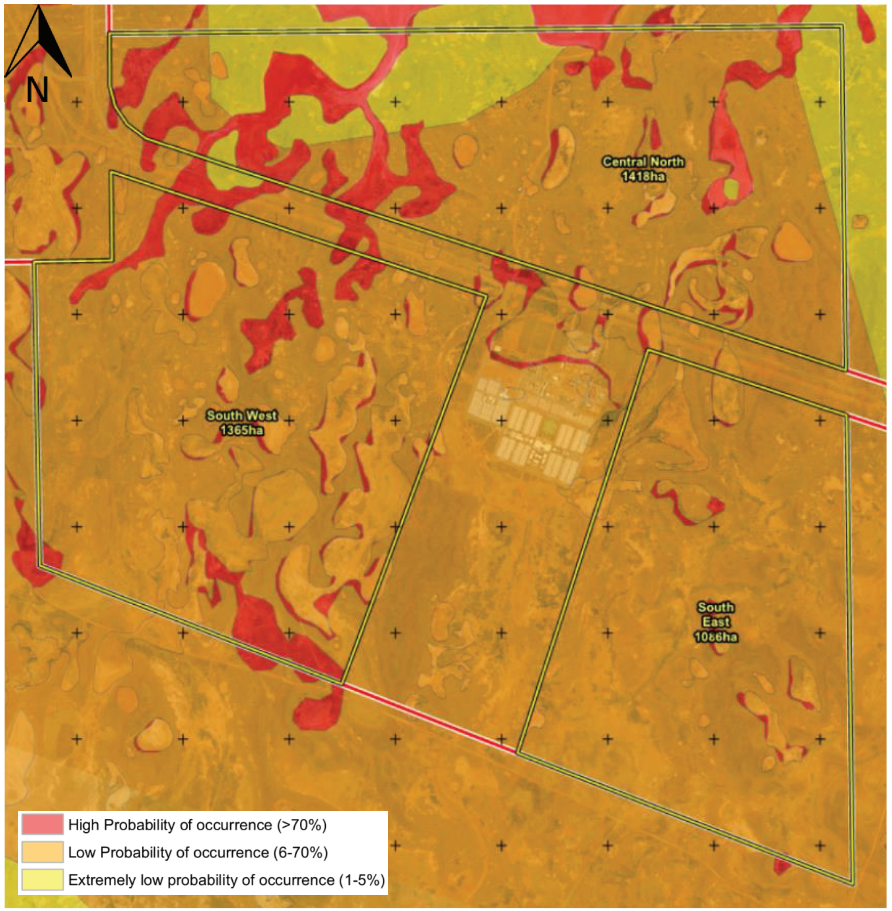



Figure 11 ANSIA Stage 2 Acid Sulfate Soil risk areas (Australian Soil Resource Information System, 2014)

## 3.5 Bulk Earthworks

As part of this preliminary site assessment, consideration of earthworks in the ANSIA Stage 2 area is limited to the formation of building pads, with the specific onus on raising low lying areas planned for development to above adjacent flood levels as discussed in Section 3.2.1.

As identified in the 2016 Arup 'ANSIA Improvement Scheme Engineering Concept Report', development building pads within the ANSIA will predominantly require fill earthworks rather than cut as a consequence of the overall topography being relatively low-lying when compared to flood levels.

Previous volumetric analysis outlined in the 2016 Arup Improvement Scheme Report suggest that there is expected to be some opportunity for the balance of cut and fill in certain elevated areas when developing building pads. This will however be dependent on the suitability of cut material geology. As described in Section 3.3, suitable excess cut materials to be used as fill during balancing will need to be well graded, adequately draining sands, rather than fine grained cohesive geologies such as clays or silts. Additionally, the balanced fill material will need to be of low ASSR risk as discussed in Section 3.4.

As a result of the above, 'Bulk Earthworks' are accounted for in the Arup Multi Criteria Analysis through the three different criteria listed below:

- Topography (Section 3.1): whereby higher elevations will have a reduced earthworks requirement, and will also represent areas from which excess material can be extracted to be used as fill elsewhere;
- Geology and Geotechnical (Section 3.3): whereby suitable earthworks materials are identified as well graded adequately draining sands; and
- Acid Sulfate Soils (Section 3.4): whereby suitable earthworks materials are identified as having a low ASSR.

A more detailed discussion regarding earthworks requirements of the entire ANSIA, along with commentary regarding the potential to import fill from off site where balance cannot be achieved, can be found in the 2016 Arup 'ANSIA Improvement Scheme Engineering Concept Report'.

## 3.6 Environmental & Heritage

ANSIA Stage 2 protected areas have been identified using the information sets listed below:

- Land Tenure Reserves extracted from Landgate 29/08/2017;
- Aboriginal Places Registered Sites extracted from the Department of Aboriginal Affairs 17/08/2017;
- Threatened and Priority Fauna extracted from the Department of Parks and Wildlife 22/04/2016; and
- Threatened Fauna extracted from the Department of Parks and Wildlife 22/04/2016.

The information included in each of the information sets is visually represented on Figure 12.

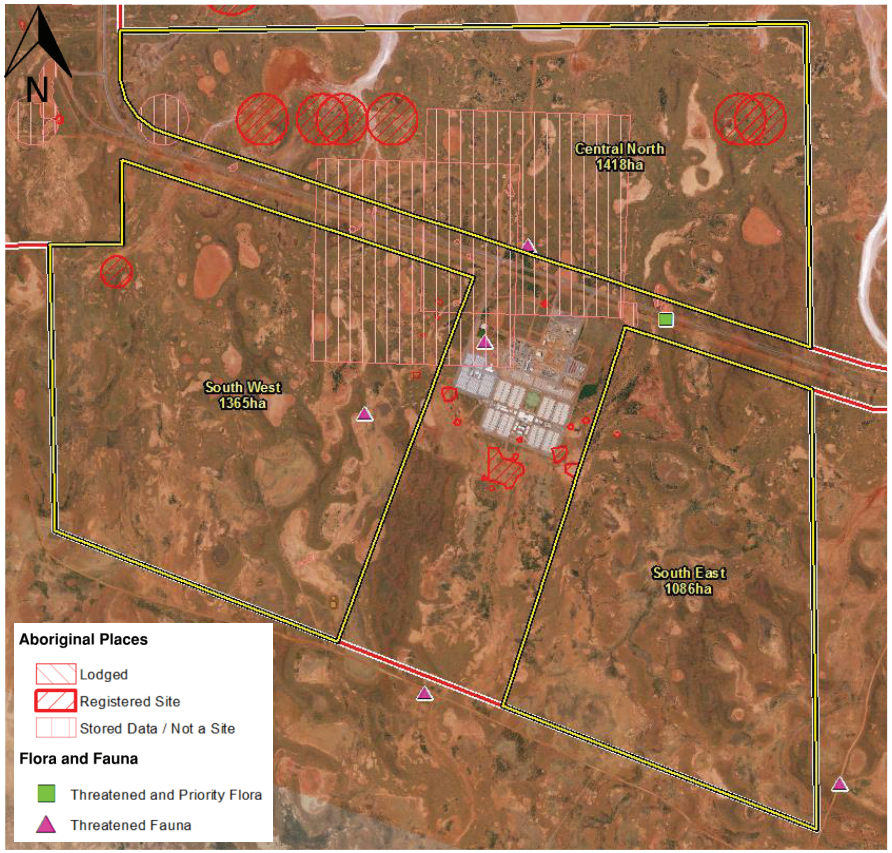



Figure 12 ANSIA Stage 2 Protected Environmental Sites (Department of Aboriginal Affairs. 2017 & Departments of Parks and Wildlife, 2016)

Development suitability has been assessed against the above environmental criteria such that existing land tenure reserves have been classed as unsuitable for development, and all other protected locations have been classed as having moderate suitability pending a more detailed investigation. This has been used to inform the Multi Criteria Analysis discussed in Section 4.

## 3.7 Infrastructure Proximity

ANSIA Stage 2 development suitability has been assessed against infrastructure proximity, both in terms of supplying the proposed developments with typical infrastructure (Transport, Water, Power and Gas) as well as avoiding development within existing infrastructure easements. This is described in Sections 3.7.1 to 3.7.5 below.

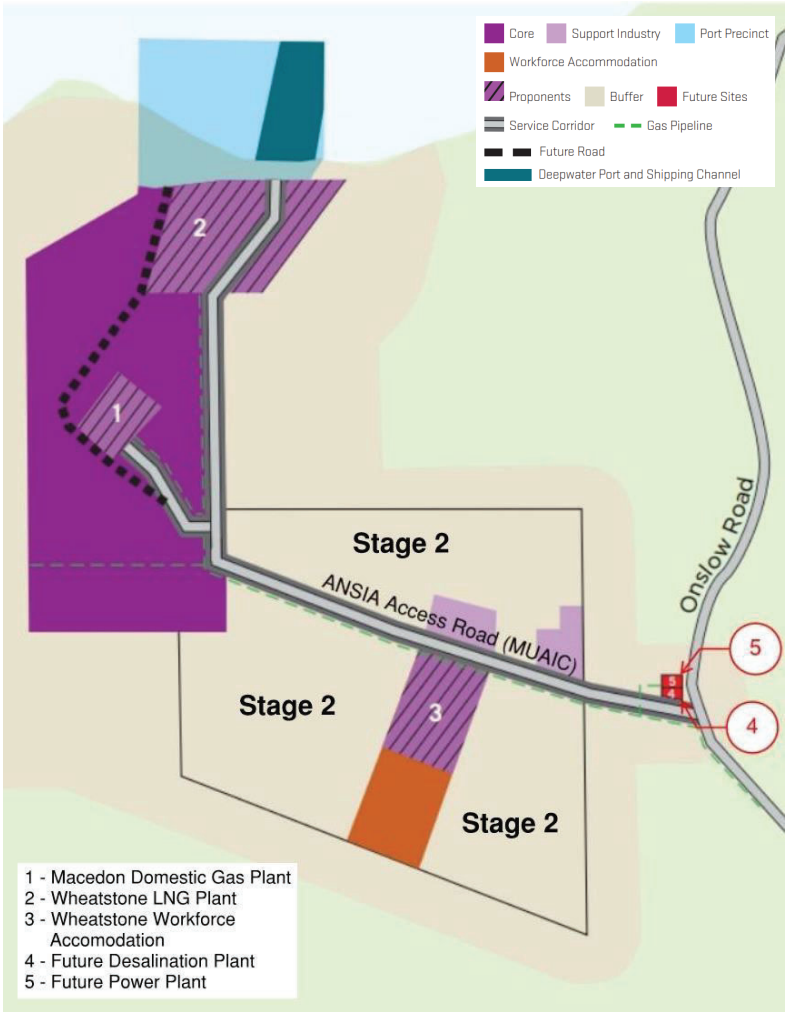



Figure 13 Location of the future desalination plant and power plant (source LandCorp)

### 3.7.1 Transport

Transport infrastructure proximity has been assessed for ANSIA Stage 2 development area by measuring the distance between the locations and both the existing ANSIA access road (MUAIC), and the existing Onslow Road, as indicated on Figure 13.

Locations within 1km of these roads have been classed as highly suitable for development, and all other stage 2 locations have been classed as moderately suitable. This has been used to inform the Multi Criteria Analysis discussed in Section 4.

### 3.7.2 Water

As discussed in the 2016 Arup 'ANSIA Improvement Scheme Engineering Concept Report', the Water Corporation has ongoing plans to construct a new desalination plant to supply water to Onslow under the Onslow Water Infrastructure Upgrade Project (OWIUP). Potable water produced by this plant could also potentially be used to supply future developments within the ANSIA through a bulk supply point. The site for the proposed desalination plant is at the North-West corner of the intersection between Onslow Road and the ANSIA Access Road (MUAIC), indicated as item 4 on Figure 13.

Consultation with the Water Corporation in January 2018 has revealed that there is still a commitment to the proposed desalination plant, however investment in infrastructure has been delayed. As part of the Wheatstone LNG project, Chevron has entered into an agreement with the State to invest in social infrastructure projects for the town of Onslow. This agreement is known as the *Ashburton North State Development Agreement (Wheatstone Project)*. The agreed investments include the 2 ML/d reverse osmosis (RO) desalination plant, 16 km transfer main and a new 5 ML service tank at the town. The new desalination plant will be integrated with Onslow's current water source, the Cane River borefield.

The proposed desalination plant is designed to service the town of Onslow and there are **no plans to service the future ANSIA development**. Water Corporation have noted that any supply to industries would need to be individually negotiated regarding their proposed water demands, the need for additional source and infrastructure upgrades, the point of bulk supply and the charging regime.

Water Corporation noted that: *"Any water supply to the ANSIA, IF additional source can be found, would likely be in the form of a bulk point of supply at or near the boundary of the ANSIA. Internal service mains and any storages would be owned by the industries."*

With the above in mind, development suitability in ANSIA Stage 2 areas has been assessed against proximity to the proposed desalination plant as locations closer to the plant will have lower costs to install future private connections. Locations within 5km have been classed as highly suitable for development, and all other Stage 2 locations have been classed as having moderate development suitability. The distance has been measured along the MUAIC where potential water distribution pipeline infrastructure would be installed. This has been used to inform Multi Criteria Analysis discussed in Section 4.

### 3.7.3 Power

As is also identified in the 2016 Arup 'ANSIA Improvement Scheme Engineering Concept Report', Horizon Power has begun construction of a new modular power station to supply the town of Onslow under the Onslow Power Infrastructure Upgrade Project (OPIUP). It is foreseeable that power generated by this plant could also be used to supply future developments within the ANSIA Stage 2 area. The site for the power plant is adjacent to the proposed desalination plant discussed in Section 3.7.2, and is indicated as item 5 on Figure 13.

January 2018 correspondence with Horizon Power has confirmed that construction of the new modular power station has commenced, with final commissioning of the power station scheduled for early 2018. Advice provided by Horizon Power notes that the modular power station being developed can be expanded to service heavy load requirements and is capable of expanding for additional customers within the ANSIA who wish to connect to their network.

As a result of the above, development suitability in ANSIA Stage 2 areas has been assessed against proximity to the newly constructed power plant. Measuring along the MUAIC where transmission main infrastructure would be installed, locations within 5km have been classed as highly suitable for development, and all other Stage 2 locations have been classed as having moderate development suitability. This has been used to inform Multi Criteria Analysis discussed in Section 4.

### 3.7.4 Gas

Gas supply for ANSIA Stage 2 industries will also form a consideration for assessing the suitability of development locations. Dampier Development Group (DDG) gas distribution pipelines are located within, and adjacent to, ANSIA Stage 2 areas, and it is anticipated that Stage 2 developments will be able to arrange a private supply agreement with DDG for the provision of raw natural gas.

As such, Stage 2 development suitability has also been assessed for proximity to existing DDG distribution infrastructure with locations within 1km of pipelines being classed as highly suitable and all other Stage 2 locations being classed as moderately suitable. This has been used to inform the Arup Multi Criteria Analysis.

### 3.7.5 Infrastructure Easements

A number of existing easements are in place for infrastructure within ANSIA Stage 2. These easements are largely centred over the existing MUAIC, bisecting the centre of the site and represent an approximate 300m width inside of which development in not permitted. The easements are in place for protection of the MUAIC roadway itself, along with a large number of existing utility pipelines which service the Wheatstone and Macedon Gas processing plants.

An additional easement for a disused LPG pipeline, formerly used for BHP's Griffin project, also runs perpendicularly through the top half of the Stage 2 site.

Noting the above, Stage 2 areas which occur within existing easements have been classed as unsuitable for development. This has been incorporated into Arup's Multi Criteria Analysis.

# 4 Site Assessment

## 4.1 Multi Criteria Analysis

### 4.1.1 Methodology

Arup has completed a thorough Multi Criteria Analysis for the ANSIA Stage 2 in order to produce a preliminary identification of areas suitable for future development.

This analysis has been developed using GIS spatial mapping software, desktop analysis of each of the criteria identified in Section 3 of this report, along with qualitative input from both LandCorp and JTSI.

In summary, the methodology used is as below:

1. Identification of relevant site characteristics used to determine development suitability;
2. Compile data specific to each of the identified characteristics, including shape files to be used in GIS software;
3. Undertake desktop studies to determine the significance of variable parameters within each characteristic to set the evaluation criteria (i.e set scoring categories, weightings);
4. Use GIS mapping inputs to undertake a layered analysis. Each point within the site will be scored; and
5. Produce output maps.

The above methodology is demonstrated visually in Figure 14.

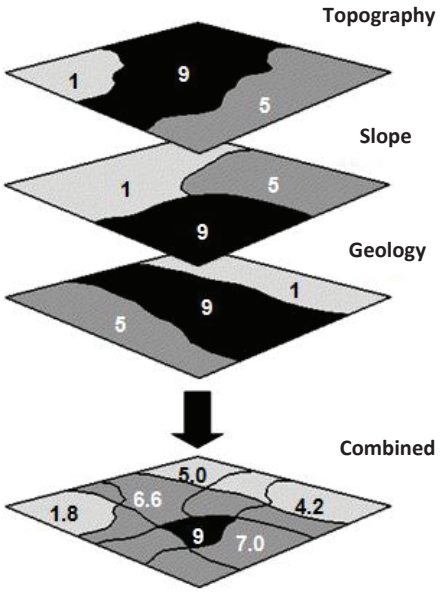



Figure 14 Multi-Criteria Analysis Process

### 4.1.2 Criteria and weightings

An evaluation criteria was set, which assigned each of the site characteristics for each of the engineering disciplines listed in Section 3 with a suitability score:

- 0 – Unsuitable
- 1 – Low
- 2 – Moderate
- 3 - High

The criteria was set based on the review of previously undertaken studies, input from LandCorp/JTSI and engineering judgement.

Each discipline was then weighted, in order to place more emphasis on the more onerous disciplines regarding future development. For example 'Flooding' was assigned a weighting of 40%, whereas the site slope was only assigned a 5% weighting as it was considered not as critical to impacting future development.

The full evaluation criteria scoring matrix is shown in Table 3 and the discipline weightings are shown in Table 2.

Table 2 Category Weightings

| Discipline/Category | Category Weighting (%) |
|---|---|
| Topography | 20% |
| Slope | 5% |
| Flooding | 40% |
| Geology - Landform | 5% |
| Soils | 5% |
| Hydrology | 10% |
| Environmental | 10% |
| Infrastructure Proximity | 5% |
| Land Use | 0% |

Table 3 Evaluation criteria scoring matrix

| Discipline | Feature | Feature Category | Suitability | Score |
|---|---|---|---|---|
| Slope | Site Gradient | 0-4 degrees | High | 3 |
| | | 4-7 degrees | Moderate | 2 |
| | | > 7 degrees | Moderate | 2 |
| Topography | Level | <2m AHD | Unsuitable | 0 |
| | | 2-4m AHD | Low | 1 |
| | | 4-6m AHD | Moderate | 2 |
| | | 6-7m AHD | High | 3 |
| | | 7m+ AHD | High | 3 |
| Flooding | Hazard Vulnerability Classification (1:100 Year) | No Classification | High | 3 |
| | | H1 | High | 3 |
| | | H2 | High | 3 |
| | | H3 | Moderate | 2 |
| | | H4 | Moderate | 2 |
| | | H5 | Unsuitable | 0 |
| | | H6 | Unsuitable | 0 |
| Geology/Landform | Geology | Qt | Low | 1 |
| | | Cza | Low | 1 |
| | | Qe | High | 3 |
| | | Czp | High | 3 |
| Soils | Acid Sulphate Soils | High Probability of occurrence (>70%) | Moderate | 2 |
| | | Low Probability of occurrence (6-70%) | High | 3 |
| | | Extremely low probability of occurrence (1-5%) | High | 3 |
| Hydrology | Watercourse | Major (with buffer 0 - 50m) | Unsuitable | 0 |
| | | Major (with buffer 50 - 100m) | Low | 1 |
| | | Major (with buffer 100 to 200m) | Moderate | 2 |
| | | Minor (with buffer 0 - 50m) | Moderate | 2 |
| | | | | |
| | Water Body | Perennial (0m buffer) | Unsuitable | 0 |
| | | Perennial (with 100m buffer) | Low | 1 |
| | | Perennial (with 100m to 200m buffer) | Moderate | 2 |
| | | Non Perennial (with buffer 0m) | Moderate | 2 |
| | | | | |
| | Coastal Flat Polygon | All Flats | Low | 1 |
| | | | | |
| | Ocean | | Unsuitable | 0 |
| Environmental & Heritage | Reserves (Land Tenure) (29/08/2017) | Other Reserves | Unsuitable | 0 |
| | Including Old Onslow Townsite Lots | R 9701 | Moderate | 2 |
| | | | | |
| | Aboriginal Places (DAA, 17/08/2017) | Registered Site | Moderate | 2 |
| | | Lodged | Moderate | 2 |
| | | Stored Data / Not a Site | Moderate | 2 |
| | | | | |
| | Coastal Flat Polygon | Mangroves | Low | 1 |
| | | Intertidal | Moderate | 2 |
| | | Saline Coastal | Moderate | 2 |
| | | Unknown | Moderate | 2 |
| | | | | |
| | Threatened and Priority Flora (DPaW) - WA Herbarium (22/04/2016) | All Classes (0m to 50m buffer) | Moderate | 2 |
| | | | | |
| | Threatened Fauna (DPaW) (10km buffer from Main Roads only) (22/04/2016) | All Classes (0m to 50m buffer) | Moderate | 2 |

| Discipline | Feature | Feature Category | Suitability | Score |
|---|---|---|---|---|
| Infrastructure Proximity | Power Station (OPIUP) | Distance (along access corridor) of less than 5 km | High | 3 |
| | | Distance (along access corridor) of between 5 and 10km | Moderate | 2 |
| | | Distance (along access corridor) of greater than 10 km | Moderate | 2 |
| | | | | |
| | Water Supply (Desalination OWIUP) | Distance (along access corridor) of less than 5 km | High | 3 |
| | | Distance (along access corridor) of between 5 and 10km | Moderate | 2 |
| | | Distance (along access corridor) of greater than 10 km | Moderate | 2 |
| | | | | |
| | Major Service Pipelines (Easement) And Existing Infrastructure (Camp, Gas Plant etc.) And ANSIA Access Road / Onslow Rd Road Reserve | Within Easements and Assigned Existing Infrastructure Lots | Unsuitable | 0 |
| | | | | |
| | | | | |
| | | | | |
| | DBP Easement | Within Easement | Unsuitable | 0 |
| | | Outside easement but within 500m | High | 3 |
| | | Outside 500m buffer | Moderate | 2 |
| | | | | |
| | ANSIA Access Road And Onslow Rd | 1km buffer | High | 3 |
| | | 1-2km | Moderate | 2 |
| | | 2km+ | Moderate | 2 |
| | | | | |
| | Gas Supply (DDG Pipeline) | Adjacent | High | 3 |
| | | 1-2km | Moderate | 2 |
| | | 2km+ | Moderate | 2 |
| Land Use | Land Tenure | Reserve | Low | 1 |
| | | R 9701 | Moderate | 2 |
| | | Easement | Low | 1 |
| | | Lease | High | 3 |
| | | Crown | High | 3 |
| | | Other | Moderate | 2 |
| | | Freehold | Moderate | 2 |
| | | Road | Moderate | 2 |
| | | Survey Strata Plan | Moderate | 2 |
| | | Strata Plan | Moderate | 2 |
| | | Unk | Moderate | 2 |
| | | | | |
| | Local Government Zones & Reservations | Industrial Zone | Low | 1 |
| | | Institutional / Public Uses | Low | 1 |
| | | Local Authority Reserve | Low | 1 |
| | | Unsuitable Zone | Moderate | 2 |
| | | Recreation / Conservation | Low | 1 |
| | | Residential | Low | 1 |
| | | Retail / Business | Low | 1 |
| | | Rural | High | 3 |
| | | Special Zones | Moderate | 2 |
| | | Unk | Moderate | 2 |

## 4.2 Outputs

The Multi-Criteria Analysis computed a score out of 100 for each point within the Stage 2 site, which considered the scoring matrix and the discipline weighting.

The score is a measure of suitability for development based on the developed criteria and is shown below in Figure 15. Based on the high weighting (40%) placed on flooding, areas where surface water is the deepest and moving the fastest in a 100 Year ARI storm event have the lowest scores. This is also heavily linked to the 20% weighting applied to topography, as low-lying areas are more prone to flooding.

There are areas within the ANSIA Stage 2 site which have an MCA output score of 100. These areas received a score of 3 (highly suitable) for each of the applicable discipline characteristics.

The lowest score allocated within the site was 23.33, however areas just outside the site received an output score as low as 13.33. These areas are located within existing floodways at low elevations.

It can be seen in Figure 15 that the western sections of the ANSIA Stage 2 site are rated the lowest for future development suitability.

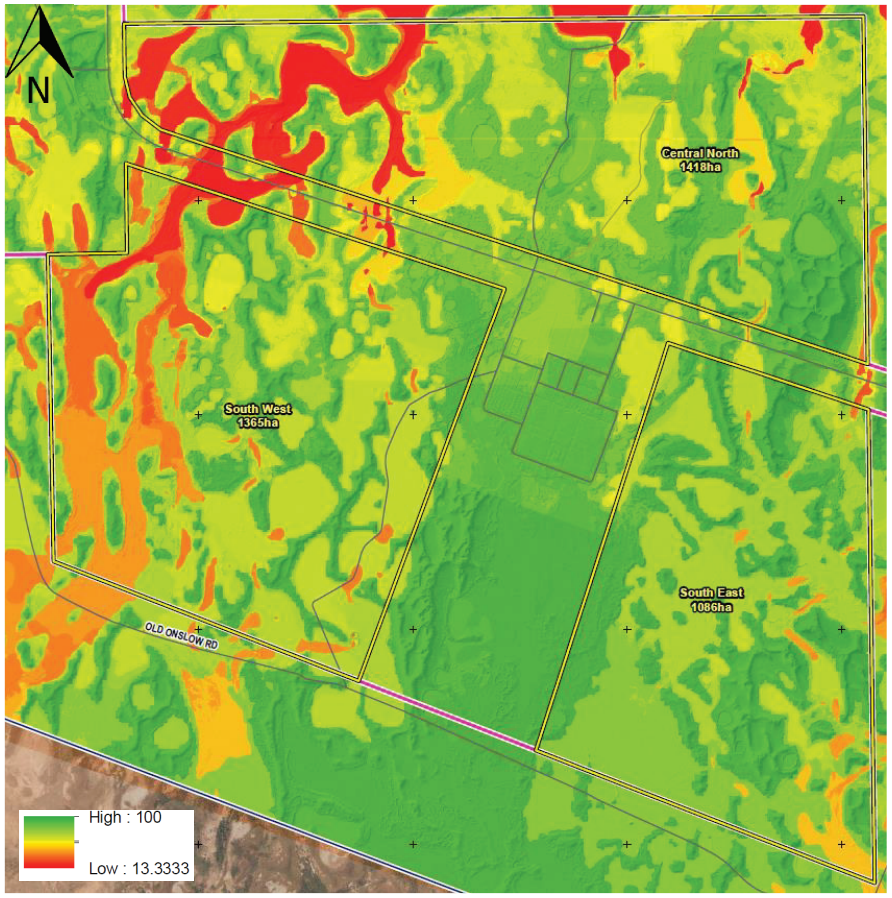



Figure 15 GIS Mapping showing the weighted suitability scoring within the ANSIA Stage 2 site

# 5 Developable Areas

The aim of this study is to provide engineering input into a Guide Plan amendment, providing clarity on future development zones within the ANSIA Stage 2 area.

Through consideration of site characteristics and undertaking the multi-criteria analysis the ANSIA Stage 2 site has been assessed for development suitability. The assessment of the site is heavily weighted towards the **flood** and **topography** characteristics of the site however a number of other factors have been considered in defining the suitability, including:

- Geology/Landform
- Soils
- Hydrology
- Environmental & Heritage

The multi-criteria analysis assigns a score out of 100 for each point within the ANSIA Stage 2 site boundary.

It was established with LandCorp and JTSI that three categories of scores would be mapped, as shown in Figure 16:

- Low (13-50%)
- Medium (50-60%)
- High (60-100%)

In establishing areas suitable for future development it was determined that isolated zones of low (13-50%) and medium (50-60%) scores could be engineered to meet requirements, whereas continuous areas containing low ratings were unlikely to be developable. This has resulted in the following areas being noted as developable within the ANSIA Stage 2 site:

- Central North: 934ha (of a possible 1418ha)
- South West: 895ha (of a possible 1365ha)
- South East: 983ha (of a possible 1086ha)

These recommendations for developable areas have been taken into account when updating the General Industry zoning in the updated Guide Plan mapping undertaken by Taylor Burrell Barnett – attached in Appendix A.

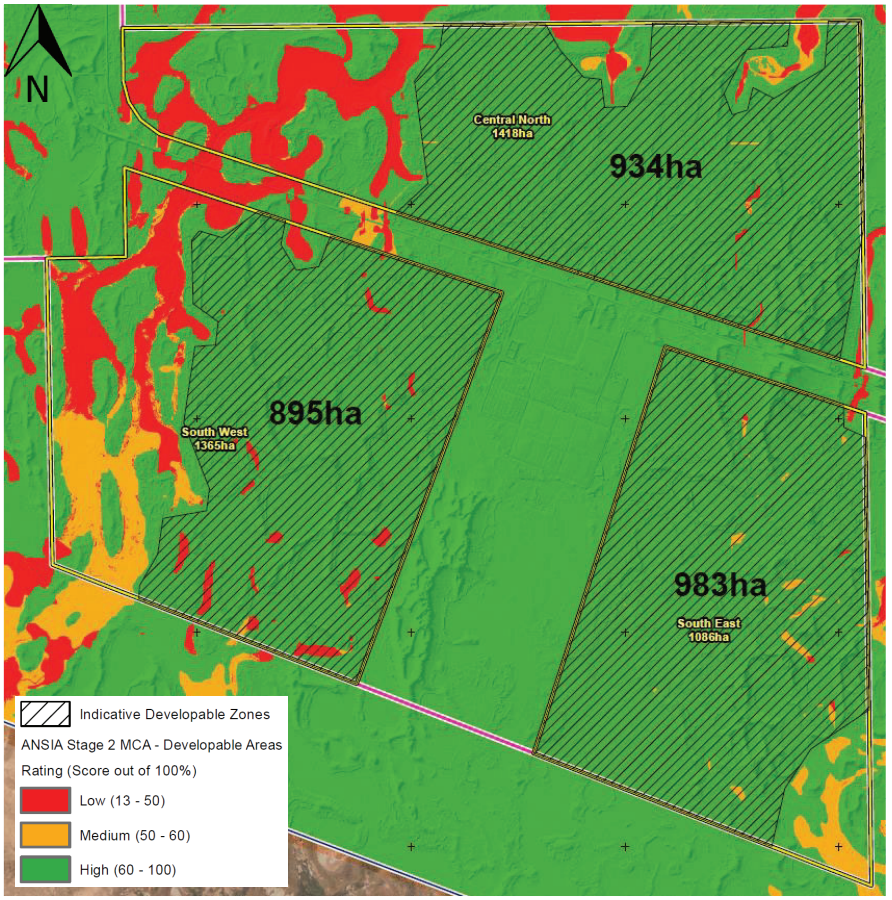



Figure 16 GIS Mapping showing the categorised weighted suitability scoring and indicative development zones within the ANSIA Stage 2 site

# B1

## Simon Tomizzi

**From:** Rusa Kong <rusa.kong@horizonpower.com.au>
**Sent:** Monday, January 22, 2018 12:05 PM
**To:** Brandon Rademeyer
**Subject:** RE: Ashburton North Strategic Industrial Area (ANSIA) - Power Provision

Good afternoon Brandon,

Perfect timing! Please find the responses in red below.

We note that ANSIA is in the vicinity of the new power station currently being built in Onslow. The power station capacity upgrade and network reinforcements will be required to facilitate the power supply to this industrial area, and we will be able to determine the requirements further once we obtain an indicative load for the area and time frames.

Additionally, the new power station requirements (capacity, use of renewable energy) are not outlined in the document from 2014 and therefore for further costing and technical requirements we will need to review ANSIA's requirements in more detail when they are confirmed.

- Whether Horizon Power (HP) operates infrastructure in vicinity of the ANSIA – yes the new power station is in the vicinity
- Whether HP has plans to service the ANSIA if you are already aware of its development- Horizon Power has provisions within the power station to service this load in its vicinity, and the power station is modular which can be expanded to service heavy or additional requirements.
- Whether HP believes their existing infrastructure has sufficient capacity to service the presumably large load generated by a heavy industrial area- yes see above, we are able to expand the current infrastructure for expansions and additional customers who wish to connect to our network.
- **And most importantly**, if power distribution infrastructure were to run alongside the ANSIA access roads (within the proposed access corridors), what size spatial allowance or easement might be required (so that this can be allocated in the masterplan scheme) - it is preferable that a 2m wide corridor for underground distribution network and space for distribution substations to service customers.

I hope the above helps you in your preliminary investigations.

Kind regards
Rusa

HORIZON POWER
energy for life

**Rusa Kong**
**Commercial & Product Development Manager**
T: (08) 6310 1641 | 18 Brodie Hall Drive, Bentley WA 6102
M: 0412 838 216 | rusa.kong@horizonpower.com.au
W: horizonpower.com.au

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**From:** Brandon Rademeyer [mailto:Brandon.Rademeyer@arup.com]
**Sent:** Monday, 22 January 2018 12:03 PM
**To:** Rusa Kong <rusa.kong@horizonpower.com.au>
**Subject:** RE: Ashburton North Strategic Industrial Area (ANSIA) - Power Provision

## Simon Tomizzi

**From:** Brett Coombes <Brett.Coombes@watercorporation.com.au>
**Sent:** Wednesday, January 10, 2018 11:28 AM
**To:** Brandon Rademeyer
**Subject:** RE: Ashburton North Strategic Industrial Area (ANSIA) - Water/Wastewater Provision
**Attachments:** LJ23-000-001-01A.pdf; Onslow water schematic.JPG; Onslow existing water scheme.JPG; Ashburton_North_Strategic_Industrial_Area_Improvement_Plan.DOCX

Good morning Brandon,

The proposed Wheatstone LNG project in the ANSIA was expected to result in significant growth in the town, increasing the number of services from the current 445 to about 1,100. This growth has no yet occurred and, while I understand there is still commitment behind the project, investments in infrastructure has been delayed.

As part of the Wheatstone LNG project, Chevron has entered into an agreement with the State to invest in social infrastructure projects for the town of Onslow. This agreement is known as the Ashburton North State Development Agreement.

The agreed investments include a 2 ML/d reverse osmosis (RO) desalination plant, 16 km transfer main and a new 5 ML service tank at the town. The new desalination plant will be integrated with Onslow's current water source, the Cane River borefield.

The Water Corporation will also build one additional 5ML tank. The new tanks will be in a new service tank complex south of the town. The existing tanks will be decommissioned. Supply to the town will be via a new booster pump station on the outlet of the storage tanks. A schematic of the planned system following commissioning of the desalination plant, new service tanks and booster pump station is attached above (Figure 1).

In response to your questions below:

1) Does Water Corporation currently operate water distribution/ wastewater infrastructure in vicinity of the ANSIA ?

   No distribution mains. There are existing and proposed source collector and transfer mains (200mm diameter) coming from the Cane River borefield and from the proposed desalination plant to the south. These mains would not be available for direct supply to customers.

2) Under the assumption that Water Corporation is aware of the ANSIA project, do you have any plans to service the proposed development ?

   No. There may have been earlier approaches to our Major Customer Branch from Chevron regarding possible bulk supply. Any supply to industries would need to be individually negotiated regarding their proposed water demands, the need for additional source and infrastructure upgrades, the point of bulk supply and the charging regime.

3) Would existing water distribution/ wastewater infrastructure in vicinity to the ANSIA require upgrade in order to service the development (if it exists) ?

Yes. The Onslow bore and proposed desalination sources have only been planned and sized to service the domestic/residential and other growth in the townsite that is projected to arise as a result of the industrial developments.

4) If water distribution infrastructure were to run alongside the ANSIA access roads (within the proposed access corridors), what size spatial allowance or easement may be required ? At this point in time a nominal spatial allowance has been allocated to water distribution within the corridor cross sections, however further refinement is needed.

   Any water supply to the ANSIA, IF additional source can be found, would likely be in the form of a bulk point of supply at or near the boundary of the ANSIA. Internal service mains and any storages would be owned by the industries.
   The need and size of easements/reserves to accommodate service pipes would depend on the size of the pipes and any safety separation distances and access requirements. These would not be Water Corporation mains.

I have also attached a copy of a letter from the WC to the DPLH in relation to the ANSIA. The letter provides further background to the question of water supply in the area.

Regards

***Brett Coombes***
*Senior Urban Planner*
*Assets Planning Group*
***Water Corporation***
***T:*** *(08) 9420 3165*

---

**From:** Brandon Rademeyer [mailto:Brandon.Rademeyer@arup.com]
**Sent:** Wednesday, 10 January 2018 9:47 AM
**To:** Brett Coombes; Land Planning
**Subject:** Ashburton North Strategic Industrial Area (ANSIA) - Water/Wastewater Provision

Hi Brett/ To whom it may concern,

Happy new year, I hope you have had a great Christmas break

As discussed briefly last year, I am emailing because Arup is currently working on another Strategic Industrial Area (high level concept stage) in the Ashburton North region on WA.

I was hoping that I might be able to request your comment on a few small queries regarding water/wastewater provision for the area. I am unaware as to whether you have returned from break at this stage, and as such can I please request that this email be forwarded to an alternative planner should you be unable to respond.

Arup is currently engaged by LandCorp to complete a high level feasibility study and constraints assessment for the Ashburton North Strategic Industrial Area (ANSIA). I've attached two plan images for location context (fig1 and fig2).

In summary, the ANSIA covers an area of approximately 8000ha located 11km south west of Onslow Town and 2km from the Ashburton River mouth. Its envisioned that the area will accommodate the needs of Liquefied Natural Gas processing and downstream facilities, as well as other heavy and light industries. The overall project is similar to both the Maitland and Anketell Strategic Industrial Areas.

At this stage of the project, the Arup team is in the process of producing concept cross sections for the ANSIA access corridors (as indicated in fig3). I would be very grateful if you could provide us with some high level comments on the below queries:

1) Does Water Corporation currently operate water distribution/ wastewater infrastructure in vicinity of the ANSIA ?

2) Under the assumption that Water Corporation is aware of the ANSIA project, do you have any plans to service the proposed development ?

3) Would existing water distribution/ wastewater infrastructure in vicinity to the ANSIA require upgrade in order to service the development (if it exists) ?

4) If water distribution infrastructure were to run alongside the ANSIA access roads (within the proposed access corridors), what size spatial allowance or easement may be required ? At this point in time a nominal spatial allowance has been allocated to water distribution within the corridor cross sections, however further refinement is needed.

Thank you in advance for your assistance,

Brandon Rademeyer
Engineer | Transport & Resources
Perth Foresight + Innovation Representative

Arup
Level 14 Exchange Tower 2 The Esplanade Perth WA Australia 6000
PO Box 5750, St Georges Tce WA 6831
t: +61 8 9327 8300 d: +61 8 9327 8332
www.arup.com

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# Onslow Water Treatment Plant and Pipelines

## NOTICE OF PROPOSAL TO CONSTRUCT A WATER TREATMENT PLANT AND PIPELINES NEAR ONSLOW TOWNSHIP

To increase the supply of water in the Town of Onslow, the Water Corporation proposes to construct the following works:

- An aquifer abstraction bore approx. 400 m deep on Lot 556.
- A 2 million litre per day ground water treatment plant on Lot 556 consisting of cooling, filtration, reverse osmosis and remineralisation as the main treatment stages.
- A 200 mm diameter buried water pipeline running from Lot 556 to a water storage tank on Lot 185, approx. 15 km in length, running predominantly in the proposed Onslow Road reserve.
- A 250 mm diameter buried residual saline stream pipeline from Lot 556 to Quick Mud Creek approx. 650 m in length.
- An asphalted intersection at the junction of Wheatstone Road (PR–1) and Lot 557 to provide access to the water treatment plant and adjacent power station.

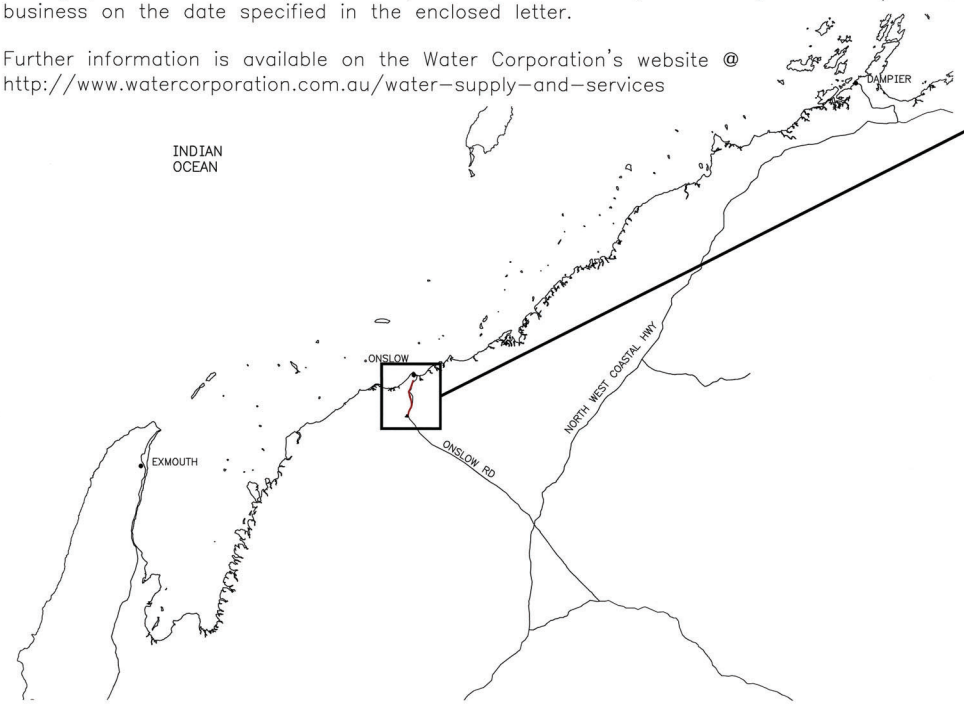
The location of the proposed works is in the Shire of Ashburton as shown in the locality plan.

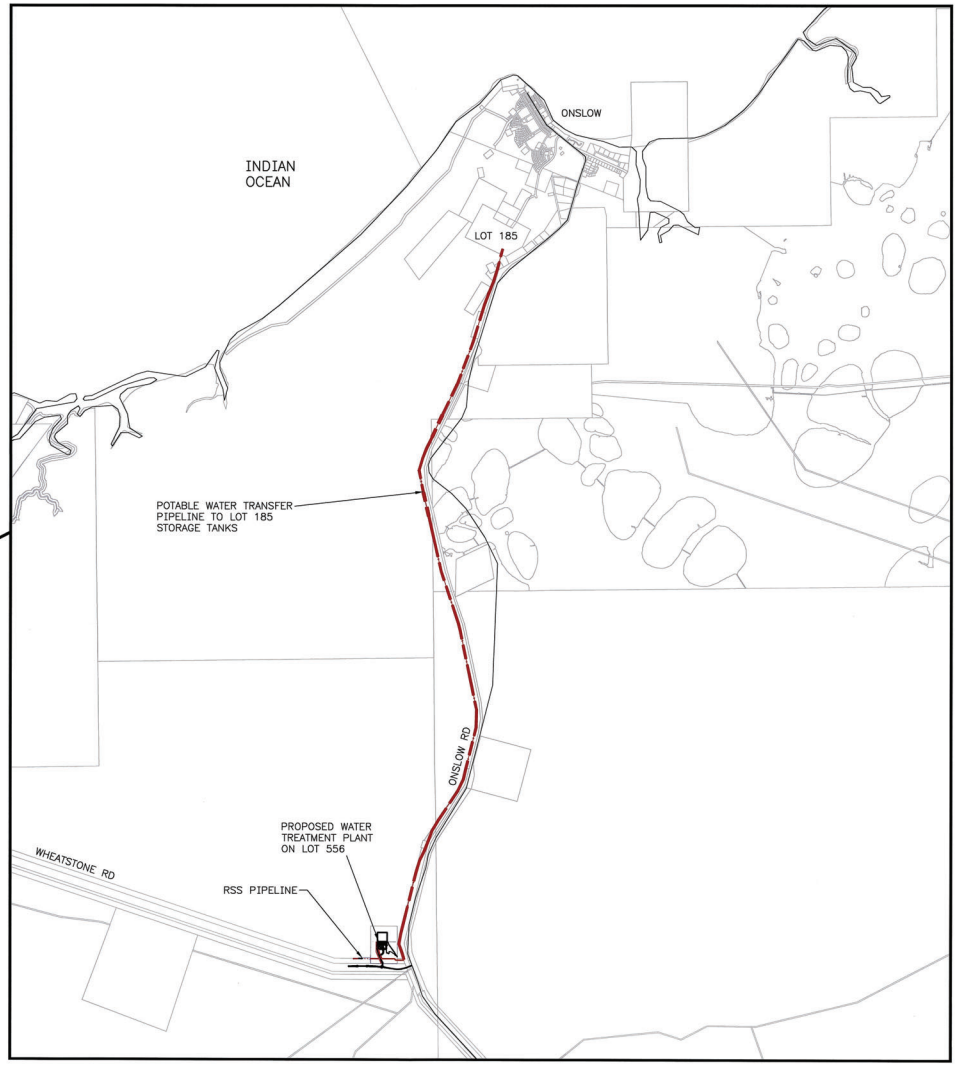
The proposed works are scheduled to commence on site in April 2015 and will continue for a duration of approximately 15 months.

Further information may be obtained by contacting the project manager, Mr Marc Griffiths, telephone (08) 9420 2379.

Objections to the proposed works will be considered if lodged in writing, addressed to the project manager, Mr Marc Griffiths, Water Corporation, PO Box 100, Leederville, WA 6902 prior to close of business on the date specified in the enclosed letter.

Further information is available on the Water Corporation's website @ http://www.watercorporation.com.au/water–supply–and–services

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DESIGN SURVEY | VERTICAL DATUM NONE | DES CALC O. JONES
COORDINATE SYS MGA94–50 | DES CHD D. WOOD
ASCON SURVEY | DES REF 301012–01803 | DRN L. BROWN | Q.C. CHD D. WOOD

NORTH POINT

WorleyParsons resources & energy

WorleyParsons Services Pty Ltd
Level 7, QV1 Building
250 St Georges Terrace
Perth WA 6000 Australia
Tel: +61 8 9278 8111
Fax: +61 8 9278 8110
www.worleyparsons.com
ABN 61 001 279 812

RECOMMENDED 11/09/2014 D. WOOD
ENGINEERING MANAGER
APPROVED 11/09/2014 J. OLIVER
PROJECT MANAGER

WATER CORPORATION

ONSLOW WATER SUPPLY
BIRDRONG AQUIFER DESALINATION PLANT
PREREQUISITES TO WORKS
NOTICE OF PROPOSAL – GENERAL WORKS

FILE | PROJECT | PLAN LJ23–0–1 | CAD | ISSUE A | ORIGINAL SHEET SIZE A1 | MF3 0 SEP 2014



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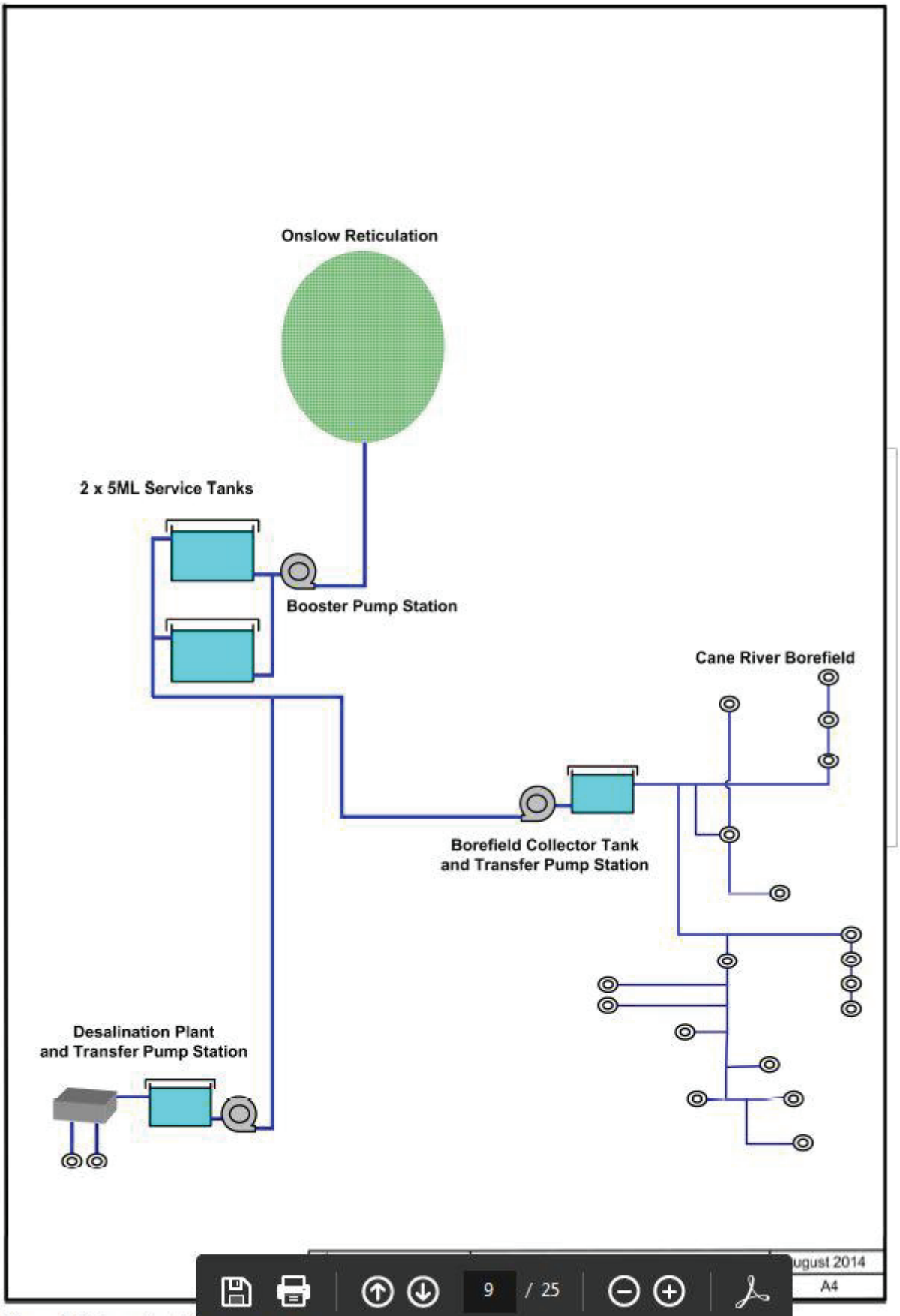
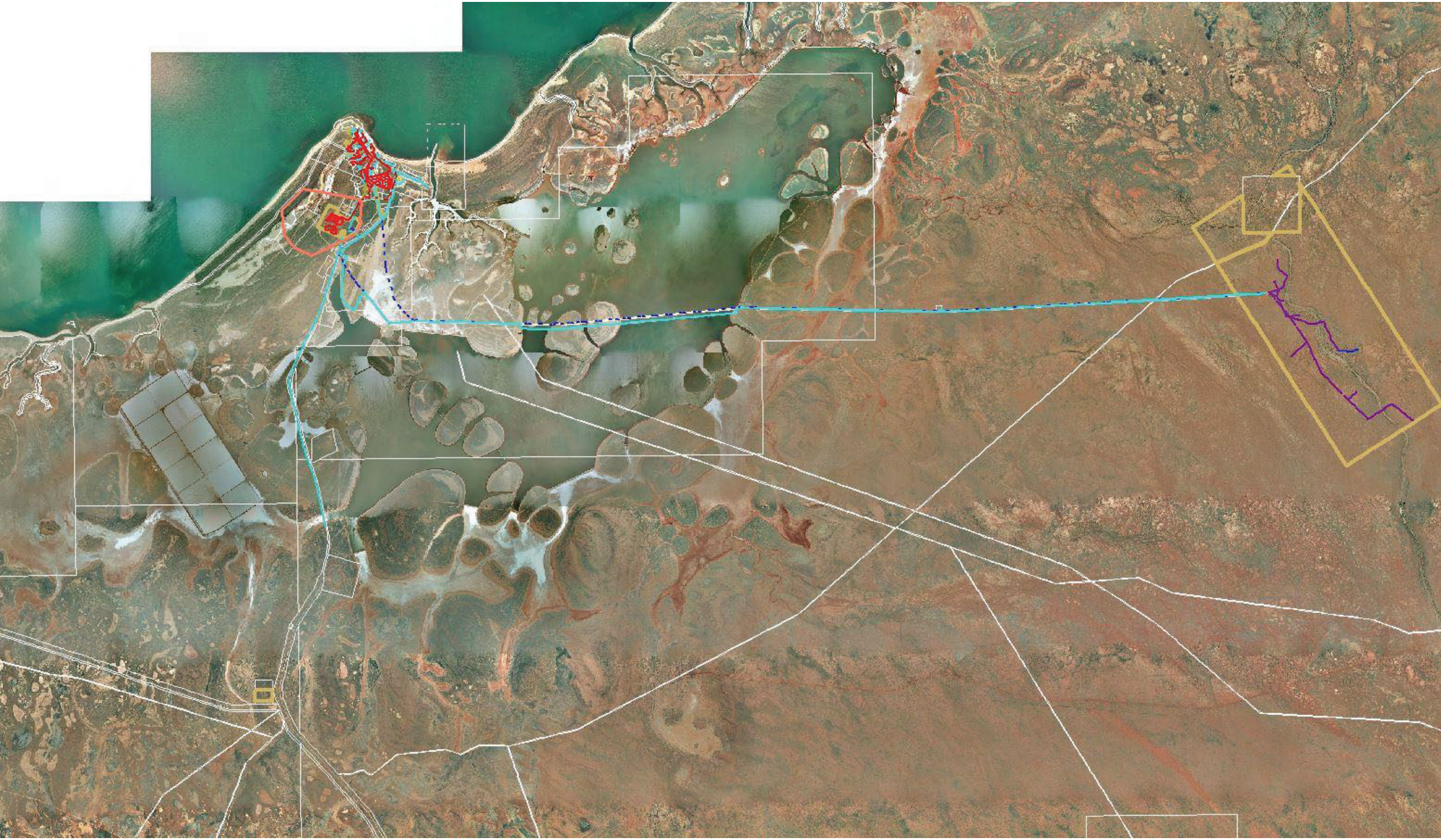





Figure 1 Schematic of Planned System



Your Ref: DP12/01091
Our Ref: JT1 2011 08047 V01
Enquiries: Frank Kroll
Phone: 9420 2221

12 May 2015

Department of Planning
Locked Bag 2506
PERTH WA 6001

Attention:
Mr. Philip Woodward, A/Executive Director, Regional Planning & Strategy

**ASHBURTON NORTH STRATEGIC INDUSTRIAL AREA**
**IMPROVEMENT SCHEME**
**(IMPROVEMENT PLAN NO. 41)**

Thank you for your letter of 21 April 2015, in relation to the Ashburton North Strategic Industrial Area (ANSIA) Improvement Scheme.

It is noted the Western Australian Planning Commission (WAPC) resolution appeared in the Government Gazette on Tuesday 21 April 2015.

In relation to provision of water and wastewater services, since the land is not within the Corporation's Operating Licence Area for Onslow, no water resource commitment or infrastructure planning exists for the area. Current water supply upgrades for bores at Cane River and conveyance items are for town supply only, and do not include supplies to industrial land.

Should the WAPC determine that either a reticulated wastewater or water supply service is required the proponent will need to negotiate a Licenced Service Provider for the area through the Economic Regulation Authority (ERA).

If the Water Corporation is approached by the proponent to be the Preferred Service Provider, this would have to be agreed by the Corporation on water resource acquisition ability, technical and commercial terms, together with all necessary approvals. At this time it is uncertain as to whether a suitable water supply can be obtained for the area, and this would need further investigation.

It is the Water Corporation's policy to give first priority to town supplies, and hence it would not be acceptable to supply ANSIA unless spare capacity is available.

This matter was discussed on the 4th of July 2014 with LandCorp with respect to a subdivision that had received planning approval; they were advised that the Corporation had not planned to service ANSIA.

With respect to water supplies in the area, a 2 ML/day Desalination Plant will be constructed by Chevron about 3km east of ANSIA in accordance with a State Development Agreement (Department of State Development). The plant will be handed over to the Corporation for operation, to supply the future population growth

of Onslow Township generated by Chevron activities. The existing water supply to the township will continue to be from the Cane River borefield but this supply is at its limit hence the need for the new desalination plant for future supplies.

With respect to the subdivision, LandCorp were advised that a servicing request for supply from the Desalination Plant would be classed as an unplanned and unscheduled project, and the application would have to include a business case. The Corporation would assess the application, and may or may not enter into an agreement to service the development. Until 2016 when capacity is taken up by development in Onslow it will not be known whether there will be any spare capacity. Therefore the Corporation was not able to make any preliminary comments as to whether it can, in principle, supply the subdivision. Other potential suppliers could also be approached to examine further possibilities.

Factors which may influence servicing decisions include the operation of the Plant which may be intermittent when it is stood down for maintenance. Storage facilities and/or tankering of water may apply during this period.

It was recommended that a re-investigation on the matter be conducted in 2016/17 after take-up of supply from the township is known, so that options could be reviewed.

I trust this gives a sufficient overview and background to the Corporation's dealings with ANSIA to date with respect to water supply. Otherwise, the Corporation notes the establishment of the Improvement Plan and the administrative mechanisms that accompany.

Some advice that may be relevant for ANSIA concerning experience in the Kwinana industrial area is that planning for infrastructure alignments and corridors is an important factor for these areas. In Improvement Plan areas, since some of the planning and approval mechanisms in other parts of the State do not apply, it becomes important to establish similar effective mechanisms and have good project management controls over the long term for successful implemented outcomes.

Should you have any further queries, please contact Frank Kroll, Senior Development Planner frank.kroll@watercorporation.com.au or phone 9420 2221.

**Peter Howard**
Manager Land Planning
Development Services
Planning & Capability