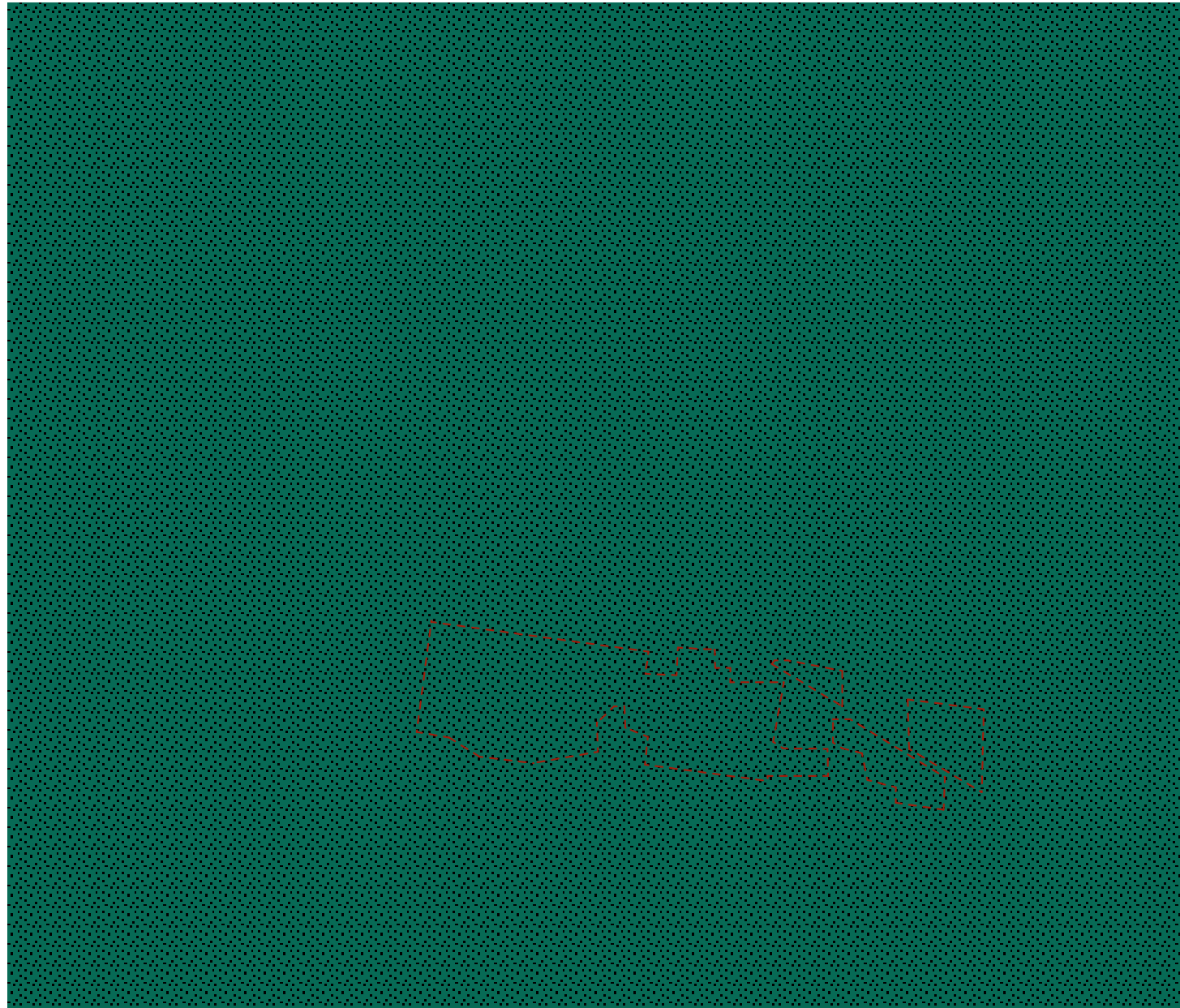


# VISUAL Impact Assessment



## NYNGAN Solar Farm

NYNGAN, NSW

Prepared for: INFIGEN ENERGY

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# 1.0 Introduction

## 1.1 Background

Moir Landscape Architecture has been commissioned by Infigen Energy to prepare a Landscape and Visual Impact Assessment (LVIA) for the proposed Nyngan Solar Farm located approximately 2km to the south of the Nyngan town centre.

As cadastral information has little influence in defining visual catchments this assessment aims to identify the landscape character, and dominant features of the relevant visual catchments that the Study Site lies within. The purpose of this report is to provide an assessment of the potential visual impact of the proposal within the defined visual catchments.

Survey work for the study was undertaken during August 2010 using key viewpoints and locations with potential views towards the Study Site. The report details the results of the field work, documents the assessment of the landscape character and visual setting, and makes recommendations concerning measures to mitigate any impacts arising from potential development.

## 1.2 Objectives

This visual impact assessment forms part of the Environmental Impact Statement for the project. The report addresses the requirements related to the preparation of a visual impact assessment as part of the environmental assessment outlined in the Director-General's requirements (DGR). The DGR states the report must:

- provide a comprehensive assessment of the landscape character and values and any scenic or significant vistas of the area potentially affected by the project. This should describe community and stakeholder values of the local and regional visual amenity and quality, and perceptions of the project based on surveys and consultation;
- include a full assessment of the visual impacts associated with the solar farm, including identification and documentation of all key viewing points and corridors particularly from identified sensitive lands. This should also include the associated transmission line. Alternative pole designs should be presented and assessed and the potential for under grounding in sensitive locations should also be assessed;
- include photomontages of the project taken from potentially affected residences (including approved but not yet developed dwellings or subdivisions with residential rights), settlements and significant public view points, and provide a clear description of proposed visual amenity mitigation and management measures for the solar farm;
- provide an assessment of the feasibility, effectiveness and reliability of proposed mitigation measures and any residual impacts after these measures have been implemented; and
- provide an assessment of the potential for reflectivity from the panels and associated infrastructure, and any safety impacts for motorists or aircraft.

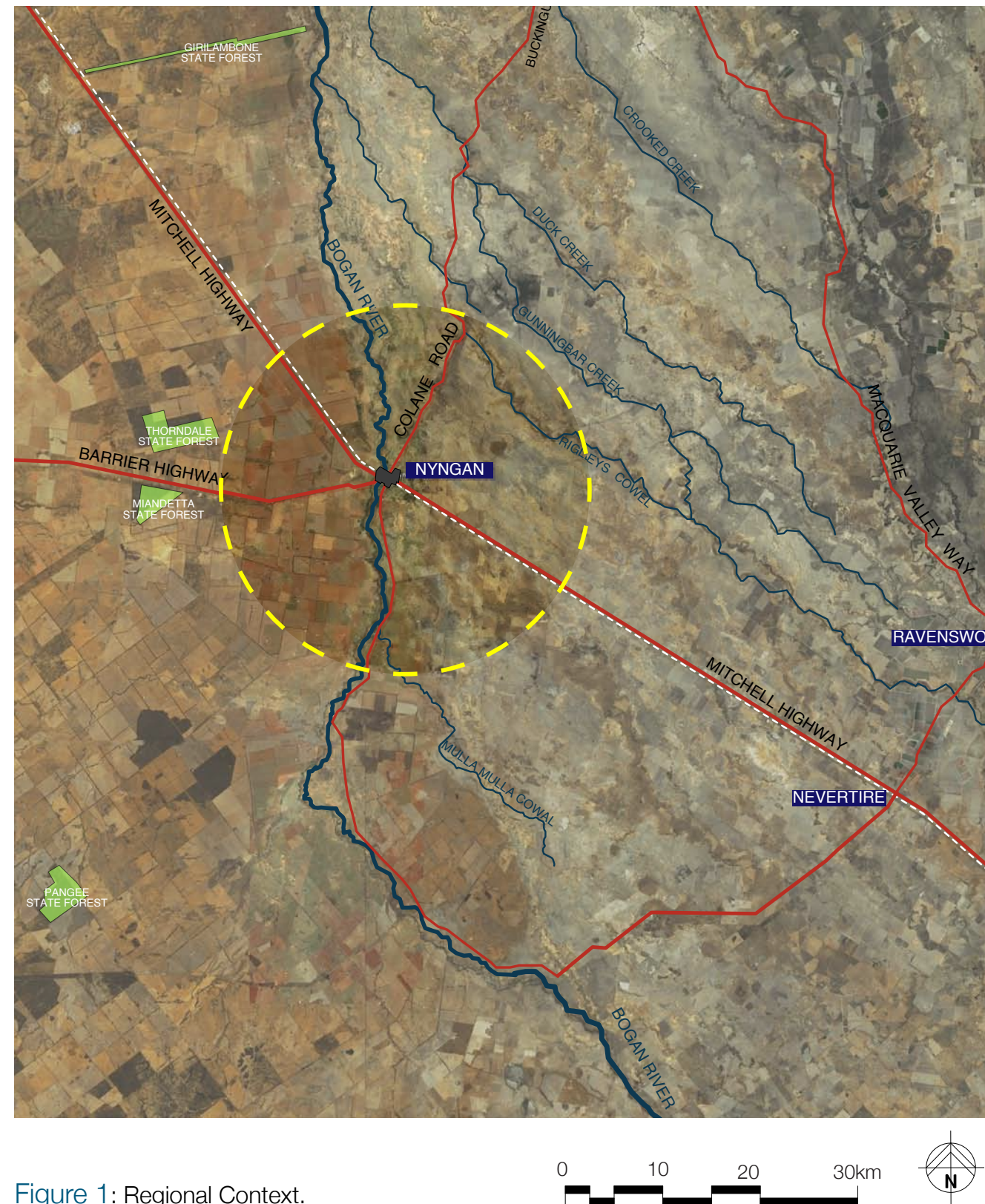


Figure 1: Regional Context.



# 2.0 Study Method

## 2.1 Visual Quality

Visual quality of an area is essentially an assessment of how viewers may respond to designated scenery. Scenes of high visual quality are those which are valued by a community for the enjoyment and improved amenity they can create. Conversely, scenes of low visual quality are of little value to the community with a preference that they be changed and improved, often through the introduction of landscape treatments.

As visual quality relates to aesthetics its assessment is largely subjective. There is evidence to suggest that certain landscapes are constantly preferred over others with preferences related to the presence or absence of certain elements.

The rating of visual quality for this study has been based on scenic quality ratings and on the following generally accepted assumptions arising from scientific research (DOP, 1988):

- Visual quality increases as relative relief and topographic ruggedness increases;
- visual quality increases as vegetation pattern variations increase;
- visual quality increases due to the presence of natural and/or agricultural landscapes;
- visual quality increases owing to the presence of water forms (without becoming too common) and related to water quality and associated activity; and
- visual quality increases with increases in land use compatibility.

In addition to the above, cultural items may also endow a distinct character to an area and therefore contribute to its visual quality due to nostalgic associations and the desire to preserve items of heritage significance.

## 2.2 Visual Sensitivity

Visual sensitivity is a measure of how critically a change to the existing landscape is viewed by people from different areas. The assessment is based on the number of people affected, land use, and the distance of the viewer from the proposal. (EDAW, 2000).

For example, a significant change that is not frequently seen may result in a low visual sensitivity although its impact on a landscape may be high. Generally the following principles apply:

- Visual sensitivity decreases as the viewer distance increases.
- Visual sensitivity decreases as the viewing time decreases.
- Visual sensitivity can also be related to viewer activity (e.g. a person viewing an affected site whilst engaged in recreational activities will be more strongly affected by change than someone passing a scene in a car travelling to a desired destination).

Sensitivity ratings are defined as high, moderate or low and are shown in the table below (EDAW, 2000).

| VISUAL SENSITIVITY TABLE (URBIS) |               |       |                      |       |                  |
|----------------------------------|---------------|-------|----------------------|-------|------------------|
| VISUAL USE AREA                  | FOREGROUND    |       | MIDDLE GROUND        |       | BACKGROUND       |
|                                  | Local setting |       | Sub-Regional setting |       | Regional setting |
|                                  | 0-1           | 1-2km | 2-4.5                | 4.5-7 | > 7kms           |
| Townships                        | High          | High  | High                 | Mod   | Low              |
| Rural residences                 | High          | High  | High                 | Mod   | Low              |
| Main Highway                     | Mod           | Mod   | Low                  | Low   | Low              |
| Local Roads                      | Mod           | Mod   | Low                  | Low   | Low              |
| Railway Line (Freight)           | Low           | Low   | Low                  | Low   | Low              |
| Agricultural Land                | Low           | Low   | Low                  | Low   | Low              |

Table 1: Visual Sensitivity Table.

# 2.0 Study Method (contd.)

## 2.3 Visual Effect

Visual effect is the interaction between a proposal and the existing visual environment. It is often expressed as the level of visual contrast of the proposal against its setting or background in which it is viewed.

Low visual effect occurs when a proposal blends in with its existing viewed landscape due to a high level of integration of one or several of the following: form, shape, pattern, line, texture or colour. It can also result from the use of effective screening often using a combination of landform and landscaping.

Moderate visual effect occurs where a proposal is visible and contrasts with its viewed landscape however, there has been some degree of integration (e.g. good siting principles employed, retention of significant existing vegetation, provision of screen landscaping, appropriate colour selection and/or suitably scaled development).

High visual effect results when a proposal has a high visual contrast to the surrounding landscape with little or no natural screening or integration created by vegetation or topography.

## 2.4 Visual Impact

Visual impact is the combined effect of visual sensitivity and visual effect. Various combinations of visual sensitivity and visual effect will result in high, moderate and low overall visual impacts as suggested in the below table (EDAW, 2000).

| VISUAL IMPACT TABLE       |          |                     |                 |                 |
|---------------------------|----------|---------------------|-----------------|-----------------|
|                           |          | VISUAL EFFECT ZONES |                 |                 |
|                           |          | HIGH                | MODERATE        | LOW             |
| VISUAL SENSITIVITY LEVELS | HIGH     | High Impact         | High Impact     | Moderate Impact |
|                           | MODERATE | High Impact         | Moderate Impact | Low Impact      |
|                           | LOW      | Moderate Impact     | Low Impact      | Low Impact      |

Table 2: Visual Impact Table.

## 2.5 Methodology

The method applied to this study involved systematically evaluating the visual environment pertaining to the site and using value judgements based on community responses to scenery.

The assessment was undertaken in five stages as noted below:

1. A description of the existing visual environment, including the identification and appraisal of visual catchments/landscape units;
2. the undertaking of a viewpoint analysis to identify sites likely to be affected by development within the investigation zone;
3. a photographic survey using a digital camera using a 50mm fixed lens on a 1:6 ASP sensor (80mm 35mm SLR equivalent) and a handheld GPS unit to record position and altitude;
4. an assessment of visual impacts; and,
5. the preparation of recommendations for impact mitigation and suggestions for suitable development to maintain the area's visual quality. The purpose of the above methodology is to reduce the amount of subjectivity entering into impact assessment and to provide sufficient data to allow for third party verification of results.

## 2.6 Community Consultation

The degree to which viewers will be impacted is a result of an individual's personal response to the solar farm. This report is intended to be a tool to assist individuals in making an informed decision on the visual impact.

Community consultation was undertaken on Monday the 2nd of August 2010 at the Bogan Shire Council Town Hall on Cobar Street in Nyngan.

The response from the community was generally supportive of the proposed development. The main concern for residents was how the development would appear and the impacts on the existing character of the landscape.

# 3.0 Existing Visual Character

## 3.1 Regional Context

The proposed solar farm is located within approximately 2km of the town centre of Nyngan, New South Wales. Nyngan is a small town of approximately 3012 people (Bogan Shire Council) situated 583 km northwest of Sydney in the Central West of New South Wales.

Located within the Bogan Shire Local Government Area, Nyngan is on the Mitchell Highway between Narromine and Bourke at the northern end of the Barrier Highway. The Barrier Highway begins at Nyngan and connects to the town of Cobar, which is located approximately 130 km to the west.

### SOILS

Nyngan is located within the Darling Riverine Plains region. The region is typified by dark red to orange-brown sandy soils with weathering profiles up to 10m. The Bogan River rarely flows strongly and carries suspended clay past Nyngan.

### AGRICULTURE

Nyngan is acknowledged as being one of the states most productive agricultural areas, with the main produce consisting of wool, wheat and cattle.

### RIVERS AND TOPOGRAPHY

Nyngan is located alongside the Bogan River, which is a tributary of the Darling River, forming apart of the Darling Riverine Plains. In April of 1990, the Bogan River rose due to rare high rainfall, resulting in the town flooding and being completely evacuated. The landscape of the region is predominately flat with vegetated river channels which branch from the Bogan River and the associated floodplain being the most dominant features.

### VEGETATION COMMUNITIES

The landscape surrounding Nyngan is characterised by generally cleared grazing land associated with wool, wheat and cattle production. Dense riparian vegetation associated with the Bogan River is a dominant feature of the landscape. A thick coverage of remnant Mallee Scrubland exists on low lying and flood prone land that has remained uncleared.

### CULTURAL HERITAGE

The district was originally inhabited by the Ngiyambaa People. The Ngyambaa people hold traditional links with the Gunderbooka Range and the plains to the east of the Darling River.

### EUROPEAN HERITAGE

The first recorded visit by Europeans to the Bogan River was by a party led by Major Thomas Mitchell, who set off from Parramatta on March 9, 1835. On May 10, 1835 Mitchell arrive in what was then known as Nyingen (Nyngan). He described this spot as a 'long pond with many birds, ducks and broilgas . The Municipality of Nyngan was proclaimed on February 17, 1891 with Nyngan having a population of 1355, and in 1906 the Bogan Shire was incorporated. The Bogan Shire Council and the Nyngan Municipal Council amalgamated with each other 1972. In 1983, Nyngan celebrated its centenary year with the unveiling of the Centenary Fountain.

## 3.2 Site Description

The Study Site is located along East Nyngan Road, in Nyngan within the Bogan Shire LGA. The proposed Nyngan Solar Farm is sited between the Mitchell Highway and Tottenham Road, to the immediate south of the township. The area covers approximately 200ha and is sited adjacent to existing 132kV power lines associated with the Nyngan Substation.

The site sits to the east of the Bogan River on flat topography. Generally characterised by cleared grazing land, with scattered remnant woodland vegetation occurring in pockets.

The broader landscape surrounding the Study Site is generally characterised by grazing land with a moderate coverage of woodland vegetation. The Riparian zone associated with the Bogan River to the West of the site has a dense coverage of vegetation. Minor tributaries branching from the Bogan River extend through the landscape and into the Study Area with a moderate to dense coverage of vegetation. Between the Study Site and the southern extent of Nyngan, a sparse coverage of vegetation exists with some cleared areas associated with infrastructure and access roads.

The southern extent of Nyngan is typified by rural residential properties, with lots increasing in density towards the centre of town. Several rural properties and homesteads are situated around the Study Area off Mitchell Highway and Tottenham Road. Two properties are located along the immediate extent of the Study Area.

# 3.0 Existing Visual Character (contd.)

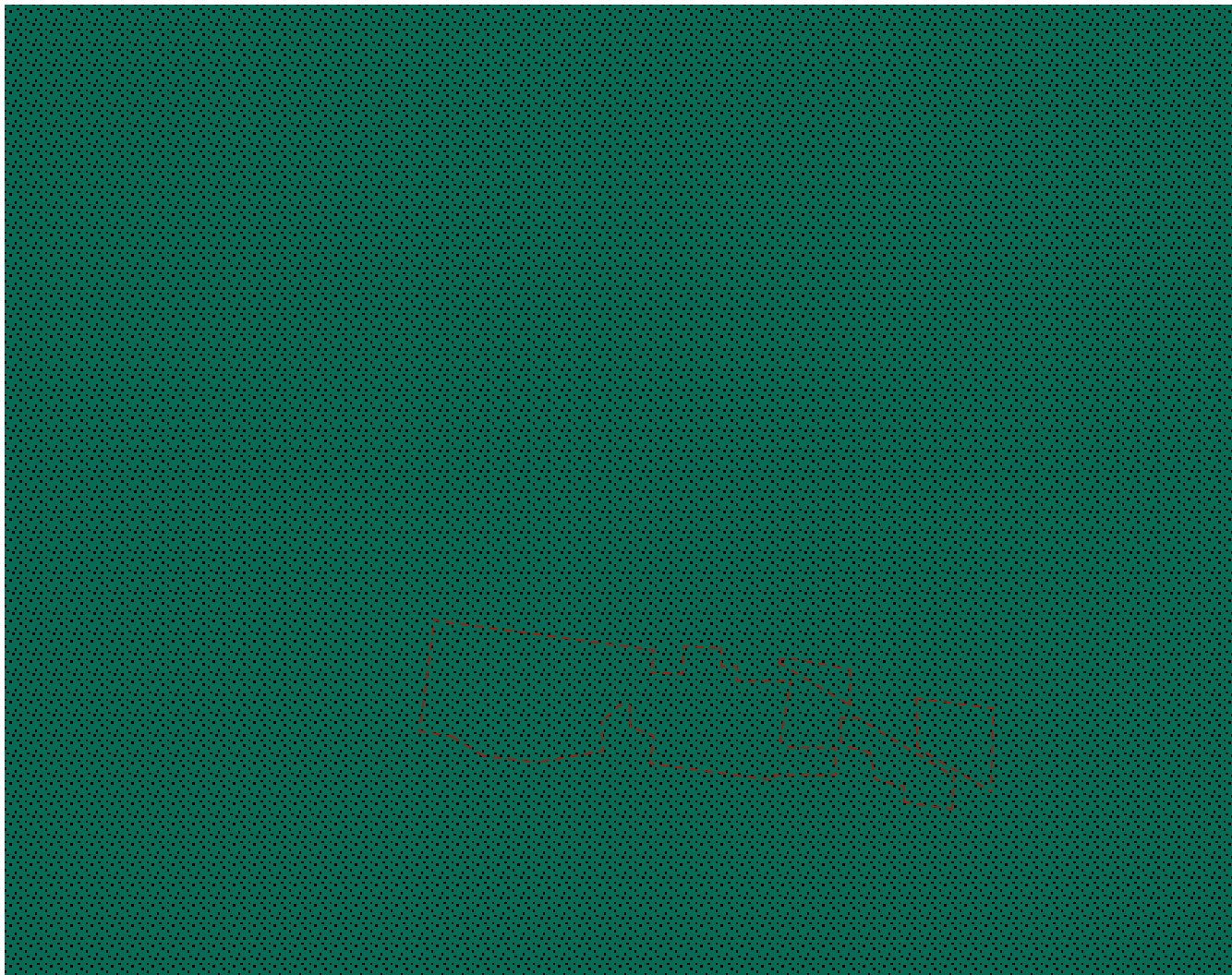


Figure 2: Study Site Location.

## 3.3 Visual Setting

Generally the first step in carrying out a landscape and visual assessment is to identify and map the Landscape Character of the surrounding area.

The landscape character can be defined as the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people. It reflects a particular combination of geology, landform, soils, vegetation, land use and human settlement and creates a particular sense of place for different areas within the landscape (Horner and MacLennan et al, 2006).

The existing landscape context of the site and its surrounding environment are classified into homogeneous units of landscape character. These Landscape Character Units are summarised below and form the elements of the local visual context. The quality of the LCU also reflects the visual amenity.

Landscape Character Units for the purpose of this assessment are defined as:

- LCU 1 - Nyngan Town
- LCU 2 - Nyngan Rural Residential
- LCU 3 - Cleared Rural Grazing Land
- LCU 4 - Bogan Scrubland

The Landscape Character Units are identified in Figure 3, and are described in detail in the following pages of this report.