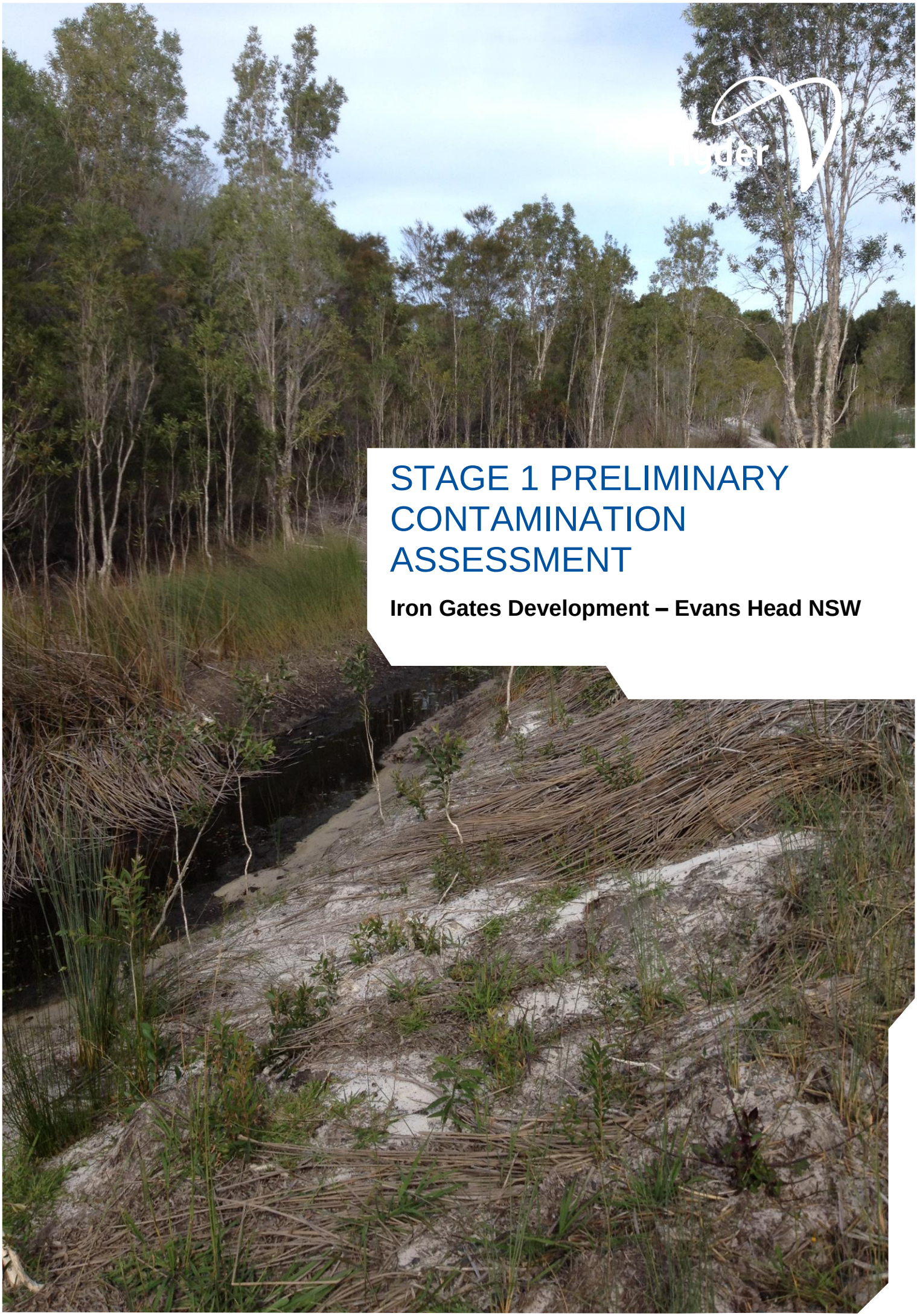

STAGE 1 PRELIMINARY CONTAMINATION ASSESSMENT

Iron Gates Development – Evans Head NSW

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GOLDCORAL PTY LTD

STAGE 1 PRELIMINARY CONTAMINATION ASSESSMENT

Iron Gates Development – Evans Head NSW

Author	Simon Groth	
Checker	Lauren Dykes	
Approver	Simon Groth	

Report No

Date 28 August 2014

This report has been prepared for Goldcoral Pty Ltd in accordance with the terms and conditions of appointment for Review of Environmental Factors, dated 16 January 2012 Hyder Consulting Pty Ltd (ABN 76 104 485 289) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

CONTENTS

EXECUTIVE SUMMARY

Hyder Consulting Pty Ltd (Hyder) has been commissioned by Goldcoral Pty Ltd to undertake a Stage 1 Preliminary Contamination Assessment (PCA) of the proposed Iron Gates residential development, Evans Head.

The scope of this study was the “development area” as detailed in the locality plan provided below. The development site is located approximately 1.7 kilometres south-west of Evans Head township. This is the area that will be directly disturbed as a result of the construction required for the development. This includes bulk earthworks, road construction and ancillary activities such as stockpile and compound sites, utility installation and access requirements, and any alterations to intersections. The purpose of the investigation was to identify high risk activities with the potential to cause substantial contamination which may have occurred or are occurring within and adjacent to the development area. Such activities may require remediation or management through construction. The investigation was undertaken in accordance with the relevant Office of Environment and Heritage (OEH) guidelines and standard industry practice.

As part of the investigation, the following was undertaken:

- A desktop review of available aerial photographs, land title certificates, contaminated sites databases, groundwater, soil and geology databases and relevant available historical reports and documentation as required; and
- A visual, non-intrusive site inspection of the proposal area.

Based on information obtained from the desktop review, potential environmental issues at the site can be summarised as follows:

- During the 1970s and early 1980s sand mining activities took place. As a result, tailings dams may have concentrated monazite separated out as part of the mining process. Monazite tailing can be responsible for elevated radiation levels and potentially causes health risks.

A site inspection was undertaken on 22 May 2014. The site visit involved identifying activities or site features that may be associated with potential contamination being present. These locations were closely inspected and reference made to the concept plan of the development works proposed. Site inspection photographs are provided in Appendix 3. No contaminating activities or evidence of contamination was identified during the site inspection.

Based on the desktop review and site assessment undertaken, further site assessments should be undertaken prior to construction to determine the presence/absence of contaminated materials in the form of radioactive residues associated with past sand mining activities.

1 INTRODUCTION

1.1 BACKGROUND

Hyder Consulting Pty Ltd (Hyder) has been commissioned by Goldcoral Pty Ltd to undertake a Stage 1 Preliminary Contamination Assessment (PCA) of the proposed Iron Gates residential development, Evans Head.

The purpose of this investigation was to identify any risks and constraints to the proposal through identification of areas of potentially contaminated land. This report has been produced as a requirement of the NSW Department of Planning Director General's Requirements under Section 75F of the *Environmental Planning and Assessment Act 1979.* This report specifically addresses SEPP 55 – Remediation of Land.

This assessment has been carried out in accordance with the relevant guidelines entitled *"Contaminated Sites – Guidelines for Consultants Reporting on Contaminated Sites"* and standard industry practices outlined by the NSW Office of Environment and Heritage (OEH).

This report will:

- Identify past and present potentially contaminating activities.
- Identify potential contamination sites.
- Discuss the site condition.
- Provide a preliminary assessment of potential site contamination.
- Assess the need for further investigations.

1.2 SITE IDENTIFICATION

The scope of this study was the "development area" as detailed in the locality plan provided below. The development site is located approximately 1.7 kilometres south-west of Evans Head township. This is the area that will be directly disturbed as a result of the construction required for the development. This includes bulk earthworks, road construction and ancillary activities such as stockpile and compound sites, utility installation and access requirements, and any alterations to intersections. The location of the proposal is illustrated in Figure 1 (A detailed locality plan with development layout is provided in Appendix 1).

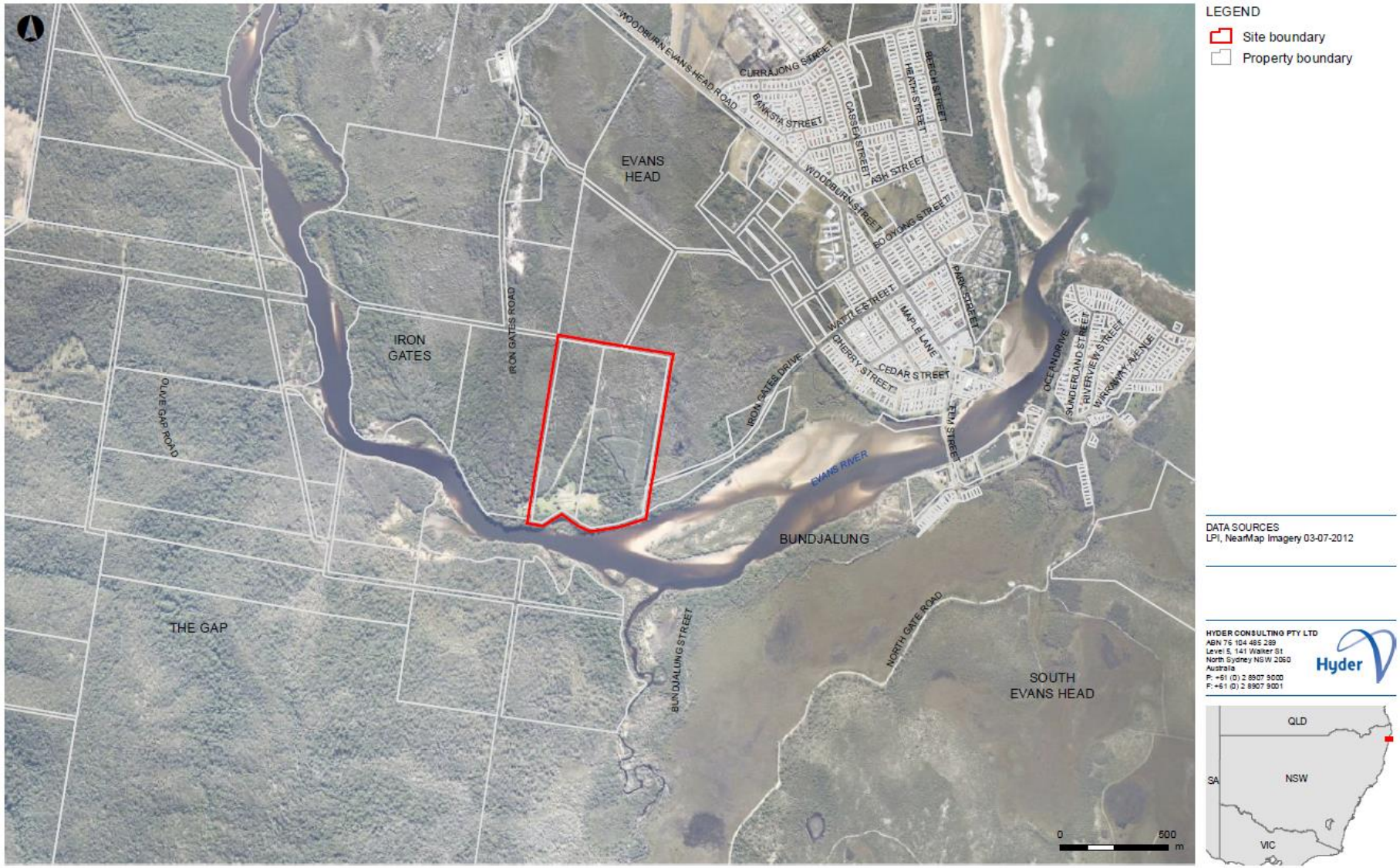


Figure 1: Site locality plan showing the development area

1.3 OBJECTIVE

The objective of this contamination investigation was to identify potential risks associated with contamination based on past and present land uses in the study area and to identify areas that may require remediation or management through construction phases.

Carrying out the Stage 1 Preliminary Contaminated Assessment will provide the Goldcoral Pty Ltd with information on potential risks associated with contamination based on past and present land uses. The process will identify where there is a contamination risk that warrant additional intrusive investigations to characterise the presence and extent of any impact on the development area. The outcomes of this Stage 1 Preliminay Contaminated Assessment will inform management actions for ongoing protection of the environment and provide baseline information to monitor future change.

1.4 SCOPE OF WORKS

To achieve the above outlined objectives the following scope of works was undertaken:

- Desktop review of site history information of the proposal site and adjoining sites to identify potential areas of environmental concern. Where available, this included review of the following information sources:
  - Historical titles.
  - Historical aerial photographs (from 1953 to present, where available).
  - Previous environmental reports for the site.
  - Licences and notices (i.e. water discharge licences, hazardous materials, trade waste etc.).
  - Groundwater bore database search.
  - Publicly available records comprising topographic, geological and hydrogeological maps.
  - Trade waste plans and EPA licence (where available).
- A site walkover by a Hyder representative; which included:
  - Identification of current activities within the study area.
  - Identification of any chemical or fuel storage areas.
  - Identification of potential sources of contamination.
  - General review of current and/or previous operations within the area of impact.
  - Identification of the current uses of adjoining properties.
  - Checking the validity of publicly available information (as listed above).
  - General description of structures, storage facilities, disposal areas etc., within the study area.
  - Checking for signs of ground contamination that are visible on the ground surface.
  - Detailing waste disposal locations along the study area.
- Preparation of a Stage 1 Preliminary Contaminated Assessment Report for the proposal.

1.5 LIMITATIONS

The findings in this report are based on a preliminary environmental desktop study described in the scope of works. Hyder has performed the services in a manner consistent with the level of care and expertise exercised by members of the environmental consulting profession. No warranties, expressed or implied are made. Hyder's assessment is limited strictly to identifying typical environmental conditions associated with the study area. All environmental and contaminated land work is subject to general limitations related to the heterogeneity of the natural environment, variability of contaminant distribution and constraints imposed by the investigation methods utilised.

The results of this assessment are based on the site inspection undertaken by Hyder personnel and specialists from accessible areas, information provided by Goldcoral Pty Ltd and publically available background information. This assessment is limited strictly to identifying typical environmental conditions associated with the study area. All environmental and contaminated land work is subject to general limitations related to the heterogeneity of the natural environment, variability of contaminant distribution and constraints imposed by the investigation methods utilised. Hyder has performed the services in a manner consistent with the level of care and expertise exercised by members of the environmental consulting profession. No warranties, expressed or implied are made. All conclusions and recommendations are the professional opinions of the Hyder personnel and specialists involved in the project, subject to the qualifications made above. While normal assessments of data reliability have been made, Hyder assumes no responsibility or liability for errors in any data obtained from external sources, or developments resulting from situations outside the scope of this project.

Specifically, with regard to this report, it should be noted that the scope of works carried out herein is not intended to include sufficient information to enable completion of a statutory audit of the site, and as such does not include the following:

- Any intrusive soil/groundwater sampling and analysis.
- Sampling and analysis of any emissions to air, wastewater discharges or solid and liquid wastes.

Please ensure that these limitations are understood before utilising, or basing decisions on the information presented in this report.

2 GEOLOGY AND HYDROLOGY

2.1 GEOLOGY

The Australian Stratigraphic Units Database describes the Evan Head area (Evans Head Coal Measure) as Thin- to thick-bedded, crossbedded, coarse-grained quartz to sublithic arenite, thinly-bedded grey siltstone, claystone, minor coal, as partings and very thin bands. The Evans Head area belongs to the Ipswich Basin Geological Province.

Basic geological mapping of the area indicates that the Evans Head headlands are comprised of different types of sediments. These are all very recent which geologically places them at Quaternary (or more specifically Pleistocene to Holocene aged) comprising mainly sands in the beach and dune systems and silts and clays around the river estuary. Many of the Holocene aged sediments contain potential acid sulfate soils, which are common in the region. Acid sulphate soils are covered in more detail in section 2.3 of this report.

2.2 CONTAMINATED LAND SEARCH

A contaminated land search of the NSW EPA on line contaminated land record was undertaken to identify contaminated sites in the area. Results of these searches are summarised below in Table 1.

Table 1: contaminated Land search for Evans Head

Suburb/City	Site description and address	EPA initial assessment	EPA site management class
Evans Head	Bundjalung National Park Gap Road	Unclassified	The EPA is awaiting further information to progress its initial assessment of this site.
Evans Head	Evans Head Aerodrome Memorial Airport Drive	Other Industry	Based on the information made available to the EPA to date, the contamination of this site is considered by the EPA to be not significant enough to warrant regulatory intervention under the *Contaminated Land Management Act 1997*.
Evans Head	Evans Head Residential subdivision Bounded by Currajong, Woodburn, Carrabeen Streets and Tuckeroo Cres	Unclassified	Based on the information made available to the EPA to date, the contamination of this site is considered by the EPA to be not significant enough to warrant regulatory intervention under the Contaminated Land Management Act 1997.

2.3 SURFACE HYDROLOGY AND HYDROGEOLOGY

The study area bounds Evans river to the south and has wetlands to the east of the site which drain into a constructed open drain on the eastern boundary of the site.

An online search of the Groundwater Bores NSW Map (http://waterinfo.nsw.gov.au/gw/) was undertaken. Through this search it was found that the closest groundwater monitoring bores are located on the east of the development site located in the township of Evans Head. Figure 2 below shows the location of the surrounding groundwater bores.

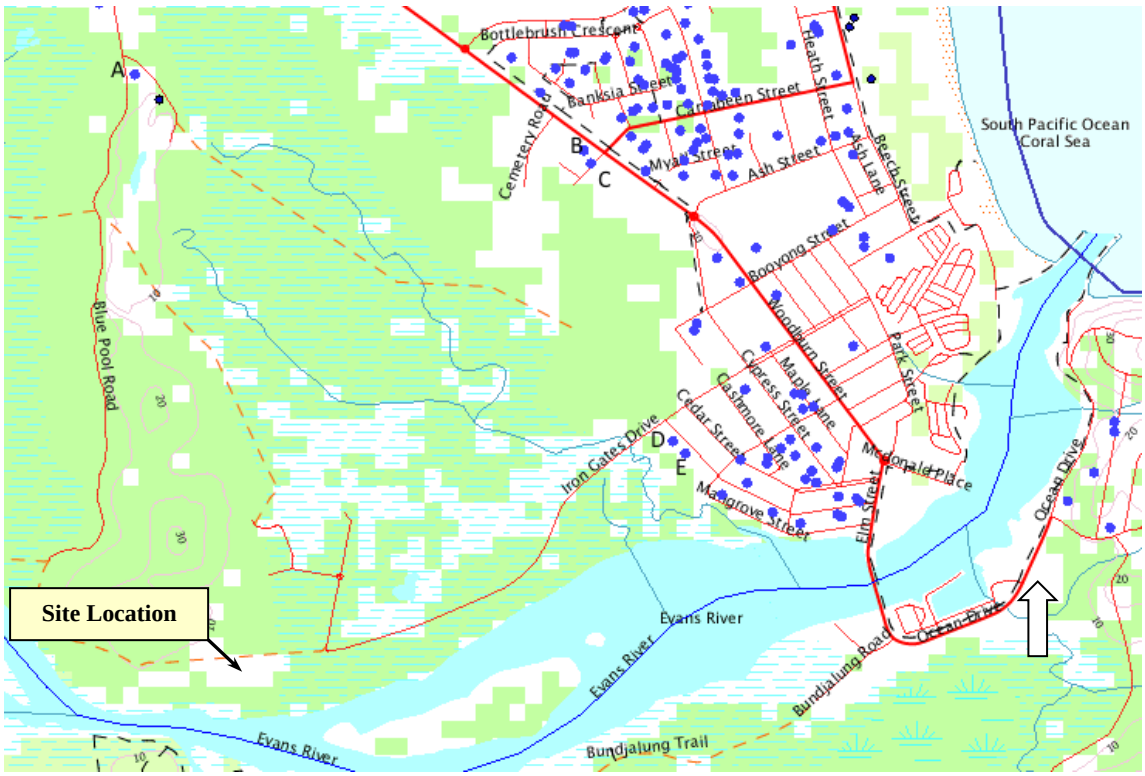


Figure 2: Map outlining locations of groundwater bores (NSW NRAtlas 2011)

Insufficient data was available for the local bores. As the elevation based on Australian Height Datum (AHD) was not provided for any of the bores the actual depth of the water table, and likelihood of there being a common groundwater system below the bores, could not be determined. Further investigation on the local aquifer depth, nature and contamination status of groundwater underneath the site was not completed during the preparation of this report.

2.4 ACID SULFATE SOILS

Acid sulfate soils are acidic soil horizons or layers formed as a result of aeration of soil materials rich in iron sulphides (predominately pyrite - FeS_2). Such characteristics are likely to be found in:

- Marine and estuarine sediments of the recent (Holocene) geological age.
- Soils usually not more than five metres above mean sea level.
- Marine or estuarine settings.
- Inland environments such as:
  - River and stream channels.
  - Lakes.
  - Wetlands.
  - Seepages overlying mineralized zones.

- Disposal basins (Evaporation).
- Billabongs.
- Marshes.
- Ground water systems.
- Sports fields.

A search of the Australian Soil Resource Information System (ASRIS) National Acid Sulphate Soils (ASS) Risk Map was carried out for the study area. The results of this search revealed the site to be located largely within a Low Probability Area with Confidence Unknown.

An acid sulphate soil Investigation was undertaken on site by Coffey Partners International in 1995. The report stated that there was no acid sulphate or acid generating potential for the samples tested.

3 SITE BACKGROUND AND HISTORICAL REVIEW

3.1 GENERAL INFORMATION

Goldcoal Pty Ltd propose to develop the Iron Gates site into a 178 lot residential development. The proposal is located approximately 1.7 kilometres south-west of Evans Head township. Figures 1 shows the proposal in relation to its local and regional context.

Table 1: Site identification details

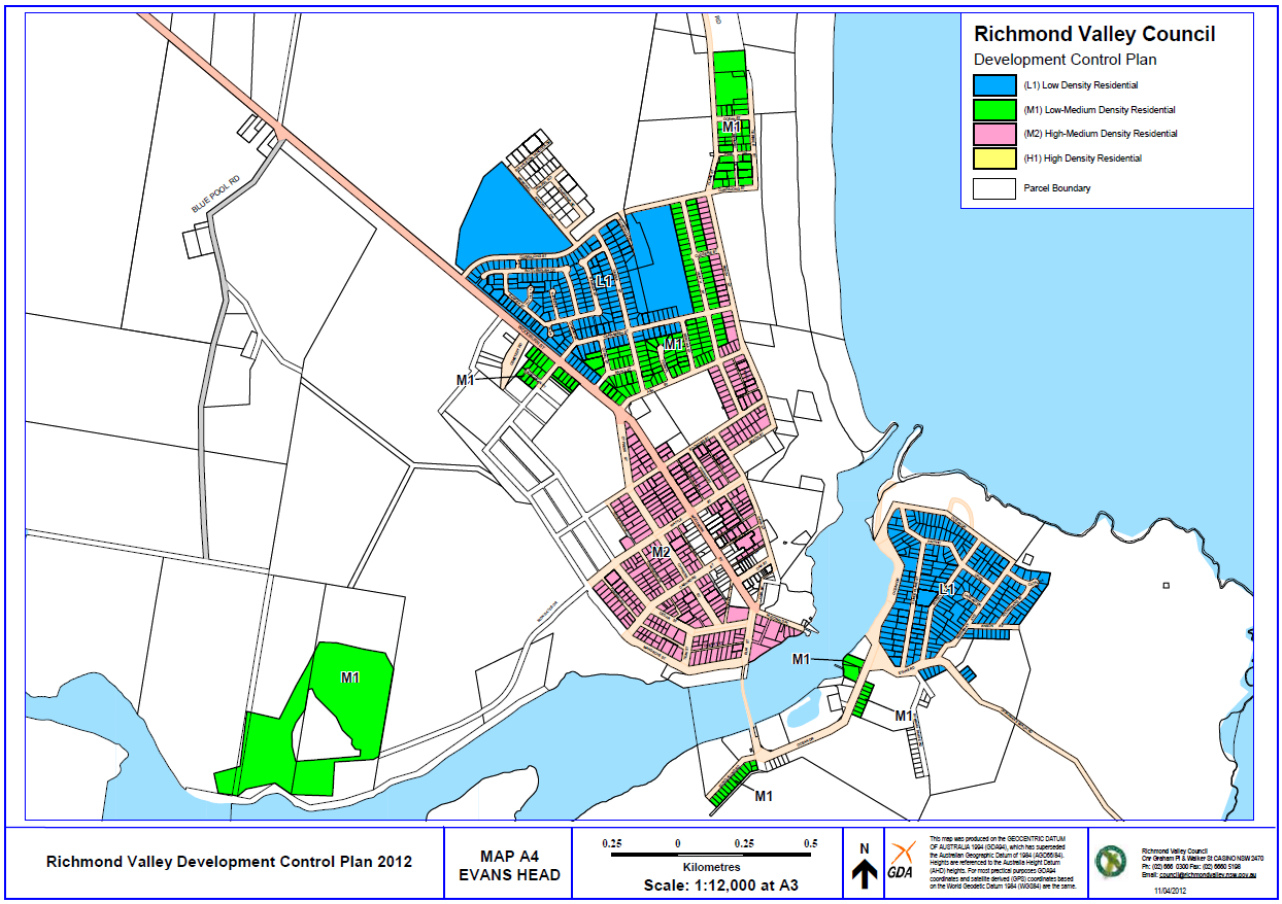
Site Address:	Iron Gates Road, Iron Gates			
Approximate Total Area of Impact	18 Hectares			
Postcode	2473			
Adjacent Lot and DP Numbers	544/48550	547/48550	276/55624	277/755624
Local Government Area	Richmond Valley Council			
Current Site Zoning	Low Medium Residential			
Current Site Use	Vacant Land			

3.2 ADJOINING LAND USES

Land use in the study area is characterised by surrounding undeveloped land zoned Parcel Boundary.

The Proposal area is zoned under the Richmond Valley Council Development Control Plan (DCP). This planning context is shown in Figure 3 below.

Figure 3: Richmond Valley Council Development Control Plan for the study area



3.3 TITLE SEARCHES

Hyder conducted a title search of "properties of interest" with the aim of tracing ownership details through a search of title records. The proposed Iron Gates development comprises of three separate properties. No historical potentially contaminating activities were identified by the historical title search.

3.4 AERIAL PHOTOGRAPH REVIEW

Historical aerial photographs were obtained from the Land and Property Management Authority (LPMA). A review of the historical aerial photographs of the site is presented in the Table 2. Aerial photographs are presented in Appendix 2.

Table 2: Review of historical aerial photographs

Year	Site History Details	Potential contamination Implications
1953	Sole Dwelling with surrounding cleared land for rural use	
1964	Sole Dwelling with surrounding cleared land for rural use	
1971	Sole Dwelling with surrounding cleared land for rural use Eastern portion and adjacent property to the Iron Gates property has evidence of substantial sand mining activities	 Potential sand mining residues with elevated radiation levels
1980	Sole Dwelling with surrounding cleared land for rural use Sand mining activities seem to have down sized and revegetation of areas is evident	 Potential sand mining residues with elevated radiation levels
1988	Sole Dwelling with surrounding cleared land for rural use Sand mining activities have ceased	
1998	Sole dwelling and cleared land and constructed roads associated with the Iron Gates development	
2001	Sole dwelling and cleared land and constructed roads associated with the Iron Gates development	
2014	Sole dwelling and cleared land and constructed roads associated with the Iron Gates development	

3.5 SUMMARY OF SITE HISTORY

The information obtained from the site history review can be summarised as follows:

- Previous to 1971 the area was generally rural with a sole dwelling.
- There is evidence that sand mining activities were undertaken between 1965 and 1981
- Sand mining activities ceased before 1988.
- In 1996 the Iron Gates urban development was constructed.

- The site has remained unchanged since 1996.

3.6 POTENTIAL AREAS OF ENVIRONMENTAL CONCERN

Based on information obtained from this site history review, it is evident that during the 1970s and early 1980s sand mining activities took place. As a result, tailings dams may have concentrated monazite and illminite separated out as part of the mining process. Monazite and illminite tailing can be responsible for elevated radiation levels and potentially causes health risks.

4 SITE INSPECTION

A site inspection was undertaken by Hyder Consulting on 22 May 2014 by Simon Groth of Hyder Consulting. The site visit involved identifying activities or site features that may be associated with potential contamination being present. These locations were closely inspected and reference made to the concept plan of the development works proposed. Site inspection photographs are provided in Appendix 3. No contaminating activities or evidence of contamination was identified during the site inspection.

Conditions at Site Boundary

There were no visible signs of contamination or staining identified during the site inspection.

Presence of Dangerous goods, Wastes and Fill Material

No dangerous goods, wastes or fill material was identified as part of the site inspection.

Odours

There were no odours encountered on site that may indicate land contamination.

Condition of Buildings and Roads

There were no signs of contamination associated with any roads or structures on or around the site.

5 FURTHER INVESTIGATIONS

Based on the desktop reviews and site assessment undertaken, further site assessments should be undertaken prior to construction to determine the presence/absence of contaminated materials in the form of radioactive residues associated with sand mining activities.

6 CONCLUSIONS AND RECOMMENDATIONS

Desktop studies revealed that eastern parts of the site and the property adjacent of the Iron Gates development was subject to sandmining activities during the 1970s and early 1980s. As a result there may be potential for the existence of sand mining residues with elevated radiation levels on site that may have been associated with tailings dams from rutile separation processes.

It is recommended that a surface radiation assessment be undertaken to determine if there are any areas with elevated radiation levels so appropriate management strategies can developed if required.

APPENDIX 1
PROPOSED DEVELOPEMENT

PLAN OF SUBDIVISION

IRON GATES, EVANS HEAD

LOT	AREA
01	775.87m²
02	716.33m²
03	716.75m²
04	717.37m²
05	717.79m²
06	718.21m²
07	718.62m²
08	719.04m²
09	719.46m²
10	719.88m²
11	718.36m²
12	655.26m²
13	717.40m²
14	721.68m²
15	722.11m²
16	722.52m²
17	722.93m²
18	723.35m²
19	721.28m²
20	712.63m²
21	704.46m²
22	705.28m²
23	731.26m²
24	760.45m²
25	605.22m²
26	604.95m²
27	604.34m²
28	603.50m²
29	608.17m²
30	631.42m²
31	610.14m²
32	621.92m²
33	624.75m²
34	623.00m²
35	702.93m²
36	731.13m²
37	637.48m²
38	637.94m²
39	645.10m²
40	662.18m²
41	702.14m²
42	900.50m²
43	740.08m²
44	842.92m²
45	1010.23m²
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47	762.20m²
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49	727.34m²
50	761.10m²
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67	603.17m²
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69	613.09m²
70	614.95m²
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72	613.62m²
73	612.85m²

LOT	AREA
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124	600.00m²
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139	808.84m²
140	743.40m²
141	701.49m²
142	685.26m²
143	694.41m²
144	701.04m²
145	911.13m²
146	1066.93m²

LOT	AREA
147	1183.68m²
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149	815.70m²
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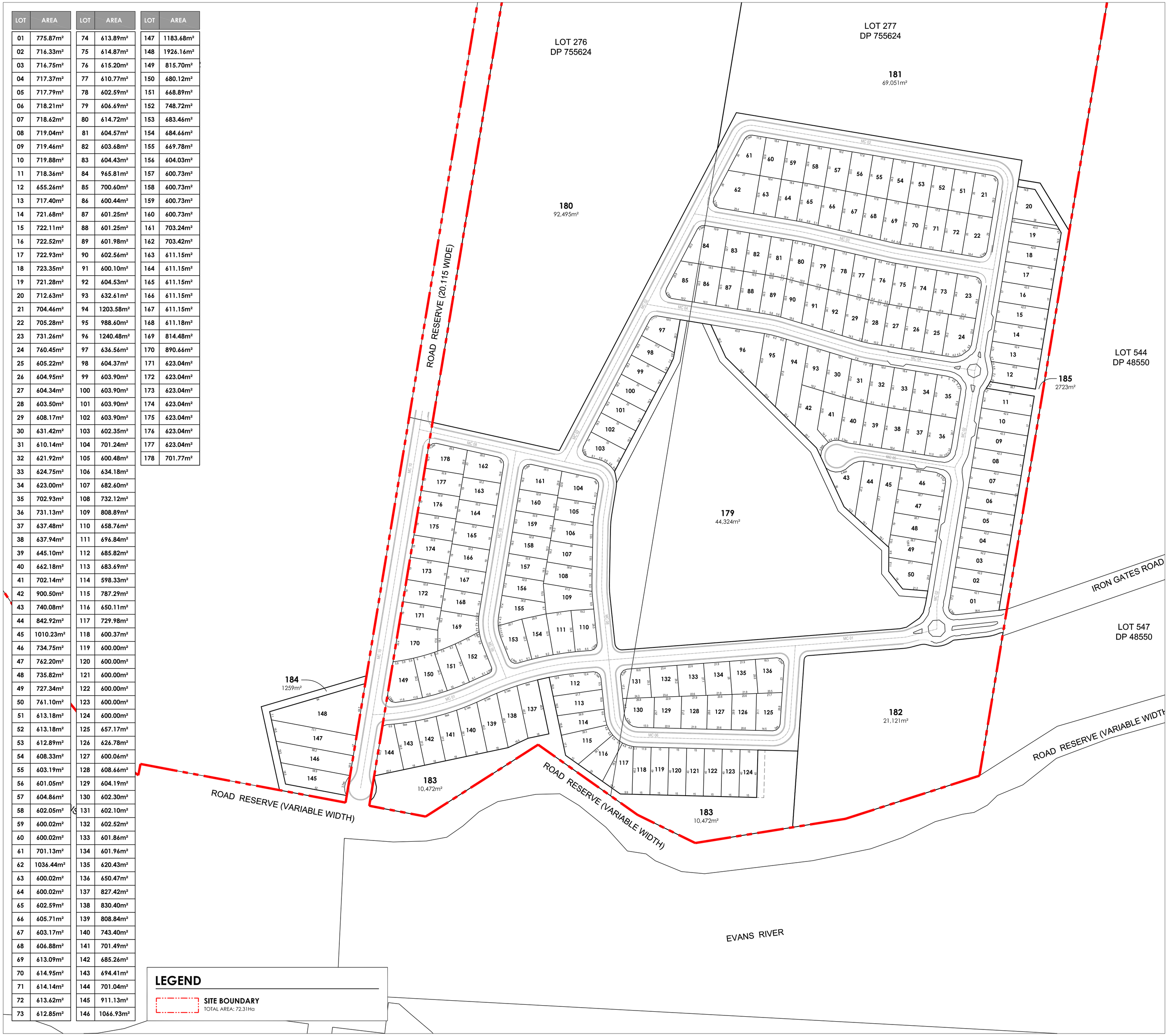


LEGEND

SITE BOUNDARY
TOTAL AREA: 72.31Ha

PLANIT CONSULTING

PROJECT TITLE:
IRON GATES DEVELOPMENT, EVANS HEAD

DRAWING TITLE:
PLAN OF SUBDIVISION

BASE PROVIDED BY:
N/A

CLIENT:
GOLD CORAL

NO	DATE	REVISION	BY
01	18/09/14	LAYOUT AMENDMENTS TO MATCH ENGINEERS ENTRY ROAD DESIGN	ZP

SCALE:
1/1500 @ A1

DESIGN:
PLANIT CONSULTING

DRAWN:
ZP

DATE:
08/2014

CHECKED:
BL

DRAWING NO:
IRONGATES_PLNOFSUB_01

NORTH POINT:

SHEET NO:
01 OF 01

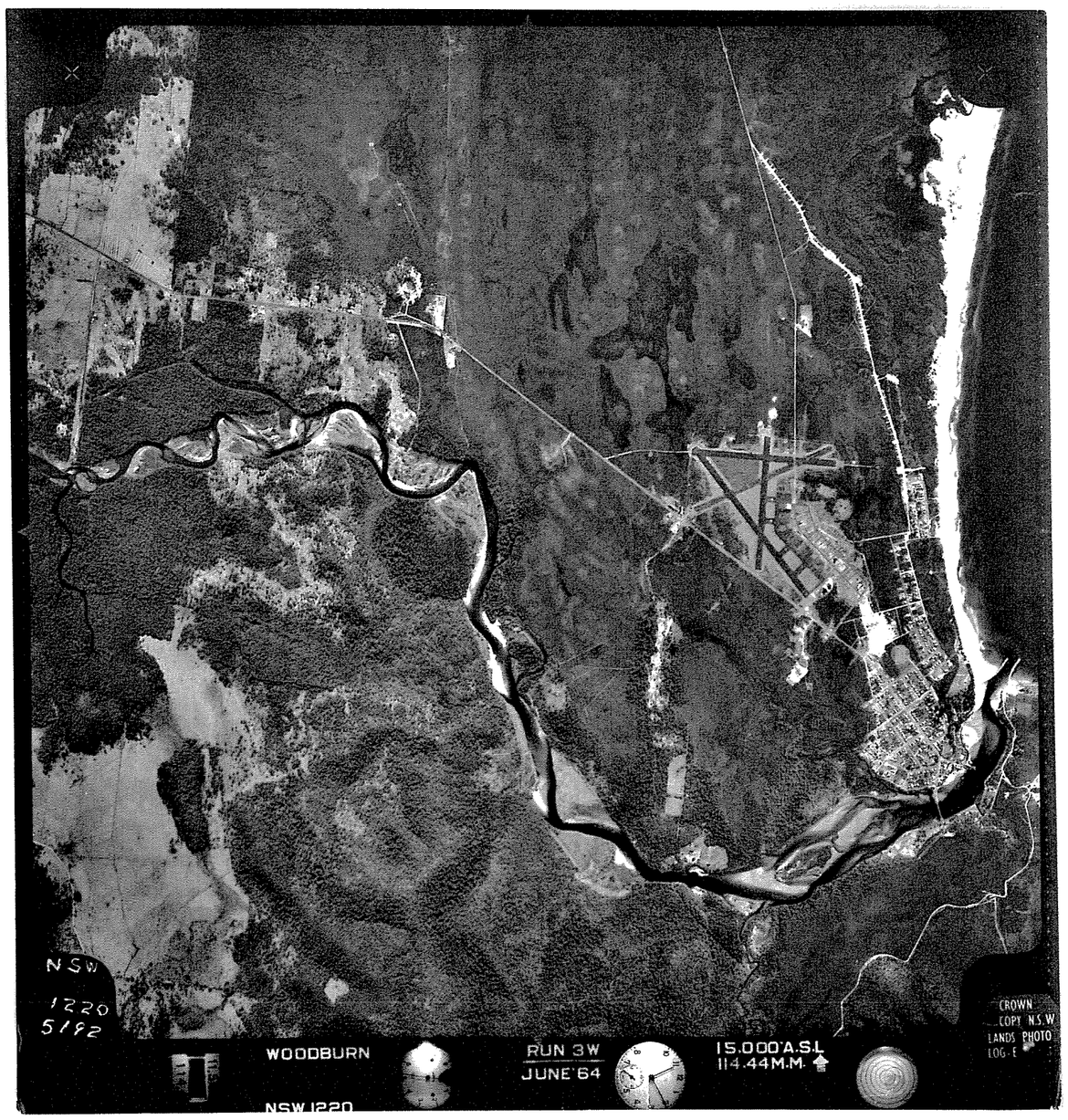
Level 1 2247 Gold Coast Hwy
Nobby Beach
PO Box 206 QLD 4218

Telephone: 07 5526 1500
Fax: 07 5526 1502
Email: admin@planitconsulting.com.au

APPENDIX 2

HISTORIC AERIAL PHOTOGRAPHS


c. 1002. 5062
WOODBURN RUN 3W NOV 53 152 21 MM 15100 →
LANDSPH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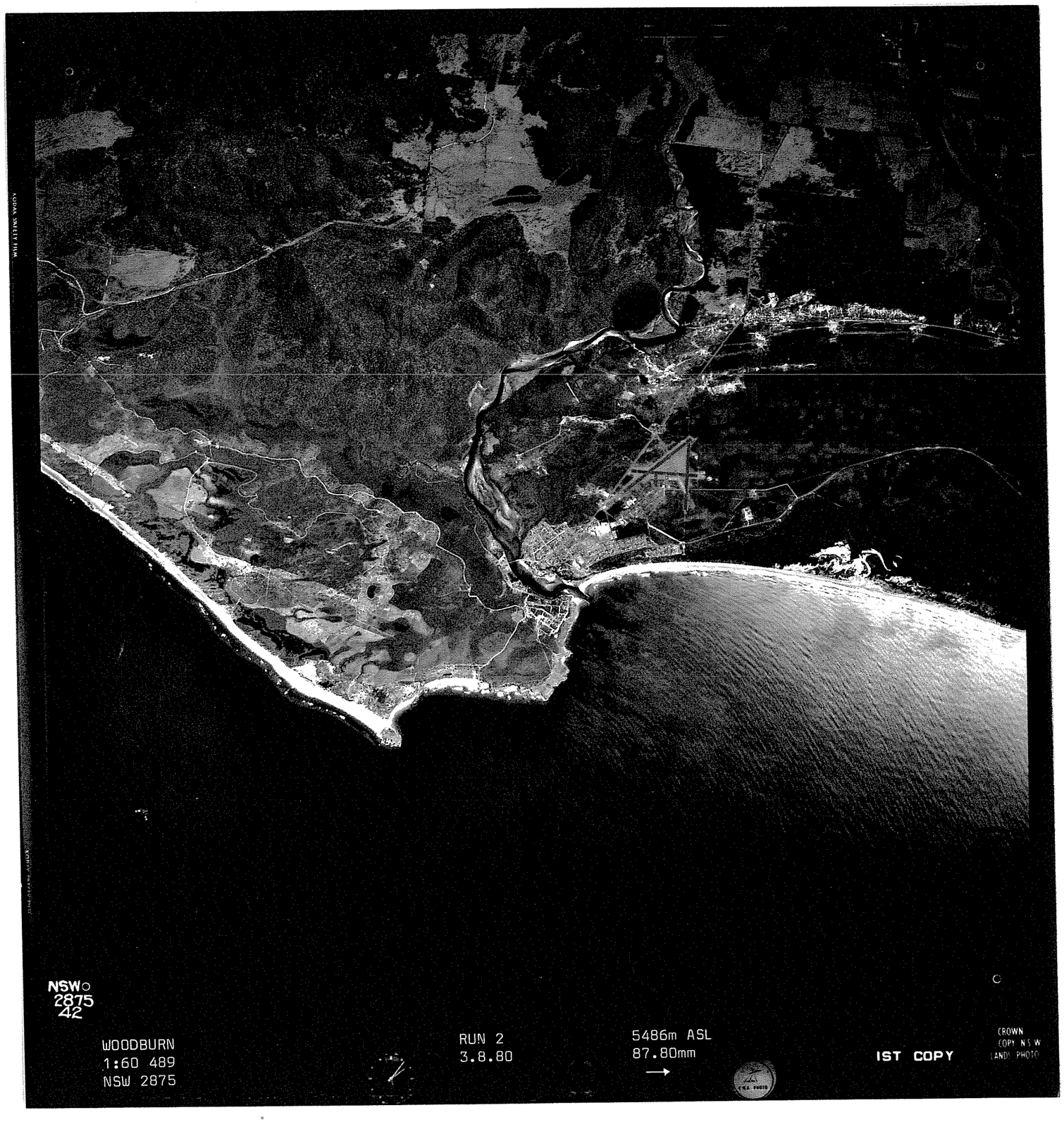
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LANDS PHOTO

20.8.88


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APPENDIX 3

SITE INSPECTION PHOTOGRAPHS

Photographic Illustration 1: Cleared area adjacent to Evans Creek with sole dwelling in the back ground.

Photographic Illustration 2: Open drain located on the eastern boundary of the site.

Photographic Illustration 3: Previously constructed road on the Iron Gates estate.

Photographic Illustration 4: Photograph of the North West portion of the Iron Gates property.