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REPORT
on
PRELIMINARY CONTAMINATION ASSESSMENT

PROPOSED TOURIST AND RESIDENTIAL DEVELOPMENT
COMBERTON GRANGE, JERVIS BAY

Prepared for
SHAOLIN TEMPLE FOUNDATION (AUSTRALIA)

PROJECT 48670
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REPORT ON PRELIMINARY CONTAMINATION ASSESSMENT
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COMBERTON GRANGE, JERVIS BAY

1. INTRODUCTION

This report presents the results of a preliminary contamination assessment undertaken at the Proposed Tourist and Residential Development, Comberton Grange, Jervis Bay. The work was commissioned by Conybeare Morrison International Pty Ltd on behalf the Shaolin Temple Foundation (Australia), developers of the site. The report was required to fulfil Item 8 of the Director General's requirement's, dated 11 September 2008 and Shoalhaven City Council's comments dated 15 July 2008. The preliminary contamination assessment has focussed on the two proposed development areas totalling 285 ha (the northern development area (NDA) and southern development area (SDA)) located in the north western part of a larger, 1249 hectare property (the site).

The objectives of the preliminary contamination assessment were:

- To identify past and present potential contaminating activities based on available information;
- To identify potential contaminants present within the surface and subsurface soils;
- To assess the contamination (if any) for the proposed use of the development areas;
- To provide information on the likely type, extent and level of contamination in the development areas; and
- To assess the need for further investigation.

This assessment was conducted in general accordance with the NSW EPA *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites* 1997.

2. DATA QUALITY OBJECTIVES

The data qualitative objectives (DQO) are qualitative and quantitative statements that specify the quality of the data required for the assessment. DQO must ensure that the data obtained are sufficient to meet the objectives of the assessment.

The DQO were developed for this assessment in accordance with the Australian Standards "*Guide to the Sampling and Investigation of Potentially Contaminated Soil Part 1: Non-volatile and semi-volatile compounds*" (AS4482.1-2005) and "*Guide to the Sampling and Investigation of Potentially Contaminated Soil Part 2: Volatile substances*" (AS4482.2-1999). The adopted DQO process is outlined as follows:

1. State the Problem
2. Identify the Decision
3. Identify Inputs to the Decision
4. Define the Boundary of the Assessment
5. Develop a Decision Rule
6. Specify Acceptable Limits on Decision Errors
7. Optimise the Design for Obtaining Data

2.1 State the Problem

The purpose of the assessment is to provide preliminary data on the development areas with respect to contamination and to assess whether the development areas are suitable for the tourist and residential development by assessing soil and groundwater.

2.2 Identify the Decisions

The primary decisions to be made in completing the assessment are as follows:

- Are past and previous site activities considered potentially contaminating?
- Are there significant signs of contamination at the development areas?
- Do the development areas, or are the development areas, likely to present a risk of harm to human health or the environment under the existing and proposed land uses.
- Are the development areas likely to be declared "significantly contaminated land" under the definition provided in the *Contaminated Land Management Amendment Act 2008 (CLMA Act)*?
- Is there any potential for groundwater contamination?
- Are the development areas currently suitable for the proposed tourist and residential use?
- Is further investigation required to adequately address the abovementioned decisions?
- Is further investigation required to delineate the extent of any identified contamination?
- Do the development areas require remediation to ensure suitability for the proposed end use?

2.3 Identify Inputs to the Decisions

The primary inputs into the decision process are as follows:

- The areas of potential contamination and contaminants of concern deriving from known historical site activities identified from the site history review;
- Existing development area operations and features, obtained through inspections and interviews;
- Soil profile information obtained through appropriate sampling;
- *In situ* screening results;
- Analytical results on both soil and groundwater samples;
- Assessment of analytical data / data sets against applicable published soil and groundwater assessment criteria.

2.4 Define the Study Boundaries

The study boundary for this assessment is defined laterally by the boundaries of the development areas, as shown on Drawing 1, Appendix A and summarised in Section 4, and vertically by the depth of sampling.

2.5 Develop a Decision Rule

The information obtained through this assessment will be used to characterise the subject development areas in terms of contamination issues and the risk to human health and the environment.

In assessing the analytical data for soil against guideline levels for the protection of human health, the site conditions can be stated to meet the human health based guidelines if:

- The 95% Upper Confidence Limit (UCL) of the average concentrations for a data set of samples of like material complies with the adopted site assessment criteria;
- Individual concentrations of analytes (non-volatile) are less than 250% of the adopted site assessment criteria; and
- The standard deviation of the data population is <50% of the site assessment criteria.

In assessing the analytical data for groundwater against adopted guideline levels, the site conditions can be stated to meet the guidelines if:

- Contaminant concentrations are within the guideline criteria; or
- Contaminant concentrations recorded are consistent with typical background / regional concentrations.

Further investigation, remediation and/or management may be recommended if any of the above criteria are not met.

Laboratory analytical results will be accepted and considered useable for this assessment under the following conditions:

- All laboratories used are accredited by NATA for the analyses undertaken.

- All practical quantitation limits (PQL) or limits of reporting (LOR) set by the laboratories are below the adopted assessment criteria. If this cannot be achieved, the PQL or LOR will be the assessment criterion.
- Analyte concentrations in the rinsate blank do not vary significantly from the concentrations in the distilled water source.
- The differences between the reported concentrations of analytes in the field replicate samples and the corresponding primary samples are within acceptable limits.
- The reported trip blank concentrations are less than PQL or LOR.
- The quality assurance / quality control (QA/QC) protocols and results reported by the laboratories comply with the requirements of the NEPM 1999 "*Guideline on Laboratory Analysis of Potentially Contaminated Soils*" and Australian and New Zealand Environment and Conservation Council (ANZECC) 1996 "*Guidelines for the Laboratory Analysis of Contaminated Soils*".

2.6 Specify Limits on Decision Errors

The limits on decision errors for this assessment are as follows:

- The analyte selection is based on site history information obtained, site activities and features. Field observations during sampling may detect other contaminants (through odours, staining and colouring). The potential for contaminants other than those analysed is considered to be low.
- The acceptable limits for intra-laboratory replicate comparisons are outlined in Appendix B of this report.
- The acceptance limits for laboratory QA/QC parameters are based on the reported laboratory acceptance limits and those stated in the NEPM 1999 "*Guideline on Laboratory Analysis of Potentially Contaminated Soils*" and ANZECC 1996 "*Guidelines for the Laboratory Analysis of Contaminated Soils*".

2.7 Optimise the Design for Obtaining Data

To optimise the investigation, the following has been undertaken:

- The procedures adopted for the location and collection of environmental samples were developed prior to implementation, in accordance with NSW Department of Environment, Climate Change and Water (DECCW) guidelines and current industry practice. The sampling program was designed to ensure the integrity of data collection during the assessment, including appropriate decontamination techniques, sample labelling, storage and chain-of-custody protocols.
- The analytical program was initially designed prior to undertaking the sampling (based on site history, observed site uses and site features) and refined on the basis of field observations (both surface and sub-surface) during the sampling phase. All potential contaminants have been included in the analytical schedule.
- Only laboratories accredited by NATA for the analyses undertaken were used for this assessment. The laboratory performance is assessed through a statistical review of the data for QA samples such as blanks, spikes, duplicates and surrogates.
- The field QA/QC protocols adopted are outlined in Section 9 of this report. The QA/QC program incorporates preparation of traceable documentation of procedures used in the sampling and analytical program and in data validation procedures.

2.8 Data Quality Indicators

The performance of the assessment in achieving the DQO will be assessed through the application of Data Quality Indicators (DQI), defined as follows:

Precision: A quantitative measure of the variability (or reproducibility) of data.

Accuracy: A quantitative measure of the closeness of reported data to the "true" value.

Representativeness: The confidence (expressed qualitatively) that data are representative of each media present on the development area.

Completeness: A measure of the amount of useable data from a data collection activity.

Comparability: The confidence (expressed qualitatively) that data can be considered equivalent for each sampling and analytical event.

An assessment of the data quality indicators, through QA/QC evaluation, is presented in Appendix B of this report.

3. SCOPE OF WORKS

The assessment included the following scope of works:

- Review of site information including site history (aerial photographs, title deeds, DECC databases, Council Records) and other site information (Council Section 149 Certificate, site geology and hydrogeology).
- Review of published geological and hydrogeological information for the site;
- Inspection of the development areas for signs of concern.
- Test pitting in 25 locations undertaken in conjunction with acid sulphate soil and geotechnical investigations.
- Laboratory analysis of samples for a range of the following contaminants:
    - heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc);
    - Polycyclic Aromatic Hydrocarbons (PAH);
    - Total Recoverable Hydrocarbons (TRH);
    - Benzene, toluene, ethyl benzene, and total xylenes (BTEX);
    - Organochlorine pesticides (OCP) and Organophosphorus pesticides (OPP);
    - Polychlorinated Biphenyls (PCB);
    - Phenols; and
    - Asbestos.
- QA/QC samples including trip blank and replicate samples.
- Installation of three groundwater wells to assess groundwater quality prior to development.
- Sampling of groundwater and laboratory analysis for a combination of the following contaminants:
    - heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc);
    - Polycyclic Aromatic Hydrocarbons (PAH);
    - Total Recoverable Hydrocarbons (TRH);
    - Benzene, toluene, ethyl benzene, and total xylenes (BTEX);
    - Organochlorine pesticides (OCP) and Organophosphorus pesticides (OPP);
    - Polychlorinated Biphenyls (PCB);
    - Phenols;
    - Hardness; and
    - pH, electrical conductivity, reduction potential and dissolved oxygen.

- Data interpretation, reporting and logging in accordance with current NSW DECC guidelines.
- Reporting, detailing the methodology and results of the assessment. The report will include comments on the implications of the assessment results and the suitability or otherwise of the development areas for the proposed tourist and residential use.

4. SITE IDENTIFICATION AND SURROUNDING LAND USES

The 1249 ha site is located to the south east of Nowra at Comberton Grange (refer to the Locality Plan provided in Drawing 1, Appendix A) and consists of six parcels of land. The parcels of land include:

- Lot 1 in Deposited Plan (DP) 725955 (1036 ha, zoned Part 1(d) Rural (General Rural), Part 1(e) Rural (Extractive and Mineral Resources) and Part 7 (a) Environmental Protection (Ecology));
- Lot 1 DP 550098 (0.4 ha, zoned 1(d) Rural (General Rural));
- Lot 4 DP 63405 (47 ha, zoned 1(d) Rural (General Rural));
- Lot 59 DP 755928 (129.5 ha, zoned 1(d) Rural (General Rural) with part land with an extractive industry buffer area);
- Lot 60 DP 755928 (16 ha, zoned 1(d) Rural (General Rural)); and
- Lot 61 DP 755928 (20 ha, zoned 1(d) Rural (General Rural)).

The majority of the 1249 ha site is occupied by thick bushland. Some cleared grazing land is located in the south of the site adjacent to Currambene Creek and a sandstone and dolerite quarry is located in the eastern part of the site (outside of development areas), refer to Drawing 1, Appendix A.

The site is bounded to the:

- North by Currambene State Forest;
- East by Jervis Bay National Park;
- South by Currambene Creek and numerous rural residential properties; and

- West by Currambene State Forest, Currambene Creek and numerous rural residential properties.

The NDA is located in the northern most area of the site, refer to Drawing 1, Appendix A. The NDA encompasses Lots 59 – 61 DP 755928 and a minor amount of Lot 1 DP 725955 and has a total area of approximately 174.5 ha.

The SDA is located in the southwest area of the site, adjacent to Currambene Creek, refer to Drawing 1, Appendix A. The SDA is located within Lot 1 DP 725955 and has a total area of 110.5 ha.

The proposed development areas will be used for tourist (commercial) and residential purposes and will include:

- Buddhist Temple Sanctuary complex with convention centre and cultural centre;
- Kung-fu Academy for up to 500 students with residential accommodation;
- Agricultural and herbal farm;
- 500 bed 4 star hotel with ancillary rooms for staff accommodation;
- Up to 300 residential dwellings;
- Retail, commercial, professional and community service centre; and
- 27 hole golf course and associated club house.

5. REGIONAL GEOLOGY AND TOPOGRAPHY

Reference to the 1:250 000 Wollongong Geological Series Sheet (Ref 1) indicates that the proposed development areas are underlain by Nowra Sandstone and Wandrawandian Siltstone both belonging to the Shoalhaven Group of Permian age. The Nowra Sandstone comprises quartz sandstone whilst the Wandrawandian Siltstone comprises sandstone, siltstone and conglomerate.

The test pits confirmed the geological mapping, with sandstone and siltstone encountered in those pits that intersected rock.

The NDA is centred on a series of west to north-east and west to south-east ridgelines which are separated by south-easterly trending depressions which drain to the Currambene Creek floodplain some 2 km to the south. Site levels fall at grades of 1 in 10 to 1 in 25, with an overall difference in level estimated to be about 36 m from the highest part to the lowest part of the development area.

The SDA is located on the south-west facing flanks of a ridgeline with site levels falling towards Currambene Creek at grades of 1 in 10 to 1 in 25, with an overall difference of about 34 m.

A registered groundwater bore search was conducted by the Department of Water and Energy (DWE, formerly Department of Natural Resources) on 7 April, 2009. The search indicated that there was one licensed bore (GW100369) installed on the site. GW1003689 is located in the southern portion of the site near the quarry (outside the development areas) and registered for domestic stock purposes. GW1003689 has a total depth of 19.70 m with a standing water level of 9 m below ground level. The driller's log indicates soils and clays to a depth of 9 m underlain by shale.

A review of licensed bores in the surrounding area of the site indicates seven bores within approximately a 2 km radius. Their details are summarised below:

- GW104109 located approximately 0.5 km to the south west of the site. The well is registered for domestic stock purposes and has a total depth of 120 m. The water bearing zone is between 38 – 39 m below ground level and the standing water level is 9 m below ground level. The driller's logs indicates 5 m of clay underlain by siltstone/sandstone.
- GW101694 located approximately 1 km to the south of the site. The well is registered for domestic purposes and has a total depth of 60 m. The water bearing zone is between 50 – 55 m below ground level and the standing water level is 12 m below ground level. The driller's logs indicate soil between 0 – 0.3 m below ground level, clay to 3 m below ground level, brown shale to 6 m below ground level and shale to depth of 60 m below ground level.
- GW016801 located approximately 0.5 km to the south of the site. The well is registered for farming stock purposes and has a total depth of 29 m. The water bearing zone is at 27.4 m below ground level and the standing water level was not indicated. The driller's logs were not provided.
- GW005323 located approximately 0.5 km to the south of the site. The well is registered for domestic stock purposes and has a total depth of 24 m. The water bearing zone is between

19.8 – 24 m below ground level and the standing water level is 7.6 m below ground level. The driller's logs indicates clay to 12.19 m below ground level, underlain by shale.

- Three other wells were identified approximately 3 km to the north, 0.5km to the south and 2 km to the west, no information was available for these wells.

No free groundwater was encountered during test pitting or drilling. Three groundwater wells were installed across the site to a depth of 6 m below ground level. Groundwater was observed in BH28 at depths of 5.5 m below ground level (during development) and 4.78 m below ground level (during sampling). The two other wells were dry during development and sampling.

6. SITE HISTORY INVESTIGATION

6.1 Regulatory Notices Search

A search was conducted through the NSW DECC web site for any Regulatory Notices that may be present on 7 April 2009.

No Notices or Orders to investigate or remediate the site have been issued under the *Contaminated Land Management Act,* 1997.

6.2 Review of Section 149 Certificate

A review of the site's Planning Certificate pursuant to Section 149 of the *Environmental Planning and Assessment Act*, 1979, was undertaken on 14 April 2009. The following was noted:

- The development areas are not located within a conservation area;
- Lot 1 DP 725955 forms part of a coastal wetland; and
- There were no matters listed under Section 59(2) of the *Contaminated Land Management Act,* 1997, specified in the certificates.

6.3 Title Deed Search

A title deed search was conducted by Peter S Hopley Pty Ltd, Legal Agents. The title information can assist in the identification of previous land uses by identifying the occupation of individual land owners or by a descriptive company name. This may, therefore, establish potentially contaminating activities. A summary of the title deeds search are shown in Table 1. The full results of the search are given in Appendix C.

Table 1: Title Deed Summary

Date	Owner	Possible Use
Lot 1 D.P. 550098		
16.10.1928	George Edwin Pattrick Hart *(Surveyor)*	Rural/Residential
18.07.1930	William Jennings *(Farmer)* and Ellen Jennings *(Married Woman)*	Rural/Residential
13.04.1951	Reginald Percy Jennings *(Farmer)*	Rural/Residential
06.11.1973	Australian Steel & Mining Corporation Pty Limited	Mining/quarrying
27.11.1985	# Council of the City of Shoalhaven	Vacant
Lot 1 D.P. 725955 (Western Portion)		
16.10.1928	George Edwin Pattrick Hart *(Surveyor)*	Rural/Residential
18.07.1930	William Jennings *(Farmer)* and Ellen Jennings *(Married Woman)*	Rural/Residential
13.04.1951	Reginald Percy Jennings *(Farmer)*	Rural/Residential
06.11.1973	Australian Steel & Mining Corporation Pty Limited	Mining/quarrying
25.10.1985	# Council of the City of Shoalhaven	Vacant
Lot 1 D.P. 725955 (Eastern Portion)		
16.10.1928	George Edwin Pattrick Hart *(Surveyor)*	Rural/Residential
01.04.1950	Reid & Herne Pty Limited (Then Reid & Herne (Milling) Pty Limited, now Reid & Herne Holdings Pty Limited)	Commercial/Timber Supply*
30.12.1969	Haughty Clare Pty Limited (Now Australian Steel & Mining Corporation Pty Limited)	Mining/quarrying
25.10.1985	# Council of the City of Shoalhaven	Vacant/Mining
Lot 4 D.P. 63405		
24.10.1905	Walter Jennings *(Farmer)*	Rural/Residential
09.05.1908	William Jennings *(Farmer)*	Rural/Residential
28.10.1936	Ellen Jennings *(Widow)*	Rural/Residential
15.05.1953?	Ronald Clive Jennings *(Farmer)*	Rural/Residential
15.12.1973	Australian Steel & Mining Corporation Pty Limited	Mining/quarrying
19.11.1985	# Council of the City of Shoalhaven	Vacant
Lot 59 D.P. 755928		
09.05.1907	Walter Jennings *(Farmer)*	Rural/Residential
06.03.1951	Gladys Marian Sturgess *(Married Woman)*	Rural/Residential
26.07.1955	Ronald William David Sturgess (Farmer)	Rural/Residential
24.04.1963	Australian Softwood Corporation Pty Limited	Commercial/Plantation
06.07.1995	# Council of the City of Shoalhaven	Vacant
Lots 60 & 61 D.P. 755928		
27.10.1890	William Jennings *(Farmer)*	Rural/Residential
28.10.1936	Ellen Jennings *(Widow)*	Rural/Residential
22.05.1951	Gladys Marian Sturgess *(Married Woman)*	Rural/Residential
26.07.1955	Ronald William David Sturgess (Farmer)	Rural/Residential
24.04.1963	Australian Softwood Corporation Pty Limited	Commercial/Plantation
06.07.1995	# Council of the City of Shoalhaven	Vacant

\# Current Registered Proprietor
* Search indicates Reid and Horne were hardware suppliers in the Nowra region in 1973

In establishing the possible use of the development areas, information has also been drawn from other sources such as aerial photographs and additional information provided by the client (project application).

Review of the title deeds indicate the site has been used for rural, residential and commercial purposes (Plantation and mining/quarrying).

6.4 Historical Aerial Photography

Historical aerial photographs from five periods of photography, archived by the Land Information Section of the Department of Lands, were inspected. Aerial photographs examined included:

- September 1961 (Run 6M);
- December 1974;
- May 1984 (Run 8);
- February 1993 (Run 13); and
- March 2002 (Run 13).

Photographs were examined for signs of potential concern, viz. structures which may have been demolished, stripped soil, bulk excavation, areas of filling and evidence of stockpiling. Unexplained surface features were noted. A summary of each review is given below.

1961: The majority of NDA appeared to had been cleared and overlain with grass. The cleared area appeared to be bounded by the site boundary in the north and west, Georges Creek in the east and a tributary of Georges Creek in the south. Several roads/tracks traverse the site in a general east west direction. In the south east corner of the NDA, a series of largely spaced roughly parallel lines were observed (possible plantation). A dark circular area located adjacent to Georges Creek was visible (possible low lying area or dam). Adjacent to the south west corner, the site boundary appeared to have been cleared however no tracks led to the cleared area. The remainder of the south west corner of the NDA appeared to be vegetated with bushland.

The SDA adjacent to Currambene Creek was cleared and appeared to be used for agricultural purposes. Comberton Grange Road and Comberton Grange homestead were also visible. Surrounding the homestead were several dark coloured shapes, possibly trees.

The remainder of the site was observed to be mostly covered by dense vegetation (bushland) except for other areas adjacent to Currambene Creek. Low lying/wetland areas (identified by sparse vegetation and grassy areas) were visible adjacent to Comberton Creek in the east and adjacent to Georges Creek. In the south eastern corner of the site, surrounded by a low lying area, appeared to be a billabong.

1974: A grid shaped pattern formed by roads was visible in the NDA. The areas within the grid were cleared of vegetation. Georges Creek and the tributary observed in 1961 were not clearly visible (possibly filled). The southern part of NDA was overlain with widely spaced, roughly parallel lines (similar to those in 1961 photograph).

The SDA adjacent to Currambene Creek appeared to be used for agricultural purposes. Several dark areas, possibly trees or dams were observed across the SDA. Comberton Grange Road and Comberton Grange homestead were also visible and with a similar footprint to the 1961 photograph. Surrounding the homestead, several dark coloured shapes, possibly trees, structures or vehicles were observed. A large rectangular structure was visible in the northern part of SDA.

The remainder of the site was largely unchanged with the exception of numerous tracks running across the eastern portion.

1984: The grid shaped pattern formed by roads observed in previous photographs were visible in the NDA. The NDA appeared vegetated and Georges Creek and tributary were visible. The cleared area appeared to have revegetated, however, the widely spaced parallel lines were still visible.

The SDA remained vegetated, however, no signs of agriculture were visible and no tracks were observed. A structure was observed to the north west of the Comberton Grange homestead. Comberton Grange homestead was visible, however, unidentified light coloured, rectangular

areas were observed surrounding the homestead. The large rectangular structure observed in the 1974 photograph was clearly visible.
The remainder of the site appeared unchanged. The tracks observed in the 1974 photograph were no longer visible. The billabong observed in 1961 was visible and larger in size.

1993: Similar to the 1984 photograph, the grid shaped road pattern was still visible in the NDA. The NDA appeared vegetated, however, a grassed area was visible adjacent to Georges Creek and tributary were visible.

The SDA remained generally unchanged except within the homestead area where some structures were no longer visible. The large rectangular structure observed in previous photographs was clearly visible.

The remainder of site remained unchanged except for the development of the quarry and associated dam.

2002: The NDA remained vegetated, however, it appeared that the vegetation appeared less dense than compared to the 1993 photograph. A square area of disturbed ground was observed adjacent to the western boundary of Lot 59 DP 755928. Georges Creek and tributary were visible.

The SDA remained unchanged.

The remainder of the site remained largely unchanged.

In summary, the review of the aerial photographs indicates that the NDA had been cleared and most likely used as a plantation. The SDA had been cleared prior to 1961 and has been used for agricultural purposes. The photographs confirm the presence of structures within the homestead area and in an area in the north of the SDA.

6.5 Review of Council Records

A review of Council files pertaining to the area of development was undertaken on 7 May 2009. Several files were made available, mostly concerning the development and expansion of the quarry (outside of the development areas), however:

- A file note on Comberton Grange homestead dated 1981, the file note indicates that the vernacular single storey colonial homestead building:
  - was constructed of bricks made on the property in 1843 by convict labour for John Terry Hughes;
  - was in good condition and is the oldest home in the Falls Creek area;
  - had hipped corrugated iron roof which replaced shingles;
  - had front and back verandahs which were supported by timber posts;
  - had two symmetrical chimneys at each end of the building; and
  - no outbuilding was located.
- Also included in the file note were some photocopied black and white photographs. The photographs were of the homestead which confirmed the above descriptions. The photographs were not included in this report due to poor copy quality.
- Numerous development applications and files notes pertained to Lot 59 – 61 being used as a softwood timber plantation. The most recent file note was dated 1997, indicating the lots were still used as a plantation at this time.
- An approval for the storage and irrigation use of 1200kL of effluent from the Council recycled water scheme, dated 1997 was included in the files. The effluent was to be in stored in three large corrugated and concrete tanks however no evidence of the tanks were observed in the 2002 aerial photograph.
- A DA, dated 1998, for the increase of extraction rates at the quarry was included in the files. Information within the DA indicated that the quarry was underlain with sandstone to depths of approximately 17 m below ground level (bgl) and dolermite in excess of 17 m bgl. Also included in the DA was the provision of fuel storage, regular testing of water from the sediment dam and a proposed armaments depot however no other information in the council files were available.

- Two DAs dated 1999 and 2000 respectively, for the subdivision of Lot 4 DP 63405 were observed in the council files however no other information was found. Review of the S149 certificates indicates the subdivision was not pursued.
- A DA for the subdivision of Lot 4 DP63405 and north west corner of Lot 1 DP25955 included an Archaeological Assessment undertaken by Dr Robert V J P Varman, Archaeologist and Heritage Consultant, dated 26 July 1999, a copy of which is provided in Appendix D of this report. The assessment was undertaken for Shoalhaven City Council and the following was noted:
    - A site inspection was undertaken between 22 – 25 July 1999.
    - Inspection of the northern portion of the site indicated that the vegetation was overlain with regrowth forest and, from observations made, appeared to have been logged at least twice.
    - No structural remains were found in northern portion of the site however some roads were observed. This correlates to the observations in the aerial photograph review.
    - An eroded area in the northern portion of the site exposed a charcoal layer and burned tree root in the strata indicated that a fire had been through the area at some stage.
    - The site was first granted in the 1830s and the construction of the homestead recorded as being between 1834 and 1847.
    - The area adjacent to Currambene Creek was cleared during the 1840s for agricultural purposes and had been used for grazing until the present day (1999) and dairying.
    - The owner of the land around this time was known for growing wheat, however, no records indicate that wheat crops were grown.
    - The Archaeological assessment described ownership of the property from 1830 and indicated that the sequence of owners were John Terry Hughes, Ellen Rosetta Hughes, James Lang, Miller, McHay, Wilford, Row and Jennings. The assessment describes William Jennings as owning the property which was then passed onto R P Jennings. This correlated with the title deed search undertaken by DP.
    - The Archaeological assessment dated a farm complex located in the western part of the site as being constructed between 1890-1920, the hay shed approximately 1940, the stockyard approximately 1840 and the windmill pump during the first half of the 20th century. The Archaeological assessment noted that the dams and fences were

most likely constructed between the 1940s and 1950s, however, following 1960 the area was mostly used for grazing and the structures were not maintained and fell into disrepair.

- The farm complex was used for branding, mustering, hay storage and as a dairy between 1920 – 1930.
- No evidence of significant Aboriginal activity was observed at the site.
- A black and white sketch diagram was included in the report. The diagram showed the locations of the proposed subdivision as well as the location of post and rail fences, dairy, windmill pump, hay shed, water tanks and stockyard, refer to Appendix D.
- Two panoramic photographs showed the cleared area adjacent to Currambene Creek.
- In describing the farm complex, the assessment noted cladding and framing in the hay shed, a concrete tank, iron feed trough, a manmade pond, iron windmill pump and *in situ* water pipes.
- The assessment noted a clump of bulb plants near the hay shed and stockyard area, which may indicate the location of a hut or cottage, however, no signs of building material were noted.
- In describing the homestead, the assessment noted the location marked by rough stones (possibly a verandah), a scatter of bricks, a coloured concrete path, a camellia plant, a nearby collapsed timber shed, concrete and iron water tanks, stockyards and an old road.

The review of the Council files confirms the NDA was used as a timber plantation up until 1997 and the SDA has been used for agricultural purposes.

7. SITE INSPECTION

A site inspection was undertaken on 25 May 2009, refer to photo plates 1 – 26, Appendix E. Photographs locations are shown in Drawings 2 and 3, Appendix A. The following was noted:

NDA:

- The area was well vegetated with native and pine species. Thick vegetation limited the inspection to areas adjacent to accessible roads.
- Tyre trails indicated the roads had been used by motorbikes.
- Remnant star picket and barbwire fences were observed in various areas;
- Fly-tipping had occurred adjacent to roads across the NDA. Minor fly-tipped materials included household rubbish (plastic containers, cardboard), 44 gallon drums (empty), plastic oil containers, oil drums and a car muffler. Some larger stockpiles of fly-tipped materials were noted. They include:
    - Domestic Rubbish (283385, 6127886) – plastic containers, cardboard, plastic sheeting, plastic bags (refer to Photo plate 1).
    - Building rubble (283665, 6127479) - bricks, concrete pieces and tiles (refer to Photo plate 2).
    - Timber logs (2834436, 6127849 and 283958, 6127061) – timber logs, with bark attached, cut at identical lengths and neatly stockpiled, most likely left over from pine plantation (refer to Photo plate 3).
    - Concrete rubble (283309, 6127150) – concrete rubble and bricks (refer to Photo plate 4).
- All roads appeared to be formed from residual soil material. No filling was observed.
- No evidence of plantation infrastructure (i.e. buildings, storage tanks) or concrete tanks (as mentioned in the Council files) were observed.

SDA:

- The majority of the area was cleared and overgrown with grass.
- Several dams were observed across the area. Dams walls appeared to be constructed of natural material excavated to create the dam.
- No fly-tipping was observed.
- All accessible creek lines were visually assessed, no signs of dumped material or filling were observed.
- The farm complex was inspected and the following was noted:
    - A small timber stockyard was observed. Some of the timber fences had been repaired with corrugated iron, steel sheeting and 'temporary' fencing (i.e. mesh fencing) (refer to Photo plate 5).

- A small timber stockpile of broken fence posts was observed adjacent to the stockyard.
- The dairy shed was in a dilapidated state with a part of the southern wall collapsed.
- The dairy shed comprised of timber frame and corrugated iron roof and walls.
- Inside the shed, corrugated iron, fencing wire, timber and an empty 10L drum was observed (refer to Photo plate 6);
- Behind the concrete slab, a concrete pit and lid were observed (refer to Photo plate 7);
- To the north of the dairy shed were a metal trough, discarded fencing wire and posts, a sunken area (potential burial pit) and a U-shaped concrete slab (refer to Photo plates 8 – 9);
- To the east of the dairy shed were four timber poles and a metal trough (refer to Photo plate 10);
- The windmill pump and associated pipe work were located to the south east of the development area. The wind turbine and metal pipe work were exposed on the banks of a rectangular dam (refer to Photo plate 11).

- The homestead and surrounding area were inspected and the following were noted:
  - A landfill was located outside of the SDA to the north west of the homestead. The land filling is located adjacent to Currambene Creek and consisted of glass bottles, ceramics, fabric, corrugated iron, terracotta pipes and an old washing machine drum. A corrugated iron tank was also observed in the creek.
  - The homestead area consisted of the homestead footprint, corrugated iron tanks, concrete tanks, stockyard and two sheds.
  - The former homestead footprint was located by the presence of stone footings, concrete paths, Telstra and electricity connections and two corrugated iron tanks (refer to Photo plates 14 and 15).
  - The area surrounding the homestead was clear of rubbish and fly-tipping. Some glass bottles and plastic rubbish and concrete pieces were noted inside one of the corrugated iron tanks (refer to Photo plate 16).
  - Two abandoned cars were observed in the homestead area (refer to Photo plates 17 and 18).
  - A large concrete tank and concrete slab was observed to the north of the homestead area. Some discarded timber fencing and wire were noted adjacent to the tank (refer to Photo plate 19).

- To north east of the homestead, a large rectangular dam was observed. The dam wall appeared to be constructed of clay material. No anthropogenic materials were observed in the walls (refer to Photo plate 20).
- A large shed constructed on timber and corrugated iron was observed to the north east of the homestead. Inside, the shed was overgrown with weeds precluding inspection. Behind the shed a soil bund was observed which was covered with grass (refer to Photo plate 21).
- Timber stockyards were observed to the east of the homestead which were in disrepair and appeared to have not been used for some time (refer to Photo plate 22).
- A smaller corrugated iron and timber shed structure was noted adjacent to the stock yards, possible stable (refer to Photo plate 23).
- To the south east of the homestead is another large shed with a concrete floor and which was constructed of timber and corrugated iron. The roof had collapsed and corrugated iron and timber lay in the grass surrounding the concrete slab (refer to Photo plate 24). Cement sheeting fragments were observed on the northern eastern part of the slab and in the surrounding grass. Two samples were collected and analysed for asbestos and lead paint (refer to Photo plate 25). A smaller, possible out-house structure was located near the larger structure. The out-house was constructed of corrugated iron and timber and had an earthen floor (refer to Photo plate 26). The area surrounding the two structures appeared to have been disturbed and possibly filled.

The results of the site inspection indicate the main potential for contamination in the NDA is fly-tipped material and illegal dumping and in the SDA land filling, burial pits, leaching from metal building materials, potential asbestos and lead paint in homestead area and filling in homestead area.

Whilst it is located outside the SDA, the land filling located adjacent to Currambene Creek consisting of bottles, ceramics, fabric, corrugated iron, terracotta pipes and an old washing machine drum and the corrugated iron tank observed in the creek presents a potential for contamination.

8. POTENTIAL FOR CONTAMINATION

From the site history review and the site inspection, the development areas have been used for various purposes including:

NDA

- Timber plantation. Potential for contamination arises from possible spillage of fuels from bulldozers and trucks, burial of wastes, use of pesticides, herbicides and fertilises and filling.

SDA

- Rural: dairying and grazing. Potential for contamination include use of pesticides and herbicides, burial of wastes/farm animals, zinc leaching from galvanised iron structures and use hazardous building materials such as asbestos.
- Residential: Potential for contamination include use of pesticides, burial of wastes, land filling, zinc leaching from galvanised iron structures and use hazardous building materials such as asbestos, lead in paint.

Based on the historic site uses and the site inspection, it was a considered that the following range of contaminants of concern were applicable to the development areas:

- heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc);
- Polycyclic Aromatic Hydrocarbons (PAH);
- Total Petroleum Hydrocarbons (TPH);
- Benzene, toluene, ethyl benzene, and total xylenes (BTEX);
- Organochlorine pesticides (OCP) and Organophosphorus pesticides (OPP);
- Polychlorinated Biphenyls (PCB);
- Phenols; and
- Asbestos.

9. SAMPLING AND ANALYSIS PLAN

The sampling and analysis plan is described in the following sections.

9.1 Sampling Pattern

Sample locations were based on a systematic and judgemental sampling pattern with consideration to the geotechnical assessments requirements.
Judgemental sample locations including test pits 1, 11, 14 and 16 were chosen to target potential contamination in cleared areas within the plantation (NDA) and the homestead area and farm complex area (SDA).

Groundwater well locations were chosen to provide coverage across the two development areas.

9.2 Sampling Density

Based on the size of the area of development (285 ha) and in accordance with the NSW EPA publication *Contaminated Sites*: *Sampling Design Guidelines*, 1995, a large number of systematic sample points are required for a detailed site characterisation.

However, based on the preliminary nature of this assessment, the rural, undeveloped nature of the land and the potential for localised contamination on a small scale, a combination of 25 sample locations were considered appropriate.

9.3 Sample Locations

Sample locations are indicated in Drawings 2 and 3 in Appendix A. A total of 25 test pit locations were placed over the development areas.

Groundwater well locations are also indicated in Drawings 2 and 3 in Appendix A. A total of three groundwater wells were installed.

9.4 Sample Depths

Samples were collected at multiple depths within fill and natural material to allow for the evaluation of various types of strata. Sample depths generally ranged between 0.0 – 3.3 m. Refer to logs provided in Appendix F.

9.5 Analytical Scheme

The analytical scheme was designed around the inferred potential for contamination and is summarised in the Table 2. Generally the samples analysed were selected to provide information on the characterisation of the fill and natural soils.

Table 2 – Analytical Scheme

Sample ID	8 HM	PAH	TPH/BTEX	Phen	PCB	OCP	AS	Rationale
1/0-0.1	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in homestead area, potential filling
1/0.3-0.5	✓		✓					Characterisation of clay in homestead area
2/0-0.1	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in homestead area
2/0.4-0.5	✓		✓					Characterisation of clay in homestead area
3/0-0.1	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in grazing area
4/0-0.1	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in grazing area
5/0-0.1	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in grazing area
6/0-0.1	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in grazing area
7/0-0.1	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in grazing area
7/0.3-0.5	✓		✓					Characterisation of clay in grazing area
8/0-0.1	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in grazing area
9/0-0.1	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in grazing area
9/0.4-0.5	✓		✓					Characterisation of topsoil in grazing area
10/0-0.1	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in grazing area
11/0-0.1	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in farm complex area
11/0.4-0.6	✓		✓					Characterisation of clay in farm complex area
12/0.3-0.5	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in grazing area
13/0-0.1	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in grazing area
13/0.5-0.7	✓	✓	✓	✓	✓	✓	✓	Characterisation of clay in grazing area
14/0-0.2	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in plantation area
14/1.0-1.3	✓		✓					Characterisation of clay in plantation area
15/0-0.2	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in plantation area
16/0-0.2	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in plantation area

Table 2 – Analytical Scheme continued

Sample ID	8 HM	PAH	TPH/BTEX	Phen	PCB	OCP	AS	Rationale
16/1.0-1.2	✓		✓					Characterisation of clay in plantation area
17/0-0.2	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in plantation area
18/0-0.1	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in plantation area
18/0.5-0.7	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in plantation area
19/0-0.2	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in plantation area
20/0-0.2	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in plantation area
21/0-0.2	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in plantation area
22/0-0.2	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in plantation area
23/0-0.2	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in plantation area
24/0-0.2	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in plantation area
25/0-0.2	✓	✓	✓	✓	✓	✓	✓	Characterisation of topsoil in plantation area
GW28	✓	✓	✓	✓	✓	✓	✓	Characterisation of groundwater
BD1 27/5/09	✓		✓					Replicate of 8/0-0.1
BD1 28/5/09	✓		✓					Replicate of 11/0-0.1
BD1 1/07/09	✓		✓					Replicate of 15/0-0.2
BD1 2/07/09	✓		✓					Replicate of 19/0-0.2
BD2 1/07/09	✓		✓					Replicate of 21/0-0.2
BD1 10/0709	✓	✓	✓					Replicate of GW/28
FB1							✓	Fibre board material found near building
FB2	✓							Tested for lead in paint
TB1 (27/5/09)			✓					Trip Blank for 27/05/09
TB2 (28/5/09)			✓					Trip Blank for 28/05/09
TB3 (29/5/09)			✓					Trip Blank for 29/05/09
TB1 (18/06/09)			✓					Trip Blank for 18/06/09
TB1 (02/07/09)			✓					Trip Blank for 02/07/09
TB (10/07/09)			✓					Trip Blank for 10/07/09

8 HM	8 heavy metals including arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc
PAH	Polycyclic Aromatic Hydrocarbons (PAH)
TPH/BTEX	Total Petroleum Hydrocarbons (TRH) and benzene, toluene, ethyl benzene, and total xylenes (BTEX)
Phen	Phenols
PCB	Polychlorinated Biphenyls (PCB)
OCP	Organochlorine pesticides (OCP)
AS	Asbestos

9.6 Sample Collection

Twenty five test pits were excavated across the site using a backhoe fitted with a 300 mm wide bucket. Samples were collected from the various strata encountered within the test pits. No soil sampling was undertaken during drilling and installation of the three groundwater wells.

The groundwater wells were dipped (only one was found to contain water) and bailed until dry and samples were collected following well recovery. Groundwater samples were collected from a disposable PVC bailer and decanted directly into sample containers with the exception of heavy metals sample which was filtered prior to transfer into sample container.

9.7 Sampling Procedure

Environmental sampling was conducted according to standard operating procedures described in the DP *Field Procedures Manual* and all sampling data was recorded on DP Chain-of-Custody sheets

Soil sampling was conducted in accordance with standard operating procedures which includes:

- the use of stainless steel sampling equipment for the collection of soil samples;
- washing of all sampling equipment in a 3% solution of phosphate free detergent (Decon 90) then rinsing with distilled water prior to each sample being collected;
- transfer of the sample into new glass jars or acidified glass bottles, sealed with a teflon lined lid;
- labelling of the sample containers with individual and unique identification including Project No. Sample No. and depth;
- placement of the containers into a chilled, enclosed and secure container for transport to the laboratory; and
- use of chain-of-custody documentation to ensure that sample tracking and custody can be cross-checked at any point in the transfer of samples from the field to hand-over to the laboratory.

Groundwater sampling was conducted in accordance with standard operating procedures which includes:

- measurement of the static water level in the monitoring bore;
- purging of well for three well volumes or until dry;
- following sufficient recovering time, collection of sample using disposable PVC bailer;

- transferring of samples into laboratory-prepared, acidified bottles and capping immediately;
- field filtering (45 µm) of samples for heavy metal analysis;
- use of a water quality meter to measure water quality parameters prior to sampling. Sampling will be undertaken upon stabilisation of parameters. The parameters to be measured included temperature, pH, EC, DO, Redox potential.
- labelling sample containers with individual and unique identification, including project number and sample location; and
- placement of the sample bottles into a cooled, insulated and sealed container for transport to the laboratory.

10. ASSESSMENT CRITERIA

The proposed use of the site is residential and as such the appropriate assessment criteria are considered to be:

- NSW DEC Contaminated Sites: *Guidelines for the NSW Site Auditors Scheme*, 2nd edition, 2006. Health-based investigation levels (HIL) for residential use with gardens and accessible soil (Appendix II, Soil Investigation Levels for Urban Development Sites in NSW, Column 1). In the absence of other DECC endorsed, comprehensive criteria for total petroleum hydrocarbon guidelines NSW EPA Contaminated Sites: *Guidelines for Assessing Service Station Sites*, 1994, Threshold concentrations for sensitive sites, were adopted; and
- NSW EPA Contaminated Sites: *Guidelines for the NSW Site Auditors Scheme* 2nd Edition, 2006, Provisional phytotoxicity-based investigation levels for sandy loams (Appendix II, Column 5).
- ANZECC *Guidelines for Fresh and Marine Water Quality*, 2000 Trigger values for toxicants at 95% levels of protection, Freshwater - Table 3.4.1
- NSW EPA Contaminated Sites *Guidelines for Assessing Service Station Sites* (1994) threshold concentrations for waters – Protection of aquatic ecosystems.
- Dutch Intervention Value (Dutch IV) for mineral oils, from *Environmental Quality Standards in the Netherlands*, 1999

These criteria are specified in the Result summary tables provided in Appendix G.

11. RESULTS

11.1 Quality Assurance and Quality Control

Quality Assurance and Quality Control (QA/QC) formed an integral part of this assessment. The methodology, results and discussion of the field and laboratory QA/QC assessment are provided in Appendix B.

11.2 Field observations

A total of 25 test pits were excavated and 3 boreholes were drilled and converted to groundwater wells across the site. Refer to Drawings 2 and 3, Appendix A. The sample locations encountered broadly similar conditions generally consisting of:

TOPSOIL: consisting of topsoil (brown silty/sandy/gravelly clay) material in locations 2 – 17, 19 – 24 and 26.

CLAY: was encountered in all locations. Grey, orange, red, yellow and brown clays, some with silt and sand components.

SILTSTONE: was confirmed to underlie clays in locations 1 – 8, 10, 17, 22, 23, 26 - 28.

Filling (0-0.3 m) was encountered in location 1, comprising brown, fine to course (siltstone) gravelly clay with some cobbles, boulders (siltstone) and rootlets.

Logs are provided in Appendix F.

No free groundwater was observed in the test pits, however, pits were in-filled immediately after sampling hence prolonged observations were not possible. Three groundwater wells were installed across the site to a depth of 6 m below ground level. Groundwater was observed in BH28 at depths of 5.5 m below ground level (during development) and 4.78 m below ground level (during sampling), the other wells were found to be dry ie not containing water at the time of development and sampling.

11.3 Well construction

Three groundwater wells were installed in boreholes 26, 27 and 28. The wells were installed to a depth of 6 metres, with 3 m screens surrounded by sand with a 0.3 m thick bentonite layer above. The wells were then backfilled and fitted with a monument cover at the surface.

11.4 Soil Results

A summary of all the soil results is provided in Tables G1 and G2, Appendix G. The Laboratory results sheets and QA/QC documentation is provided in Appendix H.

The results indicate that all soil samples taken from the NDA and SDA were within the assessment criteria. Further to this all results were within published background ranges.

The results of analysis undertaken on two fibre board samples collected from a large shed structure, with a collapsed roof, indicated the fibreboards samples contained asbestos fibres and lead paint. Test pit 1 was excavated in the vicinity of the structure, however, no asbestos or elevated levels of lead were detected in the samples indicating the asbestos and lead contamination is most likely limited to the structure and immediate area.

11.5 Groundwater Results

A summary of all the groundwater results is provided in Table G3, Appendix G. The laboratory results sheets and QA/QC documentation is provided in Appendix H.

The results of the laboratory analysis indicate exceedances of nickel and zinc within the groundwater sample. Due to the undeveloped the remote nature and of the site (i.e. not in developed areas), it is considered that these exceedances are most likely attributed to the natural soil and groundwater conditions and are not considered a sign of potential contamination.

12. CONCLUSION AND RECOMMENDATIONS

The results of the site history and site inspection have indicated that the NDA has previously been used as a timber plantation with the potential for contamination arising from possible spillage of fuels from bulldozers and trucks at the refuelling point (location unknown, if any), burial of wastes, use of pesticides, herbicides and fertilises and the presence of filling from potentially contaminated sources. The SDA has previously and continues to be used for rural purposes including dairying and grazing with the potential for contamination arising from the use of pesticides and herbicides, burial of wastes/farm animals, zinc leaching from galvanised iron structures and the use hazardous building materials such as asbestos. The SDA also encompasses the former Comberton Grange homestead and associated structures, which presents a potential for contamination from the use of pesticides, burial of wastes, land filling, zinc leaching from galvanised iron structures and the use of hazardous building materials such as asbestos and lead in paint.

The site inspection revealed the NDA had been effected by fly tipping with household rubbish, 44 gallon drums (empty), plastic oil containers, oil drums, car parts, concrete rubble and timber logs observed in various areas.

Field observations during sampling indicate the NDA and SDA are overlain with topsoil, clays and siltstone with filling identified in one location (test pit 1 in the homestead area). Groundwater was observed in groundwater well (BH28) at a depth of 4.78 – 5.5 m below ground level.

Results of the laboratory analysis of soils indicate that all levels of contaminants analysed were within the assessment criteria and published background ranges.

Asbestos and lead paint, however, were detected in two fibre board samples taken from a structure in the homestead area. Test results in the vicinity of the large shed at the homestead indicated that the asbestos and lead contamination is most likely limited to the structure and immediate area.

Groundwater sampling indicated that levels of nickel and zinc exceed the assessment criteria, however, due to the undeveloped and remote nature the of the site (i.e. not in developed

areas), it is considered that these exceedances are most likely typical background groundwater conditions and are not considered to be contamination.

Based on the site history, site inspection and laboratory analysis the overall potential for contamination at the site is considered to be low, however, the following is recommended:

- The buildings and other structures identified in the SDA should be inspected by an occupational hygienist and any asbestos containing material should be removed off site by a licensed contractor and the underlying soils and surrounding area be validated by an Occupational hygienist using visual and laboratory analytical validation methods.
- Similarly, material which has been coated with lead paint should either be sealed or removed off the site to prevent lead contamination of soils.
- Any stockpiled material currently identified on site i.e. soil, building or fly tipped materials should be assessed for its suitability to be reused on site or be disposed off site with appropriate classification prior to development. This also applies to any other fly-tipped material uncovered during site clearing and development.
- The land filling located adjacent to Currambene Creek consisting of bottles, ceramics, fabric, corrugated iron, terracotta pipes and an old washing machine drum and the corrugated iron tank observed in the creek, should be removed off site following appropriate classification. If signs of contamination such as staining, odours or asbestos containing materials are encountered then the underlying soils should be validated.
- Following clearing, areas inaccessible at the time of this assessment should be inspected by an suitability qualified consultant to assess for potential signs of contamination
- For verification purposes low density sampling be undertaken across the site, particularly in future residential areas, following site clearing and an inspection. Low density sampling would be undertaken at a nominal rate of 1 sample per 10 ha and samples would be analysed for heavy metals, TRH, BTEX, PAH, OCP, OPP, PCB and asbestos.

13. LIMITATIONS OF THIS REPORT

DP's assessment is necessarily based upon the results of the scope of work set out in the original proposal. Neither DP, nor any other reputable consultant, can provide unqualified warranties nor does DP assume any liability for site conditions not observed, or accessible

during the time of the investigations (ie swampy and overgrown areas). Despite all reasonable care and diligence, site characteristics may change at any time in response to variations in natural conditions, chemical reactions and other events, e.g. groundwater movement and or spillages of contaminating substances. These changes may occur subsequent to DP's investigations and assessment.

This report and associated documentation have been prepared solely for the use of the Shaolin Temple Foundation (Australia). Any reliance assumed by third parties on this report shall be at such parties' own risk. Any ensuing liability resulting from use of the report by third parties cannot be transferred to DP.

DOUGLAS PARTNERS PTY LTD

Jane Smalley
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APPENDIX A

Notes Relating to this Report
Drawings 1 - 3

Douglas Partners
Geotechnics · Environment · Groundwater

NOTES RELATING TO THIS REPORT

Introduction

These notes have been provided to amplify the geotechnical report in regard to classification methods, specialist field procedures and certain matters relating to the Discussion and Comments section. Not all, of course, are necessarily relevant to all reports.

Geotechnical reports are based on information gained from limited subsurface test boring and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726, Geotechnical Site Investigations Code. In general, descriptions cover the following properties - strength or density, colour, structure, soil or rock type and inclusions.

Soil types are described according to the predominating particle size, qualified by the grading of other particles present (eg. sandy clay) on the following bases:

Soil Classification	Particle Size
Clay	less than 0.002 mm
Silt	0.002 to 0.06 mm
Sand	0.06 to 2.00 mm
Gravel	2.00 to 60.00 mm

Cohesive soils are classified on the basis of strength either by laboratory testing or engineering examination. The strength terms are defined as follows.

Classification	Undrained Shear Strength kPa
Very soft	less than 12
Soft	12—25
Firm	25—50
Stiff	50—100
Very stiff	100—200
Hard	Greater than 200

Non-cohesive soils are classified on the basis of relative density, generally from the results of standard penetration tests (SPT) or Dutch cone penetrometer tests (CPT) as below:

Relative Density	SPT "N" Value (blows/300 mm)	CPT Cone Value (q_c — MPa)
Very loose	less than 5	less than 2
Loose	5—10	2—5
Medium dense	10—30	5—15
Dense	30—50	15—25
Very dense	greater than 50	greater than 25

Rock types are classified by their geological names. Where relevant, further information regarding rock classification is given on the following sheet.

Sampling

Sampling is carried out during drilling to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing with a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Details of the type and method of sampling are given in the report.

Drilling Methods.

The following is a brief summary of drilling methods currently adopted by the Company and some comments on their use and application.

Test Pits — these are excavated with a backhoe or a tracked excavator, allowing close examination of the in-situ soils if it is safe to descent into the pit. The depth of penetration is limited to about 3 m for a backhoe and up to 6 m for an excavator. A potential disadvantage is the disturbance caused by the excavation.

Large Diameter Auger (eg. Pengo) — the hole is advanced by a rotating plate or short spiral auger, generally 300 mm or larger in diameter. The cuttings are returned to the surface at intervals (generally of not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube sampling.

Continuous Sample Drilling — the hole is advanced by pushing a 100 mm diameter socket into the ground and withdrawing it at intervals to extrude the sample. This is the most reliable method of drilling in soils, since moisture content is unchanged and soil structure, strength, etc. is only marginally affected.

Continuous Spiral Flight Augers — the hole is advanced using 90—115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and in sands above the water

table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are very disturbed and may be contaminated. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively lower reliability, due to remoulding, contamination or softening of samples by ground water.

Non-core Rotary Drilling — the hole is advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from 'feel' and rate of penetration.

Rotary Mud Drilling — similar to rotary drilling, but using drilling mud as a circulating fluid. The mud tends to mask the cuttings and reliable identification is again only possible from separate intact sampling (eg. from SPT).

Continuous Core Drilling — a continuous core sample is obtained using a diamond-tipped core barrel, usually 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in very weak rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation.

Standard Penetration Tests

Standard penetration tests (abbreviated as SPT) are used mainly in non-cohesive soils, but occasionally also in cohesive soils as a means of determining density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, "Methods of Testing Soils for Engineering Purposes" — Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of say 4, 6 and 7

  as 4, 6, 7
  N = 13

- In the case where the test is discontinued short of full penetration, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm

  as 15, 30/40 mm.

The results of the tests can be related empirically to the engineering properties of the soil.

Occasionally, the test method is used to obtain samples in 50 mm diameter thin walled sample tubes in clays. In such circumstances, the test results are shown on the borelogs in brackets.

Cone Penetrometer Testing and Interpretation

Cone penetrometer testing (sometimes referred to as Dutch cone — abbreviated as CPT) described in this report has been carried out using an electrical friction cone penetrometer. The test is described in Australian Standard 1289, Test 6.4.1.

In the tests, a 35 mm diameter rod with a cone-tipped end is pushed continuously into the soil, the reaction being provided by a specially designed truck or rig which is fitted with an hydraulic ram system. Measurements are made of the end bearing resistance on the cone and the friction resistance on a separate 130 mm long sleeve, immediately behind the cone. Transducers in the tip of the assembly are connected by electrical wires passing through the centre of the push rods to an amplifier and recorder unit mounted on the control truck.

As penetration occurs (at a rate of approximately 20 mm per second) the information is plotted on a computer screen and at the end of the test is stored on the computer for later plotting of the results.

The information provided on the plotted results comprises: —

- Cone resistance — the actual end bearing force divided by the cross sectional area of the cone — expressed in MPa.
- Sleeve friction — the frictional force on the sleeve divided by the surface area — expressed in kPa.
- Friction ratio — the ratio of sleeve friction to cone resistance, expressed in percent.

There are two scales available for measurement of cone resistance. The lower scale (0—5 MPa) is used in very soft soils where increased sensitivity is required and is shown in the graphs as a dotted line. The main scale (0—50 MPa) is less sensitive and is shown as a full line.

The ratios of the sleeve friction to cone resistance will vary with the type of soil encountered, with higher relative friction in clays than in sands. Friction ratios of 1%—2% are commonly encountered in sands and very soft clays rising to 4%—10% in stiff clays.

In sands, the relationship between cone resistance and SPT value is commonly in the range:—

q_c (MPa) = (0.4 to 0.6) N (blows per 300 mm)

In clays, the relationship between undrained shear strength and cone resistance is commonly in the range:—

q_c = (12 to 18) c_u

Interpretation of CPT values can also be made to allow estimation of modulus or compressibility values to allow calculation of foundation settlements.

Inferred stratification as shown on the attached reports is assessed from the cone and friction traces and from experience and information from nearby boreholes, etc. This information is presented for general guidance, but must be regarded as being to some extent interpretive. The test method provides a continuous profile of engineering properties, and where precise information on soil classification is required, direct drilling and sampling may be preferable.

Hand Penetrometers

Hand penetrometer tests are carried out by driving a rod into the ground with a falling weight hammer and measuring the blows for successive 150 mm increments of penetration. Normally, there is a depth limitation of 1.2 m but this may be extended in certain conditions by the use of extension rods.

Two relatively similar tests are used.

- Perth sand penetrometer — a 16 mm diameter flat-ended rod is driven with a 9 kg hammer, dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands (originating in Perth) and is mainly used in granular soils and filling.
- Cone penetrometer (sometimes known as the Scala Penetrometer) — a 16 mm rod with a 20 mm diameter cone end is driven with a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). The test was developed initially for pavement subgrade investigations, and published correlations of the test results with California bearing ratio have been published by various Road Authorities.

Laboratory Testing

Laboratory testing is carried out in accordance with Australian Standard 1289 "Methods of Testing Soil for Engineering Purposes". Details of the test procedure used are given on the individual report forms.

Bore Logs

The bore logs presented herein are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable, or possible to justify on economic grounds. In any case, the boreholes represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes, the frequency of sampling and the possibility of other than 'straight line' variations between the boreholes.

Ground Water

Where ground water levels are measured in boreholes, there are several potential problems;

- In low permeability soils, ground water although present, may enter the hole slowly or perhaps not at all during the time it is left open.
- A localised perched water table may lead to an erroneous indication of the true water table.
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report.
- The use of water or mud as a drilling fluid will mask any ground water inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water observations are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Engineering Reports

Engineering reports are prepared by qualified personnel and are based on the information obtained and on current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal (eg. a three storey building), the information and interpretation may not be relevant if the design proposal is changed (eg. to a twenty storey building). If this happens, the Company will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface condition, discussion of geotechnical aspects and recommendations or suggestions for design and construction. However, the Company cannot always anticipate or assume responsibility for:

- unexpected variations in ground conditions — the potential for this will depend partly on bore spacing and sampling frequency
- changes in policy or interpretation of policy by statutory authorities
- the actions of contractors responding to commercial pressures.

If these occur, the Company will be pleased to assist with investigation or advice to resolve the matter.

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, the Company requests that it immediately be notified. Most problems are much more readily resolved when conditions are exposed than at some later stage, well after the event.

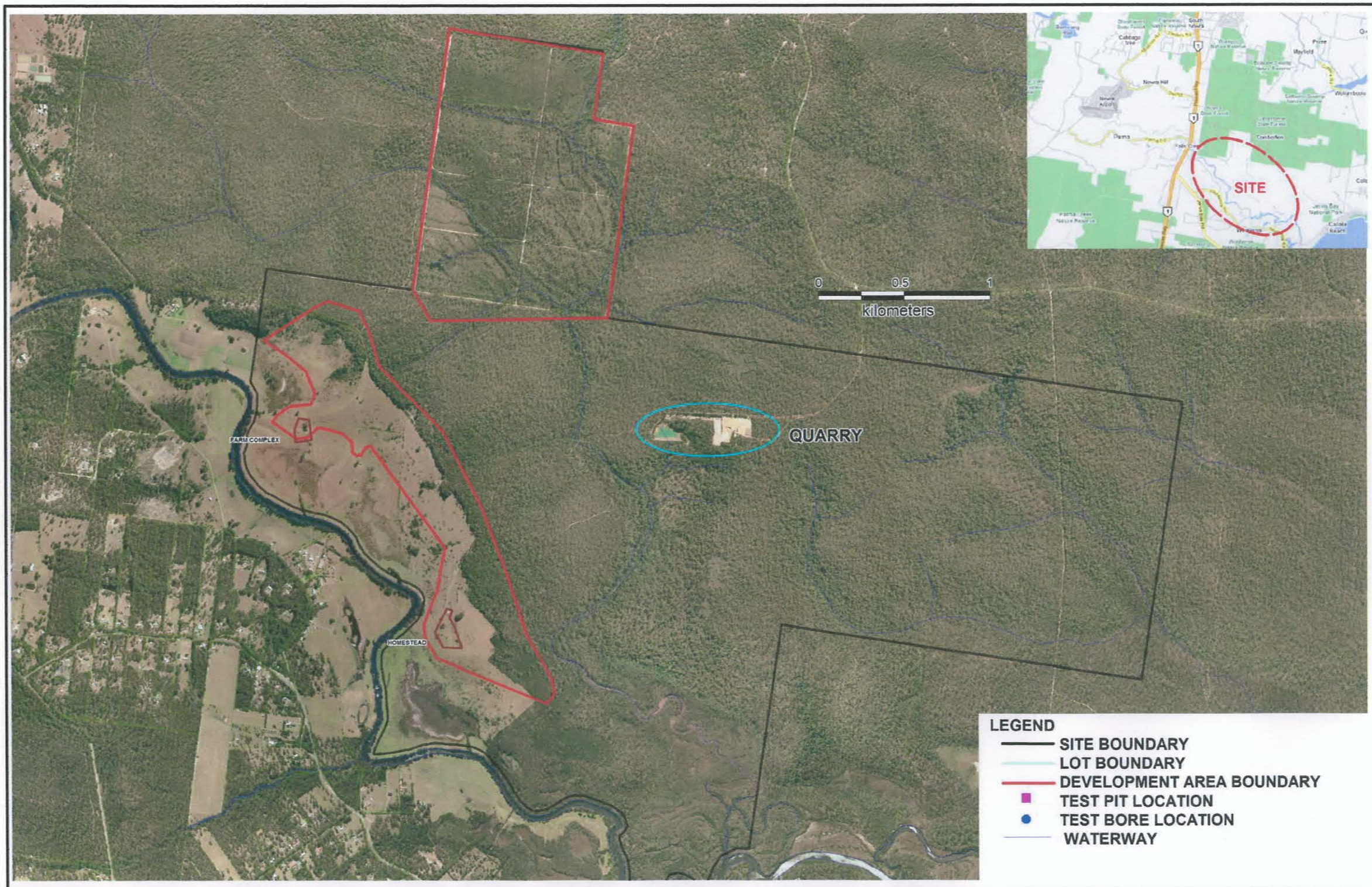
Reproduction of Information for Contractual Purposes

Attention is drawn to the document "Guidelines for the Provision of Geotechnical Information in Tender Documents", published by the Institution of Engineers, Australia. Where information obtained from this investigation is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section

is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. The Company would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

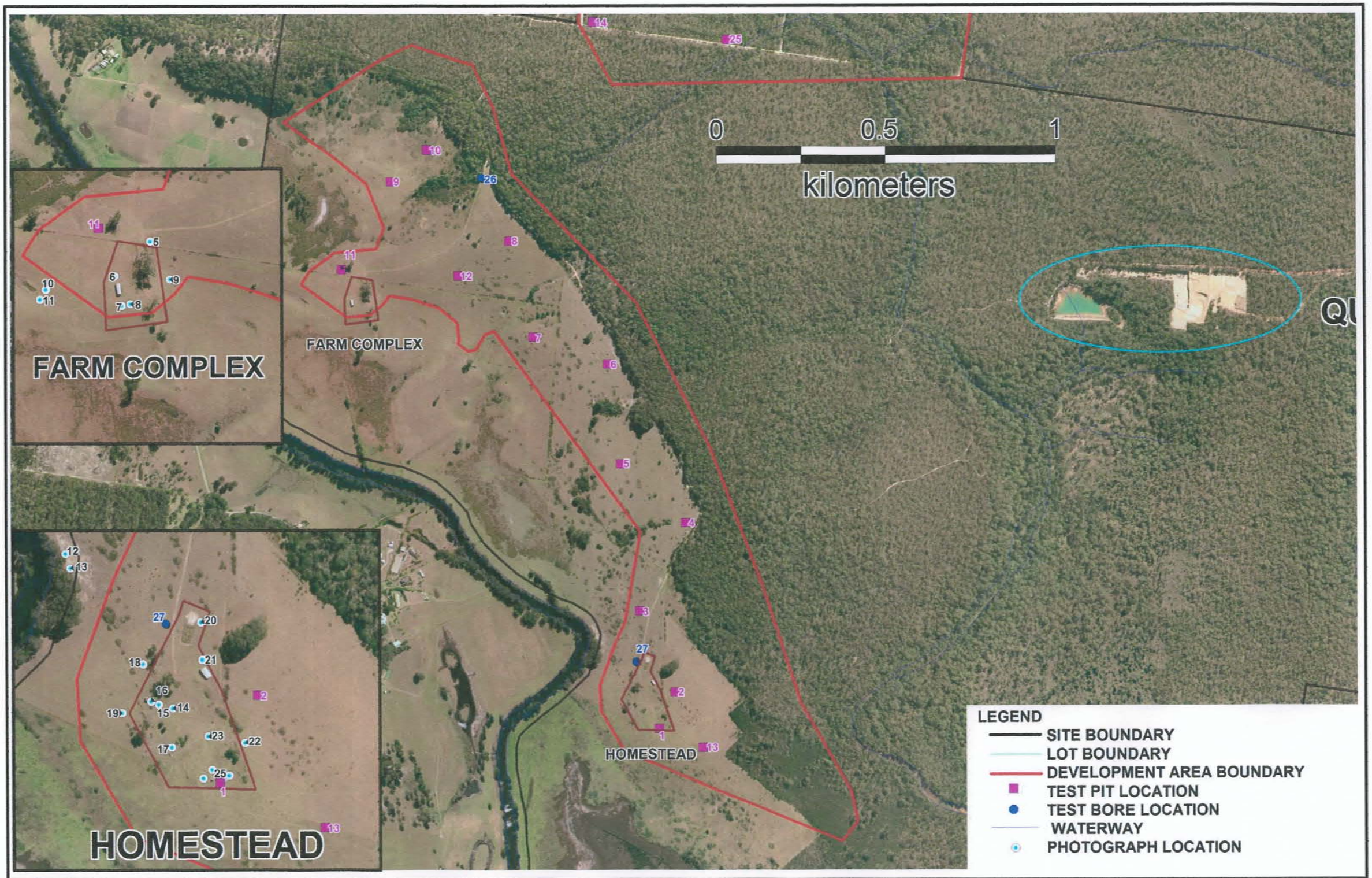
The Company will always be pleased to provide engineering inspection services for geotechnical aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.



Douglas Partners
Geotechnics · Environment · Groundwater

CLIENT: SHAOLIN TEMPLE FOUNDATION AUSTRALIA			TITLE: SITE PLAN PROPOSED RESIDENTIAL AND TOURIST DEVELOPMENT COMBERTON GRANGE
DRAWN BY: JAS	SCALE: AS SHOWN	OFFICE: WOL	
APPROVED BY:		DATE: 20 JUL 09	

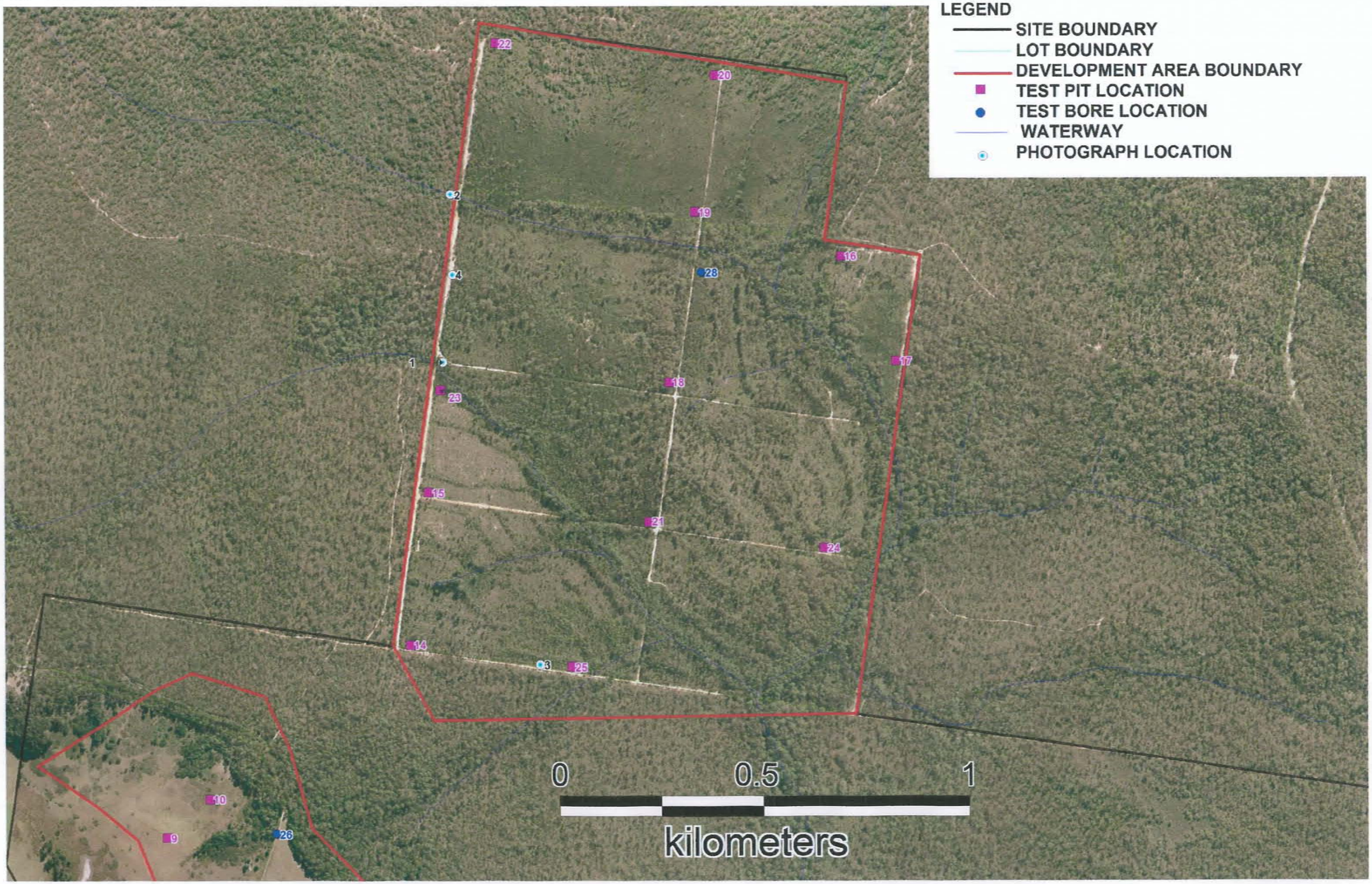
PROJECT: 48670
DRAWING: 1
REVISION: A



Douglas Partners
Geotechnics · Environment · Groundwater

CLIENT: SHAOLIN TEMPLE FOUNDATION AUSTRALIA			TITLE: SDA TEST LOCATIONS PROPOSED RESIDENTIAL AND TOURIST DEVELOPMENT COMBERTON GRANGE
DRAWN BY: JAS	SCALE: AS SHOWN	OFFICE: WOL	
APPROVED BY:		DATE: 20 JUL 09	

PROJECT: 48670
DRAWING: 2
REVISION: A



Douglas Partners Geotechnics · Environment · Groundwater	CLIENT: SHAOLIN TEMPLE FOUNDATION AUSTRALIA		TITLE: NDA TEST LOCATIONS PROPOSED RESIDENTIAL AND TOURIST DEVELOPMENT COMBERTON GRANGE	PROJECT: 48670
	DRAWN BY: JAS	SCALE: AS SHOWN	OFFICE: WOL	DRAWING: 3
	APPROVED BY:		DATE: 20 JUL 09	REVISION: A

APPENDIX B

QA/QC Assessment

QA/QC PROCEDURES AND RESULTS

Quality assurance and control formed an integral part of this assessment. The results of the QA/QC assessments are detailed below.

The following table provides a list of the data quality indicators (refer to Section 2.8) adopted for the contamination assessment and the methods adopted in ensuring that the data quality indicators were met. Reference should be made to all previous report sections and referenced appendices for specific details.

Table B1: QA/QC Evaluation

Data Quality Indicator	Method(s) of Achievement
Data Precision and Accuracy	Use of trained and qualified field staff ; same sampler(s) used for all recoveries Appropriate sampling methods used, minimising the opportunity for cross-contamination Use of analytical laboratories experienced in the analyses undertaken, with appropriate NATA certification Appropriate and validated laboratory test methods used Adequate laboratory performance based on results of the blank samples, matrix spike samples, control samples, duplicates and surrogate spike samples Field replicate, trip blank and trip spike samples analysed Acceptable RPD for replicate comparison Acceptable concentrations (less than PQL) in trip blank sample Acceptable recoveries in trip spike sample
Data Representativeness	Sampling numbers comply with the NSW DECC sampling design guidelines Representative coverage of potential contaminants, based on site history, site activities and site features Adequate replicate sample numbers prepared and analysed, complying with NEPM Adequate laboratory internal quality control and quality assurance methods, complying with the NEPM
Documentation Completeness	Preparation of test pit and borehole logs, sample location plan and chain of custody records Laboratory sample receipt information received confirming receipt of samples intact and appropriateness of the chain of custody NATA registered laboratory results certificates provided by both laboratories
Data Completeness	Review of acquired documented information pertaining to site history Analysis for potential contaminants of concern Field replicate sample, trip spike and trip blank numbers complying with NEPM

Data Comparability	Using appropriate techniques for sample recovery Experienced sampler used Using appropriate sample storage and transportation methods Using the same sampling, storage and transportation methods for each day of sampling Use of NATA registered laboratories Test methods consistent for each sample Acceptable RPD between original samples and field replicates. Adequate laboratory internal quality control and quality assurance results, generally complying with the NEPM and laboratory internal standards.

Based on the above, it is considered that the quality assurance and quality control data quality indicators have been complied with. As such, it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

FIELD QUALITY ASSURANCE AND QUALITY CONTROL

The field QC procedures for sampling as prescribed in Douglas Partners *Field Procedures Manual* were followed at all times during the assessment. Field sampling comprised replicate sampling, at a rate of at least 5% intra-laboratory replicate samples and 5% inter-laboratory replicate samples. Disposable sampling equipment was used where possible to prevent cross contamination between samples, where re-usable sampling equipment was used, equipment rinsate samples were collected. Laboratory prepared trip spike and trip blank samples were also used.

Sample Documentation

Details of samples collected, including the date, lithology and depth of each sample was recorded on the test pit/bore logs and record of samples tables (Appendix F). Samples were transported to the laboratory under chain of custody documentation (Appendix H). Sample Receipt advice was provided by the laboratory certifying the condition of the samples upon arrival at the contract laboratory (Appendix H).

Trip Blank Samples

The laboratory prepared trip blanks were taken out to the field unopened, and subjected to the same preservation methods as the field samples. The samples were then analysed for the purposes of determining the transfer of contaminants into the blank sample incurred prior to reaching the laboratory. The results of the laboratory analysis for the trip blanks are shown in the Table B2.

Table B2: Results of Trip Blank Samples

Sample ID	Date Sampled	media (soil/ water)	units	Benzene	Toluene	Ethylbenzene	xylene	C6-C9	C10-C36
TB1	27/5/09	S	mg/kg	<0.5	<0.5	<1	<3	<25	<250
TB2	28/5/09	S	mg/kg	<0.5	<0.5	<1	<3	<25	<250
TB3	29/5/09	S	mg/kg	<0.5	<0.5	<1	<3	<25	<250
TB1 (18/06/09)	18/06/09	S	mg/kg	<0.5	<0.5	<1	<3	<25	<250
TB1 (02/07/09)	02/07/09	S	mg/kg	<0.5	<0.5	<1	<3	<25	<250
TB (10/07/09)	10/07/09	W	µg/L	<1	<1	<1	<3	<10	-

Levels of analytes were found to be below detection limits, indicating that cross contamination had not occurred during the course of the round trip from laboratory to site.

Rinsate Samples

Rinsate samples were not collected since disposable sampling equipment was used during soil and water sampling.

Relative Percentage Difference

A measure of the consistency of results for field samples is derived by the calculation of relative percentage differences (RPDs) for replicate samples. The RPD is calculated using the following formula:

$$\%RPD = \frac{|C_{original} - C_{duplicate}|}{Average(C_{original}, C_{duplicate})} \times 100$$

The field QC comprised the collection of more than 10% replicate samples during the course of sampling. The comparative results of analysis are included in Tables B5.

Relative Percentage Differences (RPD) was calculated as an assessment of the result consistency. Generally, an RPD of ± 30% is considered acceptable by the DECC, however, certain exceptions apply (e.g. for organic compounds where ± 50% is considered acceptable).

Table B3: Intra-laboratory RPDs

Sample ID	filling/ natural soil/ water	As	Cd	Cr	Cu	Pb	Hg	Ni	Zn	C_6-C_9	C_{10}-C_{36}	Benzene	Toluene	Ethyl-benzene	Total Xylenes
8/0-0.1	Natural, soil	<4	<0.5	2	3	18	<0.1	<1	5	<25	<250	<0.5	<0.5	<1	<3
BD1-27/5/09	Natural, soil	<4	<0.5	2	3	6	<0.1	<1	5	<25	<250	<0.5	<0.5	<1	<3
Diff		0	0	0	0	8	0	0	0	0	0	0	0	0	0
%RPD		0	0	0	0	67	0	0	0	0	0	0	0	0	0
11/0-0.1	Natural, soil	<4	<0.5	7	5	10	<0.1	4	17	<25	<250	<0.5	<0.5	<1	<3
BD1-28/5/09	Natural, soil	<4	<0.5	8	6	11	<0.1	4	19	<25	260	<0.5	<0.5	<1	<3
Diff		0	0	1	1	1	0	0	2	0	10	0	0	0	0
%RPD		0	0	13	18	10	0	0	11	0	4	0	0	0	0
15/0-0.2	Natural, soil	11	<0.5	19	<1	11	<0.1	<1	1	<25	<260	<0.5	<0.5	<1	<3
BD1/1/07/09	Natural, soil	12	0.5	28	<1	15	<0.1	<1	1	<25	<250	<0.5	<0.5	<1	<3
Diff		1	0	9	0	4	0	0	0	0	10	0	0	0	0
%RPD		9	0	38	0	30	0	0	0	0	4	0	0	0	0
21/0-0.2	Natural, soil	5	<0.5	7	3	13	<0.1	1	3	<25	<250	<0.5	<0.5	<1	<3
BD2/1/07/09	Natural, soil	7	<0.5	14	4	16	<0.1	2	5	<25	<250	<0.5	<0.5	<1	<3
Diff		2	0	7	1	3	0	1	2	0	0	0	0	0	0
%RPD		33	0	67	29	21	0	67	50	0	0	0	0	0	0
19/0-0.2	water	5	<0.5	18	4	11	<0.1	3	6	<25	<250	<0.5	<0.5	<1	<3
BD1/2/07/09	water	5	<0.5	15	3	10	<0.1	3	6	<25	<250	<0.5	<0.5	<1	<3
Diff		0	0	3	1	1	0	0	0	0	0	0	0	0	0
%RPD		0	0	18	29	10	0	0	0	0	0	0	0	0	0

Generally all the RPD results for the laboratory replicates fall within the typical acceptable range (± 30%) with the exceptions highlighted.

The results show that actual differences between the levels recorded were all low, indicating that the RPDs are due to minor differences in concentration and the limits of the analytical process.

It is therefore considered that the results indicate an acceptable consistency between the samples and their replicates and indicate suitable field sampling methodology was adopted. It is also noted that both the original and replicate results were included in the dataset.

LABORATORY QA/QC PROCEDURES

The following QA/QC procedures were conducted by the laboratory, with details provided in the NATA Laboratory Report, Appendix H.

Reagent Blank

This sample is prepared and analysed at the beginning of every analytical run, following calibration of the analytical apparatus. The laboratory results for reagent blanks for soil analyses indicated concentrations of all analytes to be below laboratory detection limits.

Spike Recovery

This is a sample replicate prepared by adding a known amount of analyte prior to analysis, and then treated exactly the same as all the other samples. The recovery result indicates the proportion of the known concentration of the analyte that is detected during analysis. The spike recovery rates are compared with limits as specified in Envirolab Services Quality Control Systems, and any exceedances are highlighted in the report.

All results were within the laboratories' acceptable limits (70%-130%) and it is considered that the results indicate that the analytical results are not significantly affected by matrix interference.

Surrogate Recovery

This sample is prepared by adding a known amount of surrogate, which behaves similarly to the analyte, prior to analysis to each sample. The recovery result indicates the proportion of the

known concentration of the surrogate that is detected during analysis. All results were within acceptance limits, indicating that the extraction technique was effective.

Duplicates

These are additional portions of a sample which are analysed in exactly the same manner as all other samples. The duplicate sample results are included in the laboratory results in Appendix H.

All results were within the laboratories acceptance criteria, indicating acceptable replicability of results.

APPENDIX C

Results of Title Deed Search

ACN: 093 412 474
ABN: 61 093 412 474

Peter S. Hopley Pty Limited
Legal Searchers

1 Boronia Avenue
Mount Annan , NSW , 2567
Mobile: 0412 199 304
Fax 9233 4590 (Attn Box 29)

SUMMARY AS TO OWNERS.

Property: Land off Forest Road, Nowra

Description: - Lot 1 D.P.725955, Lot 1 D.P.550098, Lot 4 D.P. 63405 and Lots 59, 60 & 61 D.P. 755928

As regards Lot 1 D.P. 550098

16.10.1928	George Edwin Pattrick Hart *(Surveyor)*	Book 1534 No. 109
18.07.1930	William Jennings *(Farmer)* Ellen Jennings *(Married Woman)*	Book 1611 No. 383
13.04.1951	Reginald Percy Jennings *(Farmer)*	Book 2178 No. 328
06.11.1973	Australian Steel & Mining Corporation Pty Limited	Vol 12343 Fol 97
27.11.1985	# Council of the City of Shoalhaven	1/530098

 # Current Registered Proprietor

As regards Lot 1 D.P. 725955

As to the parts marked 1 & 2 on the attached cadastre

16.10.1928	George Edwin Pattrick Hart *(Surveyor)*	Book 1534 No. 109
18.07.1930	William Jennings *(Farmer)* Ellen Jennings *(Married Woman)*	Book 1611 No. 383
13.04.1951	Reginald Percy Jennings *(Farmer)*	Book 2178 No. 328
06.11.1973	Australian Steel & Mining Corporation Pty Limited	Book 3060 No. 753

email: grolly1@bigpond.net.au

ACN: 093 412 474
ABN: 61 093 412 474

Peter S. Hopley Pty Limited
Legal Searchers

1 Boronia Avenue
Mount Annan , NSW , 2567
Mobile: 0412 199 304
Fax 9233 4590 (Attn Box 29)

For search continued as to this part, See Page No. 2

As to the part marked 3 on the attached cadastre

16.10.1928	George Edwin Pattrick Hart *(Surveyor)*	Book 1534 No. 109
01.04.1950	Reid & Herne Pty Limited (Then Reid & Herne (Milling) Pty Limited) (Now Reid & Herne Holdings Pty Limited)	Book 2316 No. 969
30.12.1969	Haughty Clare Pty Limited (Now Australian Steel & Mining Corporation Pty Limited)	Book 2965 No. 927

For search continued as to this part, See below

Search continued as to the whole of Lot 1 D.P. 725955

25.10.1985	# Council of the City of Shoalhaven	1/725955

 # Current Registered Proprietor

As regards Lot 4 D.P. 63405

24.10.1905	Walter Jennings *(Farmer)*	Vol 1644 Fol 166
09.05.1908	William Jennings *(Farmer)*	Vol 1644 Fol 166
28.10.1936	Ellen Jennings *(Widow)* *(We have not investigated the Transmission Application)*	Vol 1644 Fol 166
15.05.1953?	Ronald Clive Jennings *(Farmer)*	Vol 1644 Fol 166
15.12.1975	Australian Steel & Mining Corporation Pty Limited	Vol 1644 Fol 166

email: grolly1@bigpond.net.au

ACN: 093 412 474
ABN: 61 093 412 474

Peter S. Hopley Pty Limited
Legal Searchers

1 Boronia Avenue
Mount Annan , NSW , 2567
Mobile: 0412 199 304
Fax 9233 4590 (Attn Box 29)

19.11.1985	# Council of the City of Shoalhaven	4/63408

 # Current Registered Proprietor

As regards Lot 59 D.P. 755928

09.05.1907	Walter Jennings *(Farmer)*	Vol 1776 Fol 195
06.03.1951	Gladys Marian Sturgess *(Married Woman)*	Vol 1776 Fol 195
26.07.1955	Ronald William David Sturgess (Farmer) *(We have not investigated the Transmission Application)*	Vol 1776 Fol 195
24.04.1963	Australian Softwood Corporation Pty Limited	59/755928
06.07.1995	# Council of the City of Shoalhaven	59/755928

 # Current Registered Proprietor

As regards Lots 60 & 61 D.P. 755928

27.10.1890	William Jennings *(Farmer)*	Vol 991 Fol 4
28.10.1936	Ellen Jennings *(Widow)* *(We have not investigated the Transmission Application)*	Vol 991 Fol 4
22.05.1951	Gladys Marian Sturgess *(Married Woman)*	Vol 991 Fol 4
26.07.1955	Ronald William David Sturgess (Farmer) *(We have not investigated the Transmission Application)*	Vol 991 Fol 4
24.04.1963	Australian Softwood Corporation Pty Limited	A/C 991-4

email: grolly1@bigpond.net.au

ACN: 093 412 474
ABN: 61 093 412 474

Peter S. Hopley Pty Limited
Legal Searchers

1 Boronia Avenue
Mount Annan , NSW , 2567
Mobile: 0412 199 304
Fax 9233 4590 (Attn Box 29)

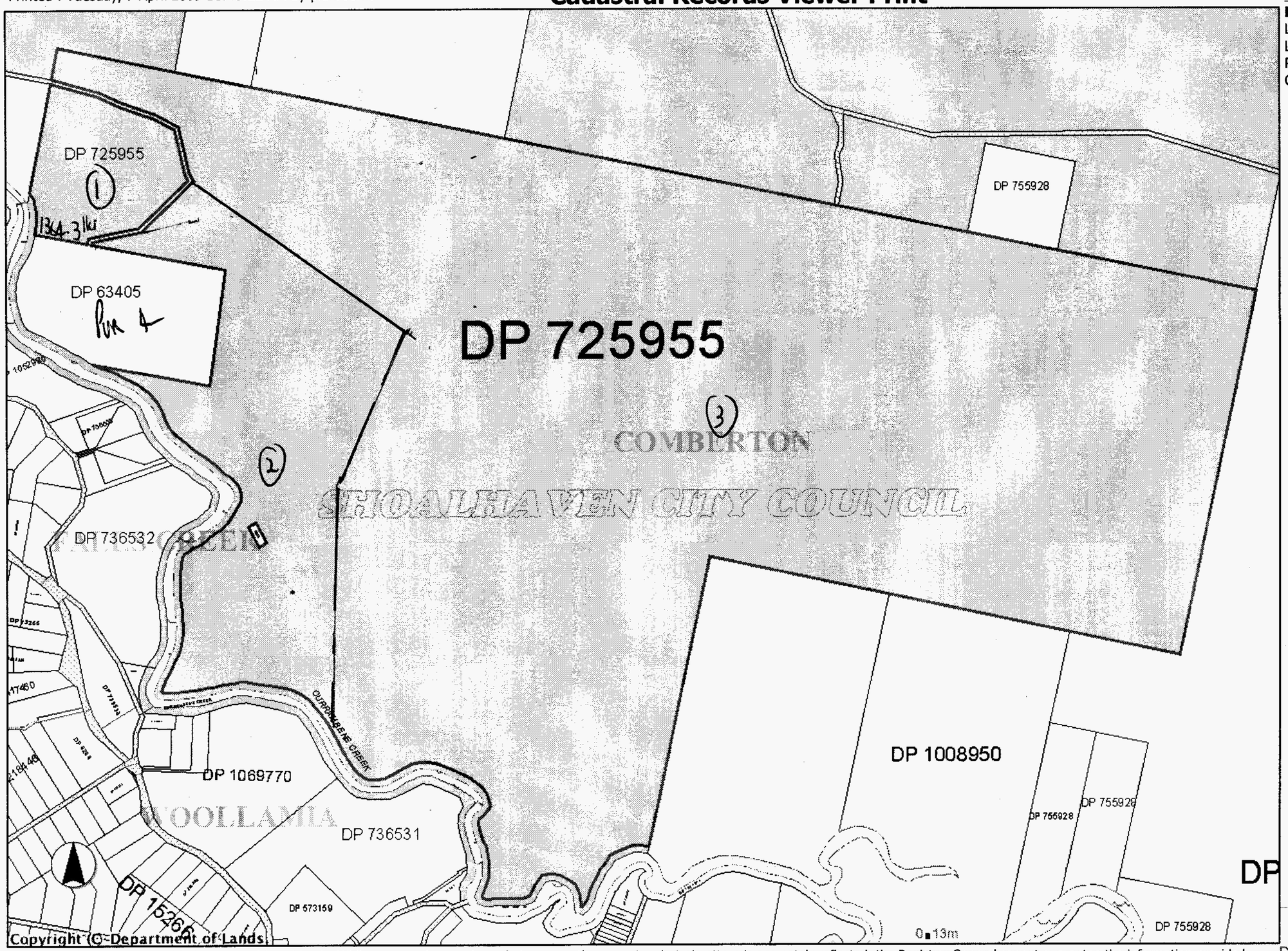
06.07.1995 # Council of the City of Shoalhaven A/C 991-4

 # Current Registered Proprietor

email: grolly1@bigpond.net.au

Printed : Tuesday, 7 April 2009 11:46:22 AM by planroom3

Cadastral Records Viewer Print



Current Feature
Lot 1 DP725955
Locality: COMBERTON
LGA: SHOALHAVEN
Parish: CURRAMBENE
County: ST VINCENT

LEGEND

Legend
Parcels [Selected Features]

- **Current Feature**
- **Other Selected Features**
- **Localities**
- **LGAs**
- **Rail Corridor**
- **Waterway Corridor**
- **Waterways**
- **Unidentified Parcels**

Parcels

- **Standard Lot**
- **Standard Part Lot**
- **Strata**
- **Stratum**
- **Road Corridor**
- **Roads**

NEW SOUTH WALES

[redacted]ICATE OF TITLE

[redacted]L PROPERTY ACT, 1900

Vol. 12343 Fol. 97

3123-973

IVA No.13686

Edition issued 12-2-1974

12343 Fol. 97

I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

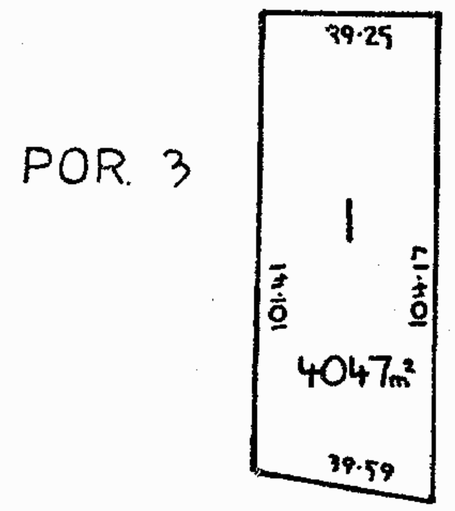
CANCELLED

Registrar General

PLAN SHOWING LOCATION OF LAND

SEE AUTO FOLIO

LENGTHS ARE IN METRES



NA 13686 S.No. 6

REDUCTION RATIO 1:2000

S

ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot 1 in Deposited Plan 550098 at Falls Creek in the Shire of Shoalhaven Parish of Currambene and County of St.Vincent being part of Portion 3 granted to Sydney Stephen on 16-7-1840.

FIRST SCHEDULE

~~AUSTRALIAN STEEL AND MINING CORPORATION PTY. LIMITED.~~

SECOND SCHEDULE

GRY 1. Reservations and conditions, if any, contained in the Crown Grant above referred to.
QG 2. CAUTION No.N675532P pursuant to Section 28J Real Property Act, 1900. 12-2-1974
RC2 3. Right of Carriageway appurtenant to the land above described created by the registration of Deposited Plan 550098D See Book 3020 No.585.

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED.

W50870T R

Vol. 12343 Fol. 97

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar General
Council of The City of Shoalhaven by Transfer W50870. Registered 27-11-1985					

CANCELLED

SEE AUTO FOLIO

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar General	CANCELLATION		

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

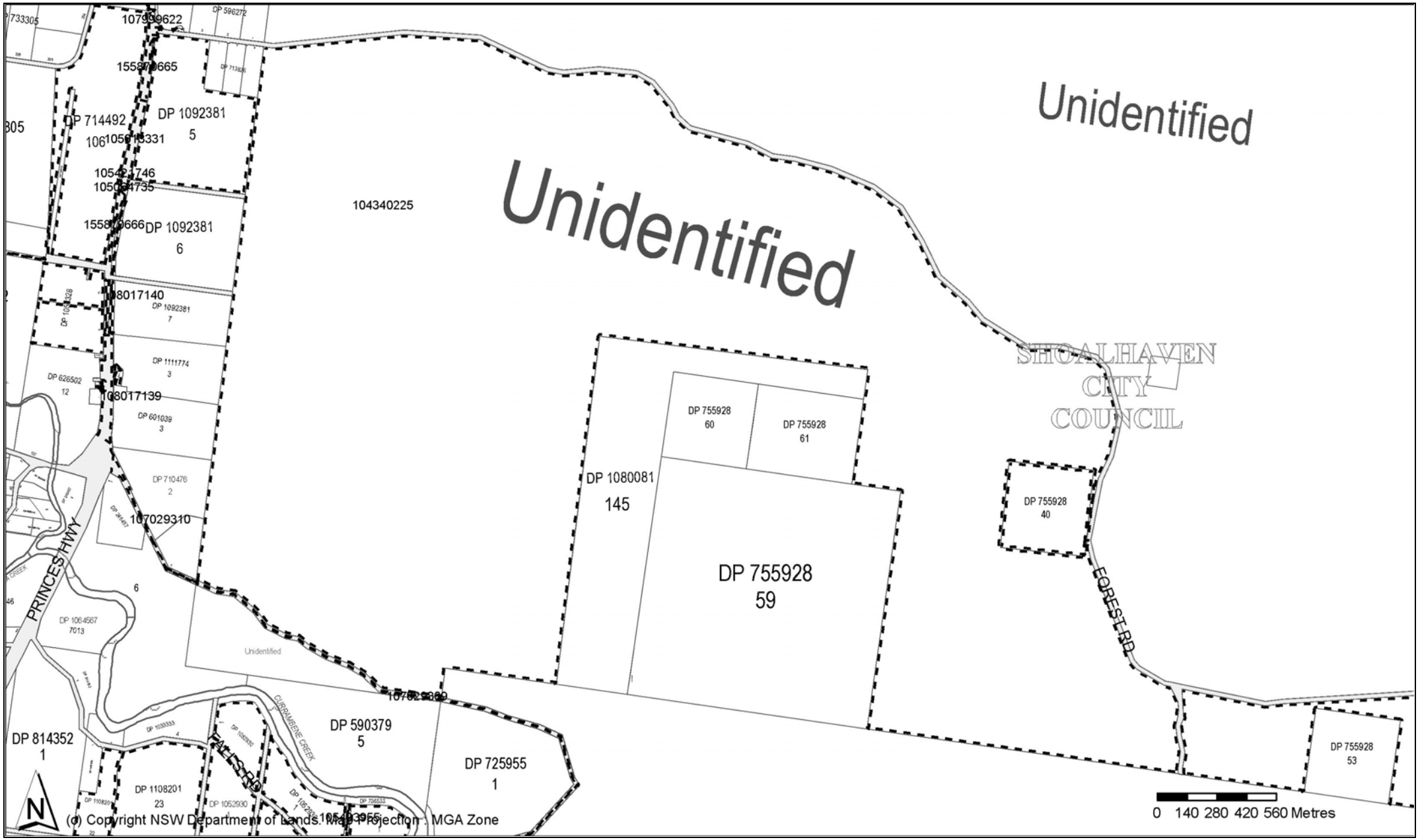
Department of Lands
Reliable from the ground up

Cadastral Records Enquiry Report

Ref : surv:scim-grollm

Requested Parcel : Lot 60 DP 755928 **Identified Parcel :** Lot 60 DP 755928

Locality : COMBERTON **LGA :** SHOALHAVEN **Parish :** CURRAMBENE **County :** ST VINCENT



	Status	Surv/Comp	Purpose
DP714492			
Lot(s): 106			
DP1092381	REGISTERED	SURVEY	ROADS ACT, 1993
DP755928			
Lot(s): 40			
DP1011775	REGISTERED	SURVEY	ROADS ACT, 1993
Lot(s): 101			
CA103738 (LOT 101 DP755928)			
DP1051328			
Lot(s): 1, 2			
DP592478	HISTORICAL	COMPILATION	SUBDIVISION
DP1052930			
Lot(s): 1			
DP880056	HISTORICAL	SURVEY	SUBDIVISION
DP1065429			
Lot(s): 15, 16			
DP246456	HISTORICAL	SURVEY	ROAD OR MOTORWAY
Lot(s): 17			
NSW GAZ 31-01-2003 Folio : 724 LOTS 46-49 IN DP258153 DEDICATED PUBLIC ROAD			
DP1092381			
Lot(s): 5, 14			
DP713826	HISTORICAL	SURVEY	SUBDIVISION
Lot(s): 12, 13			
NSW GAZ 13-03-2009 Folio : 1383 Dedicated Public Road			
Lot(s): 14			
NSW GAZ 13-03-2009 Folio : 1383 Dedicated Public Road Declared Main Road and Controlled Access Road			
DP1101153			
Lot(s): 2			
NSW GAZ 13-03-2009 Folio : 1383 Dedicated Public Road			
DP1106144			
Lot(s): 1			
NSW GAZ 23-03-2007 Folio : 1843 Closed Road: LOT 1 DP1106144 NOW CLOSED ROAD. SEE AD21728			
DP1108201			
Lot(s): 22, 23			
DP1033333	HISTORICAL	SURVEY	SUBDIVISION
DP1111774			
Lot(s): 4			
NSW GAZ 13-03-2009 Folio : 1383 Dedicated Public Road			
Intersection			
Polygon Id(s): 105421746			
NSW GAZ 15-10-2004 Folio : 8010 LOTS 3, 4 AND 5 DP238975; LOTS 52 AND 53 DP845277; LOTS 41, 42 AND 43 DP258153 DECLARED MAIN AND CONTROLLED ACCESS ROAD (RESTRICTED)			
NSW GAZ 13-03-2009 Folio : 1383 Declared Main Road and Controlled Access Road LOT 15 DP1092381			
Road			
Polygon Id(s): 105013331, 105064735			
NSW GAZ 13-03-2009 Folio : 1383 Declared Main Road and Controlled Access Road LOT 15 DP1092381			
Polygon Id(s): 107029309, 107029310			
NSW GAZ 31-01-2002 Folio : 724 LOTS 3-11 IN DP567097 DEDICATED PUBLIC ROAD			
Polygon Id(s): 108017138, 108017139			
NSW GAZ 31-01-2003 Folio : 724 LOTS 3-11 IN DP567097 DEDICATED PUBLIC ROAD			

	Status	Surv/Comp	Purpose

Polygon Id(s): 108017138, 108017139, 108017140

NSW GAZ 31-01-2003 Folio : 724
LOTS 46-49 IN DP258153 DEDICATED PUBLIC ROAD

Polygon Id(s): 105013331, 105064735, 155870665, 155870666

NSW GAZ 15-10-2004 Folio : 8010
LOTS 3, 4 AND 5 DP238975; LOTS 52 AND 53 DP845277; LOTS 41, 42 AND 43 DP258153 DECLARED MAIN AND CONTROLLED ACCESS ROAD (RESTRICTED)

Unidentified

Polygon Id(s): 104340225

DP1084209 REGISTERED SURVEY ROADS ACT, 1993

PA82132 - (LOT 1 IN DP1084209)

NSW GAZ 19-05-2006 Folio : 3151
Acquired
FOR THE PURPOSES OF A PUBLIC ROAD

NSW GAZ 28-07-2006 Folio : 6040
Dedicated Public Road
LOT 1 IN DP1084209

WARNING: Not all notations are displayed in the above list as some plans are undergoing data remediation.

Cadastral Records Enquiry Report

Ref : surv:scim-grollm

Requested Parcel : Lot 60 DP 755928 **Identified Parcel :** Lot 60 DP 755928

Locality : COMBERTON **LGA :** SHOALHAVEN **Parish :** CURRAMBENE **County :** ST VINCENT

Plan	Surv/Comp	Purpose
DP22602	SURVEY	UNRESEARCHED
DP246457	SURVEY	ROAD OR MOTORWAY
DP256351	COMPILATION	CROWN FOLIO CREATION
DP397305	SURVEY	UNRESEARCHED
DP567097	SURVEY	RESUMPTION OR ACQUISITION
DP590379	SURVEY	SUBDIVISION
DP596272	SURVEY	SUBDIVISION
DP601039	SURVEY	SUBDIVISION
DP626502	SURVEY	SUBDIVISION
DP710476	SURVEY	SUBDIVISION
DP713826	SURVEY	SUBDIVISION
DP714492	SURVEY	SUBDIVISION
DP720061	COMPILATION	CROWN FOLIO CREATION
DP725955	COMPILATION	DEPARTMENTAL
DP733305	SURVEY	SUBDIVISION
DP736533	SURVEY	SUBDIVISION
DP755928	COMPILATION	CROWN ADMIN NO.
DP755965	COMPILATION	CROWN ADMIN NO.
DP789734	SURVEY	SUBDIVISION
DP795895	COMPILATION	DEPARTMENTAL
DP814352	COMPILATION	CONSOLIDATION
DP829956	SURVEY	SUBDIVISION
DP830244	SURVEY	SUBDIVISION
DP1024300	COMPILATION	DEPARTMENTAL
DP1033333	SURVEY	SUBDIVISION
DP1051328	COMPILATION	DEPARTMENTAL
DP1052930	SURVEY	SUBDIVISION
DP1055671	SURVEY	CROWN FOLIO CREATION
DP1058615	COMPILATION	DEPARTMENTAL
DP1058616	COMPILATION	DEPARTMENTAL
DP1064546	COMPILATION	DEPARTMENTAL
DP1064563	COMPILATION	DEPARTMENTAL
DP1064567	COMPILATION	DEPARTMENTAL
DP1065429	COMPILATION	ROADS ACT, 1993
DP1080081	SURVEY	CROWN FOLIO CREATION
DP1092381	SURVEY	ROADS ACT, 1993
DP1101153	SURVEY	ROADS ACT, 1993
DP1106144	COMPILATION	CROWN ROAD ENCLOSURE
DP1108201	SURVEY	SUBDIVISION
DP1111774	SURVEY	ROADS ACT, 1993
DP1135208	COMPILATION	CROWN ROAD ENCLOSURE

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: AUTO CONSOL 991-4

SEARCH DATE	TIME	EDITION NO	DATE
7/4/2009	6:07 PM	1	6/7/1995

LAND

LAND DESCRIBED IN SCHEDULE OF PARCELS
LOCAL GOVERNMENT AREA SHOALHAVEN
PARISH OF CURRAMBENE COUNTY OF ST VINCENT
TITLE DIAGRAM CROWN PLAN 486.2013

FIRST SCHEDULE

THE COUNCIL OF THE CITY OF SHOALHAVEN (T O361447)

SECOND SCHEDULE (1 NOTIFICATION)

1 LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANT(S)

NOTATIONS

NOTE: THE CERTIFICATE OF TITLE FOR THIS FOLIO OF THE REGISTER DOES NOT INCLUDE SECURITY FEATURES INCLUDED ON COMPUTERISED CERTIFICATES OF TITLE ISSUED FROM 4TH JANUARY, 2004. IT IS RECOMMENDED THAT STRINGENT PROCESSES ARE ADOPTED IN VERIFYING THE IDENTITY OF THE PERSON(S) CLAIMING A RIGHT TO DEAL WITH THE LAND COMPRISED IN THIS FOLIO.
UNREGISTERED DEALINGS: NIL

SCHEDULE OF PARCELS

LOTS 60-61 IN DP755928.

*** END OF SEARCH ***

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Tel: (02) 9231 0122 Fax: (02) 9233 6411 www.legalstream.com.au

An Approved
LPI NSW
Information

Search Date: **07-Apr-2009**

Cost Summary

Our Ref#	Search Type	Search Reference	Client Ref#	Total Cost	Total GST
1686696	Title Search	991-4	SMALLEY	7.54	0.69
			REPORT TOTAL:	**7.54**	**0.69**

*** * * END OF REPORT * * ***

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 1/550098

SEARCH DATE	TIME	EDITION NO	DATE
7/4/2009	6:07 PM	-	-

VOL 12343 FOL 97 IS THE CURRENT CERTIFICATE OF TITLE

LAND

LOT 1 IN DEPOSITED PLAN 550098
AT FALLS CREEK
LOCAL GOVERNMENT AREA SHOALHAVEN
PARISH OF CURRAMBENE COUNTY OF ST VINCENT
TITLE DIAGRAM DP550098

FIRST SCHEDULE

COUNCIL OF THE CITY OF SHOALHAVEN (T W50870)

SECOND SCHEDULE (3 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 N675532 OUALIFIED TITLE. CAUTION PURSUANT TO SECTION 28J OF THE REAL PROPERTY ACT, 1900. ENTERED 12-2-1974
3 DP550098 RIGHT OF CARRIAGEWAY APPURTENANT TO THE LAND ABOVE DESCRIBED

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

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Information

Search Date: **07-Apr-2009**

Cost Summary

Our Ref#	Search Type	Search Reference	Client Ref#	Total Cost	Total GST
1686694	Title Search	1/550098	SMALLEY	7.54	0.69
			REPORT TOTAL:	**7.54**	**0.69**

*** * * END OF REPORT * * ***

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 1/725955

SEARCH DATE	TIME	EDITION NO	DATE
7/4/2009	6:07 PM	1	1/2/1988

LAND

LOT 1 IN DEPOSITED PLAN 725955
AT CURRAMBENE
LOCAL GOVERNMENT AREA SHOALHAVEN
PARISH OF CURRAMBENE COUNTY OF ST VINCENT
TITLE DIAGRAM DP725955

FIRST SCHEDULE

THE COUNCIL OF THE CITY OF SHOALHAVEN (CA23905)

SECOND SCHEDULE (5 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 LIMITED TITLE. LIMITATION PURSUANT TO SECTION 28T(4) OF THE REAL PROPERTY ACT, 1900. THE BOUNDARIES OF THE LAND COMPRISED HEREIN HAVE NOT BEEN INVESTIGATED BY THE REGISTRAR GENERAL.
3 DP550098 RIGHT OF WAY 20.115 WIDE AFFECTING THE PART OF THE LAND ABOVE DESCRIBED SHOWN SO BURDENED IN THE TITLE DIAGRAM SEE BK 3020 NO 585
4 BK 3511 NO 325 EASEMENT FOR WATER SUPPLY AFFECTING THE PART OF THE LAND ABOVE DESCRIBED SHOWN SO BURDENED IN THE TITLE DIAGRAM
5 BK 3646 NO 95 RIGHT OF WAY AFFECTING THE PART OF THE LAND ABOVE DESCRIBED SHOWN SO BURDENED IN THE TITLE DIAGRAM

NOTATIONS

NOTE: THE CERTIFICATE OF TITLE FOR THIS FOLIO OF THE REGISTER DOES NOT INCLUDE SECURITY FEATURES INCLUDED ON COMPUTERISED CERTIFICATES OF TITLE ISSUED FROM 4TH JANUARY, 2004. IT IS RECOMMENDED THAT STRINGENT PROCESSES ARE ADOPTED IN VERIFYING THE IDENTITY OF THE PERSON(S) CLAIMING A RIGHT TO DEAL WITH THE LAND COMPRISED IN THIS FOLIO.
UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

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LPI NSW
Information

Search Date: **07-Apr-2009**

Cost Summary

Our Ref#	Search Type	Search Reference	Client Ref#	Total Cost	Total GST
1686693	Title Search	1/725955	SMALLEY	7.54	0.69
			REPORT TOTAL:	**7.54**	**0.69**

*** * * END OF REPORT * * ***

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 4/63405

SEARCH DATE	TIME	EDITION NO	DATE
7/4/2009	7:18 PM	-	-

VOL 1644 FOL 166 IS THE CURRENT CERTIFICATE OF TITLE

LAND

LOT 4 IN DEPOSITED PLAN 63405
LOCAL GOVERNMENT AREA SHOALHAVEN
PARISH OF CURRAMBENE COUNTY OF ST VINCENT
TITLE DIAGRAM DP63405

FIRST SCHEDULE

COUNCIL OF THE CITY OF SHOALHAVEN

SECOND SCHEDULE (1 NOTIFICATION)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

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Information

Search Date: **07-Apr-2009**

Cost Summary

Our Ref#	Search Type	Search Reference	Client Ref#	Total Cost	Total GST
1686720	Title Search	4/63405	SMALLEY	7.54	0.69
			REPORT TOTAL:	**7.54**	**0.69**

*** * * END OF REPORT * * ***

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 59/755928

SEARCH DATE	TIME	EDITION NO	DATE
7/4/2009	6:07 PM	1	6/7/1995

LAND

LOT 59 IN DEPOSITED PLAN 755928
LOCAL GOVERNMENT AREA SHOALHAVEN
PARISH OF CURRAMBENE COUNTY OF ST VINCENT
(FORMERLY KNOWN AS PORTION 59)
TITLE DIAGRAM CROWN PLAN 485.2013

FIRST SCHEDULE

THE COUNCIL OF THE CITY OF SHOALHAVEN (T O361447)

SECOND SCHEDULE (1 NOTIFICATION)

1 LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANT(S)

NOTATIONS

NOTE: THE CERTIFICATE OF TITLE FOR THIS FOLIO OF THE REGISTER DOES NOT INCLUDE SECURITY FEATURES INCLUDED ON COMPUTERISED CERTIFICATES OF TITLE ISSUED FROM 4TH JANUARY, 2004. IT IS RECOMMENDED THAT STRINGENT PROCESSES ARE ADOPTED IN VERIFYING THE IDENTITY OF THE PERSON(S) CLAIMING A RIGHT TO DEAL WITH THE LAND COMPRISED IN THIS FOLIO.
UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

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Tel: (02) 9231 0122 Fax: (02) 9233 6411 www.legalstream.com.au

An Approved
LPI NSW
Information

Search Date: **07-Apr-2009**

Cost Summary

Our Ref#	Search Type	Search Reference	Client Ref#	Total Cost	Total GST
1686695	Title Search	59/755928	SMALLEY	7.54	0.69
			REPORT TOTAL:	**7.54**	**0.69**

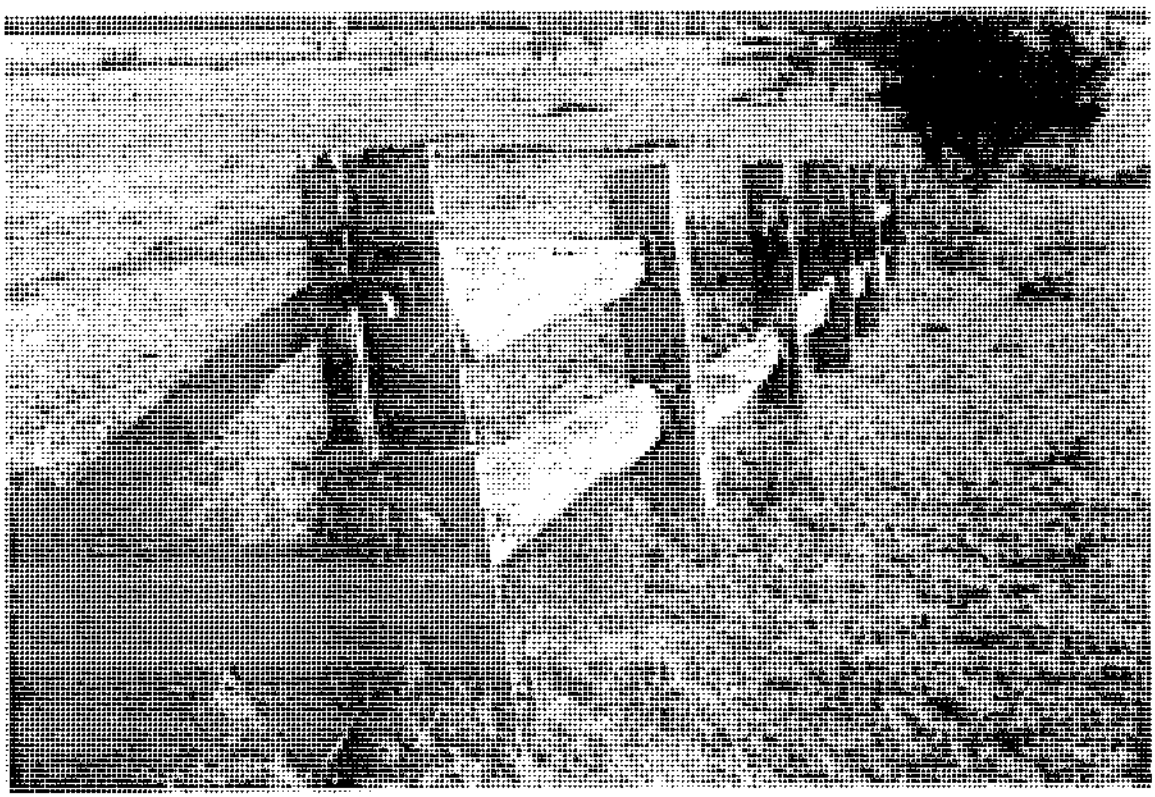
*** * * END OF REPORT * * ***

APPENDIX D

Copy of Heritage Report

COMBERTON GRANGE
Falls Creek, Nowra
Archaeological Assessment

of Nine Proposed Lots for Subdivision



Shoalhaven CITY COUNCIL

For: Shoalhaven City Council

By Dr Robert V J P Varman
Archaeologist & Heritage Consultant

26 July 1999

1.1 INTRODUCTION

Shoalhaven City Council, Nowra, required an archaeological inspection and assessment of cultural values of its land at Falls Creek as a condition of subdivision consent for nine concessional lots, as expressed in the following quote:

"An operational consent cannot be granted until the applicant has adequately demonstrated that the proposal will not have a significant impact on the cultural values of the area. In this regard, it is necessary to carry out a preliminary archaeological site inspection of the proposed house sites."

This commission was initiated by John Drummond, Property Services Manager of Shoalhaven City Council.

The archaeological inspection took place between July 22 and July 25, 1999, under optimum conditions. The weather was clement with good sunshine. The ground was water saturated and dams and ponds full due to recent rains.

The proposed subdivision of nine lots are arranged in groups of three, as shown in the site plan. One group is located in native regrowth forest, the other two groups in grazing land further down Comberton Grange Road to the south-east.

The nine lots are parts of areas cleared during the 1840s for grazing and perhaps limited agriculture. Part of this area reverted to bushland at an early stage (proposed lots 1 to 3), the remainder (proposed lots 4 to 9) continued to be used for grazing until the present day. Dairying also took place in the vicinity.

Areas adjacent to the proposed lots were also examined, including the original Comberton Grange farm complex. Account was taken of views from various points of the site, for example the fields subject to this report, the hay barn and the extensive post and rail fencing can be clearly seen from the original farm complex.

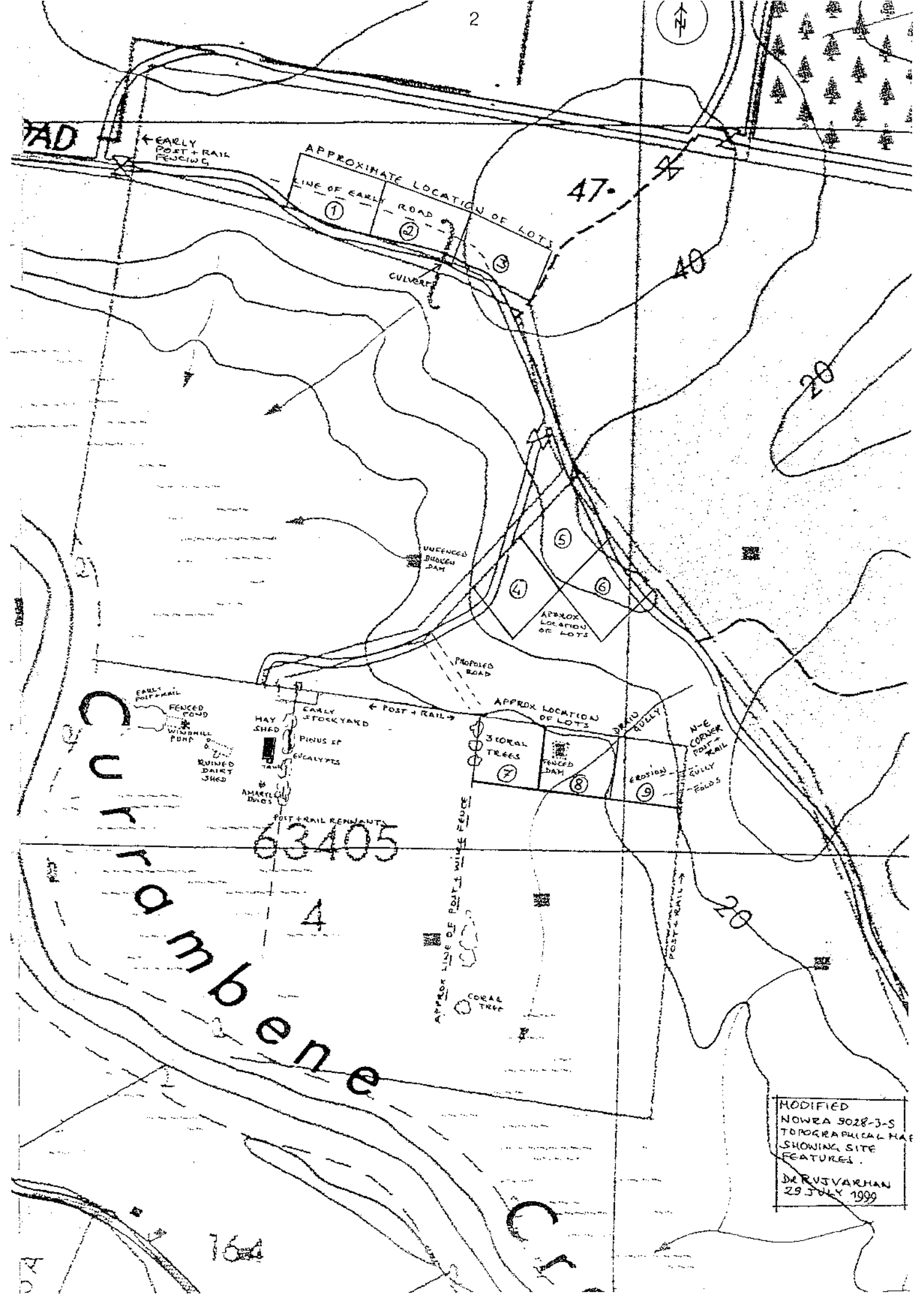
Exposed surfaces and soil profiles throughout the site were examined for signs of Aboriginal past activity.

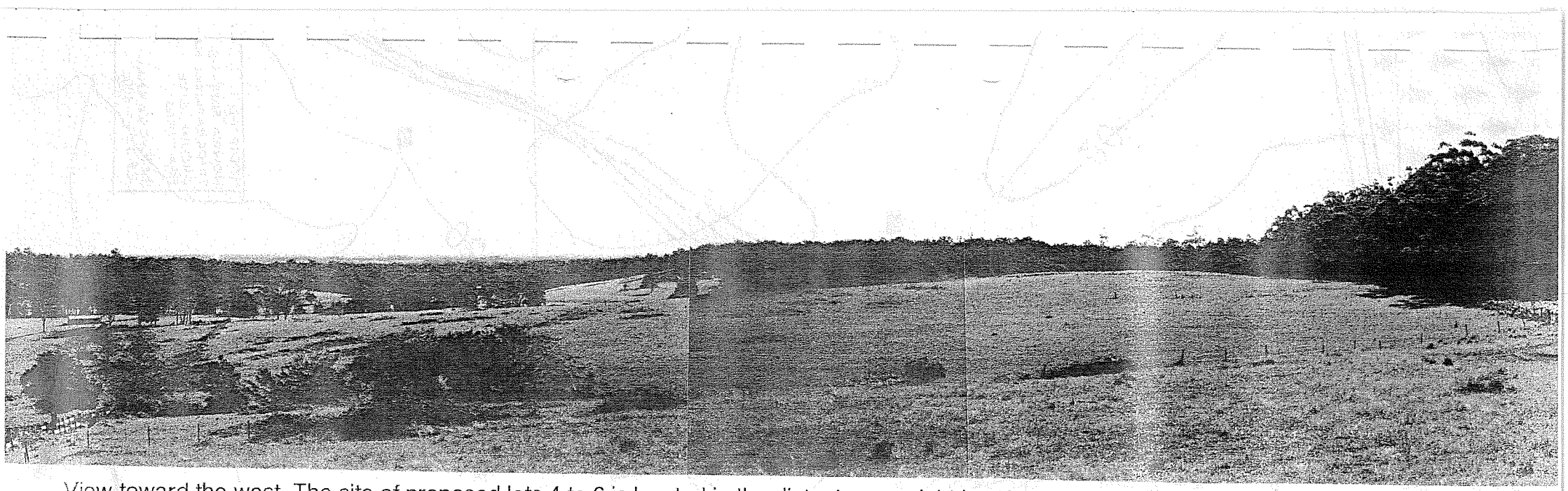
1.2 EXECUTIVE SUMMARY

The site under study derives its principal significance as part of Comberton Grange farm complex. Historically it was an outlying extension of the main farm complex, perhaps first used for growing grain but later for grazing and use for musters, branding and the like. The hay barn area was used as a dairy by the 1920s/1930s.

Proposed lots 1 to 6 are free of significant historical and archaeological remains. Proposed lots 7 to 9 are partly 'framed' by the historically highly significant post and rail fence and also contains a small dam of medium to low significance (mid- west end of that location). Proposed lots 7 to 9 could be developed if development included the conservation and on-going maintenance of the post and rail fence.

All proposed lots were free of significant Aboriginal activity.


2
AD
EARLY POST + RAIL FENCING
APPROXIMATE LOCATION OF LOTS
LINE OF EARLY ROAD
1
2
3
47
40
20
CULVERT
UNFENCED BURIED DAM
4
5
6
APPROX LOCATION OF LOTS
PROPOSED ROAD
EARLY POST + RAIL
FENCED POND
WINDMILL PUMP
RUINED DAIRY SHED
HAY SHED
EARLY STOCKYARD
POST + RAIL
PINUS SP
EUCALYPTUS
TANK
ASBESTOS RUINS
APPROX LOCATION OF LOTS
3 CORAL TREES
7
FENCED DAM
8
DEAD GULLY
N-E CORNER POST + RAIL
EROSION GULLY
FOLDS
9
POST + RAIL REMNANTS
63405
4
APPROX LINE OF POST + WIRE FENCE
CORAL TREE
POST + RAIL
20
Currambene
MODIFIED NOWRA 9028-3-S TOPOGRAPHICAL MAP SHOWING SITE FEATURES.
DR RUTVARHAN
29 JULY 1999



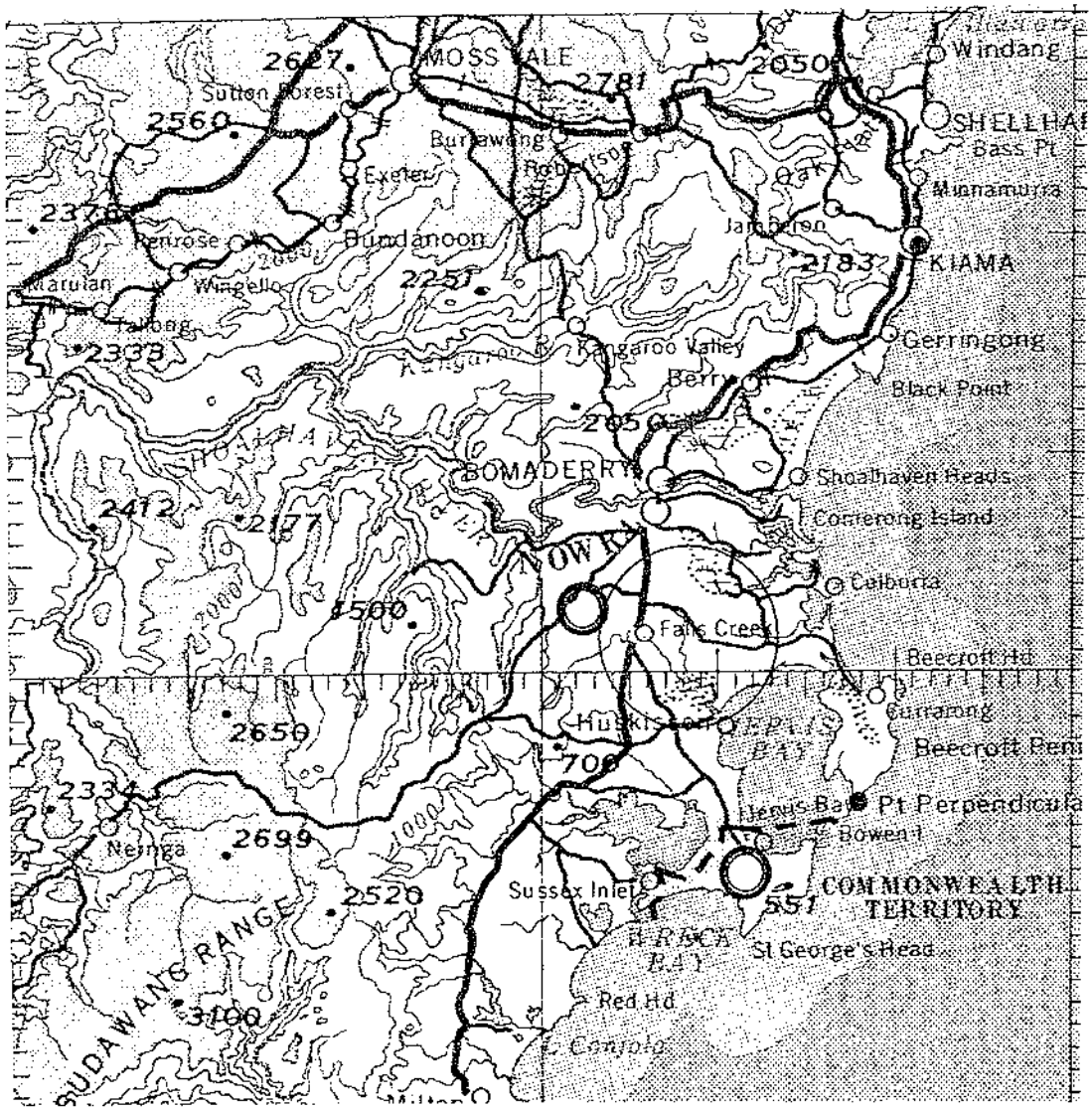
View toward the west. The site of proposed lots 4 to 6 is located in the distant upper right hand grassed area. Note hay shed on the far left.

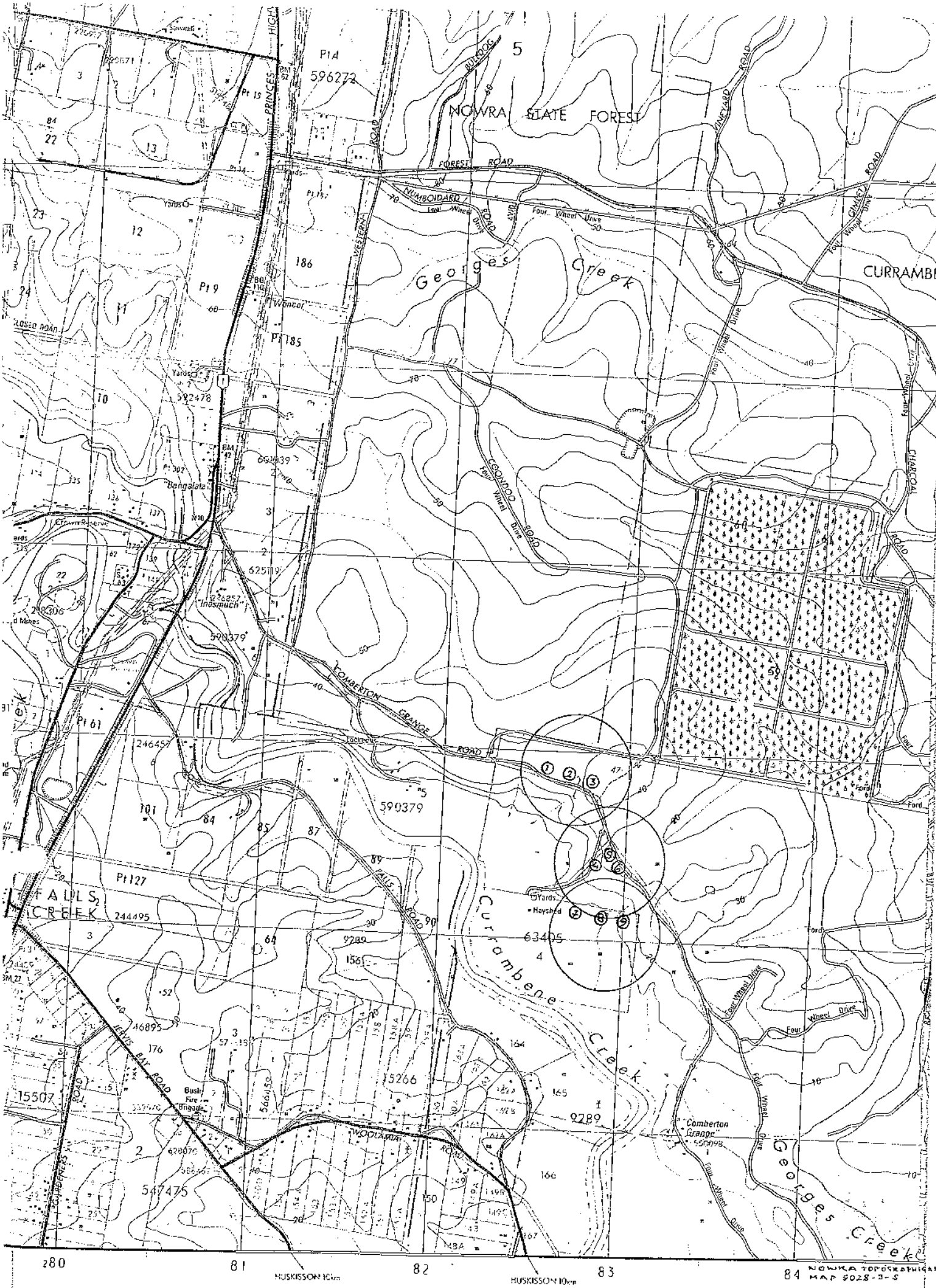
View toward the south-west. The site of proposed lots 7 to 9 is located in the mid to right of the view, inside the fence line.

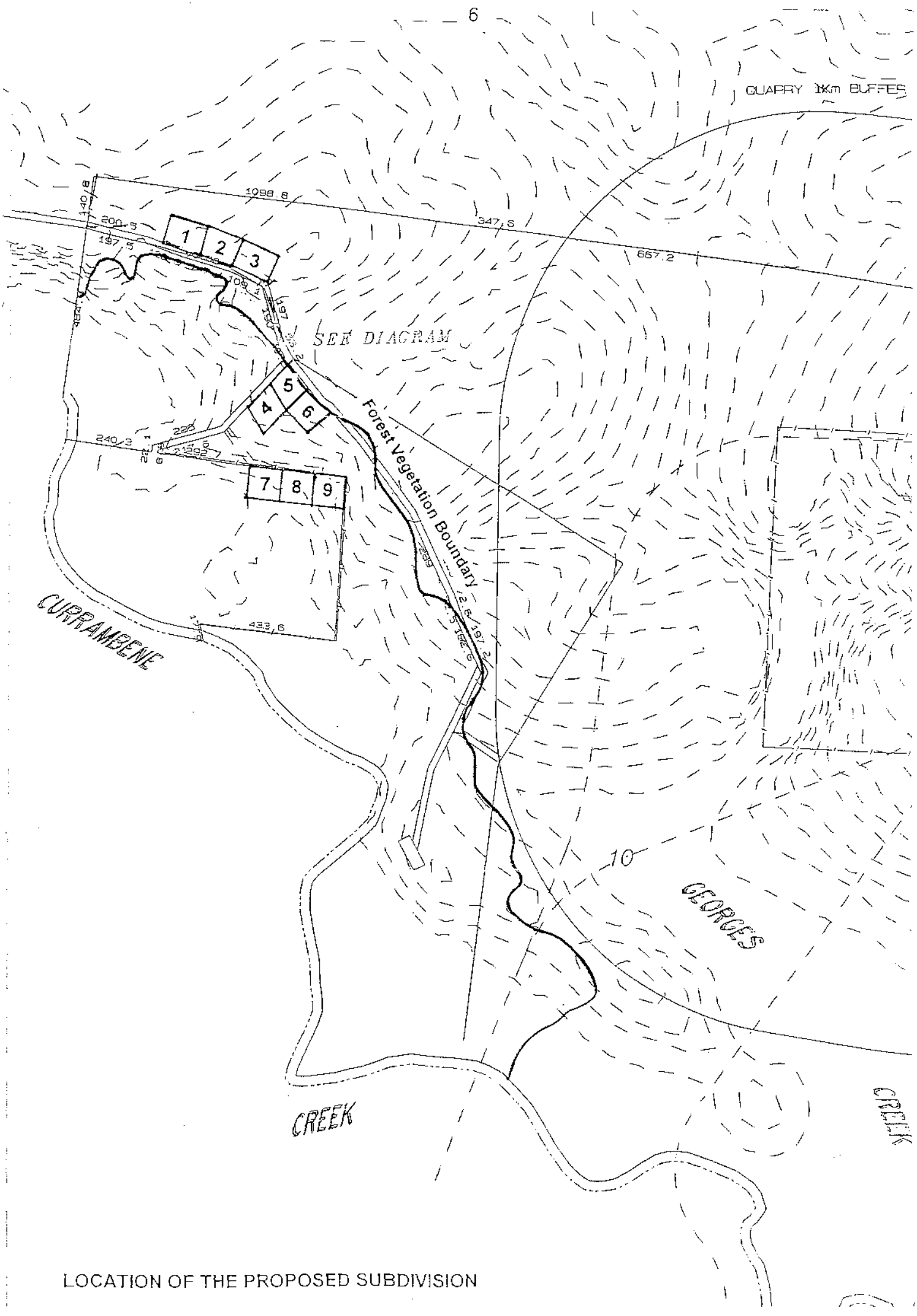
1.3 SITE LOCATION AND IDENTIFICATION

The site is located along the one lane, unsealed, Comberton Grange Road. The road is located on the east side of the Princess Highway (Route 1) in an area generally referred to as Falls Creek. The grid co-ordinates are 283350 6124950 (topographic map Nowra 9028-3-S). The proposed subdivisions, lots 1 to 9 are as shown on the following maps.

The Real Property description is: Lot 1 DP 550096, zoned as Rural 1 (A), Property number, 52636. The Shoalhaven Heritage Study reference number is CR045, category St Ar, sub category 0101 1501 1504 1614.




NOWRA STATE FOREST
Georges Creek
CURRAMBE
Currambene Creek
Georges Creek
FALLS CREEK
Bungalata
Inasmuch
Yards
Hayshed
Comberton Grange
Bush Fire Brigade
Ford
Four Wheel Drive
FOREST ROAD
NUMBOIDARD ROAD
COMBERTON GRANGE ROAD
FALLS CREEK ROAD
JERVIS BAY ROAD
WOODLAMAI ROAD
CHARCOAL ROAD
PRINCES HIGHWAY
WESTERN ROAD
VINEYARD ROAD
GIMBEE ROAD
CROOKWOOD
Pt 4
596272
Pt 9
Pt 185
Pt 61
Pt 127
590379
63405
9289
15266
547475
15507
280
81
82
83
84
HUSKISSON 10km
HUSKISSON 10km
NOWRA TOPOGRAPHICAL MAP 9028-3-S



LOCATION OF THE PROPOSED SUBDIVISION

1.4 ACKNOWLEDGEMENTS

My thanks to Mr John Drummond, Property Services Manager, Shoalhaven City Council for providing relevant information concerning the site. My thanks also to Carol Andrews, Local Studies Librarian at Nowra City Library for providing me with material in relation to Comberton Grange and the people associated with the property.

1.5 METHODOLOGY

The documentary evidence regarding Comberton Grange is sparse, most of what is available relates to the actual farm complex to the south-east of the study area. The documentary material available was closely examined in relation to maps and the actual site. Reports were reviewed in relation to the Aboriginal remains on sites in the broader district.

After document familiarization, the survey took place over two days to locate site features relating to the development of Comberton Grange as a whole. Archaeological theory and sites of a similar nature were used to predict and interpret site features.

The site was traversed in an east-west direction in a number of close transects. All exposed earth, disturbed earth and soil profiles caused by erosion were examined closely for human activity such as charcoal, mixed soil stratigraphy, bone, shell and stone remains. The present road and tracks were traversed including a number of disused (overgrown) carriage tracks and kangaroo trails. All signs of significant human activity were noted.

Sites and features of significance were recoded by making notes, plotting on maps and photography. All features of significance were analysed on site as to date and origin and related to the documentation wherever possible. The principal site features were also assessed as to the degree of significance.

Sites outside the study area, such as the Comberton Grange farm complex were also examined for physical comparisons and to create a context for the study area.

1.6 SITE AND STUDY CONSTRAINTS

As noted above, the documentation for the site is sparse, typical of most farm sites. However, the study area (proposed lots 1 to 9) was found to be outside the principal farm complex and it would be unlikely that the usual documentation would have thrown much light on the study area, unless a farm journal could be located.

There were sufficient areas of exposed and eroded soil for the conclusions of this study to be reliable. The weather conditions were also optimal.

2.1 STATEMENT OF SIGNIFICANCE

The site under study is of high local significance in that it represents an extension of the Comberton Grange farm complex and played a significant part in the earliest European development of Currambene Creek.

Comberton Grange farm complex (not the subject of this study) is of undoubted archaeological sensitivity and significance. An extension of this complex was the system of nineteenth century fences which defined the rural landscape for a considerable distance and spoke loudly about the function of the enclosed lands.

One part of the site, in proposed lots 7 to 9, is of high significance in that it represents a rare survival of a largely intact nineteenth century interlocking, split timber, post and rail fence. The significance of the fence is enhanced by the extent and high quality of the surviving sections. The visual impact from the south and from the site of the original farm complex is reminiscent of rural scenes seen in many early illustrations of colonial farms.

The fence relates to the stockyard near the study site and other features including the hay shed, dairy remains and fenced dams. The fence had several extensions, covering considerable distances but these extensions only survive in remnant form.

One small dam is within the study area (lots 7 to 9) and is important as a rural element in the picture as a whole. However, as an individual element, it is likely much later in date than the fence and so of medium significance to the site.

A remnant planting of three old Coral trees (Erythrina speciosa) which seems to be on the boundary of proposed lot 7 is also an important, but later, site element. The trees, likely to be over 60 years old, appear to have been planted as an ornamental wind break and relate to an example further south and to plantings at the original farm complex. The trees would be of medium significance and worthy of preservation.

3.1 STATUTORY PROTECTION

The site is subject to local government (Shoalhaven City Council) statutory protection under the Local Environment Plan, reference number CR045.

The site is listed on the Register of the National Trust (NSW) but this has no direct statutory status.

The National Parks and Wildlife Service should be consulted if items of Aboriginal significance are located.

Protection may be sought under the Heritage Act of New South Wales (1977).

4.1 SITE PHASING

No Aboriginal traditions are associated with this particular study area and no Aboriginal remains were located during the time of the survey, hence the following phasing deals only with the European development of the site.

The source material is very sparse and what does exist seems to originate from local historian I. M. Jennings, a descendant of a line of owner/occupiers of Comberton Grange (The Shoalhaven Chronograph, November 1970, Vol 1, No 11 and a typed monograph, with additions and corrections in pen, held by the Nowra City Library). The nature of the information suggests that the primary source was a deed or land file which listed leases and changes of ownership (probably no longer available to the public since the land was converted to Torrens title).

4.2 PHASE 1 1830s - 1850s

As with many inland properties of the time, landowners employed overseers, or foremen, to run the property. In the early years convict labour was available to assist in the development of the land or to look after cattle or sheep.

A certain Captain Brooks of Gerringong held grazing rights during the late 1830s. However Sydney Stephens made a grant application in 1837 which was ratified by 1840. Judging by entries in the publication of colonial correspondence, *Historical Records of Australia*, Stephens did not live locally and the property of some 2,000 acres, with an annual quit rent of sixteen shillings per year, would have been run by a free or government overseer.

The next owner was also an absentee landowner, the merchant and land speculator, John Terry Hughes. He obtained the property in 1843. It is thought that the house, which survived within a decade or two of the present, was built for Hughes in 1843. However, a pen alteration on the monograph held at the Nowra City Library changed the construction date from 1843 to 1847.

The construction of the house between 1843 and 1847 suggests that the property was being developed into a viable farm and possibly cattle station. It is likely that the surviving post and rail fence was established at this time.

Hughes was also known for his interest in wheat for colonial consumption and export but whether such crops were grown at Comberton grain is not known for certain. The very large area enclosed by the post and rail fence may originally have been intended to keep grazing cattle out of the richer crop lands closer to the swamp but later used for fattening cattle and dairying purposes.

During this time James Lang is said to have lived in the house, so it seems that he had been appointed by Hughes to run the property.

In 1857 the property came to belong to Miss Rosetta Hughes (another source states incorrectly, sold to Miss Rosetta Terry). The property was actually an inheritance.

The 1788-1820 Association's *Pioneer Register*, Volume I (Second Edition 1981) by Dr C. J. Smee and Mrs J Selkirk Provis reveals that John Terry Hughes married, Esther, the step-daughter of Samuel Terry (Samuel Terry was almost certainly Hughes' uncle). One of their children was Ellen Rosetta Hughes, born ca 1825 at Sydney. Rosetta inherited the property as part of her patrimony.

The property continued in the hands of absentee landowners, though by this time it was probably leased to various individuals rather than run by overseers for the owners. The surnames of those running or leasing the property, starting with James Lang, are given as: Miller, McHay (probably McKay), Wilford and Row but there are no indications of when and for how long. A Mrs Patrick was thought to have owned the property after Rosetta Hughes but there is some uncertainty.

4.3 Phase 2 1850s - 1963

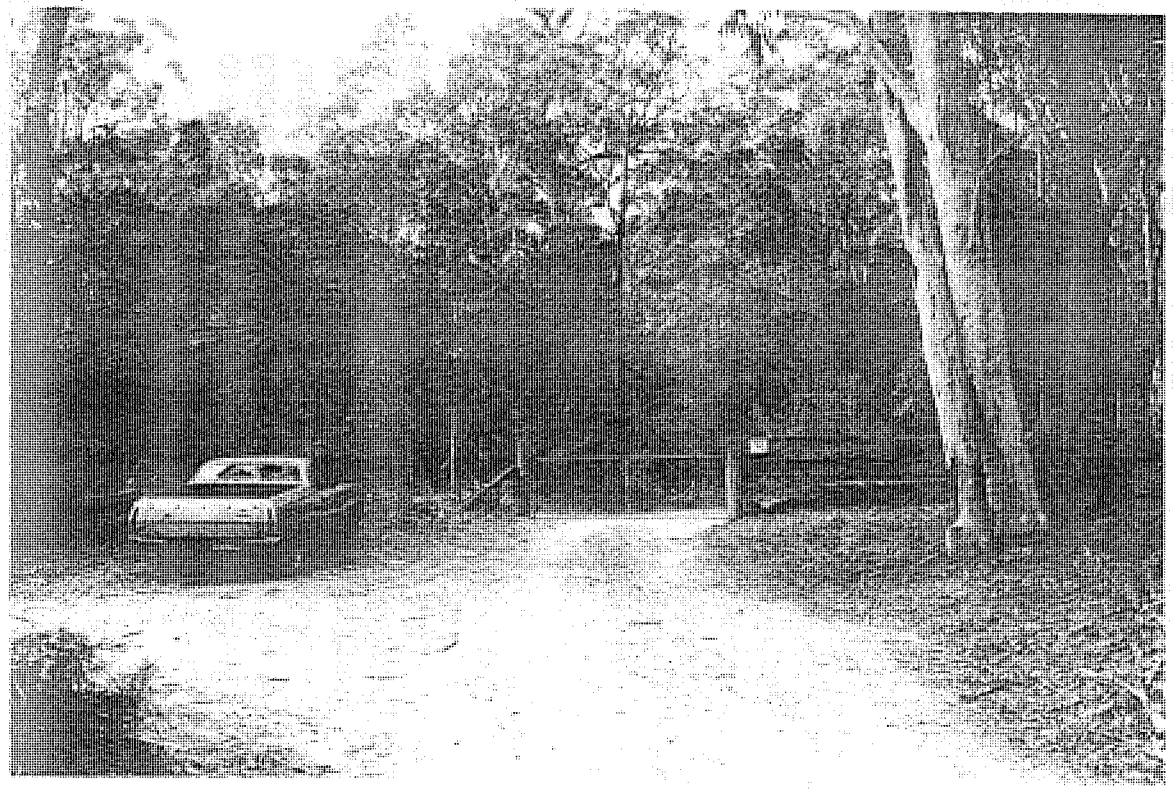
There is no indication of when the Jennings family purchased the property but it is stated that William Jennings was the first owner/ occupier, yet the next occupier after Row (see paragraph above) was listed as Simon Jennings. A genealogy of the Jennings family may clarify this. The situation might have been that Simon Jennings rented the property under lease and William Jennings (his son?) purchased it outright. The property then passed to R. P. 'Bob' Jennings: he was said to be the third generation to occupy the house (I. M. Jennings). It appears that the property was sold in 1963 and soon fell into decline.

The property as a whole, including the study area, shows gradual improvements from the nineteenth century to about the 1940s and 1950s. The 1940s/1950s period is characterised by improvements to sheds, fences and particularly water storage.

The hay shed and dairy remains near the study area are of different dates, the dairy shed may date between the 1890s to 1920s or may have been converted out of an earlier structure. The hay shed does not appear to be earlier than the 1940s. The stockyard nearby may well be as early as the 1840s or slightly later but has been modified and improved until very recent times and is still able to function as such. The hay shed area may have had structures since the early years of Comberton Grange. The windmill pump dates to the first half of the twentieth century.

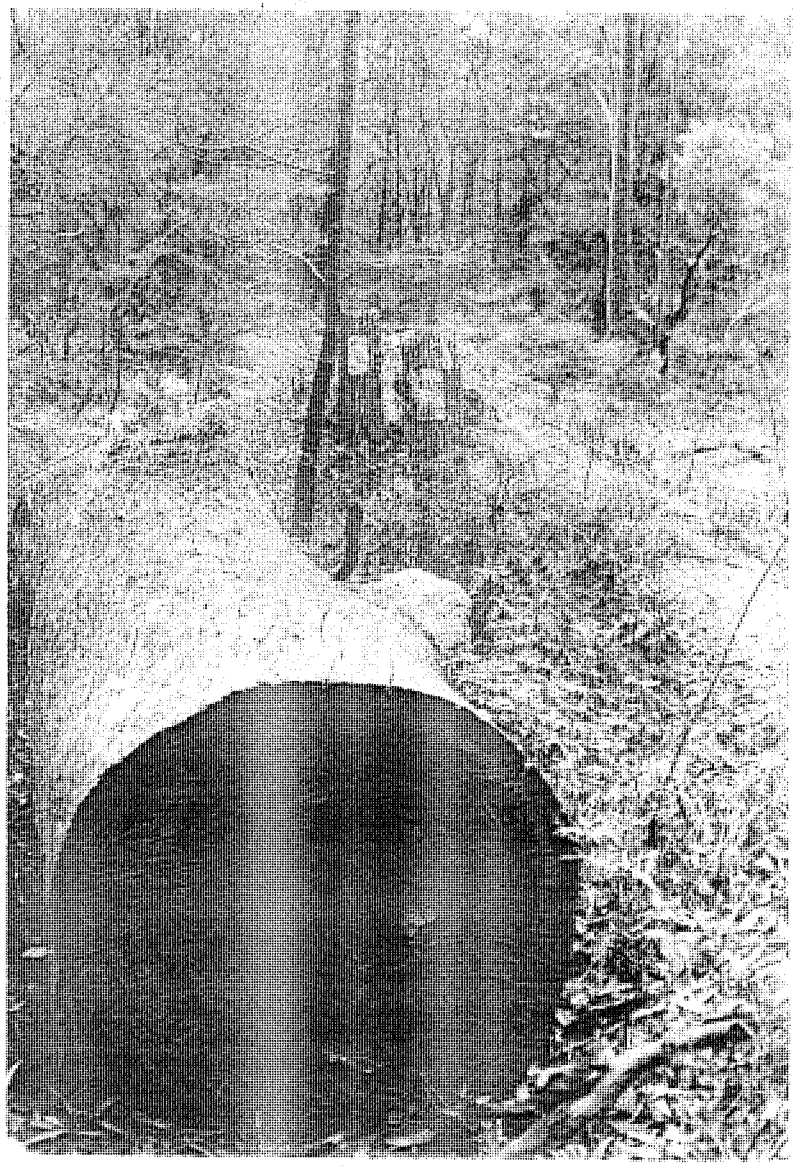
4.4 PHASE 3, 1963 -1999

The land around the study area now belongs to Shoalhaven City Council but there seems to be some provision to allow grazing. Structures had fallen into decline for some time and have been subject to vandalism but there have been attempts at the maintenance of fencing, particularly by the installation of electric fencing (electricity run by a solar panel). Apart from the electric fencing, attempts to secure the fencing against grazing kangaroos have been largely unsuccessful, points of entry are to be seen at very regular intervals all along Comberton Grange Road.



Above: Entrance to the council property, Comberton Grange. The native regrowth seen here is typical of that found on proposed subdivisions lots 1 to 3, located further down the road.

Right: To the north of the entrance, showing remnant post and rail fencing. The log is one of many scattered through the bushland.



5.1 ARCHAEOLOGICAL EVALUATION

The following archaeological evaluation is organized into three groups according to the proposed subdivision lot numbers: 1 to 3, 4 to 6 and 7 to 9. Other sites which relate to the areas of the proposed subdivisions will receive a summary evaluation at the end of this section.

Conventional compass points are based on Nowra topographic map 9028-3-S, north being in the direction of Berry map 9028-3-N, east being in the direction of Crookhaven map 9028-2-S and so on.

5.2 SUBDIVISION LOTS 1 TO 3

This area is located some distance east from the main entrance into the property, at the junction of the dogleg road leading to plantation marked as 59 along the Comberton Grange Road. The main entrance is an old boundary where remnants of a split timber post and rail fence were traced. The east boundary of lots 1 to 3 is located at a ridge track leading more directly to plantation 59. Informal boundary markers of white painted timbers tied with fading pink tape appear to be related to these lots. The area is fairly homogeneous, hence the exact boundaries of these lots are not of any consequence in regard to this evaluation.

The area is characterised by secondary, or regrowth, eucalyptus dominated forest. There is indirect evidence that the area has been cleared or logged at least twice. The last phase of clearing probably took place some time after World War II. Tree stumps, mostly of medium size, are to be found throughout the site. The trees were felled, by the two levels cut method, using a (petrol driven) chain saw, though some may have been felled using a cross-cut saw. The majority of the living trees are comparatively young. There is a good range of plant and insect (various ant mounds) species, suggesting that the land was in proximity with native forest to allow re-establishment of species in cleared areas. Evidence of kangaroo and other marsupial activity were seen throughout the area. The number of disturbed ant mounds (nocturnal Bull Ants?) were noted, suggesting echidna activity. A number of very large felled eucalyptus trees were noted in the area, suggesting that these were survivors from a previous clearing, one showed the scars of an unsuccessful attempt at axe felling high up on the trunk.

No structural remains were found in this area but remains of a previous single carriage road was discovered running more or less parallel north of the present road for the full length of the study area. The disused road was fairly overgrown and didn't have a drainage ditch as the present road does. The remains of a small bore concrete culvert pipe and dry-press bricks were found along the present road along the drainage line fronting proposed lot 3. The culvert, and probably the present road, dates after World War II.

All areas of exposed earth were examined for Aboriginal stone implements, evidence of soil disturbance and charcoal. There were quite a number of fallen trees, exposing the soil and subsoil. Areas along the roads and road ditch were

examined also any area clear of vegetation or disturbed by animal activity. No trace of Aboriginal activity was found.

No significant remains relating to European settlement, worthy of preservation, were found on proposed lots 1 to 3

5.3 SUBDIVISION LOTS 4 TO 6

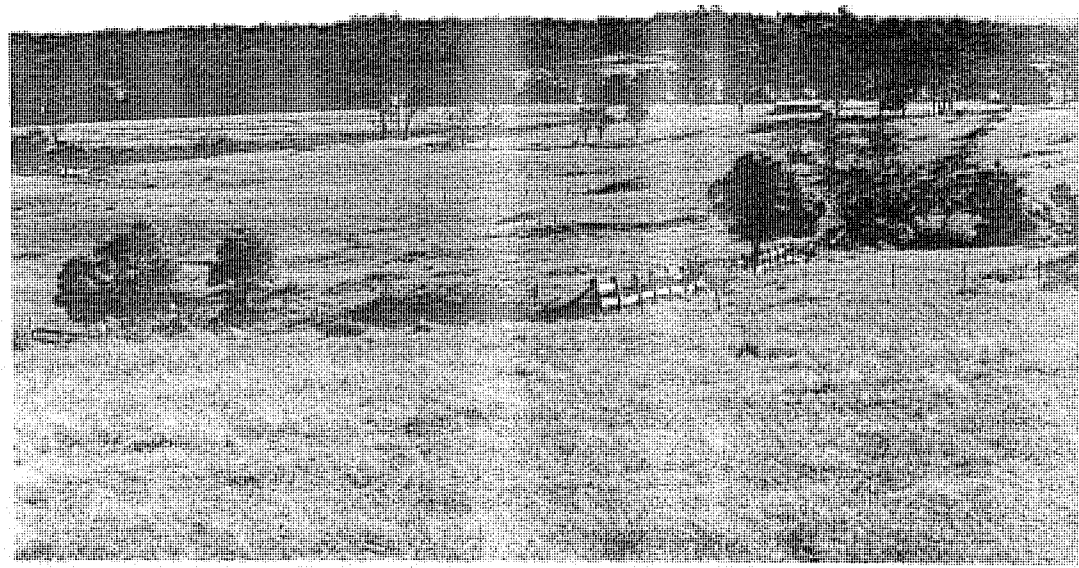
These three proposed lots are located near the junction of Comberton Grange Road and the road leading to the stockyard and hay shed. The latter road does not quite follow the line of the gazetted road (or road as shown in the Nowra topographical map 9028-3-S): this was taken into account during the survey.

The land in this area is flat to gently sloping, suitable as a house location. The vegetation was of varying sparse to thick grass with patches of native bracken. Patches of nearly bare earth are to be found on the higher level grounds. No signs of Aboriginal activity, such as tool scatters, were noted. Nearby areas and the Comberton Grange Road were also carefully searched.

The study area was searched for European artefact scatters and building materials, nothing was found apart from a Department of Main Roads survey control mark, numbered 63029.

A number of fence posts survive in the area, remnants of an early to mid twentieth century timber post and wire fence which extended to a gate further eastwards along the Comberton Grange Road.

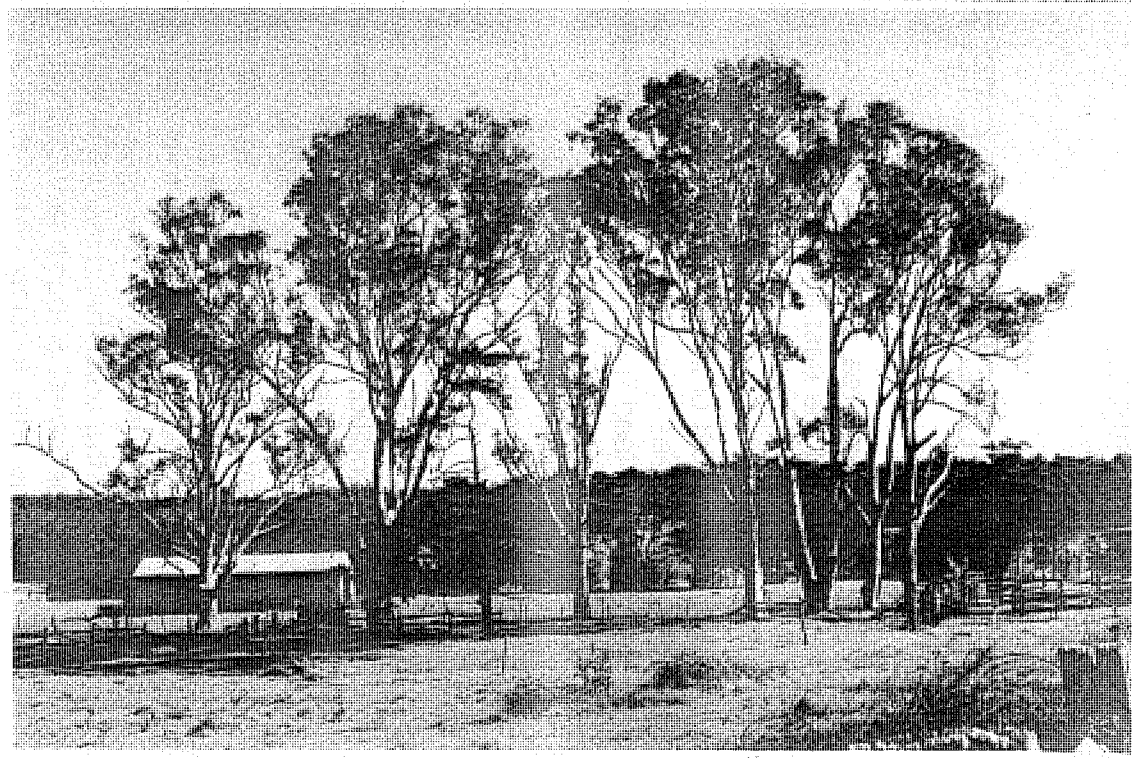
No significant remains relating to European settlement, worthy of preservation, were found on proposed lots 4 to 6.



Above: View eastward, from the south side of the Hay shed, showing the site of proposed lots 7 to 9 (distance mid, left). In the foreground (left) remnant bulb planting of the Amaryllis family.

Above right: Showing the east end of proposed lots 7 to 9. View toward the west.

Right: View to the west, showing the hay shed, stockyard to the right. The top of the post and rail fence at the bottom right is the same line of fence as seen in the above-right view.



5.4 SUBDIVISION LOTS 7 TO 9

This is an area enclosed on the north and east sides by an early post and rail fence. At the east end the land is cut by a natural gully drain from the north, to the east of this are a couple of shallow, lightly eroded, gully folds.

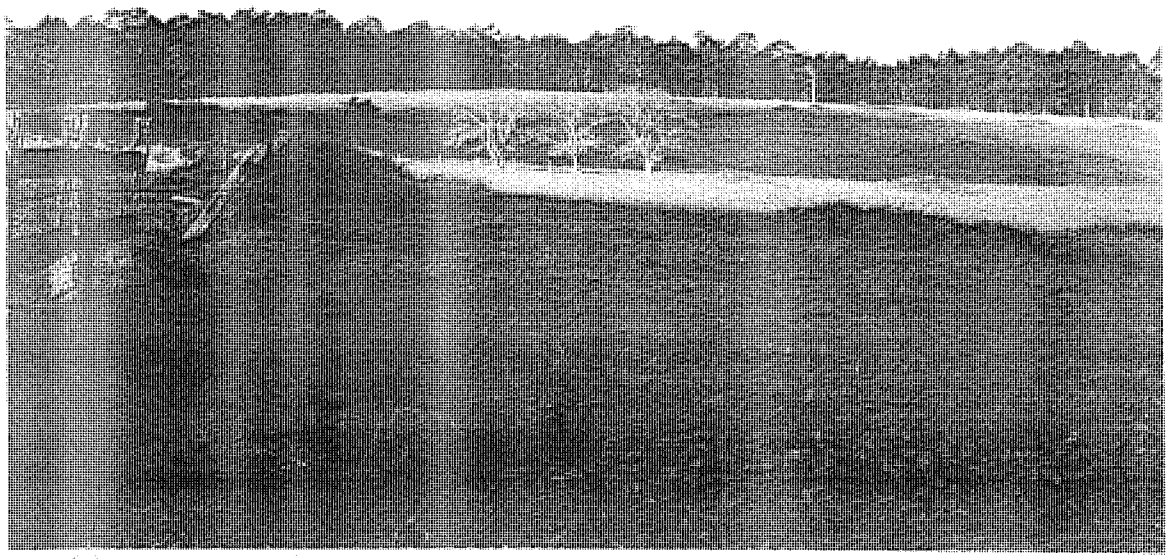
A little west of the natural gully drain is a small dam and further west a line of three Coral trees (Erythrina speciosa). The land generally slopes southward toward swampy land. The area is thickly grassed except where erosion has occurred.

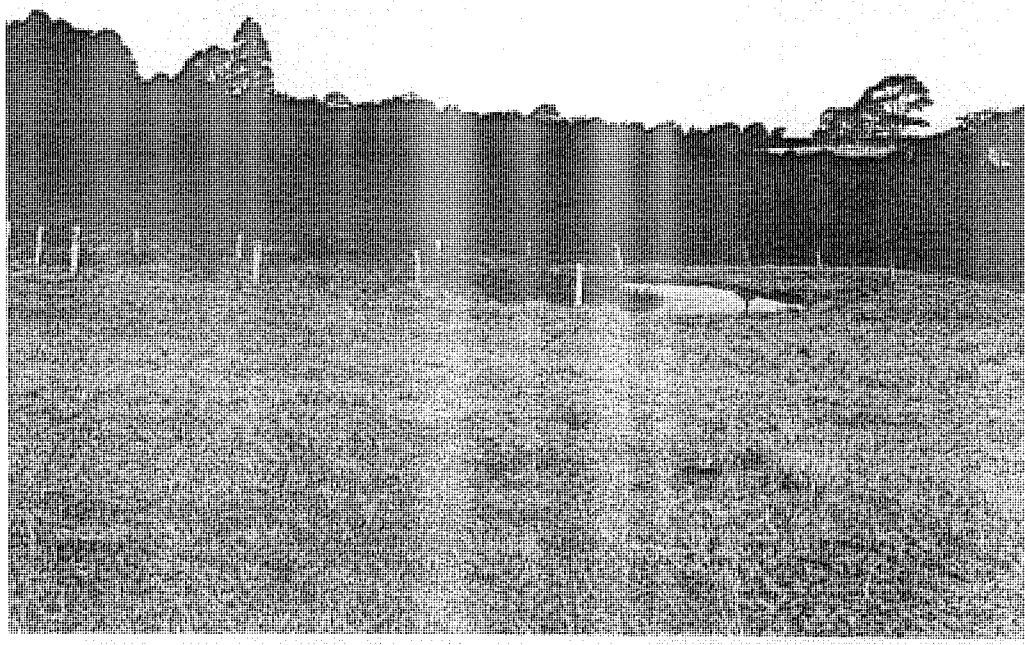
Of high local significance is the interlocking, split timber, post and two rail fence along the north and east ends of the study area. Such fences are difficult to date but may well date to the 1840s when the property was developed by John Terry Hughes. It is unlikely that the fence was built after the 1880s, by which time timber post and drawn-wire fencing had become inexpensive and popular. The fence is in good condition compared to most remaining examples of such fencing. While the majority of the timbers were split from the trunks of eucalyptus trees, one at least showed signs of sawing. The rectangular open mortise holes in the posts were made by drilling four holes and chipping out the centre with a specialized tool similar to the narrow form of a shingle froe. The two rails were also of split timber and the ends made thinner and reduced by adze so that rails from one post to the next could interlock in the open mortises of the posts. Some rails are missing and some of the posts have started to lean. A few timbers show minor signs that a bush fire once swept through the location. The fenced area was later subdivided using post and wire fencing, a major example being in the location of the three Coral trees.

Evidence of the initial clearing period was noted at the east end of the area where erosion exposed the soil profile. The evidence was in the form of a charcoal layer a short distance (about 100mm - 150mm) below the present surface.

A small dam is located just west of the natural drain gully. The dam was of a characteristic rectangular shape, as also seen at the Comberton Grange farm complex and also to the west of the hay shed and dairy remains nearer to the study area. As with the other examples, the dam was fenced with split posts and wire, the corner posts having notches on one side for strainers. This dam was excavated rather than converted from a natural feature, the excavated soil used as the dam wall. The concentration of Kikuyu grass over the dam wall confirmed that the soil was loosely piled. The purpose of the fence was to prevent cattle from treading in the sides of the dam. The dam appears to be later than the post and rail fence, probably dating to the period when the fence near the Coral trees was established. The dam has been colonised by semi aquatic plants, frogs and turtles.

Three Coral trees grow along the split timber and wire fence further west from the dam. These may be all that is left of a wind break once extending along that fence line. Coral trees in some circumstances can be fast growing initially but these examples appear to be at least about 60 years old (they do have reliable annual tree rings). The trees are of approximately the same age as one further south along

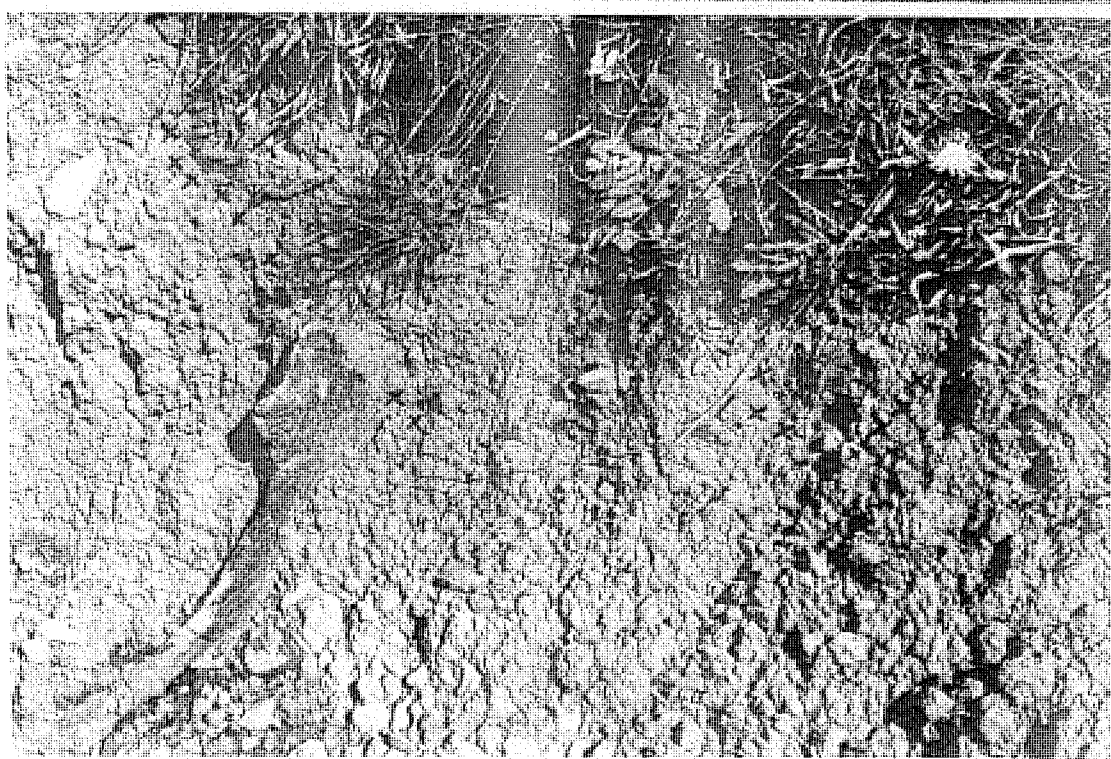




Above: View of proposed lots 7 to 9 looking eastward. The three Coral trees, possibly over 60 years old, may be seen in the middle of the view.

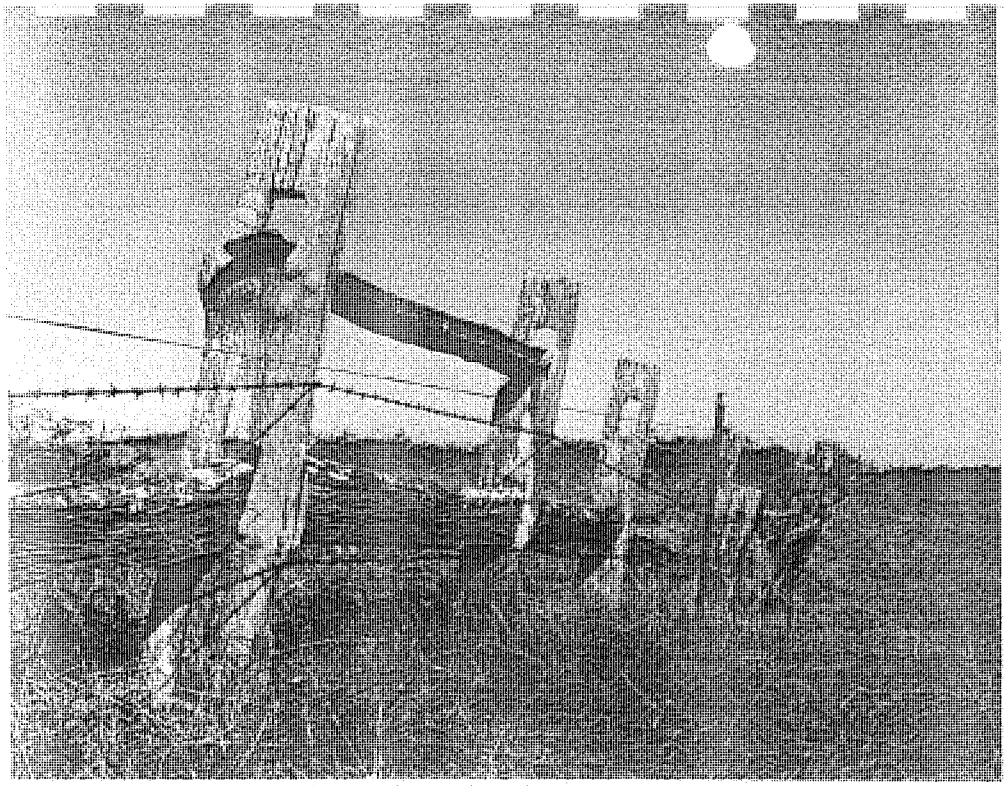
Above right: The dam on the site of proposed lots 7 to 9. The fence posts form a rectangular configuration.

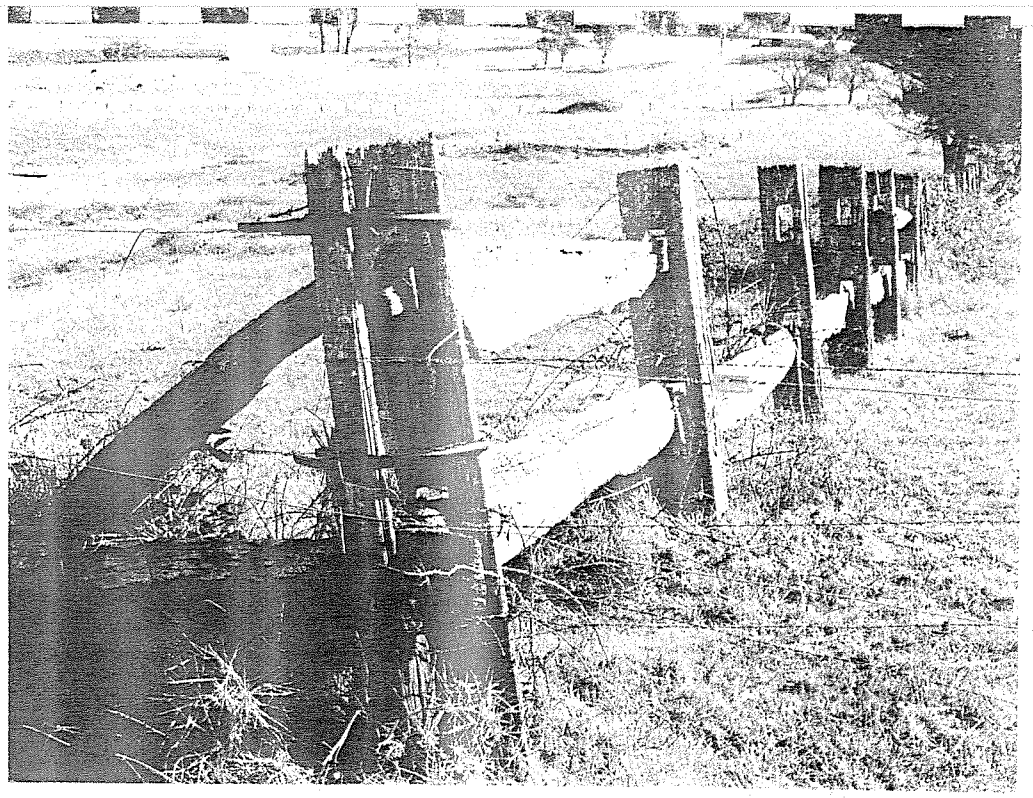
Right: Soil profile from the east end of proposed lots 7 to 9, showing a charcoal deposit likely from the initial clearing, marked by crosses. The burned tree root appears to be part of the charcoal deposit.



the fence line and also a group found at Comberton Grange farm complex.

The remaining areas are free of structures or man-made features. Signs of Aboriginal activity were looked for in all areas where the ground surface or earth profile was exposed but no signs were found. This also applies to the remainder of the area extending westward to the road leading to the hay shed.

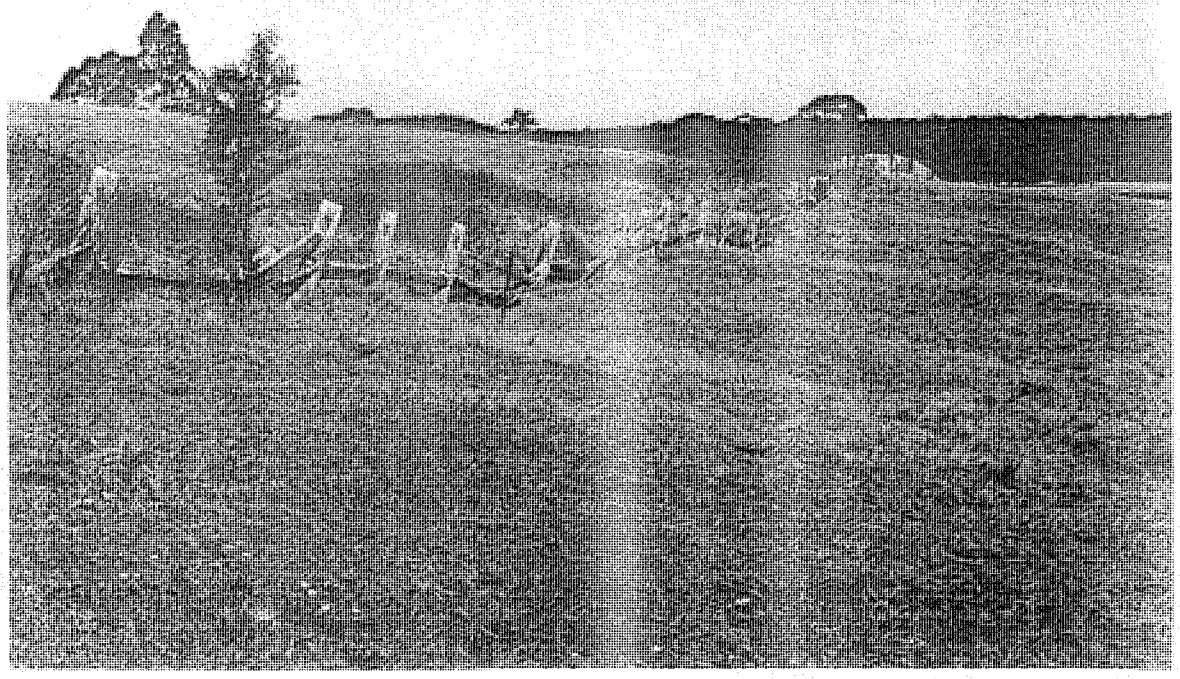




Above: Post and rail fence to the east of proposed lot 9. The post in the foreground was once the outer part of a tree. A little further to the south the posts show evidence of a former bushfire.

Above right: North-east corner near proposed lot 9. This is the corner of the two great lengths of the post and rail fence.

Right: Post and rail fence to the east of proposed lot 9.

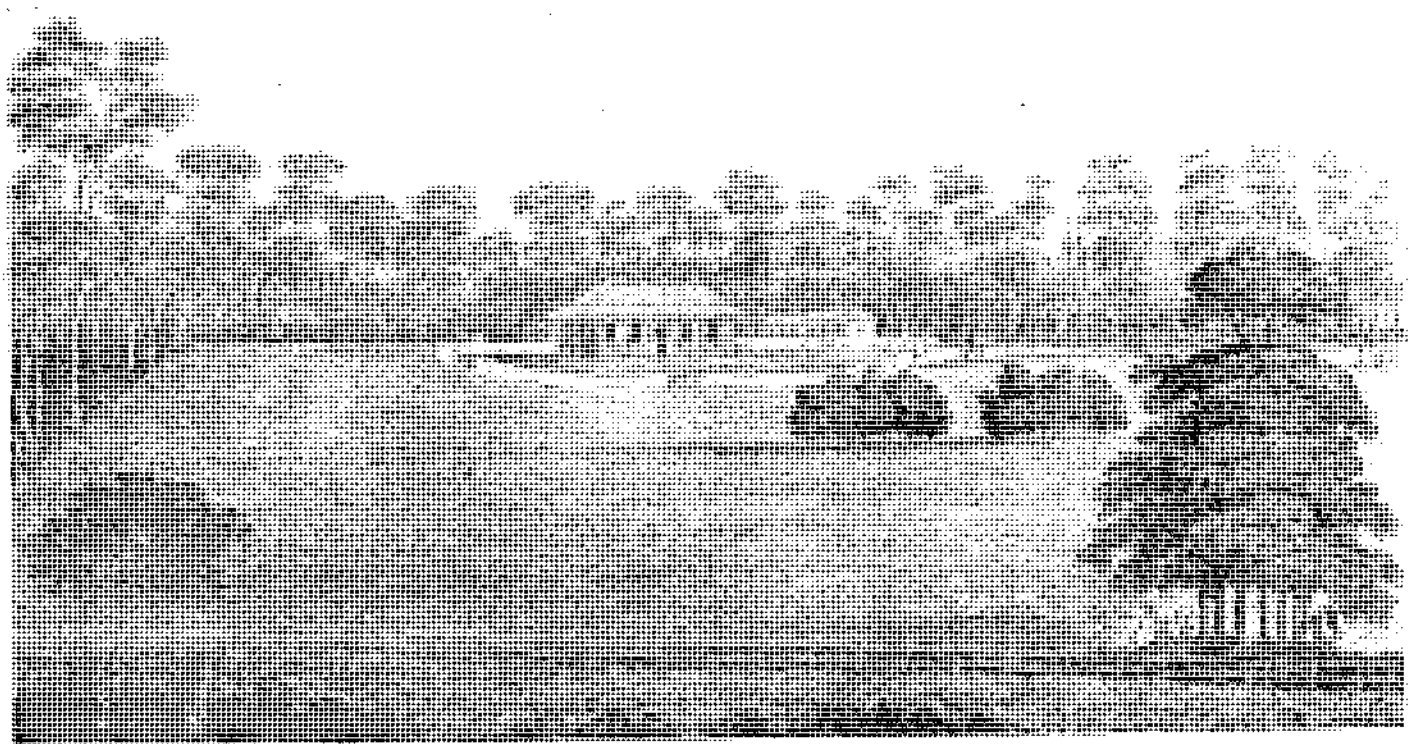


6.1 SUBDIVISION LOTS 7 TO 9 RECOMMENDATIONS

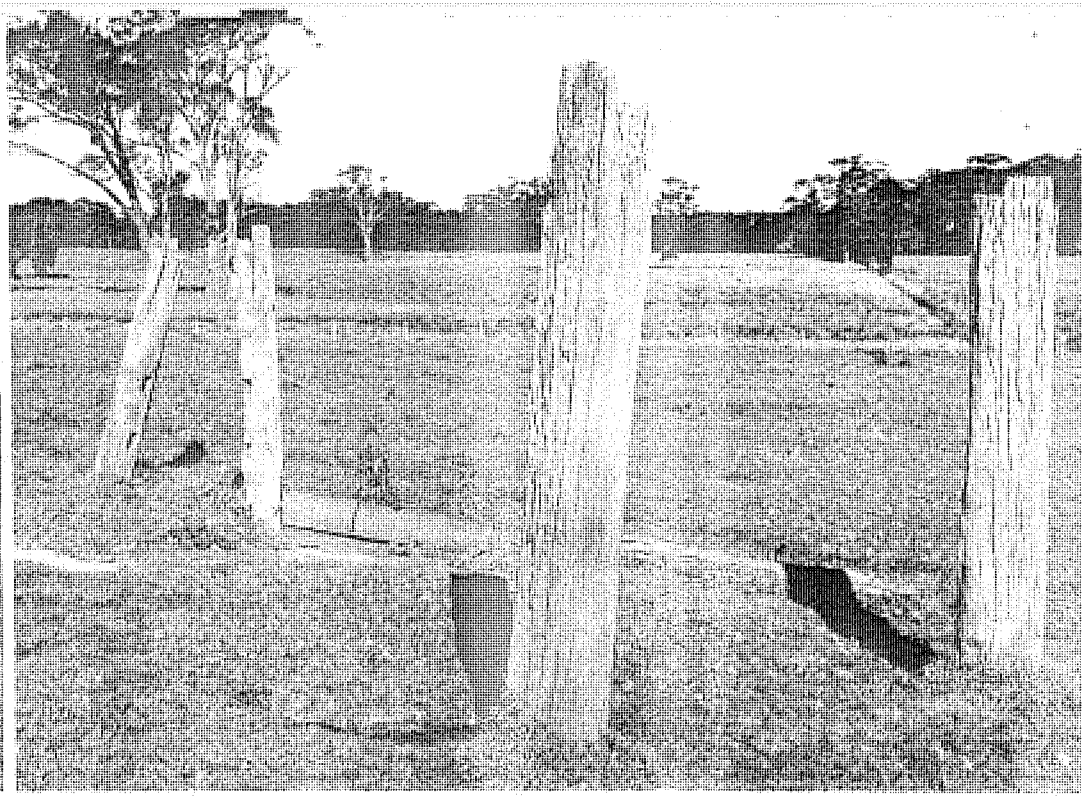
The post and rail fence is of high local significance and should be conserved and preserved as part of any future development of the site. If the site is subdivided, terms of sale should include that the owner is (or Council remains) responsible for the maintenance and protection of the fence. Posts may be straightened or 'coupled' with new timbers in cases where the post is weak, rails may be restored where missing but the fence should not be painted or obscured by vines or other plantings.

The dam and Coral trees should be preserved as elements in the evolution of Comberton Grange farm, if possible. These site features are not of the same high significance as the post and rail fence. The fence around the dam could be close-wired to discourage access by young children.

There remains the issue of visual impact. The most important element is the post and rail fence which can be seen for kilometres from the south-east and south-west. The view from the Comberton Grange farm complex is particularly striking, reminiscent of early colonial views of rural areas.



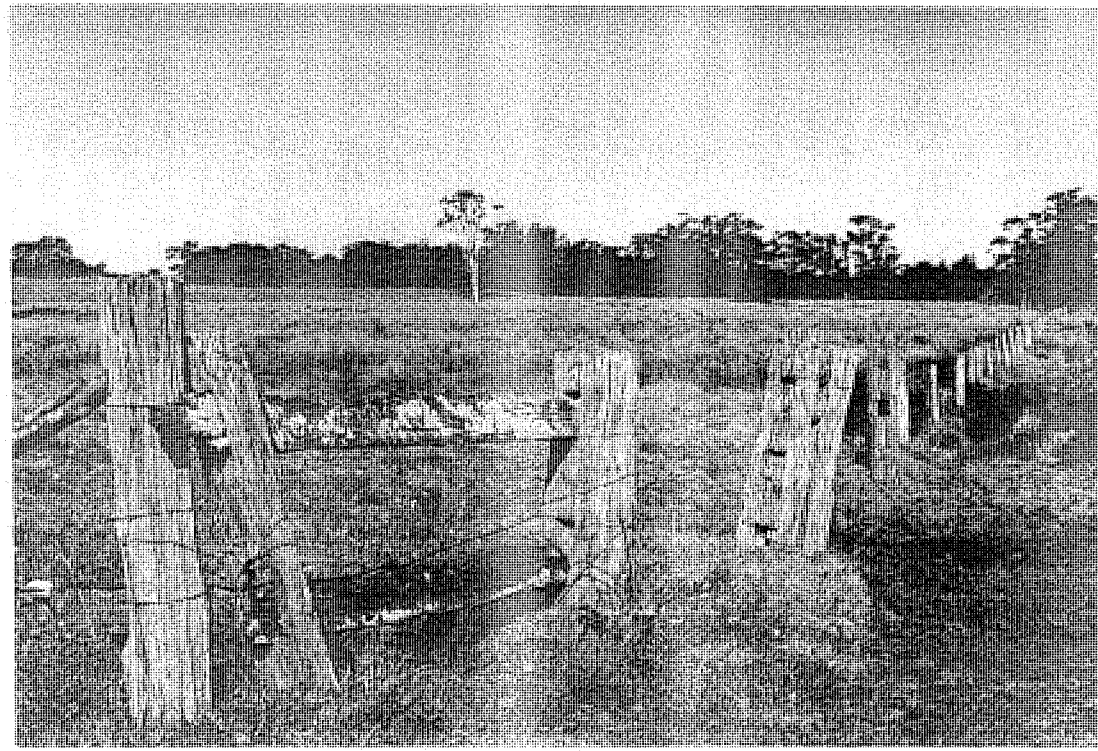
Joseph Lycett ca 1822
"VIEWS IN AUSTRALIA"
PUBLISHED J. SOUTER, LONDON 1824 pl 5



Above: Stockyard and hay shed.

Above right: The remains of a dairy structure.

Right: The remains of about four phases of fencing, south of the hay shed.



7.1 SUMMARY OF RELATED SITES

The following were cursorily examined to provide a better context for the features recorded in the study area. There were many other items on the property deserving recording but were not directly relevant to features found in the study area.

HAY SHED AND STOCKYARD AREA

The hay shed and stockyard area was the focus of several phases of Comberton Grange as a farm as a whole. The stockyard is the earliest element to have survived and dates between the 1840s and 1880s but has been added to, strengthened over the years and still functions as a stockyard. If it was an extension to the main farm complex, there would have been earlier structures like barns and huts for the accommodation for workers. The present hay shed does not predate the 1940s, judging by the cladding and framing. A concrete tank (?) was built against the south end of the hay shed.

There is evidence that the area was used as a dairy. Four supporting posts of a dairy structure survive, west of the hay shed. It appears that the floor, of a primitive form of concrete, was added later but shows that the structure extended further toward the barn and had an entrance on the south side. The surviving posts (there were several more once) supported top plates to carry roof framing. Two of the posts have mortises for rails or braces, the function for these is not clear, those posts may even have been reused from a previous structure. A long iron feeding or water trough lies over this ruin, an identical trough is still in use for water along the fence line to the north.

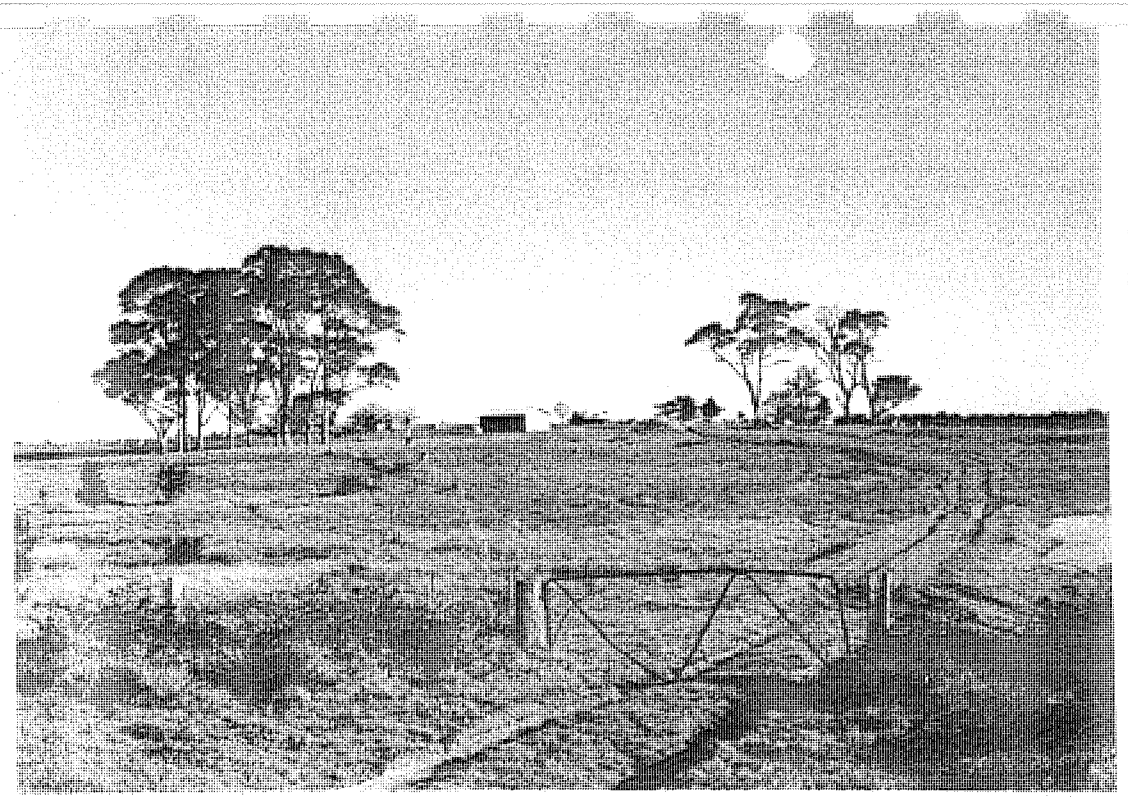
Westward of the dairy structure is a rectangular pond connected to a natural pond further west. The pond was fenced with split post and wire fencing of a similar nature and date as noted in the area of lots 7 to 9 and at the Comberton Grange farm complex. At the head of the pond are the remains of an iron windmill pump, the water pipes are still in situ.

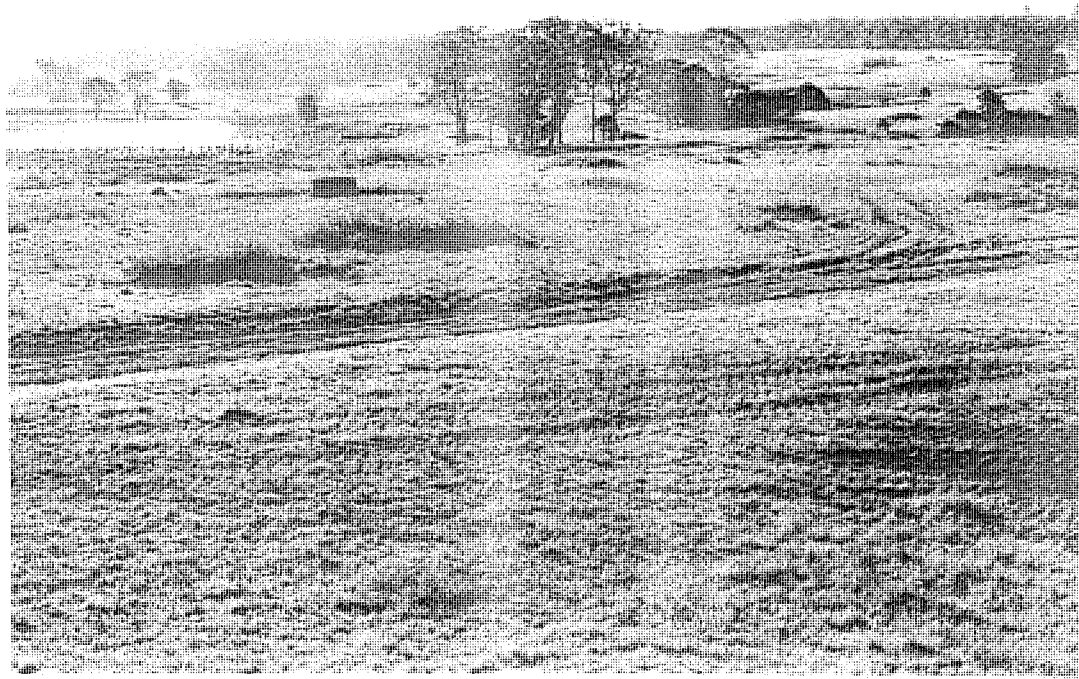
To the south of the hay shed is a clump of bulb plants of the Amaryllis family, these may mark the site of a former cottage or hut. No signs of building materials were found around this area.

Another remnant planting is near the fence line eastward of the stockyard next to eucalyptus trees. The stunted tree resembles Pinus radiata but I suspect it to be other than the species radiata and may relate to a better formed specimen (Pinus sp) at Comberton Grange farm complex.

COMBERTON GRANGE FARM COMPLEX

This is located some distance east (south-east) of the study area and is marked with buildings indicated on the Nowra topographical map (9028-3-S). Time did not permit a detailed examination but elements of the site, such as dam construction and remnant plantings, clearly related to elements in and around the study area.

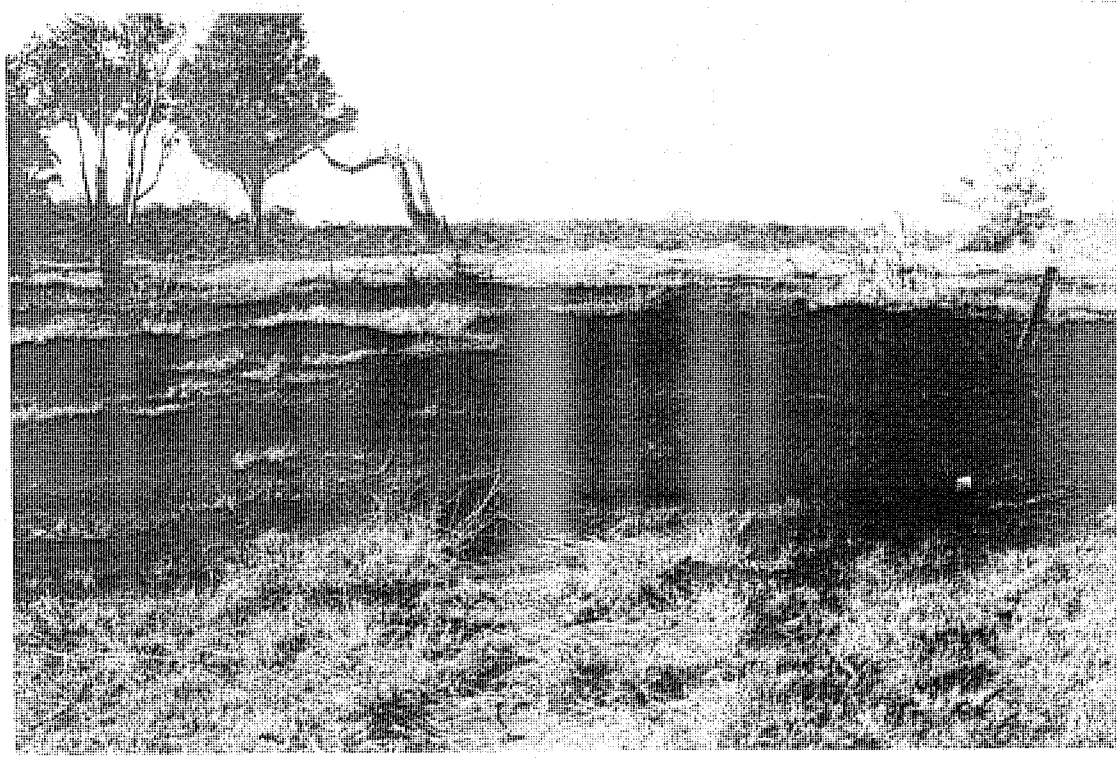




Above: View of the front gate of Comberton Grange farm complex, looking southward.

Above right: View from Comberton Grange farm complex looking north-west toward the study site. The post and rail fence and hay shed can be seen from various parts of the farm complex.

Right: Site of the original house at Comberton Grange, showing the back concrete path (mid bottom). This path likely indicated the location of the backdoor and hallway.



The old house site is marked by a number of rough stones (possibly used for the original south verandah), a scatter of bricks, and a coloured concrete path, on the south side, marking the location of the back door. The front door area was marked by one surviving Camellia (a similar arrangement found at Erowal Farm near Vincentia). Other remnant plantings defined the greater yard around the house and beyond, too numerous to list here. There was also a collapsed timber slab shed at the north-east corner of the house yard. Further out from the house yard were the remains of dams, sheds, a privy, a fairly recent barn, concrete and iron water tanks, stockyards, fences and an old road.

There is a clear view from here toward the study area where the post and rail fences and hay shed are clearly visible.

MISCELLANEOUS

There are a number of old post and rail fence remains at Comberton Grange, remnants of early field divisions. There are also a number of small dams or artificial ponds scattered over the property. There was not sufficient time to record these, or other sites on the property, as they fell outside the study area.

An early road was located to the north of the present road to Comberton Grange on the high land before the descent down to the north entrance of the farm complex.

Post and rail fencing at the west entrance to the Comberton Grange property. On the north side of the entrance gate one post was reused as a strainer, the third and fourth posts further north, survive in situ, having a spacing of eight feet (2440mm), the next original post is located around the 20th post spacing.

8.1 BIBLIOGRAPHY

The study site and immediate area does not have a very extensive bibliography. The State Library of New South Wales, the Mitchell Library, the public library at Nowra and Shoalhaven City Council were consulted. The Nowra library holds the most extensive collection of books, reports and primary source materials. The combined index of the State Library of N.S.W and Mitchell Library revealed little direct relevant material on the region but there are, for example, map collections, regional directories, newspapers and newspaper indexes, government records, manuscript collections to consult if a more detailed site history is ever required.

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