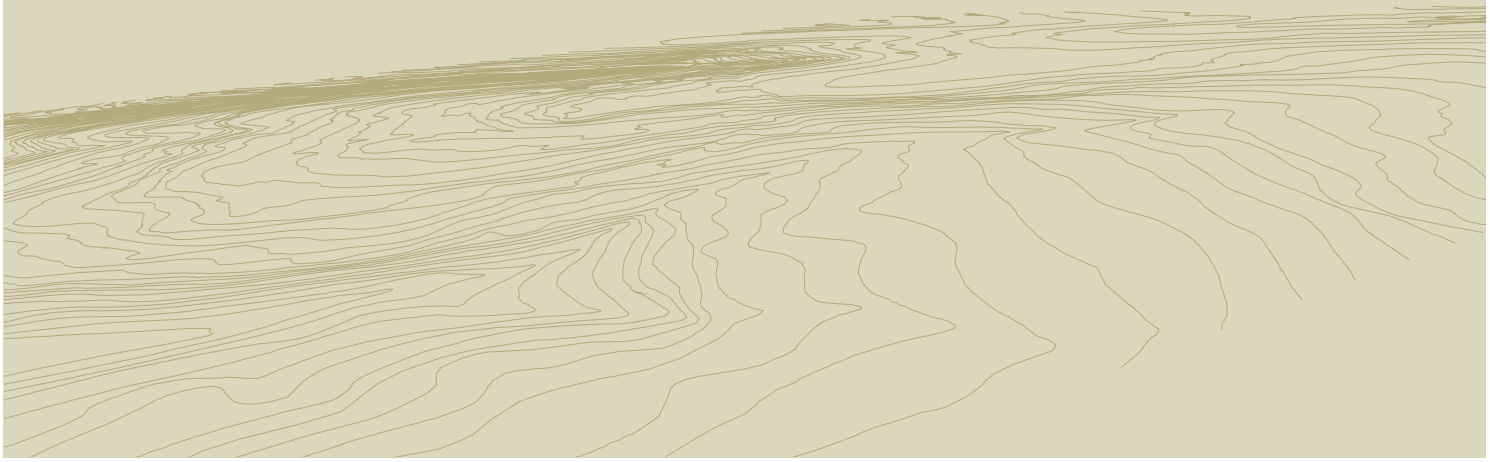
Appendix J

NSW Department of Public Works and Services, 2002: Landfill Siting Study, Aerial Photographic Survey

ARMIDALE REGIONAL LANDFILL

Environmental Assessment



Armidale Dumaresq Council

Landfill Siting Study

Aerial Photographic Survey

NSW Department of Public Works and Services

JUNE 2002

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1. INTRODUCTION

1.1 OBJECTIVE

The Department of Public Works and Services (DPWS), Lismore were engaged, in June 2002 by Armidale Dumaresq Council, to undertake a brief review of aerial photographs, to determine if suitable landfill sites, other than those previously identified by Council, might exist.

1.2 BACKGROUND

Consultants Brian J. Mackney & Associates Pty. Ltd. (BJM), ERM Mitchell McCotter (ERM), and the Department of Public Works and Services (DPWS) previously reported on a total of nine landfill sites.

BJM was engaged in 1996 jointly by Armidale, Dumaresq and Uralla Councils to assist Councils in landfill siting investigations. This engagement was to *establish baseline information about the region and to determine what are likely to be the key landfill site selection criteria.* This was to narrow the focus of investigation to areas of maximum potential.

BJM was then engaged to carry out assessments of sites which had been identified by Council. These studies were presented in the following reports:

- Preliminary Regional Landfill Siting Study (PRLSS) - BJM July 1996
- Landfill Siting Study - Metz Site Assessment - BJM December 1996
- Preliminary Site Assessment Sites 2, 3 & 4 - BJM November 1997
- Preliminary Site Assessment Sites 5, 6 & 7 - BJM July 1998

ERM was then engaged by Boral to carry out further studies on Site 1, the Metz quarry owned by Boral, as follows:

- Preliminary Desktop Investigation – Metz Quarry - ERM January 1999
- Preliminary Geotechnical & Hydrogeological Investigation - ERM April 2000
- Draft Concept Design Proposed Landfill Site Metz Quarry - ERM March 2001

The ERM studies relate only to Site 1 and deal specifically with the geology and hydrogeology of the site, and the concept for landfill layers, sealing, drainage and collection of leachate.

DPWS were subsequently engaged to carry out a Peer Review and Risk Assessment of the work previously done by BJM and ERM. In addition they examined two new sites (Sites 8 & 9) using the same methodology previously employed by BJM.

- Landfill Facility Peer Review – DPWS, June 2001.
- Siting Study Site 8 Assessment – DPWS, June 2001
- Siting Study Site 9 Assessment – DPWS, April 2002

Geotechnical Consultants Australian Soil and Concrete Testing P/L, under the direction of DPWS, were engaged by Council to report on more detailed geotechnical investigations of Site 9.

Following these investigations and reports, Site 9 has been recommended by DPWS as the preferred site for a landfill.

2. AERIAL PHOTOGRAPHIC SURVEY

In a further effort to identify other possible landfill sites, Council engaged DPWS to conduct a review of aerial photographs of target areas nominated in the PRLSS (BJM July 1996).

These efforts have been focussed on areas to the north and east of Armidale, acknowledging the expressed interest of Guyra Council in using the proposed regional landfill and the need to maintain acceptable proximity of the facility to that Council's area.

2.1 METHODOLOGY

Figure 1 shows the aerial extent of photographs included in the review. The survey included all Csx and Ccgs geological formations located within an area bounded to the west by the Dumaresq Dam, to the north by Black Mountain, east to Hillgrove and Four Mile Creek and south to Bald Knobs Hill and Hillgrove. These formations were previously identified in the PRLSS as offering the most suitable geology in the region for the siting of a landfill.

A total of 119 aerial photographs, at a scale of 1:25000, were obtained from Land and Property Information NSW. The photographs were taken from an aerial photographic survey dated 10th May, 2001. Details of photographs are as follows:

Area	Film No.	Run No.	Print Numbers
Armidale	4556	1	131 – 146 (inclusive)
Armidale	4556	2	215 – 229 (inclusive)
Guyra	4554	9	141 – 154 (inclusive)
Guyra	4556	10	28 – 43 (inclusive)
Guyra	4556	11	56 – 73 (inclusive)
Guyra	4556	12	78 – 97 (inclusive)
Guyra	4556	13	104 – 123 (inclusive)

Figure 1 - Aerial Photographic Runs

The photographs were viewed as stereo-pairs using a SOKKIA MS27 Mirror Stereoscope. The MS27 is specifically designed for detailed interpretation of aerial photographs, allowing direct or magnified (x 3) viewing. The field of view (18 x 23 cm) allows adequate viewing of 23 x 23 cm format stereo photographs. The standard binoculars (x 3) of the MS27 have a 70mm field of view.

Direct viewing was used, in the first instance, to broadly identify potentially suitable sites. The binoculars were then used for more detailed examination of each site.

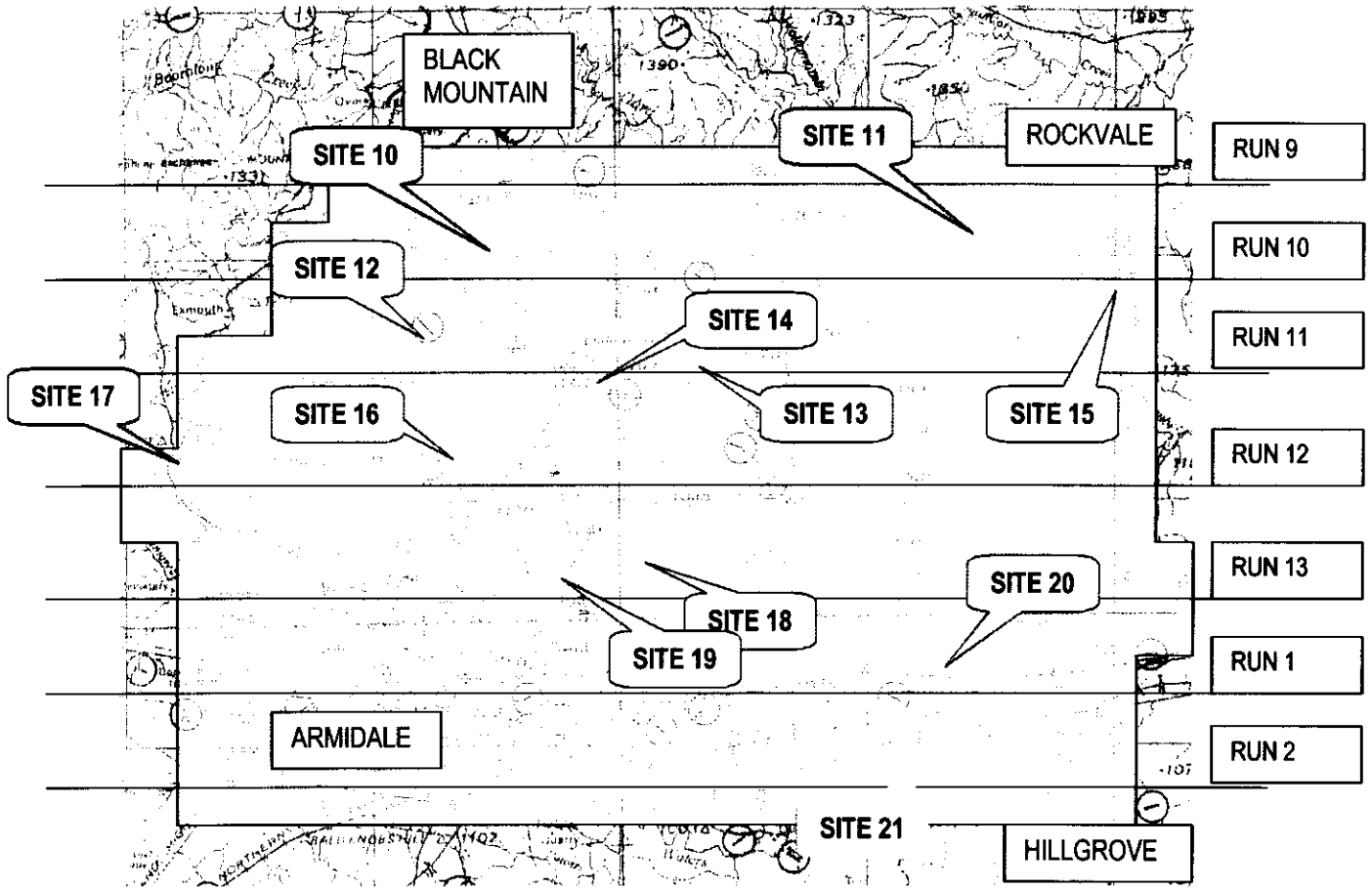


Figure 2 - Photographic Runs & Site Locations

-- *Photo Coverage*

2.1.1 Site Identification Criteria

Target sites for the aerial survey were identified with reference to the selection criteria adopted in the earlier PRLSS. These were interpreted for application to the aerial photographic survey. The primary identification criteria used in the photographic survey were as follows:

Criteria	Comment
Suitable geology	Assessed by reference to the PRLSS
Distant from waterways	Separation distance subjectively assessed, taking into account practical management of surface & groundwater.
Low ground relief	Sites with slopes > 5% discarded.
Good surface water control	Sites at head of catchment targeted
Minimal external catchments	Avoid through flow of run-off
Good erosion protection	Control of surface run-off & slopes
Compatibility with adjoining development	Adequate buffer distance > 1 km approx.
Low agricultural value	Defined by soils, geology, terrain.
Visually protected	Subjective assessment, subject to inspection
Minimal impact on local roadways	Limit distances to main road.
Adequate road access	Elevated, flood free, alignment.
Proximity to centres serviced	Locate nearest centroid of service area
Topography and terrain	Undulating with adequate protection
Elevated	Flood free
Capacity for 50 years minimum	Preferably 100 year capacity
Opportunity for expansion	Desireable
Orientation	North easterly preferred. Protected.

Table 1 - Site Identification Criteria

2.2 OUTCOMES.

The review identified an additional twelve (12) possible sites. These are discussed in the context of the primary identification criteria listed in Table 1. Subjective assessments for the twelve sites are provided in Table 2 below.

Site	Run	Photo No.	Comment
10	10	40	Isolated location. Poor road access. Exposed visual aspect. Limited capacity.
11	10	32	Remote location. Poor road access. Distant from centres serviced. Substantial on site roads required. Elevation excessive. Surface water controls difficult.
12	11	59	Visually and physically exposed site. Costly highway intersection. Soils appear erodible, possible dispersive. External surface water catchment. Nearby dwellings. Not favoured.
13	11	63	Three potential sites of variable potential. Good capacity and potential for expansion. Nearby dwellings possible constraint. Visually exposed? External catchments would require careful attention. Orientation variable but manageable. Geology & soil type possibly basalt with associated groundwater issues.
14	11	65	Exposed southwest orientation. Large capacity. Remote. Access poor. Lengthy internal access road required. Soils unknown. Possibly basalt. Not recommended.
15	11	73	Remote location. Limited capacity. Rocky outcrops suggest site is unlikely to have adequate construction materials, particularly clays.
16	12	86	Unsuitable terrain. Surrounding soils appear susceptible to erosion. Difficult to manage external catchments. Nearby dwellings within line of site. Not favoured.
17	12	98	Visually exposed. Access and location OK, although dust may be an issue on access road. Indirect access from Guyra. Not favoured.
18	13	118	Lengthy access roads. Mix of small sites would cause difficulties in managing stormwater and leachate. Remote from dwellings. Landform suggests basalt, with inherent groundwater issues. Doesn't appeal.
19	13	114	Visually exposed and adjacent (~ 2km) closely developed area. West orientation not desirable. Proximity and access to Armidale good. Not recommended.
20	1	133	Two sites considered. First site visually exposed to main road. Second site has external catchment which may be difficult to manage. Not favoured.
21	2	226	Two possible sites. Relatively steep terrain. Geology appears a mix of igneous extrusions, with potential groundwater issues. Access good. Not ideal topography.

Table 2 - Subjective Assessment of Sites

3. CONCLUSIONS

This report concludes that none of the possible sites identified by this preliminary aerial photographic review are likely to offer a superior alternative to the previously recommended Site 9 when compared using site identification criteria listed in Table 1 of this report. In these circumstances, none of the sites are recommended for further investigation while Site 9 remains a viable option.

Given the level of detail available on the aerial photographs, it is unlikely that other sites exist other than those identified by this investigation.

The report supports the earlier conclusions of the DPWS "Siting Study - Site 9 Assessment" and recommends that Council proceed with the ongoing Environmental Impact Assessment of Site 9 and other investigations into alternative processes now in progress.

4. APPENDICES

APPENDIX A – AERIAL PHOTOGRAPHS OF POTENTIAL SITES

Site 10 - Run 10, South of Black Mountain

Site 11 – Run 10, Southwest of Rockdale

Site 12 – Run 11, North of Tillbuster

Site 13 – Run 11, Northeast of Tillbuster

Site 14 – Run 11, Northeast of Tillbuster

Site 15 – Run 11, Southeast of Rockdale

Site 16 – Run 12, East of Tillbuster

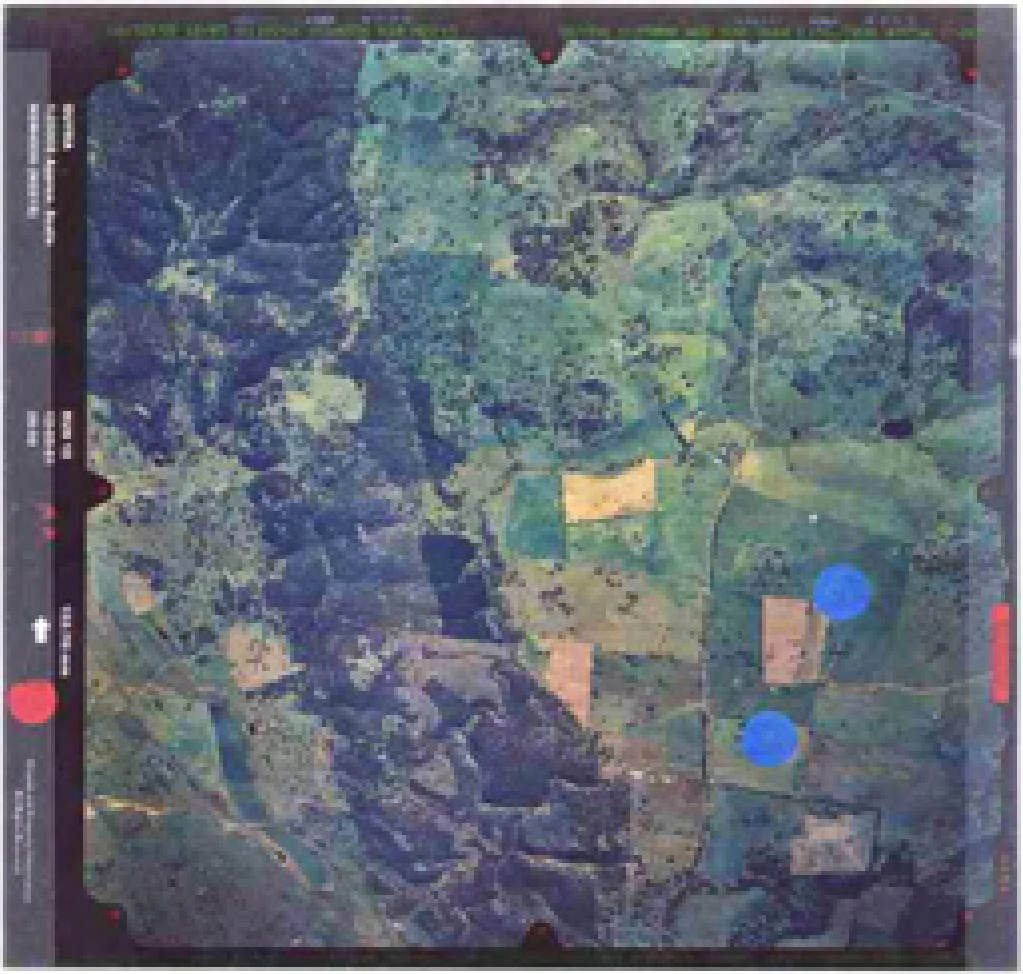
Site 17 – Run 12, Dumaresq Dam

Site 18 – Run 13, Northeast of Armidale

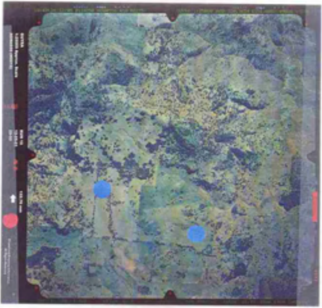
Site 19 – Run 13, Northeast of Armidale

Site 20 – Run 1, Grafton Road east of Armidale

Site 21 – Run 2, South of Grafton Road at Hilgrove



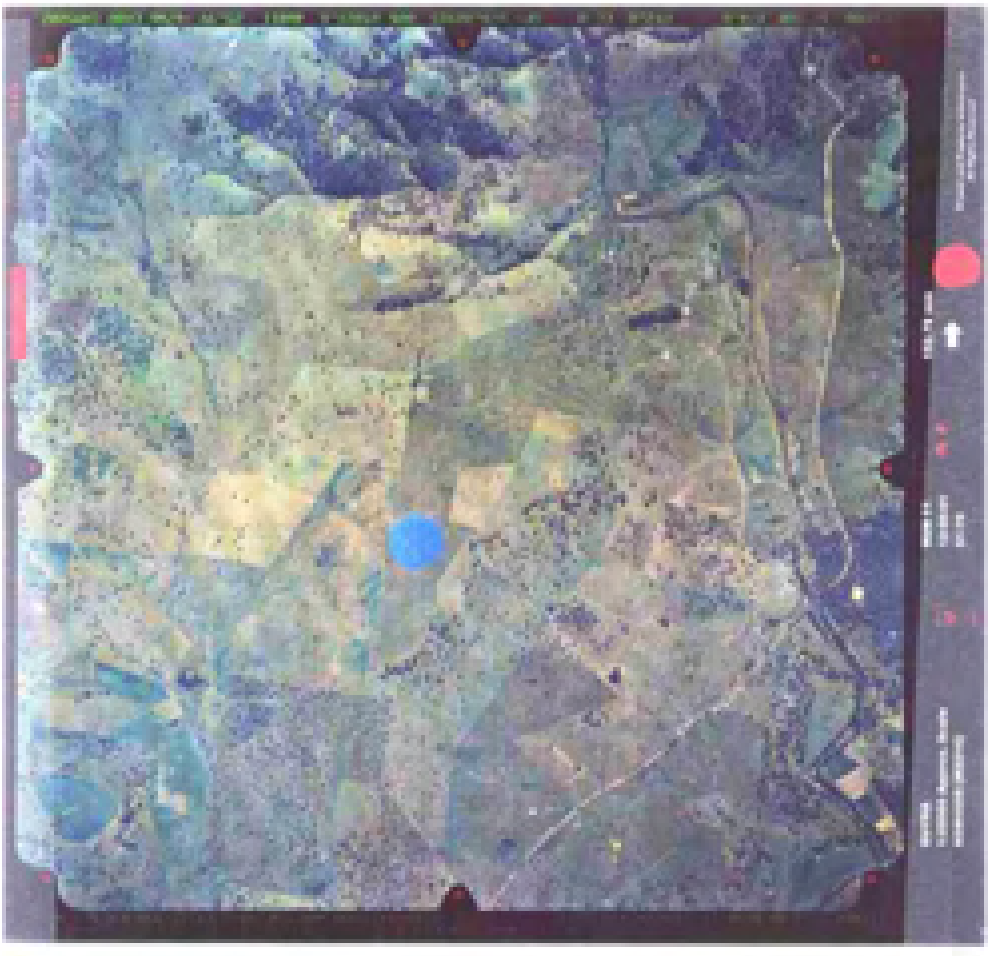
Site 10 - Run 10, South of Black Mountain



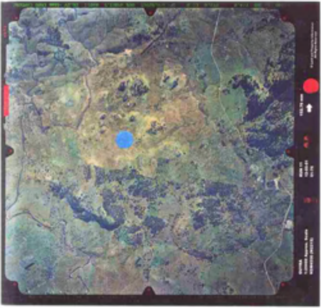
Site 11 – Run 10, Southwest of Rockdale

Site 12 – Run 11, North of Tilbuster

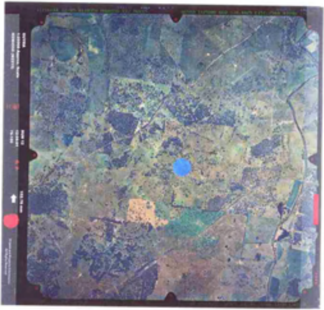
Site 13 – Run 11, Northeast of Tillbuster



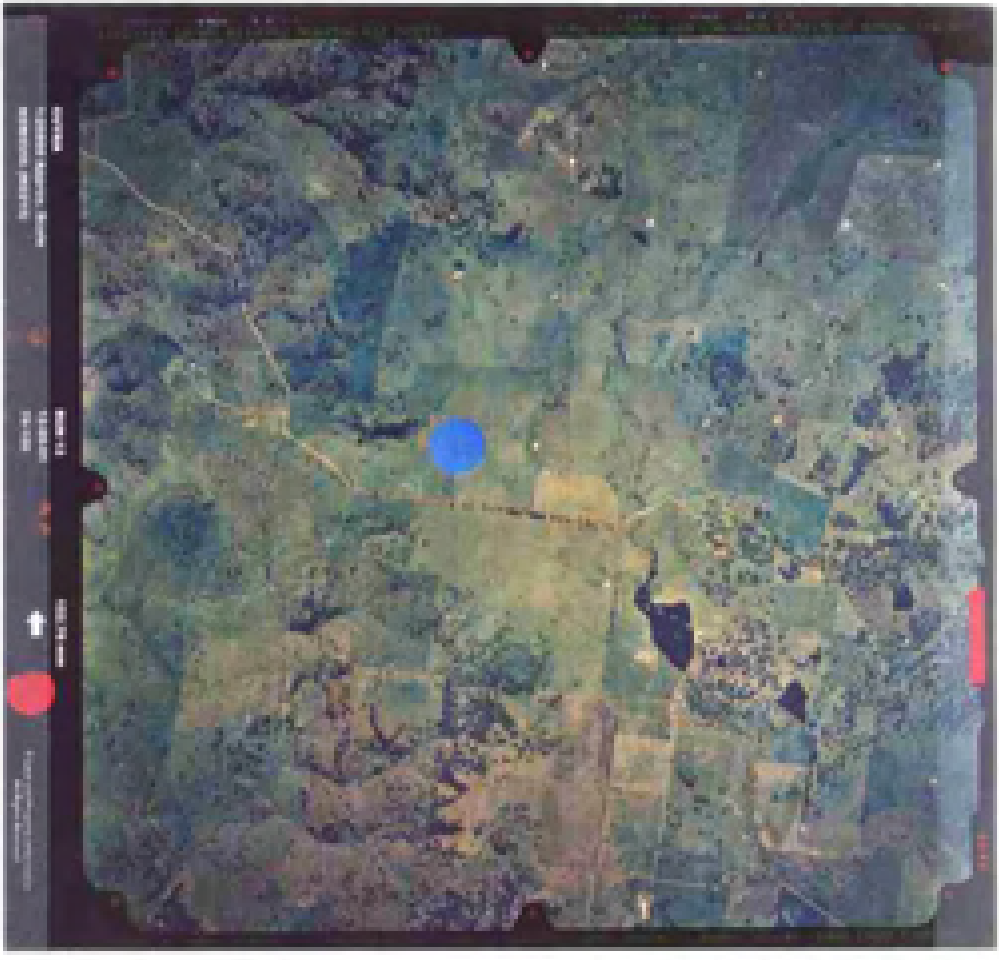
Site 14 – Run 11, Northeast of Tillbuster



Site 15 – Run 11, Southeast of Rockdale



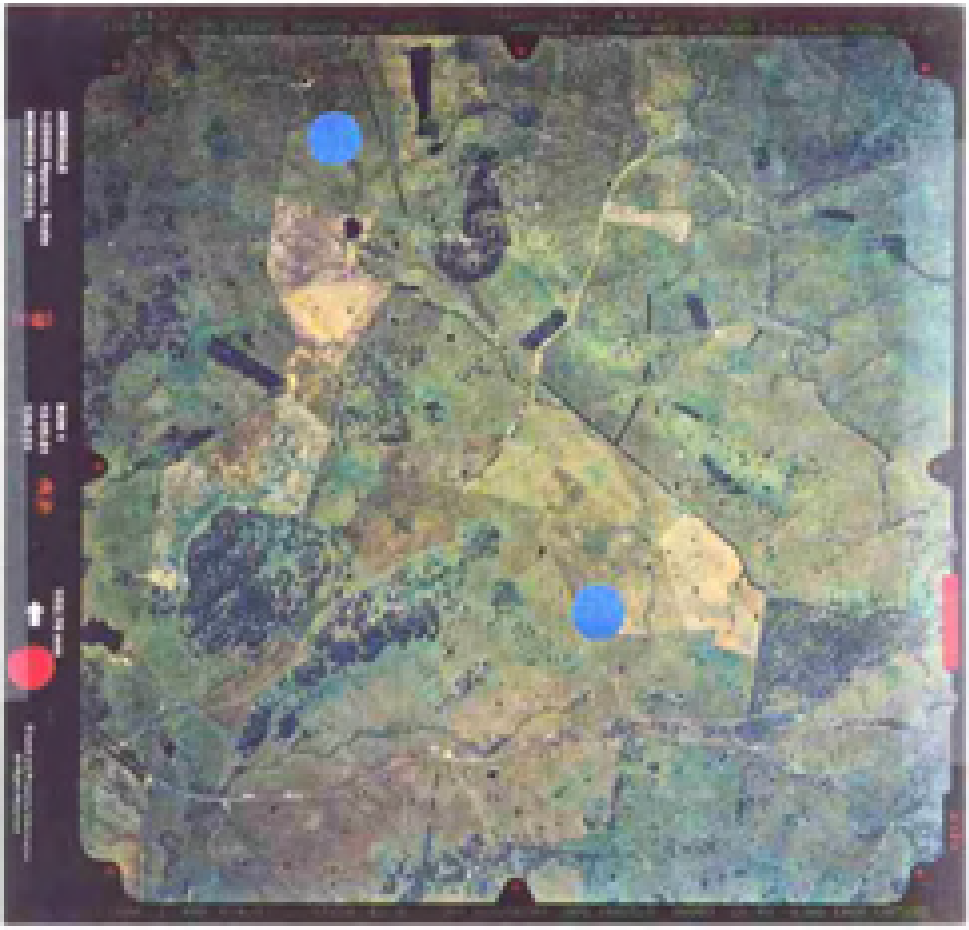
Site 16 - Run 12, East of Tilbuster



Site 17 – Run 12, Dumaresq Dam

Site 18 – Run 13, Northeast of Armidale

Site 19 – Run 13, Northeast of Armidale



Site 20 – Run 1, Grafton Road east of Armidale

Site 21 – Run 2, South of Grafton Road at Hillgrove