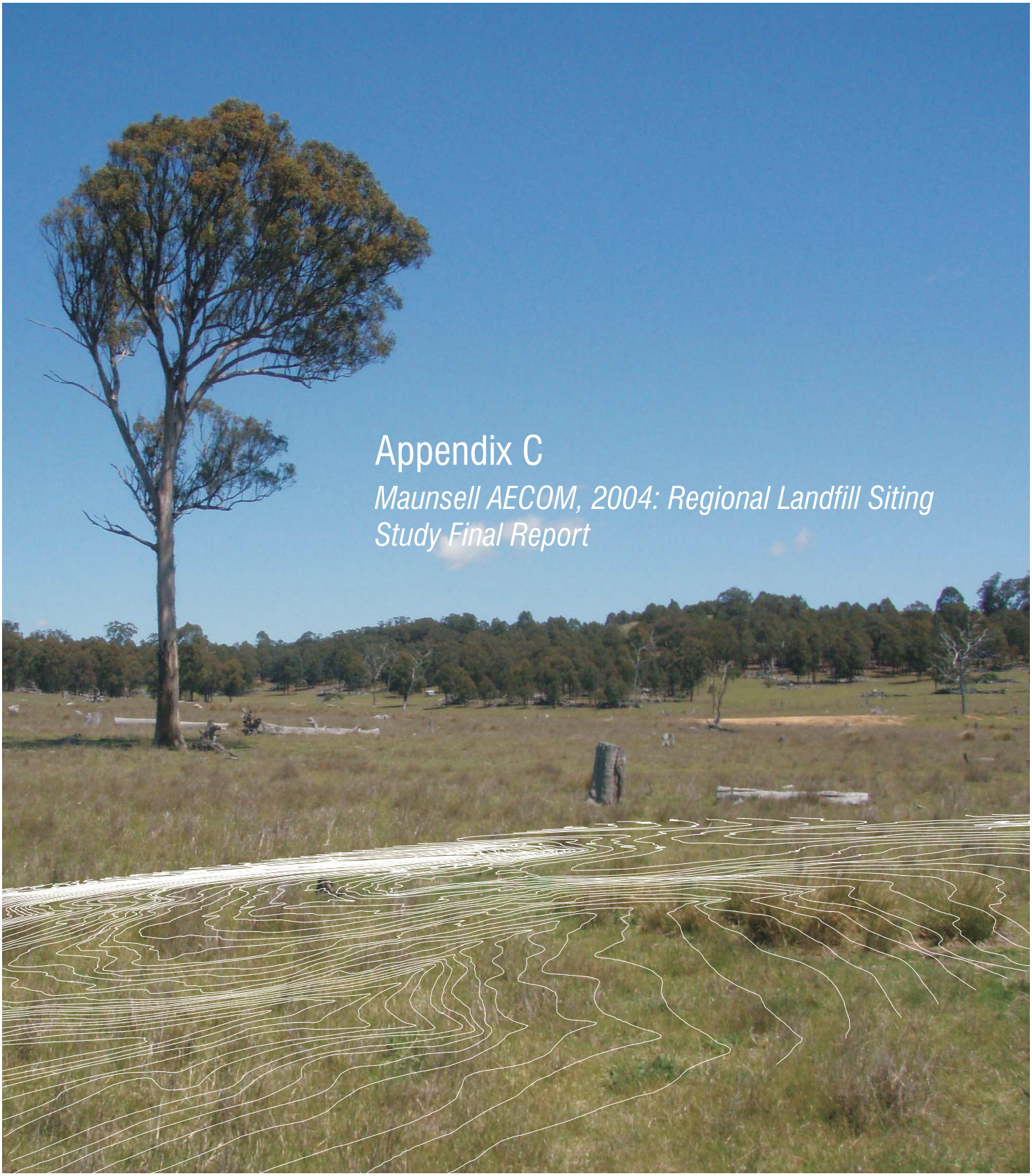
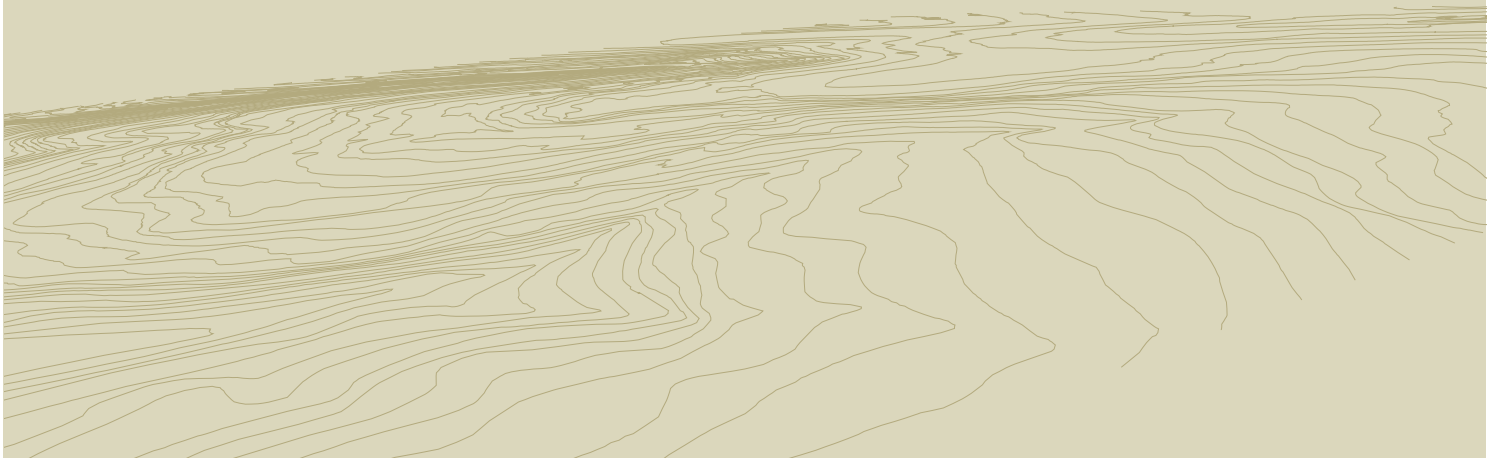


# Appendix C

*Maunsell AECOM, 2004: Regional Landfill Siting Study Final Report*

# ARMIDALE REGIONAL LANDFILL

*Environmental Assessment*



maunsell

# Regional Landfill Siting Study

**Final Report**

## Armidale Dumaresq Council

**March 2004**

# Regional Landfill Siting Study

Prepared for

Armidale Dumaresq Council

Prepared by

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| Date | March 2004 |
| Prepared by | Matthew Hinton |
| Reviewed by | Michael Borman |

**To review ten sites for the siting of a regional landfill.**

**Revision History**

| Revision | Revision Date | Details | Authorised | |
|---|---|---|---|---|
| | | | Name/Position | Signature |
| 1 | 25/11/2003 | Draft Report | Kevin Mills<br>Group Manager | Original signed |
| 2 | 17/12/2003 | Draft Report for Public Consultation | Kevin Mills<br>Group Manager | Original signed |
| Final | 04/03/2004 | Final Report | Kevin Mills<br>Group Manager | |

# Table of Contents

# Executive Summary

Maunsell Australia Pty Ltd (Maunsell) has been commissioned by Armidale Dumaresq Council (Council) to evaluate nine identified sites for the potential siting of a regional landfill. The evaluation was based on a strategy and revised set of criteria and sub-criteria identified in the report titled 'Review of Criteria and Strategy used for Locating Sites for a Regional Landfill' (Maunsell, 2003), which involved the review of a Preliminary Regional Landfill Siting Strategy (PRLSS), performed in 1997, by Brian.J.Mackney & Associates Pty Ltd.

During the performance of the review work by of Maunsell (2003), Maunsell concluded that it was neither feasible nor appropriate to "*Recalculate and adjust the numerical matrix of the Table of Comparison of Sites taking account of amendments or additions to parameters and agreed weightings assigned"* as requested in Council's original project brief, due to:

- Revised site selection criteria, including new sub criteria making the original site evaluations irrelevant;
- A revised ranking scale making re-evaluation of specific sites necessary;
- The consultation process questioning the existing evaluations; and
- The scope supplied in the Consultant's Brief not including detailed site evaluations or site visits.

It was therefore recommended that should Council still wish to consider any of the existing identified sites that had been evaluated using the original PRLSS criteria, that these sites be re-evaluated against the revised criteria and the re-evaluation include consultation with the Armidale Dumaresq Landfill Community Consultative Committee (ADLCCC) and site visits/evaluations.

The scope of work included in the report is as follows:

1. A desktop review.
2. A field investigation.
3. Initial evaluation.
4. Evaluation of an additional Site – Site 10.
5. Presentation of a draft evaluation report.
6. Evaluation of sites 3 and 4 as one combined site.
7. Review and incorporation of public comment.
8. Submission of final evaluation report

The structure of this report is set up to provide:

- The revised strategy and methodology of site selection;
- A siting study for each of the identified sites;
- Evaluation of each of the sites against the established weighted site assessment criteria; and
- Ranking the sites for comparative suitability in a site assessment matrix to give a preferred site.

During the site evaluation desktop and field studies, discussions and interviews with stakeholders were held. Stakeholders consulted included the following:

- Council Employees;
- Landowners of sites under evaluation (where available);

- Neighbouring landowners (where available);
- ADLCCC members;
- Local DIPNR employees;
- Planners from Armidale Dumaresq and Uralla Shire Councils; and
- Local Real Estate agents.

After assessment against each of the sub criteria and ranking on a scale of 1-10 against the primary criteria, the rankings for each of the criteria were transposed into a site evaluation matrix, which was incorporated into a draft report.

After a presentation of the draft report on 8 December 2003 at a special ADLCCC meeting, a motion was passed by the ADLCCC to release the draft report for public comment. A review period was set by Council, which finished 27 January 2004.

Another motion was passed at this ADLCCC meeting, which was to further evaluate sites 3 and 4 as one combined site.

As a result of ADLCCC review of the draft report and the public review period, a total of 16 submissions were received. These submissions were reviewed and incorporated into the report as appropriate, and the matrix was adjusted in accordance with relevant comments.

The weightings for each of the criteria as recommended in the review work by Maunsell (2003) are applied, the sites obtain the overall evaluation scores as shown in table below.

**Site Evaluation Scores and Overall Suitability Ranking**

| Site | Evaluation Score | Comparative Suitability Ranking |
|---|---|---|
| Site 7 - Sherraloy | 372 | 1 |
| Site 4A (Site 3 & 4 combined) | 340 | 2 |
| Site 8 - Waioma | 328 | 3 |
| Site 9 - Miningvale Road | 322 | 4 |
| Site 2 - Bannaweera | 304 | 5 |
| Site 4 - Tillbuster | 292 | 6 |
| Site 1 – Metz Quarry | 278 | 7 |
| Site 3 - Annaleey | 272 | 8 |
| Site 5 - East Mihi | 266 = | 9 |
| Site 6 - Pinaroo | 266 = | 9 |
| Site 10 - Greenhill | 0 | NA |

From these evaluation scores, the sites have been ranked from 1 to equal 9 in order of their comparative suitability for use as a regional landfill site. Site 10 was not assessed further due to a potentially prohibiting zoning restriction.

Based upon this assessment. Site 7, Sherraloy is the best site of the eleven sites considered for location of a regional landfill facility.

It must be re-iterated at this point that there is no 'ideal' score above which a site becomes the ideal location for a landfill, nor is there a threshold score over which a site becomes suitable for a landfill. This result is purely based upon comparative evaluation of the eleven sites in question, giving the most suitable site out of these ten.

It is recommended that should Council wish to proceed with the preferred site or any other site(s), that concept design and costings are undertaken as the next step.

Should Council then wish to proceed further with the preferred or any other selected site(s), then in accordance with SEPP48 and the DUAP Guidelines, an EIS should be performed. The Director General should be formally contacted to ascertain the Department of Infrastructure, Planning and Natural Resources'(DIPNR) requirements in the EIS. All issues that have been noted within the site selection criteria will then be required to be addressed in detail within the EIS.

As SEPP48 requires the Planning Minister to be the consent authority, the development application and EIS would be required to be assessed by DIPNR.

A Planning focus meeting should be held to obtain all regulatory stakeholder requirements.

Should council wish to evaluate other sites, it is recommended that they follow the site identification procedure outlined in Maunsell, (2003).

# Glossary

| | |
|---|---|
| ADLCCC | Armidale Dumaresq Landfill Community Consultative Committee |
| bgs | below ground surface |
| BH | Borehole |
| Council | Armidale Dumaresq Council |
| DEC | Department of Environment and Conservation (formerly EPA) |
| DG | Director General |
| DIPNR | Department of Infrastructure, Planning and Natural Resources (formerly DUAP) |
| DPWS | Department of Public Works and Services (Now Department of Commerce) |
| DUAP | Department of Urban Affairs and Planning (Now DIPNR) |
| EIS | Environmental Impact Statement |
| EPA | Environment Protection Authority (Now DEC, Environmental Protection Division) |
| ERM | ERM Australia Pty Ltd |
| FML | Flexible Membrane Liner |
| GCL | Geosynthetic Clay Liner |
| LGA | Local Government Area |
| LEP | Local Environmental Plan |
| Mackney | Brian Mackney & Associates Pty Ltd |
| Maunsell | Maunsell Australia Pty Ltd |
| NPWS | National Parks and Wildlife Service (Now DEC) |
| PRLSS | Preliminary Regional Landfill Siting Study |
| REP | Regional Environmental Plan |
| RTA | Roads and Traffic Authority |
| SEPP | State Environmental Planning Policy |

# 1.0 Introduction

## 1.1 Introduction

Maunsell Australia Pty Ltd (Maunsell) has been commissioned by Armidale Dumaresq Council (Council) to evaluate a number of identified sites for the potential siting of a regional landfill. The evaluation will be based on a strategy and revised set of criteria and sub-criteria identified in the report titled 'Review of Criteria and Strategy used for Locating Sites for a Regional Landfill' (Maunsell, 2003).

The structure of this report is set up to provide:

- The revised strategy and methodology of site selection;
- A siting study for each of the identified sites;
- Evaluation of each of the sites against the established weighted site assessment criteria; and
- Ranking the sites for comparative suitability in a site assessment matrix to give a preferred site.

## 1.2 Background

In 1996, a study was undertaken to investigate the siting of a regional landfill for the Armidale, Dumaresq and Uralla local government areas of NSW. The 'Preliminary Regional Landfill Siting Study' (PRLSS) - Brian J Mackney & Associates Pty Ltd, (1996a) was a joint study commissioned by Armidale City, Uralla and Dumaresq Shire Councils, which sought to reduce the areas under consideration for the siting of the landfill by eliminating unsuitable areas and identifying key selection criteria in order to focus on specific areas of maximum potential.

Conclusions from the investigation were that site geology and hydrogeology were likely to be the key factors that will influence the successful selection of a site for a landfill facility. The study identifies four broad geological formations of tertiary basaltic volcanics and other extrusive; Permian and Triassic granite, adamellite, granodiorite and other plutonic intrusives; late Carboniferous metasediments, dominated by the Girrakool beds and Agnes Greywacke; late Devonian, early Carboniferous metasediments, dominated by Sandon beds and Lochaber Greywackes (with acronyms B, G&A, CCGS and CSX respectively) as likely to provide best prospects as a result of their limited groundwater potential. Seven suitable geological formations were identified in the study area and a matrix was developed to rank each location for the various parameters. Based on this analysis, areas numbered 2, 4 and 6 identified on pages 38 and 41 of the PRLSS, appeared to offer the best potential for siting a regional landfill.

Between 1996 and 1998, following consultation with local real estate agents as to availability of land, seven sites (Sites 1 to 7) had been identified as potential regional landfill sites, being consistent with the criteria recommended in the PRLSS.

During 1998 the "Joint Councils Regional Landfill Advisory Committee" was formed between Armidale City and Dumaresq Shire Councils, with support from Uralla Shire Council. The committee considered and eventually declined a number of landfill options.

In February 2001, Armidale City and Dumaresq Shire councils amalgamated resulting in the formation of Armidale Dumaresq Council and the disbanding of the Joint Councils Regional Landfill Advisory Committee.

Investigations for a new regional landfill site were continued by Council, with a number of new options (Sites 8 and 9) being explored and some of the original options being re-visited.

In early 2003, Council endorsed the formation of the Armidale Dumaresq Landfill Community Consultative Committee (ADLCCC) to consider the landfill siting and other waste associated issues. The ADLCCC is constituted as follows:

- 3 Council Representatives;
- 6 Stakeholder Representatives from the three landfill sites under consideration at the time (Sites 7, 8 and 9);
- 1 Independent Chair; and
- 5 Members of the public.

After the performance of various risk studies, peer reviews and aerial terrain reviews of the work performed to date and much discussion between Council and the ADLCCC, it was decided to review the original PRLSS. As such, a brief was prepared by Council and approved by the ADLCCC for an independent consultant to perform such a review.

Tenders were submitted by consultants and the ultimate selection of Maunsell to perform this review was undertaken by Council in consultation with the ADLCCC, based upon experience, methodology and price.

During the performance of 'Review of Criteria and Strategy used for Locating Sites for a Regional Landfill' (Maunsell, 2003), Maunsell concluded that it was neither feasible nor appropriate to "*Recalculate and adjust the numerical matrix of the "Table of Comparison of Sites" taking account of amendments or additions to parameter and agreed weightings assigned"* as requested in Council's original project brief,
due to:

- Revised site selection criteria, including new sub criteria making the original site evaluations irrelevant;
- A revised ranking scale making re-evaluation of specific sites necessary;
- The consultation process questioning the existing evaluations; and
- The scope supplied in the Consultant's Brief not including detailed site evaluations or site visits.

It was therefore recommended that should Council still wish to consider any of the existing identified sites that had been evaluated using the original PRLSS criteria, that these sites be re-evaluated against the revised criteria and the re-evaluation include consultation with the ADLCCC and site visits/evaluations.

Subsequent discussions with Council and the ADLCCC concluded that it was desired to re-evaluate the nine existing identified and 'shortlisted' sites.

## 1.3 Scope of Study

The scope of work as required by Council and study methodology as defined in the brief is as follows:

**1. Desktop Review**

Perform a desktop review of the nine sites, including a review of the following data and information sources:

- Available existing site investigations and evaluations;
- Relevant LEP zoning plans for the site and surrounding land;
- Topographic maps;
- Geological maps;
- Groundwater maps/ existing bore information; and
- Other relevant and available information.

As a result of the review, information that assisted with evaluation against the site selection sub-criteria was noted and recorded on the site evaluation sheets. This task aimed to fill in any gaps in data that had not been addressed in the original site evaluations.

**2. Field Investigation**

A field inspection of each of the sites was carried out in order to determine any local site issues that were not evident from the desktop study. This included discussions and/or joint visits with Council Officers and, where possible, brief discussions were held with the land owners themselves, neighbouring landowners, members of the ADLCCC, and local DIPNR officers. As a result of this review, information that assisted with evaluation against the site selection sub-criteria was noted and recorded on the site evaluation note sheets.

**3. Final Evaluation**

Notes recorded on the site evaluation note sheets from the desktop study and subsequent field visits, were then evaluated against the relevant site evaluation sub-criteria and primary criteria from each of the sites and were ranked in accordance with the recommendations of Maunsell (2003).

After ranking each site on a scale of 1-10 for each of the primary criteria, rankings were incorporated into the weighted site evaluation matrix (**Section 4**), in order to ascertain a score for each site that will give a preferential order of sites with respect to suitability for landfill location.

**4. Evaluation of an additional Site – Site 10**

During performance of the field studies, it was brought to Council's attention that a site to the east of Armidale was currently advertised for sale by auction. Upon Council's advice, Maunsell was requested to evaluate, where possible, this additional site, now known as Site 10, against the selection criteria. The investigation of this site was to be limited only, due to time constraints imposed upon issuing this report. Should the preliminary investigation of Site 10 show it to appear suitable against the criteria against which it was able to be investigated, then further investigation may be necessary.

**5. Presentation of Draft Evaluation Report**

As part of the consultation process, Maunsell has presented the draft evaluation report to both Council and the ADLCCC at a special ADLCCC meeting on 8 December 2003, in order to address any concerns regarding the evaluations and 'fine-tune' the rankings according to any further recommendations prior to issuing the final version of the report to Council.

a motion was passed by the ADLCCC to release the draft report for public comment. A review period was set by Council, which finished 27 January 2004.

**6. Evaluation of sites 3 and 4 as one combined site**

At the presentation of the draft report to the ADLCCC meeting, a motion was passed which was to further evaluate sites 3 and 4 as one combined site.

This was subsequently discussed with Council and the evaluation of the two sites as one combined site was performed and incorporated into the report.

**7. Review and incorporation of public comment**

At the presentation of the draft report to the ADLCCC meeting, a further motion was passed which was to release the draft report for public comment. A review period was set by Council, which concluded on 27 January 2004. Submissions were received from ADLCCC members and other stakeholders. These submissions were reviewed and the relevant information incorporated into the report and the selection criteria re-evaluated as necessary.

**8. Submission of evaluation report**

At the presentation of the draft report to the ADLCCC meeting, a further motion was passed which was to release the draft report for public comment. A review period was set by Council, which concluded on 27 January 2004. Submissions were received from ADLCCC members and other stakeholders. These submissions were reviewed and the relevant information incorporated into the report and the selection criteria re-evaluated as necessary.

Maunsell's scope for this work as approved by Council and the ADLCCC, did not include the following:

- Identification of any further sites to be evaluated;
- Adjustment of the methodology (e.g weightings) determined during the review of the PRLSS; or
- Determination of the technology to be used for the handling of the region's waste in the future (ie Landfill versus Alternate Waste Technology, etc).

# 2.0 Methodology

This section summarises the recommendations of Maunsell (2003) and provides an overview of relevant criteria and sub-criteria, plus the relative weightings uses to evaluate the criteria.

## 2.1 Criteria

**Table 2.1** shows a breakdown of the primary criterion used to assess each of the sites. For each of the primary criterion a number of sub-criterion are indicated with an explanation of potential measurable critiques. The information source indicates the basis for the evaluation of each sub-criterion, whether by desktop review of existing and/or new information, by site assessment, or both.

**Table 2.1: Overview of Relevant Criteria and Sub-criteria**

| | | Information Source | |
|---|---|---|---|
| | | Desktop | Site |
| **Criterion 1 - Strategic Planning Guidelines** | | | |
| EPA [1]Guidelines | All siting considerations included in the EPA Guidelines are deemed covered by the criteria and sub-criteria covered in the following evaluation (i.e. groundwater issues); | ✔ | |
| DUAP [2]Guidelines | All siting considerations included in the DUAP Guidelines are deemed covered by the criteria and sub-criteria covered in the following evaluation (i.e. distance to waterways, distance to residential areas); | ✔ | |
| **Criterion 2 - Statutory Planning Issues** | | | |
| Council Zoning | Current Council Planning Instruments include:<br>• Armidale City LEP;<br>• Dumaresq LEP;<br>• Uralla Shire LEP; and<br>• Guyra Shire LEP.<br>The Preliminary Armidale Dumaresq Plan 2004 is at public consultation stage, prior to becoming a Draft document, and will eventually replace the Armidale City LEP and Dumaresq LEP. | ✔ | |

[1] The former NSW Environment Protection Authority (EPA) is currently known as the Department of Environment and Conservation (DEC) Environment Protection Division.

[2] The former Department of Urban Affairs and Planning (DUAP) is currently known as the Department of Infrastructure, Planning and Natural Resources (DIPNR).

| | | Information Source | |
|---|---|---|---|
| | | Desktop | Site |
| | While the Preliminary Plan has no statutory standing the intentions of the Plan should be taken into consideration. In terms of zoning implications both plans appear similar in that the least restrictive zone (General Rural 1(a) in the current plans and General Rural 1(1) in the Preliminary Plan) is the only zone that would not 'prohibit' landfill. Other relevant zones include Rural 1(b) or 1(1) 'Arterial Road Frontage' where landfill is prohibited. Zoning is also reflective of minimum subdivision standards which are applicable to all sites; | | |
| Aims and Objectives | Consistency with the aims and objectives of a zone is a significant criteria in terms of guiding proposed development though the statutory planning process; | ✔ | |
| SEPPs & SREPs | Applicable SEPPs may include:<br>• SEPP 44 – Koala Habitat Protection; applies in areas of potential or core Koala habitat;<br>• SEPP 48 – Major Putrescible Landfill Sites; applies for landfill used for the purposes of disposing putrescible waste from more than one LGA and that has the capacity to receive more than 75,000 tonnes of waste per annum or more than 650,000 tonnes of waste over a lifetime. | ✔ | |
| Other Constraints | Other statutory planning constraints may include the RTA approval process for new or upgraded vehicular access from an arterial road. | ✔ | |
| **Criterion 3 - Ground and Surface Water Environment** | | | |
| Regional Geology | Preferred regional geology identified as the metasediments, because of their limited potential for groundwater movement and exploitation;<br>Target geology identified as the Palaeozoic metasediments (CSX and CCGS), found in areas of the former-Armidale City area and Uralla Shire;<br>Least preferred identified as basalt deposits;<br>Least preferred areas identified as the basalt and granitic areas (A, B & G), found in areas of the ex-Dumaresq Shire and Uralla Shire;<br>Whilst not limited to CSX and CCGS zones, other areas raise | ✔ | |

| | | Information Source | |
|---|---|---|---|
| | | Desktop | Site |
| | construction and operation costs due to cost of higher level of lining/leachate control being required. | | |
| Local Geology | Geological formations, rock types and soil characteristics will affect the suitability of the immediate site in terms of supply and suitability of liner construction, cover materials and road construction materials;<br>A good supply of clays for the liner and basaltic rock formations are essential for the economic suitability of the site;<br>High permeability of basalts also allows freedom of groundwater movement, which will adversely affect leachate control;<br>Data review to be reliant on previous investigations performed on site, which are to be assumed as being reliable. | ✔ | |
| Hydrology/Groundwater | Soils to have a low hydraulic conductivity, with little or no local potential for exploitation of connected groundwater;<br>Some groundwater supply is desirable;<br>Alluvial soils are likely to have high levels of vulnerable groundwater.<br>Location of groundwater wells to be found by search of DIPNR records for registered bores within 5km radius of each site. DIPNR supplied records for sites 2 to 9 are provided in **Appendix B**. | ✔ | |
| Land Capability | The higher value agricultural land is normally used for cultivation or intensive grazing, while the lower value agricultural land is used for extensive grazing. The lowest value agricultural land is normally characterised by steep terrain and heavy constraints against grazing or any agricultural use.<br>Land capability not critical for site selection, as landfill can occur on all land types, provided necessary mitigation measures put in place. Land Capability, however, will affect land price. | ✔ | ✔ |
| Leachate Control | Geology and soils need to have low conductivity or connectivity in order to minimise the risk of leachate from the landfill entering groundwater. | ✔ | |

| | | Information Source | |
|---|---|---|---|
| | | Desktop | Site |
| Flooding | Sites should have minimal connectivity to external stormwater catchments;<br>An ideal site will be located at or near the head of the local stormwater catchment to avoid the path of and potential collection of water however, it is usually possible to divert stormwater around the site;<br>Catchment areas and potential for flooding can be checked on-site or by photographic evidence;<br>Flooding down-catchment of landfill site not necessarily critical to landfill operation. | ✔ | ✔ |
| Surface Water Control | Sites should have low ground relief and minimal external catchment opportunities for groundwater;<br>Evidence of surface water direction and control can be checked on-site; | ✔ | ✔ |
| Erosion Protection | Gently sloping land with a good level of cover will support erosion and sediment control;<br>Excessive soil erosion will be evident on-site. | ✔ | ✔ |
| Distance from Waterways | DIPNR (formerly DUAP) Guidelines state an acceptable distance from intermittent or permanent waterways is at least 40 metres;<br>Topographical and site checks can be made. | ✔ | ✔ |
| **Criterion 4 - Local Amenity and Environmental Considerations** | | | |
| Visual Amenity | DIPNR (ex-DUAP) Guidelines state that landfills should not be located within 250 metres of a residential zone, or a dwelling not associated with the facility;<br>Ideal sites will be well protected from adjoining properties by gradient and landform;<br>Vegetative screening can also be useful, however not as effective as landform barriers;<br>Particular notice must be paid to dwellings, public land (such as reserves or parks), rural and arterial roads visible from the site or immediately adjoining land;<br>Visual amenity can be mitigated by the effective use of bunding or vegetative landscaping. | | ✔ |

| | | Information Source | |
|---|---|---|---|
| | | Desktop | Site |
| Flora and Fauna | Minimal disruption to existing levels of flora and fauna both on the site and within a reasonable distance of the site;<br>Ideally the site and surrounding area should be largely cleared of vegetation, and used for extensive purposes such as grazing;<br>Evaluation will be based on observation, however further investigation is recommended during the EIS stage. | ✔ | ✔ |
| Land Environment | Existing landuses and activities should be noted with ideal sites having minimal cultivation/agricultural value;<br>Surrounding landuses should be noted. | ✔ | ✔ |
| Land Compatibility | The setup and operation and rehabilitation of a landfill should be reasonably compatible with surrounding landuses where possible;<br>Generally the higher quality agricultural or cultivation land will have lower levels of compatibility, though adequate buffer zones can be used to mitigate potential effects; | ✔ | ✔ |
| Noise | More isolated sites will be advantageous to minimise noise impacts on surrounding properties and sensitive landuses;<br>Adequate buffer zones should be provided. | ✔ | |
| Orientation | Protection from prevailing weather/wind should be provided in order to minimise airborne dust and odour;<br>Generally north-facing sites with suitable surrounding landforms will offer the best protection. | ✔ | ✔ |
| Atmospheric Protection | The control of dust, odour and pollution can include water sources and adequate buffer zones. | ✔ | ✔ |
| Landfill Gas Control | Ideal geological conditions will prevent the potential build-up of landfill gas;<br>The siting of buildings in isolated locations will prevent the potential build-up of gas within the buildings themselves;<br>New landfills should be constructed with gas monitoring programs in place as an EPA licence requirement and the provision for gas collection and venting/flaring/electricity generation. | ✔ | |

| | | Information Source | |
|---|---|---|---|
| | | Desktop | Site |
| **Criterion 5 - Level of Service** | | | |
| Distance to Areas Serviced | The Local Government Area (LGA) of Armidale Dumaresq has the largest population, followed by Uralla and Guyra. The closest location to these areas will create an efficient and sustainable operation;<br>However, some distance from these centres is required in order to minimise potential nuisance (noise, dust, odour, pollution) and likely to create an efficient transfer and recycling operation;<br>Walcha not to be considered for the purposes of this evaluation. | ✔ | |
| Required Land Area | Armidale LGA generates approximately 16,000 tonnes of waste per annum. Current rates of Waste disposed of to Landfill are approximately 9,000 tonnes (based upon 2003 annual landfill survey);<br>Uralla –disposes of 480 tonnes/annum<br>Guyra –disposes of 780 tonnes/annum<br>Landfill area required depends on method of landfilling (ie, trench, gully or mound) as well as existing site topography and whether excavation is performed prior to filling. Site surveys and modelling of available airspace should be performed prior to or during concept design stage to ascertain site capacity. An assumption of a land area requirement of 100 hectares (including buffer area) plus associated access road area has been made. | ✔ | ✔ |
| Level of Site Access | Sites that are used primarily for landfill, rather than processing or recycling may restrict or prohibit public access;<br>Approximately 5 heavy vehicles trips are thought to be required daily from Armidale; Proposed services from Uralla and Guyra will increase trip numbers; | ✔ | |
| Needs of Processing, Handling, Recycling | Sites should have the capability to allow effective operations such as those required for processing, handling and recycling, such as green waste handling and stockpiling of recyclables (concrete, timber etc.);<br>Higher levels of recycling will decrease the capacity requirements or increase the lifetime of the landfill; | ✔ | |

| | | Information Source | |
|---|---|---|---|
| | | Desktop | Site |
| Level of Existing Road Service | The most ideal level of road service is normally offered by arterial roads to within a close proximity to the site;<br>Rural roads with two lanes will have potential traffic safety constraints and are likely to require a significant level of upgrading, including widening, pavement improvements, line-marking and may require significant maintenance works over time;<br>Intersection upgrading will normally be required for road access onto rural roads from arterial roads (requiring RTA approval);<br>Site access roads used exclusively by landfill traffic may be gravel/dirt roads however is not recommended;<br>New access roads to sites may increase land area requirements and additional agreements with landowners;<br>Potential impacts of traffic generated by the development should be assessed in terms of local/rural communities, the proximity of dwellings and other road users. | ✔ | ✔ |
| Bush Fire Hazard | Lower levels of vegetation will generally be more conducive to lower bush fire hazard;<br>Flatter gradient land and a good availability of water will improve the sites fire fighting abilities. | ✔ | ✔ |
| **Criterion 6 - Adequacy of Existing Services** | | | |
| Infrastructure | A certain level of services will be required for the set-up and operation of sites;<br>Electricity is normally required, though solar power could be considered a reasonable alternative;<br>Telephone connections will be required;<br>Potable water and wastewater treatment can be provided on-site;<br>Water storage (for dust control and fire fighting) can be made available on-site;<br>Distance to available sources is mainly a cost factor;<br>As all sites being considered are rural sites, there is generally services available to a property on the site, however, not to where the landfill operations would require it. The ability to connect to services should not vary greatly from site to site. | ✔ | ✔ |

| | | Information Source | |
|---|---|---|---|
| | | Desktop | Site |
| **Criterion 7 - Site Features Required** | | | |
| Topography/Terrain | A site will ideally be well protected from surrounding land and adjoining properties by topography;<br>Site topography/terrain generally dictates the type of filling to be employed.<br>A site that will not require expensive, large volume excavation works should preferably have a gentle sloping topography and be located within a natural depression near the top of a local catchment, in order to minimise potential impacts of overland flow;<br>Rock outcrops and highly vegetated areas are likely to be less suitable, however can be managed with an increase in costs. | ✔ | ✔ |
| Capacity To Accept Defined Waste | Projected waste generation from Armidale Dumaresq, Uralla and Guyra for a 50 year period is approximately 625,000m³, based on Council supplied landfill disposal data for 2003;<br>A 50 year capacity site is being sought, however possible expansion to a 100 year capacity will be ideal (1,250,000m³);<br>In terms of leachate control, a detailed hydrological assessment is recommended on any chosen site. And the lining/leachate control system should be designed with specific hydrogeology in mind to satisfy EPA Guideline benchmark techniques. | ✔ | |
| **Criterion 8 - Set-up Costs** | | | |
| Land Area Requirement | The total area of land that will require acquisition/ purchase by Council and the land area arrangements of residual lots;<br>Obviously the smaller the area of land required to be purchased the lower the land costs, however this may be offset by leaseback arrangements, subdivision requirements and land capability of residual land areas; | ✔ | |
| Land Cost | Higher land cost per hectare will obviously increase the initial cost of the landfill;<br>However, higher quality agricultural land is likely to reduce operational and maintenance costs as supply of suitable clays and cover materials are likely;<br>Also, land closer to Armidale with a higher cost is also likely to have reduced haulage costs; | ✔ | |

| | | Information Source | |
|---|---|---|---|
| | | Desktop | Site |
| | Land cost will be determined by the cost of 100 Ha plus road access land requirement and assumes that Council will either subdivide and sell the remainder of the site purchased, or use the remaining land for other purposes. | | |
| Infrastructure Costs | Cost implications for the provision of infrastructure increases with distance from an existing source, which can be assessed comparatively against each site;<br>Generally, unless the site has infrastructure in place, costs for infrastructure installation from site to site will not vary significantly;<br>Cost estimates for roads can be assessed by a standard cost per metre of road required. Rawlinsons (2003) states a cost (for NSW) of $410 - $460 per linear metre of two-lane country road with a hard shoulder. A discounted figure of $350 per linear metre can be assumed for the formation of a sealed access road while a further discounted figure of $250 per linear metre can be assumed for the formation of an unsealed road. It is also assumed that cost is consistent for a new sealed road or an upgrade of an existing unsealed road to sealed. A further cost can be applied for new or upgraded vehicular access to the arterial road network, however a direct value will not be provided for this as is largely dependant on the RTA approval process and resultant conditions and recommendations. Other cost implications include the potential upgrading of existing public sealed roads that are considered to have poor pavement structure and/ or carriageway width, however only an implied cost value will be evaluated within the scope of this report. | ✔ | |
| Leachate Control | EPA Guideline benchmark techniques require a minimum 900mm clay barrier of specified permeability;<br>Cost will depend on availability/ suitability of on-site material and/or nearest available source;<br>Synthetic liners can also be considered as a viable alternative if clays are not likely to be economically available; | ✔ | |
| **Criterion 9 - Operational Costs** | | | |
| Compaction | Overall landfill compaction costs include a percentage of cover material; | ✔ | |

| | | Information Source | |
|---|---|---|---|
| | | Desktop | Site |
| | Operation methodology should not vary significantly from site to site therefore it is assumed waste compaction costs obtained will not vary significantly from site to site. | | |
| Transfer Operations | The sites can be compared in terms of distance from areas serviced and the transfer station;<br>Haulage costs are directly variable to distances form waste generation source;<br>The main source of waste generation will be from Armidale, such that comparison of haulage distance/cost will be biased towards Armidale's waste volumes. | ✔ | |
| Operation and Maintenance | Dependant largely on site geology, hydrology and availability of on-site materials;<br><br>Site rehabilitation costs should also be taken into account;<br>Overall costs are not likely to be available and subject to further investigation of the chosen site. | ✔ | |
| **Criterion 10 - Social Issues** | | | |
| Regional Economy | The loss of higher quality agricultural land will have more relative impact, however is considered to be mitigated by the operation of a well-managed landfill capable of serving the region over at least 50 years; | ✔ | |
| Sensitive Landuses | Proximity to potentially sensitive landuses such as cultivation; public reserves and wildlife corridors should be evaluated; | | ✔ |
| Land Values | Impact on surrounding land values is an issue, however is considered to be relatively constant across all sites where a 'new' activity is being introduced; | ✔ | |
| Tourism | An ideal site should not be easily visible from public land either naturally or via screening/mitigation measures therefore should not impact upon tourism in the region;<br>Sites that may be visible from existing tourist destinations (or even potential tourist destinations) can be evaluated accordingly;<br>Additional heavy vehicles on existing 'tourist 'routes' should usually also be avoided if possible, though is not a necessity due | ✔ | ✔ |

| | | Information Source | |
|---|---|---|---|
| | | Desktop | Site |
| | to the low number of vehicles involved in the landfill operation; | | |
| Agriculture | Compatibility with surrounding agricultural practices should be evaluated, though can be mitigated by an adequate buffer zone distance and good construction and management techniques; Surrounding agricultural sensitivities can be evaluated on site. | ✔ | ✔ |
| Future Development | The impacts of the landfill development on the potential for the development of surrounding land should be taken into account; | ✔ | |
| Heritage | Heritage values may not be significant on the site itself, however surrounding sites should be evaluated for their heritage potential, both in terms of European and Aboriginal significance; | ✔ | ✔ |

## 2.2 Weighting

The relative importance of each primary criteria will be weighted using a 1-10 scale, ranging from 'relevant' (assigned as 1) to 'essential' (assigned as 10). The weightings assigned to each of the primary criteria are shown in **Table 2.2**.

These weightings were determined during the review of the PRLSS based upon Maunsell's experience with landfill site selection. Draft weightings were determined and incorporated into a draft report, which was reviewed by Council and in consultation with the ADLCCC. Weightings were then adjusted based upon comments received as a result of this consultation and finalised in the report, Maunsell (2003).

Upon Council's advice, further review of these weightings have not been undertaken in this review of sites.

**Table 2.2: Primary Criteria Weightings**

| Primary Selection Criteria | Weighting |
|---|---|
| Strategic Planning Guidelines | 1 |
| Statutory Planning Issues | 10 |
| Ground and Surface Water Environment | 10 |
| Level of Service | 10 |
| Adequacy of Service | 4 |
| Local Amenity and Environmental Considerations | 6 |
| Site Features Required | 4 |
| Set-up Costs | 4 |
| Operational Costs | 6 |
| Social Issues | 4 |

## 2.3 Evaluation

In evaluating the sites, each of the primary criteria will be assessed in terms of the sub-criteria and assigned a relative ranking using a 1-10 scale, ranging from 'poor' (assigned as 1), to 'ideal' (assigned as 10). The ranking for site suitability will be assigned according to the scale shown in **Table 2.3**.

**Table 2.3: Ranking for Site Suitability**

| Ranking | Importance |
|---|---|
| 10 | Ideal |
| 9 | |
| 8 | Very Good |
| 7 | |
| 6 | Good |
| 5 | |
| 4 | |
| 3 | Fair |
| 2 | |
| 1 | Poor |

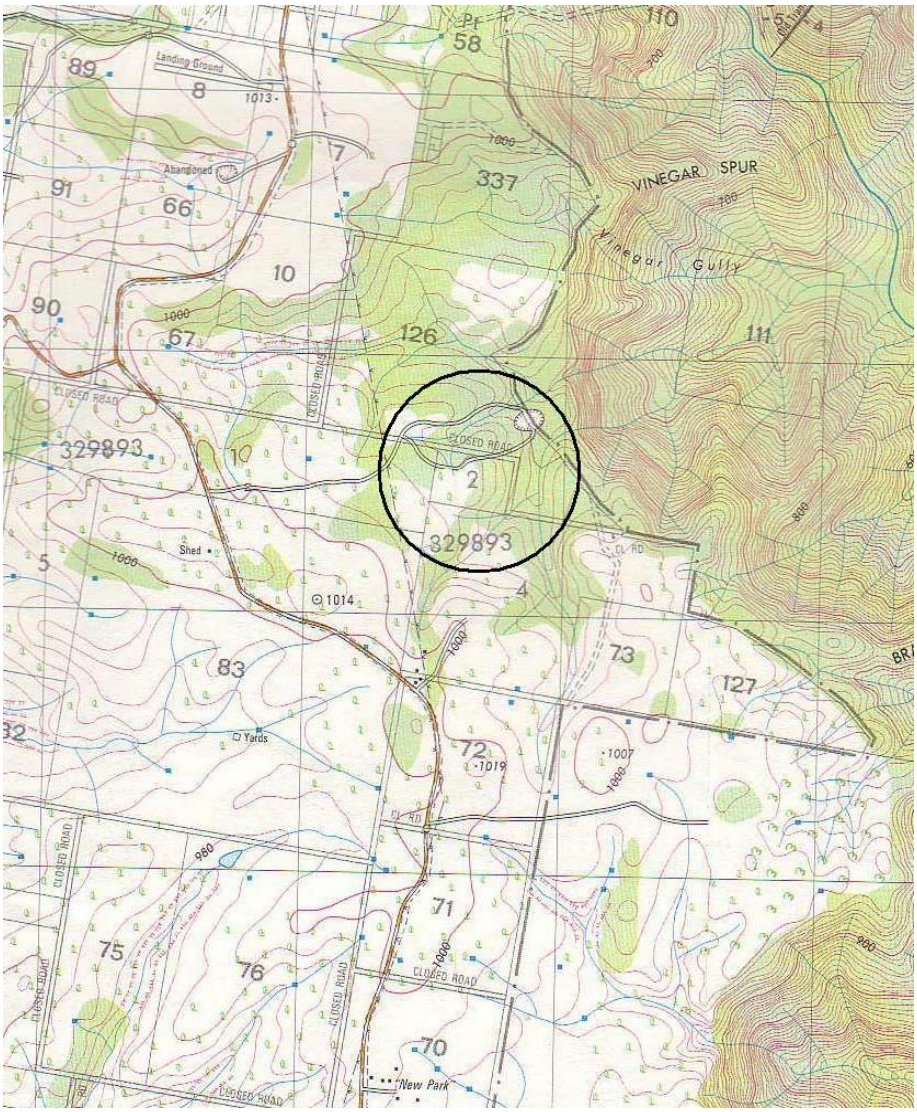
The evaluation of each site will involve multiplying the relative primary criteria ranking against the constant criteria weighting in a site evaluation matrix. The total of these values for all of the criteria becomes the score for that site. Therefore the highest possible score a site can obtain is 590, while the lowest possible score is 59. There is no predetermined threshold within this score-line than would indicated an 'ideal' site or a 'poor' site, for example, a site that may score 450 does not necessarily represent an 'ideal' location for the siting of a landfill, however is considered to be a more suitable site than those that score lower. In this regard, the site with the highest overall score will be the preferred site relative to the other sites included in this evaluation but not necessarily the most ideal site in which to situate a landfill.

One drawback with this ranking system however, is that there is no automatic elimination for a site, should it be found to be totally unacceptable in one of the 'essential' criteria, ie one that cannot be overcome by mitigation measures, such as statutory planning. To account for this, the criteria have been weighted, so that such a site would receive a ranking of 1, for a criterion weighting of 10. In this instance, the site would receive a score of 10 out of a possible 100, which should be enough to reduce the site in the overall scoring to a non preferred position. A confirmatory review however, should be undertaken, such that any sites that are unsuitable for landfill location against essential criteria are actually noted and eliminated from the selection process, even if they are ideal in all other criteria.

# 3.0 Site Assessment

## 3.1 Site 1: 'Metz Site'

| | |
|---|---|
| **Location:** | Hillgrove 9236-I-N;<br>0.5 kilometres east of Metz Road, 25 kilometres east of Armidale; |
| **Ownership:** | Boral Quarries, 305 Sandon Road; |
| **Property Details:** | Part of Lot 4 DP 813860; |
| **Site Area:** | 14.41 hectares; |
| **Development Area:** | 14.41 hectares available; |
| **Situation:** | Within an existing basalt quarry and mining area; |



## Evaluation – Site 1

| Criterion 1 - Strategic Planning Guidelines | |
|---|---|
| EPA Guidelines | EPA licencing may be problematic due to local geology and potential for leachate to migrate into adjacent land if groundwater is not managed properly; |
| DUAP Guidelines | Not included in any areas deemed insensitive or unsuitable; |
| **Criterion Ranking** | **4** |

| Criterion 2 - Statutory Planning Issues | |
|---|---|
| Council Zoning | Rural 1(a) - Development consent required, subject to consistency with aims and objectives;<br>Subdivision can be created with an area between 2 and 200 hectares subject to Council approval; |
| Aims and Objectives | The proposed use is compatible with the existing landuse as a quarry; |
| SEPPs & REPs | SEPP 44 – Koala Habitat Protection;<br>SEPP 48 – Major Putrescible Landfill Sites, applicable. |
| Other Constraints | RTA approval is required for intersection upgrade works on Grafton Road, however the intersection is an established heavy vehicle route, therefore approval is not anticipated to be problematic. |
| **Criterion Ranking** | **7** |

| Criterion 3 - Ground and Surface Water Environment | |
|---|---|
| Regional Geology | Located on tertiary basaltic volcanics (not within PRLSS target area);<br>Shallow basalt deposit overlaying metasediments;<br>Least desired regional geological formation identified. |
| Local Geology | Founded on remnant basalt flow, rock mass exhibits columnar formation with open fractures and potentially high permeability that will allow freedom of groundwater movement;<br>Confirmation that there are insufficient clay resources;<br>Suitable soil/ drainage;<br>Construction materials available. |
| Hydrology/Groundwater | No registered bores within 5 kilometres (Mackney 1996b);<br>Groundwater supply likely to be limited due to the shallow depth of the basalt deposit and its limited catchment;<br>Groundwater flows directed towards Bakers Creek;<br>Hydrological testing indicated that permanent groundwater is located well below the |

| | |
|---|---|
| | base of Metz Quarry, and the groundwater could be suitable for stock watering; |
| Land Capability | Land Class 7 or 8<br>No agricultural value due to quarrying activities; |
| Leachate Control | No availability of on-site clay;<br>Natural barriers to groundwater movement are minimal;<br>Control and management of leachate would be costly;<br>Geological records suggest potential for free movements of leachate;<br>EPA licencing may not be feasible due to geology and leachate control;<br>Liability, risk management and environmental impact mitigation measures will need to be investigated further than ERM (1999) if site is selected; |
| Flooding | The site will not be affected by significant external stormwater drainage catchments or flooding; |
| Surface Water Control | The topography of the site will allow effective surface drainage; |
| Erosion Protection | Local soils are basalt in origin, with a gently sloping to flat topography;<br>More problematic off-site with steep terrain immediately towards the east;<br>Good erosion protection; |
| Distance from Waterways | Bakers Creek is located approximately 250 metres to the east;<br>Bounded to the north and east by watercourses, probably fed by springs that provide permanent low flows (previous site visits state ephemeral); these watercourses merge and flow into Bakers Creek approximately 800 metres east of the quarry;<br>Bakers Creek flows into Macleay River approximately 8.0 kilometres downstream; |
| **Criterion Ranking** | **2** |

| **Criterion 4 - Local Amenity and Environmental Considerations** | |
|---|---|
| Visual Amenity | Well protected visually in all directions by topography and vegetation;<br>Potential views of the site from the Bakers Creek Gorge lookout located 2.0 kilometres due north;<br>Potential views from Hillgrove and surrounding areas located approximately 3.0 kilometres to the northeast; |
| Flora and Fauna | Little additional impact on flora and fauna;<br>Likelihood of increased vermin if not managed correctly; |

| | |
|---|---|
| Land Environment | Very low to no agricultural value as a result of quarrying works and large-scale clearance of vegetation;<br>Largely devoid of topsoil material;<br>Trees form an ideal buffer area around the quarry and site; |
| Land Compatibility | Past usage as a quarry and for heavy machinery means the site use as a landfill is very compatible;<br>The relocation of the quarry to an adjoining site would allow the operation of both activities;<br>Land to the east within Bakers Creek Gorge contains abandoned and working mines and is considered historically significant, however, presently public access into the area is prohibited;<br>Land to the west is predominantly grazing; |
| Noise | Operational noise levels will be mitigated by the sites relative isolation; |
| Orientation | Existing quarry depth ensures protection from prevailing weather/wind;<br>Measures would need to be taken to protect any recycling stockpiles on the site; |
| Atmospheric Protection | Control should be adequately achievable; |
| Landfill Gas Control | Potential impacts can be mitigated if catered for in design and licencing; |
| **Criterion Ranking** | **8** |

| **Criterion 5 - Level of Service** | |
|---|---|
| Distance to Areas Serviced | 25 kilometres east of Armidale via Grafton Road and 'Metz' Road;<br>58 kilometres from Uralla via Armidale and Grafton Road;<br>65 kilometres from Guyra via Armidale and Grafton Road; |
| Land Area | Property size of 14.41 hectares is too small for required minimum 50 year lifespan;<br>The site is likely to require expansion into the adjoining eastern property to cater for an adequate buffer zone;<br>Any further expansion is not guaranteed; |
| Level of Site Access | Landfill access would be restricted to transfer vehicles and commercial contractors (i.e. no public access facilities available); |
| Needs of Processing, Handling, Recycling | Lack of available site area and good terrain will inhibit the development of processing, handling and recycling ability; |
| Level of Existing Road | Grafton Road is an Arterial Road with an ideal level of service (16 kilometres from |

| | |
|---|---|
| Service / Impacts | Armidale to the 'Metz' Road intersection);<br>An upgraded intersection to Grafton Road may be required (involving RTA approval);<br>'Metz' Road is an unsealed rural road that has been constructed to cater for heavy vehicles; This road may require some upgrading over the 8.0 kilometres between Grafton Road and the site access road;<br>The site access road of approximately 1.0 kilometre is most likely to require upgrading;<br>There is a good level of existing heavy vehicle site access and circulation on the site, however a graded road over the site is likely to be required;<br>Overall transport impacts are not considered to be significant subject to a significant road upgrade, however a number of dwellings in the settlement of Metz may be affected by road traffic; |
| Bush Fire Hazard | Low bush fire hazard as largely clear of vegetation;<br>Existing dam provides potential water source for fire-fighting;<br>Areas to the east may have high fire rating due to isolation, slope and fuel loads; |
| **Criterion Ranking** | **5** |

| **Criterion 6 - Adequacy of Existing Services** | |
|---|---|
| Infrastructure | Existing electricity substation, weighbridge, site office, workshop, phone, electricity, plant re-fuelling depot, fencing;<br>Ideal level of existing infrastructure; |
| **Criterion Ranking** | **9** |

| **Criterion 7 - Site Features** | |
|---|---|
| Topography/Terrain | Located on the edge of a ridge at the top of the eastern tableland escarpment;<br>Elevation of the site is between 930 and 950 metres;<br>The land immediately to the east of the site falls in gradient steeply (up to 70%) from 930 metres to 500 metres at Bakers Creek, approximately 250 metres east of the site; |
| Capacity To Accept Defined Waste | Limited in capacity with an estimated volume of less than 200,000m³ (approximately 15 year capacity);<br>Hydrology likely to limit the ability of the site to accept other than inert wastes. |
| **Criterion Ranking** | **1** |

| **Criterion 8 - Set-up Costs** | |
|---|---|
| Land Area Requirement | Secure tenure for outright purchase;<br>Existing 14.41 hectares available for purchase;<br>Insufficient land area for the provision of an adequate buffer zone; |

| | |
|---|---|
| Land Cost | Owners price is stated at $2000/ acre (approximately $4942/ hectare);<br>Estimated total land cost = $69,200; |
| Infrastructure Costs | Much of the existing 8.0 kilometres of unsealed road (Metz Road) is considered to be in good condition therefore minimal upgrade would be required;<br>Upgrading the existing access road from Metz Road to the quarry is likely to be required to unsealed standard, at a cost of approximately $250,000 (at a rate of $250 per linear metre);<br>Arterial Road intersection upgrade may be required by the RTA;<br>Minimal additional on-site infrastructure costs; |
| Leachate Control | Overall development costs are likely to be high (prohibitively high is suggested) as a direct result of problematic leachate control;<br>EPA Guidelines require a minimum 900mm clay barrier, requiring substantial re-shaping of vertical rocky sides;<br>Double synthetic (GCL/FML) liner would require similar costs and present extreme difficulty in construction; |
| **Criterion Ranking** | **2** |

| **Criterion 9 - Operational Costs** | |
|---|---|
| Compaction | Good supply of basalt gravels from the continued quarrying operation as cover material;<br>Little on-site clay available, which will substantially increase costs (would need for intermediate cover material even if synthetic liner is used;<br>Measures to prevent/minimise leachate will be costly. |
| Transfer Operations | Haulage costs amongst the lower of the sites evaluated due to lower distances to areas serviced (taking into account average haulage levels) and reasonably good quality road access; |
| Operation and Maintenance | High costs associated with stormwater management and erosion control;<br>Good availability of materials for operation and maintenance;<br>Monitoring and site closure costs likely to be high due to poor geology; |
| **Criterion Ranking** | **3** |

| **Criterion 10 - Social Issues** | |
|---|---|
| Regional Economy | Impacts on regional economy will be consistent across all sites under evaluation; |
| Sensitive Landuses | Immediately adjacent to Bakers Creek Gorge, which is considered a significant and potentially sensitive land area; |

| | |
|---|---|
| Land Values | Negligible effect due to known impacts of existing use as a quarry; |
| Tourism | Bakers Creek Gorge is a significant landform, however is closed to the public;<br>Hillgrove and surrounding area is considered significant for its mining heritage and is a known tourist destination;<br>Highest potential impact on tourism of all sites evaluated due to proximity to Hillgrove and surrounding historical area;<br>Increased truck movements on Grafton Road which is the main route to the coast; |
| Agriculture | Minimal impact due to little surrounding agricultural use; |
| Future Development | Limited potential for significant development on neighbouring properties due to terrain; |
| Heritage | Metz is an important archaeological site, with ruins and heritage significance;<br>The mining area around Hillgrove is also significant as a result of its mining history;<br>No investigations of Aboriginal significance undertaken, but unlikely;<br>Would require European and Indigenous cultural heritage assessment at EIS stage; |
| **Criterion Ranking** | **5** |

## Other Issues

Geotechnical: Limitations of slope stability and availability of on-site clay.

## 3.2 Site 2: 'Bannaweera'

**Location:** Balala 9136-I-N, 454114;
1.0 kilometre north of Retreat Road, 13 kilometres west of Uralla;

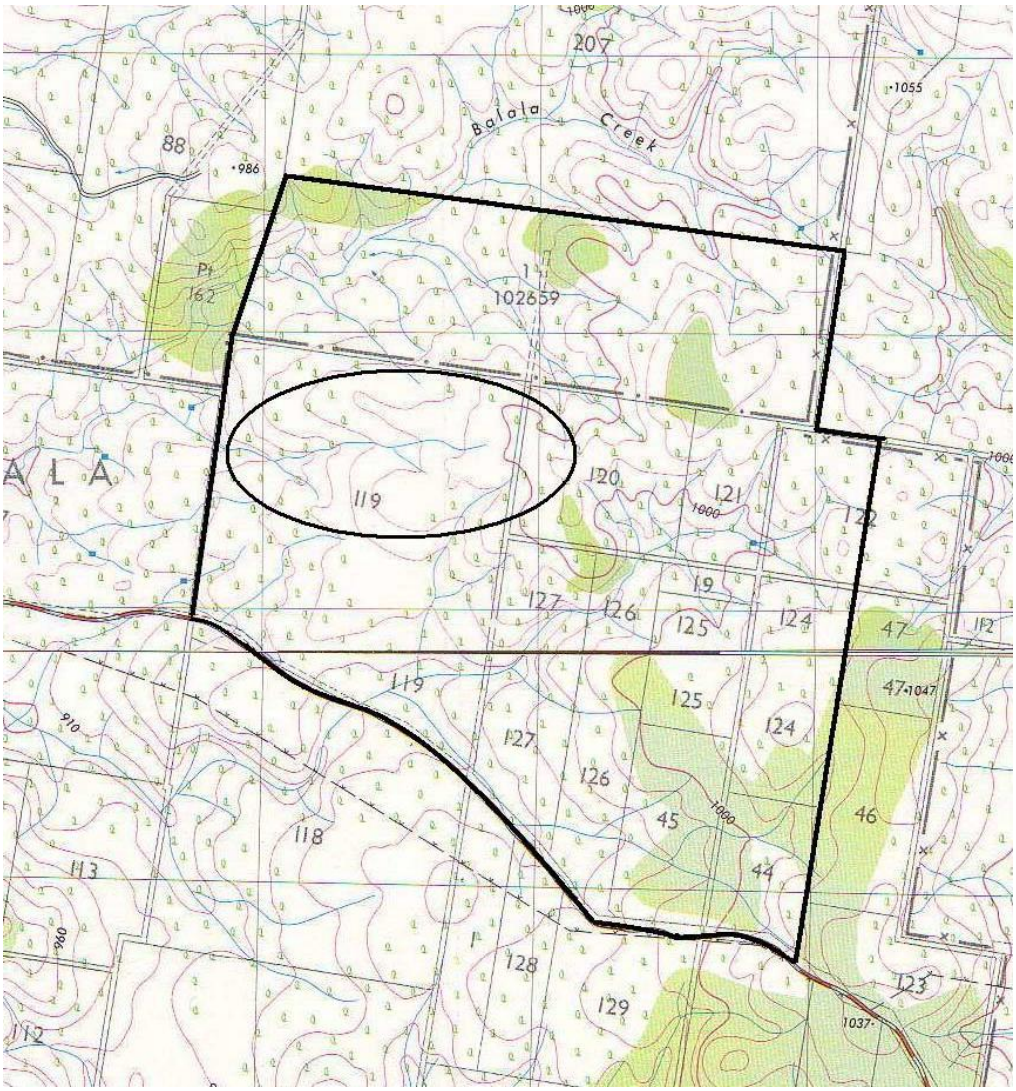
**Ownership:** DN & AE Press, 1294 Kingstown Road, Balala, Shire of Uralla;

**Property Details:** Parts of Lot 6 DP 21530, Lot 7 DP 753640, Pt Lot 162288 DP 753666, Lots 86-87 & 207 DP 753666, Lot 1171 DP 876986, Lot 1 DP 902156, Parish of Balala; (Identified as Lot 1 DP 712761 in Mackney (1997));

**Site Area:** 761.2 hectares;

**Development Area :** 100 hectares required plus an additional 1.5 hectares for road access;

**Situation:** Farmland; Disused Basalt Quarry south of the site;



## Evaluation – Site 2

| **Criterion 1 - Strategic Planning Guidelines** | |
|---|---|
| EPA Guidelines | Not included in any areas deemed sensitive or unsuitable. |
| DUAP Guidelines | Not included in any areas deemed sensitive or unsuitable. |
| **Criterion Ranking** | **6** |

| **Criterion 2 - Statutory Planning Issues** | |
|---|---|
| Council Zoning | General Rural 1(A) – (Uralla LEP);<br>Development consent required, subject to consistency with aims and objectives;<br>Subdivision can be created down to 400 hectares subject to Council approval;<br>Smaller land-holdings may be considered for 'special uses';<br>Not 'Environmental Protection Zone', 'Environmentally Sensitive', 'Agricultural Protection' (zoned 1B), 'Rural Residential', Rural Small Holdings', 'Prime Agricultural Grazing', 'Crop Land', special uses, or forestry. |
| Aims and Objectives | Reasonably consistent with aims and objectives providing ideal site design and compatibility with surrounding landuses; |
| SEPPs & REPs | SEPP 44 – Koala Habitat Protection; does not appear to fall within this category;<br>SEPP 48 – Major Putrescible Landfill Sites, potentially applicable. |
| Other Constraints | Nil |
| **Criterion Ranking** | **6** |

| **Criterion 3 - Ground and Surface Water Environment** | |
|---|---|
| Regional Geology | Located within PRLSS target area (CSX 2);<br>Area of suitable or desired regional geology. |
| Local Geology | Underlain by clays and gravely clays of relatively low hydraulic conductivity, though considered inadequate to provide appropriate cover or liner materials;<br>Appropriate local geology;<br>Geology from DIPNR supplied borelogs approximately 3.0 kilometres north of site show topsoil/granite to 0.3m, granite/sand to 45.7m and granite/rock to end of hole (EOH) at 57.9m bgs. |
| Hydrology/Groundwater | No work on groundwater quality;<br>Assumption that any potential groundwater quality is good;<br>Nearest groundwater well approximately 3.0 kilometres north of site, installed June 2002. Used for stock watering purposes. Groundwater present at approximately 40- |

| | |
|---|---|
| | 50m bgs; |
| Land Capability | Land Class 6; |
| Leachate Control | Geological records suggest potential for movements of leachate due to potential sand lenses and fractured rock. |
| Flooding | Site is elevated and flood-free. |
| Surface Water Control | The topography of the site will allow effective surface drainage and stormwater management – stormwater can be effectively diverted around the site;<br>Little evidence of water penetration into soils; |
| Erosion Protection | Limited external catchment allows good erosion control opportunities;<br>Some care required over control of potentially dispersive soils;<br>Evidence of surface water flow during storm events;<br>Site appeared to be stripped of top-soil, particularly down catchment; |
| Distance from Waterways | Nearest permanent water is Balala Creek a minimum of 400 metres to the northwest; |
| **Criterion Ranking** | **5** |

| **Criterion 4 - Local Amenity and Environmental Considerations** | |
|---|---|
| Visual Amenity | Visually protected from the south-west, west, north and northwest;<br>Extensive rural views are predominant from the west, southwest and south;<br>Care will need to be taken to protect visual amenity, though all land with views to the site is at an acceptable distance;<br>Nearest adjoining property is approximately 300 metres to the west, owned by the subject landowner;<br>Nearest adjoining property to the north at minimum distance of 700 metres; |
| Flora and Fauna | Observation suggests site is extensively disturbed through clearing and grazing;<br>No sensitive habitats are evident, though further studies could confirm;<br>Little opportunity for vegetative growth;<br>Little additional impact on flora and fauna;<br>Likelihood of increased vermin if not managed correctly;<br>Further studies are recommended should the site progress to EIS stage; |
| Land Environment<br>Land Compatibility | Predominantly extensive grazing quality land;<br>Use as landfill should not impact on surrounding landuse provided the landfill is managed correctly and adequate buffer distances are maintained; |

| | |
|---|---|
| Noise | An adequate buffer zone will mitigate potential noise impacts; |
| Orientation | The relatively open aspect to the south gives the site increased potential for wind exposure; |
| Atmospheric Protection | Control of dust/debris will be required to mitigate potential effects; |
| Landfill Gas Control | Potential impacts can be mitigated if catered for in design and licencing; |
| **Criterion Ranking** | **6** |

| **Criterion 5 - Level of Service** | |
|---|---|
| Distance to Areas Serviced | 13 kilometres from Uralla along East Street/Retreat Road;<br>36 kilometres from Armidale via New England Highway;<br>76 kilometres from Guyra via the New England Highway; |
| Land Area | Property size 486 hectares;<br>Approximately 100 hectares would require subdivision for the potential development area plus an additional 1.5 hectares for the access road; |
| Level of Site Access | Landfill access would be restricted to transfer vehicles and commercial contractors (i.e. no public access facilities available); |
| Needs of Processing, Handling, Recycling | The site area available should provide sufficient capability for the envisaged needs of processing, handling and recycling; |
| Level of Existing Road Service / Impacts | From Uralla, access via existing sealed bitumen road of good condition and carriageway width; some up grading may be required, though not significant enough to require evaluation prior to EIS stage;<br>From Armidale, access via New England Highway (arterial road), excellent condition; no upgrading required;<br>Existing private accessway from Retreat Road has limited sightlines and potentially unsafe;<br>The site will require the construction of approximately 700 metres of access road from Retreat Road at a location suitable for an adequate intersection; |
| Bush Fire Hazard | Relatively low bush fire hazard as largely clear of vegetation;<br>Risk can be managed appropriately by use of dams/tanks and site management practices. |
| **Criterion Ranking** | **4** |

| **Criterion 6 - Adequacy of Existing Services** | |
|---|---|
| Infrastructure | No existing services;<br>Power and telephone upgrades would be required either from roadside or nearest residence supply line;<br>Potable water and wastewater treatment can be provided on-site;<br>Requirement for fire-fighting provisions can be covered by on-site detention tank with emergency storage; |
| **Criterion Ranking** | **4** |

| **Criterion 7 - Site Features** | |
|---|---|
| Topography/Terrain | Largely undulating site with some steeper gradients evident lower in the catchment;<br>Elevated site facing southwest;<br>Significant rock outcrops evident; |
| Capacity To Accept Defined Waste | Capacity between 50 and 100 years could be made available subject to detailed design and analysis; |
| **Criterion Ranking** | **6** |

| **Criterion 8 - Set-up Costs** | |
|---|---|
| Land Area Requirement | Secure tenure for outright purchase of part of the property is proposed (property size is 486 hectares);<br>Approximately 100 hectares required; |
| Land Cost | Estimated land value in the region of $740 - $865 / hectare;<br>Purchase of 100 hectares estimated at $80,000 (at $800 per hectare); |
| Infrastructure Costs | Reasonable existing condition of Retreat Road means that an upgrade is not likely to be required;<br>New access road from Retreat Road to the site would be required to the value of approximately $245,000 (approximately 700 metres of access road at a rate of $350 per linear metre);<br>No on-site infrastructure and all necessary services will require connection – comparable to all sites except Site 1; |
| Leachate Control | Availability of about 120,000m³ of clay/clay gravels;<br>The site would require about 800,000m³ over lifetime;<br>Consideration of either sourcing clay or synthetic liners required for balance of required lining for leachate barrier; |
| **Criterion Ranking** | **5** |

| **Criterion 9 - Criterion - Operational Costs** | |
|---|---|
| Compaction | Compaction costs may be slightly higher than those sites where intermediate daily cover is available; |
| Transfer Operations | Haulage costs amongst the higher of the sites evaluated due to longer distances to areas serviced (taking into account average haulage levels) and generally poorer quality road access; |
| Operation and Maintenance | Poor availability of materials for operation and maintenance costs;<br>Topsoil would need to be collected and stored for future use in rehabilitation; |
| **Criterion Ranking** | **4** |

| **Criterion 10 - Social Issues** | |
|---|---|
| Regional Economy | Impacts on regional economy will be consistent across all sites under evaluation; |
| Sensitive Landuses | No evidence of sensitive landuses;<br>Adjoining landuses are predominantly used for grazing stock; |
| Land Values | Land value impacts on adjoining properties will be relatively consistent across all sites under evaluation; |
| Tourism | Retreat Road has tourism value due to local attractions, however the landfill is not likely to be visible from the road; |
| Agriculture | Potential impact on surrounding agricultural activities can be mitigated; |
| Future Development | Distance from Armidale and Uralla, makes large scale future development of area unlikely; |
| Heritage | No investigations of Aboriginal significance undertaken, but unlikely due to major land disturbance;<br>Would require European and Indigenous cultural heritage assessment at EIS stage; |
| **Criterion Ranking** | **7** |

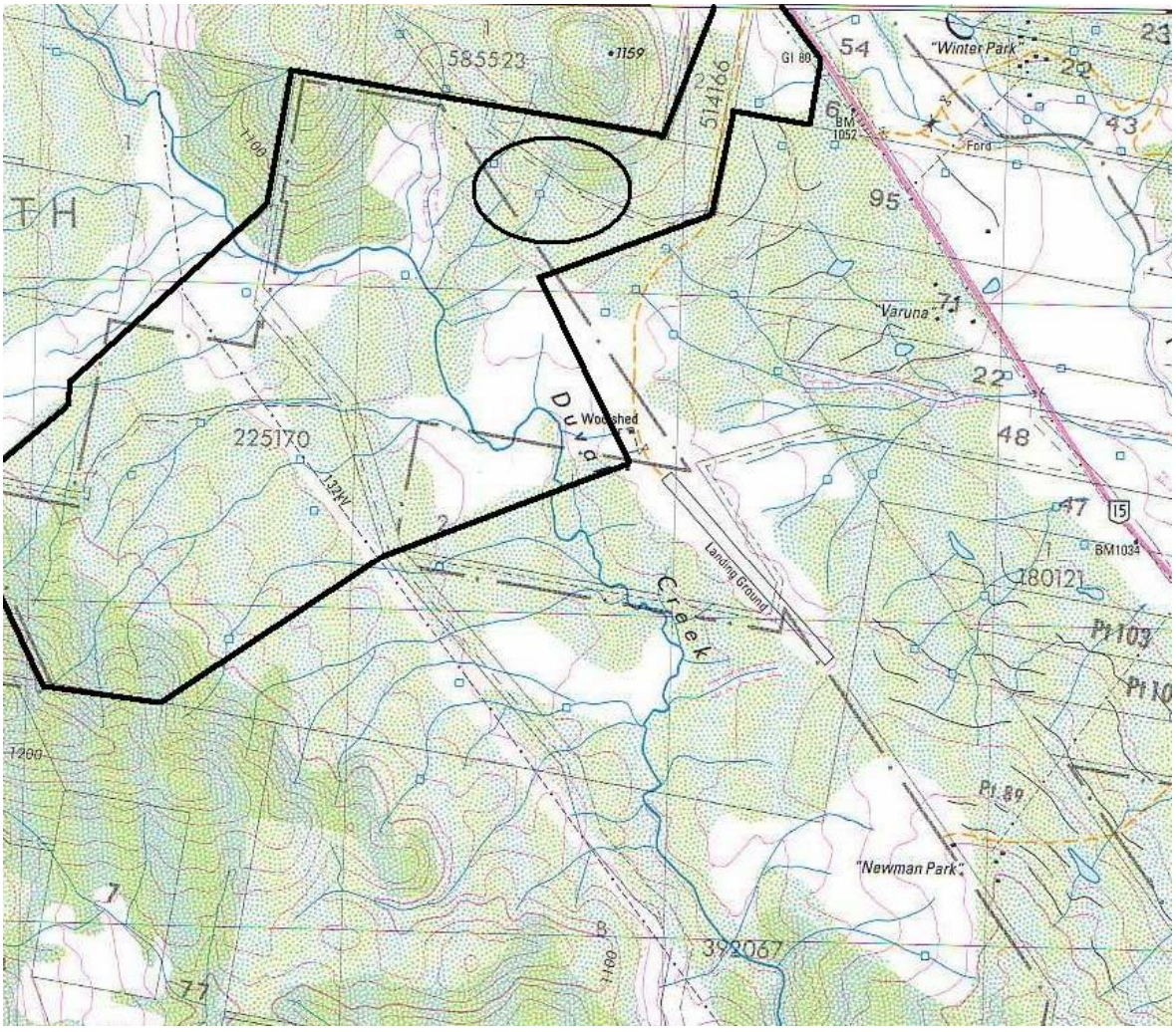
## Other Issues

A second natural depression to the southeast of the main site was tested in terms of geological suitability. This area has a smaller catchment area with steeper topography, generally not as suitable for the subject area.

A disused Basalt Quarry is located several hundred metres down-catchment from the immediate landfill area. Uralla Shire are said to still have an option over the use of the Quarry, it has not been used for approximately 4 years.

## 3.3 Site 3: 'Tillbuster West'

| | |
|---|---|
| **Location:** | Dumaresq 9237-3-S; 385713 |
| | 1.0 kilometre west of the New England Highway; 19 kilometres north of Armidale; |
| **Ownership:** | 'Tillbuster West', Neil Clayton; |
| **Property Details:** | Parts of Lot 1 DP 514166, Lot 3 DP 800611, Lot 1 DP 585523, Lots 1–2 DP 127631; |
| | Lot 1 DP 225170; (Lot 3 DP 800611 in Mackney 1997); |
| **Site Area:** | 231.7 hectares; |
| **Development Area:** | Approximately 100 hectares required plus 2.0 hectares for road access; |
| **Situation:** | The southern block of 2 properties under the same ownership; |
| | Directly adjoins the southern boundary of Site 4; |
| | Options considered for separate sale or individual based on merits; |



## Evaluation – Site 3

| **Criterion 1 - Strategic Planning Guidelines** | |
|---|---|
| EPA Guidelines | Not included in any areas deemed sensitive or unsuitable; |
| DUAP Guidelines | Not included in any areas deemed sensitive or unsuitable; |
| **Criterion Ranking** | **6** |

| **Criterion 2 - Statutory Planning Issues** | |
|---|---|
| Council Zoning | Rural 1(A) – Development consent required, subject to consistency with aims and objectives;<br>Subdivision can be created with an area between 2 and 200 hectares subject to Council approval;<br>The site itself is not located within the 1(B) Rural Arterial Road Frontage corridor, however the access road would pass through this corridor; |
| Aims and Objectives | Reasonably consistent with aims and objectives providing ideal site design and compatibility with surrounding landuses;<br>Consideration of the objective of restricting inappropriate traffic generating uses along main road frontages may be relevant due to proposed access from the New England Highway; |
| SEPPs & REPs | SEPP 44 – Koala Habitat Protection; does not appear to fall within this category;<br>SEPP 48 – Major Putrescible Landfill Sites, potentially applicable; |
| Other Constraints | RTA approval is required for a new intersection with access from the New England Highway; |
| **Criterion Ranking** | **6** |

| **Criterion 3 - Ground and Surface Water Environment** | |
|---|---|
| Regional Geology | Located within PRLSS target area (CSX 7);<br>Situated close to isolated units of Palaeozoic metasediments; |
| Local Geology | Lack of soil and clay cover depth to basement rock;<br>Topsoils are weak and shallow;<br>Geological records describe a series alluvial muds, silts and sands over parts of the site with bedrock as close as 300mm to the surface;<br>Proximity of the basement confining layer has created extremely wet surface conditions;<br>Shortage of suitable cover material noted on-site from previous investigations; |

| | |
|---|---|
| Hydrology/Groundwater | No work on groundwater quality;<br>Assumption that any potential groundwater quality is good;<br>Nearest DIPNR registered groundwater well approx 5km south west of site showed no water bearing zones to approx 15m. Nearest groundwater well approx 5km north of site show groundwater present at approximately 40m bgs;<br>Anecdotal advice from neighbouring landowners of closer registered bores used for stock watering and other domestic uses;<br>Groundwater used for domestic stock watering purposes; |
| Land Capability | Land Class 4 |
| Leachate Control | Effective leachate management possible if designed in accordance with EPA Solid Waste Guidelines; |
| Flooding | Site is elevated and flood-free; |
| Surface Water Control | The topography of the site will allow effective surface drainage and stormwater management, though some ponding may be evident down-catchment;<br>Located mid-way down catchment from Site 4, which is located at the of the catchment;<br>Subject to potential quantities of overland flow from Site 4; |
| Erosion Protection | Limited external catchment allows good erosion control opportunities;<br>Some care requires over control of potentially dispersive soils;<br>Limited evidence of soil erosion; |
| Distance from Waterways | Nearest permanent water is Duval Creek, which passes close to the south of the site (the distance is not clear as there is no proposed landfill boundary), however;<br>EPA Guidelines for minimum distances to waterways can be adhered to;<br>Direct waterways down-catchment (stormwater flow only) into Duval Creek;<br>Recommend Minister of Fisheries be consulted at EIS stage, due to proximity of Duval Creek; |
| **Criterion Ranking** | **3** |

| **Criterion 4 - Local Amenity and Environmental Considerations** | |
|---|---|
| Visual Amenity | Immediate vicinity is generally well protected to the west, north and east, with a relatively open vista towards the south;<br>Nearest visible dwelling is 'Taits Gully' located approximately 3.0 kilometres to the southeast;<br>Nearest external property is approximately 500 metres to the south;<br>Nearest dwellings include 'Annaleey' approximately 700 metres to the northeast, |

| | |
|---|---|
| | 'Tillbuster North' 1.2 kilometres to the northeast, and 'Varuna' 1.5 kilometres to the southeast, though none of these dwelling are visible form the site;<br>Mount Duval (1393 metres) and Duval State Forest Park situated a minimum of 3.2 kilometres to the southwest;<br>The site would require some visual screening on the buffer zone from the southwest round to the southeast.<br>Anecdotal information supplied on an approved building site on adjoining land with potential views over the development area; |
| Flora and Fauna | Observation suggests site is extensively disturbed through clearing and grazing;<br>Little additional impact on flora and fauna;<br>Likelihood of increased vermin if not managed correctly;<br>Further studies are recommended should the site progress to EIS stage; |
| Land Environment | Immediately surrounding land is grazed farmland;<br>Dam located on northern perimeter adjoining Site 4; |
| Land Compatibility | Use as landfill should not impact on surrounding landuse provided the landfill is managed correctly and adequate buffer distances are maintained; |
| Noise | Adequate buffer zone will mitigate potential noise impacts; |
| Orientation | Site exposed to prevailing south / south-westerly winds;<br>More protected from westerly winds (which the owner states are predominant);<br>The relatively open aspect to the south gives the site increased potential for wind exposure; |
| Atmospheric Protection | Control of dust/debris will be required to mitigate potential effects; |
| Landfill Gas Control | Potential impacts can be mitigated if catered for in design and licencing; |
| **Criterion Ranking** | **5** |

| **Criterion 5 - Level of Service** | |
|---|---|
| Distance to Areas Serviced | 19 kilometres north of Armidale on the New England Highway;<br>42 kilometres from Uralla via New England Highway;<br>21 kilometres south of Guyra on the New England Highway; |
| Land Area | Property size is 225 hectares;<br>Approximately 50 hectares of the property is suitable for landfill due to topography restrictions;<br>An additional 2 hectares would be required for the access road; |

| | |
|---|---|
| Level of Site Access | Landfill access would be restricted to transfer vehicles and commercial contractors (i.e. no public access facilities available); |
| Needs of Processing, Handling, Recycling | The site area available may not provide sufficient capability for the envisaged needs of processing, handling and recycling; |
| Level of Existing Road Service / Impacts | New England Highway (from Armidale, Uralla and Guyra) is an arterial road of excellent condition and carriageway width;<br>Existing unsealed 'paper road' from the highway into the site with adequate sightlines in terms of location and road safety;<br>Access road would require extending and upgrading over a total length of approximately 1.0 kilometre;<br>Arterial Road intersection would require appropriate construction and treatment; |
| Bush Fire Hazard | Relatively low bush fire hazard as largely clear of vegetation;<br>Risk can be managed appropriately by use of dams/tanks and site management practices. |
| **Criterion Ranking** | **5** |

| **Criterion 6 - Adequacy of Existing Services** | |
|---|---|
| Infrastructure | No existing services;<br>Power and telephone is presumably available from New England Highway (1.0 kilometre);<br>Potable water and wastewater treatment can be provided on-site;<br>Requirement for fire-fighting provisions can be covered by on-site detention tank or dam with emergency storage; |
| **Criterion Ranking** | **4** |

| **Criterion 7 - Site Features** | |
|---|---|
| Topography/Terrain | Gentle sloping land approximately half-way down the catchment, towards Duval Creek;<br>Situated below the 1090 contour between 2 peaks, which rise to approximately 1160 metres;<br>No significant rock outcrops visible; |
| Capacity To Accept Defined Waste | The site has less capacity due to restrictive topography, however a capacity of at least 50 years should be available subject to detailed design and analysis;<br>Opportunity for expansion towards the north into Site 4; |
| **Criterion Ranking** | **3** |

| **Criterion 8 - Set-up Costs** | |
|---|---|
| Land Area Requirement | Approximately 50 hectares would be required from the 225 hectares available for purchase;<br>Additional land could be purchased for future expansion (being Site 4); |
| Land Cost | 225 hectares on sale for $1778 / hectare (stated by Uphill & Schaefer Real Estate);<br>Purchase of 50 hectares estimated at $100,000 (at $2000 per hectare); |
| Infrastructure Costs | Approximately 1.0 kilometre of new access road will be required from the New England Highway at a cost of approximately $350,000 (at a rate of $350 per linear metre);<br>A new intersection will also be required to RTA standards, which will impose additional costs relative to the RTA assessment and approval process;<br>No on-site infrastructure and all necessary services will require connection - comparable to all sites with the exception of Site 1; |
| Leachate Control | Small quantity of clays may be available on Site 4 for excavation, subject to further investigation;<br>Consideration of either sourcing clay or synthetic liners required for balance of required lining for leachate barrier; |
| **Criterion Ranking** | **7** |

| **Criterion 9 - Operational Costs** | |
|---|---|
| Compaction | Shortage of suitable cover material;<br>Compaction costs will be higher than those sites where intermediate daily cover is available; |
| Transfer Operations | Haulage costs amongst the lowest of the sites evaluated due to lower distances to areas serviced (taking into account average haulage levels) and good quality road access; |
| Operation and Maintenance | Poor availability of materials for operation and maintenance costs; (Questionable as a result of proximity to Site 4)<br>Topsoil would need to be collected and stored for future use in rehabilitation; |
| **Criterion Ranking** | **4** |

| **Criterion 10 - Social Issues** | |
|---|---|
| Regional Economy | Impacts on regional economy will be consistent across all sites under evaluation; |
| Sensitive Landuses | Adjoining landuses are predominantly used for grazing stock;<br>EU accredited organic agriculture is located in the surrounding area; |

| | |
|---|---|
| | Potentially sensitive land is noted with the Duval State Forest, a minimum of 2.5 kilometres to the southwest; |
| Land Values | Land value impacts on adjoining properties will be relatively consistent across all sites under evaluation; |
| Tourism | Potential impacts on tourism can not be foreseen for the site or surrounding area; |
| Agriculture | Upstream of EU accredited organic agriculture;<br>Additional mitigation measures may need to be imposed in order to ensure negligible impact; |
| Future Development | Opportunity available for expansion into Site 4;<br>Potential for up to 100 years landfill capacity;<br>Possible future development along northern areas of highway due to proximity to Armidale. |
| Heritage | No investigations of Aboriginal significance undertaken, but unlikely due to major land disturbance;<br>Would require European and Indigenous cultural heritage assessment at EIS stage; |
| **Criterion Ranking** | **4** |

## Other Issues

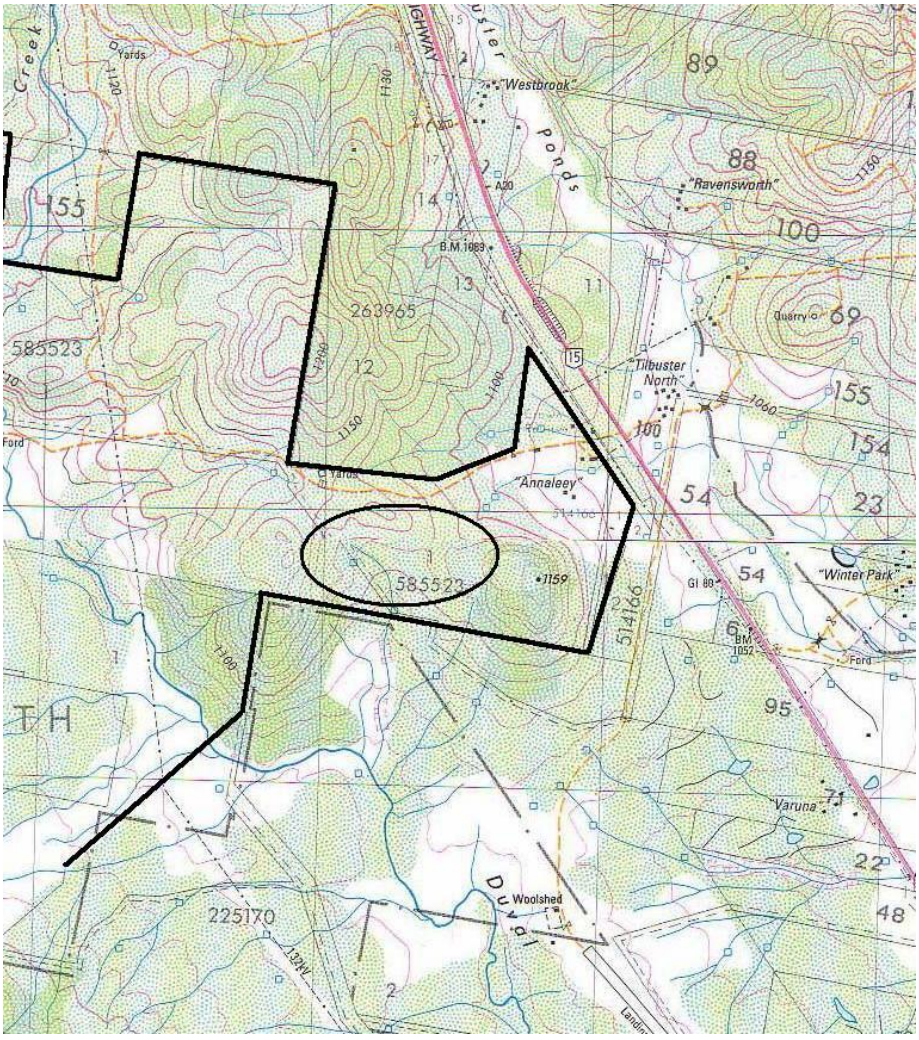
Due to the mid-catchment location of Site 3 and potential impacts on the area considered under Site 4, it is not recommended to look at the feasibility of Site 3 in isolation.

It would therefore be recommended that should these sites progress beyond this stage of the study, that only a Site 3 and Site 4 combined landfill be investigated further.

Both sites are considered as a single site in Option 4A.

## 3.4 Site 4: 'Annaleey'

| | |
|---|---|
| **Location:** | Dumaresq 9237-3-S; 389713<br>1.0 kilometre west of the New England Highway; 19 kilometres north of Armidale; |
| **Ownership:** | 'Annaleey', Neil Clayton; |
| **Property Details:** | Parts of Lot 1 DP 585523 (Lot 121 & Pt Lot 87 DP 755823, Parish of Exmouth; Lot 1 DP 585523, Lot 7 DP 755823, Lot 1 DP 102773, Parish of Exmouth, Pt Lot 3 DP 800611, Parish of Exmouth/Duval, in Mackney 1997); |
| **Site Area:** | 644.6 hectares; |
| **Development Area:** | Approximately 100 hectares required plus 2 hectares for road access; |
| **Situation:** | The northern block of 2 properties under the same ownership;<br>Site 3 is located directly down-catchment to the south;<br>Options considered for separate sale or individual based on merit; |



## Evaluation – Site 4

| Criterion 1 - Strategic Planning Guidelines | |
|---|---|
| EPA Guidelines | Not included in any areas deemed sensitive or unsuitable; |
| DUAP Guidelines | Not included in any areas deemed sensitive or unsuitable; |
| **Criterion Ranking** | **6** |

| Criterion 2 - Statutory Planning Issues | |
|---|---|
| Council Zoning | Rural 1(A) – Development consent required, subject to consistency with aims and objectives;<br>Subdivision can be created with an area between 2 and 200 hectares subject to Council approval;<br>Access road will be located within the 1(B) Rural Arterial Road Frontage corridor; |
| Aims and Objectives | Reasonably consistent with aims and objectives providing ideal site design and compatibility with surrounding landuses;<br>Consideration of the objective of restricting inappropriate traffic generating uses along main road frontages may be relevant due to proposed access from the New England Highway; |
| SEPPs & REPs | SEPP 44 – Koala Habitat Protection; does not appear to fall within this category;<br>SEPP 48 – Major Putrescible Landfill Sites, potentially applicable; |
| Other Constraints | RTA approval is required for a new intersection with access from the New England Highway; |
| **Criterion Ranking** | **6** |

| Criterion 3 - Ground and Surface Water Environment | |
|---|---|
| Regional Geology | Located within PRLSS target area (CSX 7);<br>Situated close to isolated units of Palaeozoic metasediments; |
| Local Geology | Good depth of soil and clay cover to basement rock;<br>Working and drying out of extremely wet clays near basement rock may be problematic;<br>Geology from borelog at nearest groundwater well approx 5km south west of site show clay to 2.74m then basalt bedrock to 11.28m bgs;<br>Geology from borelog at nearest groundwater well approx 5km north of site show clay to 14.3 m then basalt/shale/gravel. |
| Hydrology/Groundwater | No work on groundwater quality; |

| | |
|---|---|
| | Assumption that any potential groundwater quality is good;<br>Nearest DIPNR registered groundwater well approx 5km north of site show groundwater present at approximately 40m bgs;<br>Anecdotal advice from neighbouring landowners of closer registered bores used for stock watering and other domestic uses; |
| Land Capability | Land Class 4 |
| Leachate Control | Effective leachate management possible if designed in accordance with EPA Solid Waste Guidelines; |
| Flooding | Site is elevated and flood-free; |
| Surface Water Control | The topography of the site will allow effective surface drainage and stormwater management;<br>Site located at head of the stormwater catchment directly above Site 3; |
| Erosion Protection | Limited external catchment allows good erosion control opportunities;<br>Some care requires over control of potentially dispersive soils; |
| Distance from Waterways | Nearest permanent water is Duval Creek, which passes approximately 400 metres to the south of the site;<br>Direct waterways down-catchment (stormwater flow only) into Duval Creek;<br>Recommend Minister of Fisheries be consulted at EIS stage, due to proximity of Duval Creek; |
| **Criterion Ranking** | **4** |

| **Criterion 4 - Local Amenity and Environmental Considerations** | |
|---|---|
| Visual Amenity | Immediate vicinity is generally well protected to the west, north and east, with a relatively open vista towards the south;<br>Nearest visible dwelling is 'Taits Gully' located approximately 3.0 kilometres to the southeast, though this site is more protected from the southeast than Site 3;<br>Nearest external property is approximately 600 metres to the south;<br>Nearest dwellings include 'Annaleey' approximately 600 metres to the northeast, 'Tillbuster North' 1.1 kilometres to the northeast, and 'Varuna' 1.6 kilometres to the southeast, though none of these dwelling are visible form the site;<br>Approved building site overlooking site;<br>Mount Duval (1393 metres) and Duval State Forest Park situated a minimum of 3.2 kilometres to the southwest;<br>The site would require some visual screening on the buffer zone from the southwest round to the southeast. |

| | |
|---|---|
| | Anecdotal information supplied on an approved building site on adjoining land with potential views over the development area; |
| Flora and Fauna | Observation suggests site is extensively disturbed through clearing and grazing;<br>Little additional impact on flora and fauna;<br>Likelihood of increased vermin if not managed correctly;<br>Further studies are recommended should the site progress to EIS stage; |
| Land Environment | Predominantly extensive grazing quality land;<br>Dam located on southern perimeter adjoining Site 3; |
| Land Compatibility | Use as landfill should not impact on surrounding landuse provided the landfill is managed correctly and adequate buffer distances are maintained; |
| Noise | Adequate buffer zone will mitigate potential noise impacts; |
| Orientation | Site exposed to prevailing south / south-westerly winds;<br>The relatively open aspect to the south gives the site increased potential for wind exposure; |
| Atmospheric Protection | Control of dust/debris will be required to mitigate potential effects; |
| Landfill Gas Control | Potential impacts can be mitigated if catered for in design and licencing; |
| **Criterion Ranking** | **5** |

| **Criterion 5 - Level of Service** | |
|---|---|
| Distance to Areas Serviced | 19 kilometres north of Armidale via New England Highway;<br>42 kilometres from Uralla via New England Highway;<br>21 kilometres south of Guyra via New England Highway; |
| Land Area | Property size is 648 hectares;<br>Approximately 50 hectares of the property is suitable for landfill due to topography restrictions;<br>An additional 2 hectares would be required for the access road; |
| Level of Site Access | Landfill access would be restricted to transfer vehicles and commercial contractors (i.e. no public access facilities available); |
| Needs of Processing, Handling, Recycling | The site area available may not provide sufficient capability for the envisaged needs of processing, handling and recycling; |

| | |
|---|---|
| Level of Existing Road Service / Impacts | New England Highway (from Armidale, Uralla and Guyra) is an arterial road of excellent condition and carriageway width;<br>Existing unsealed 'paper road' from the highway to within 500 metres of the site with adequate sightlines in terms of location and road safety;<br>Access road would require extending and upgrading over a total length of approximately 1.0 kilometre;<br>Intersection would require appropriate construction and treatment; |
| Bush Fire Hazard | Relatively low bush fire hazard as largely clear of vegetation;<br>Risk can be managed appropriately by use of dams/tanks and site management practices. |
| **Criterion Ranking** | **5** |

| **Criterion 6 - Adequacy of Existing Services** | |
|---|---|
| Infrastructure | No existing services;<br>Power and telephone is presumably available from New England Highway (1.0 kilometre);<br>Potable water and wastewater treatment can be provided on-site;<br>Requirement for fire-fighting provisions can be covered by on-site detention tank or dam(s) with emergency storage; |
| **Criterion Ranking** | **4** |

| **Criterion 7 - Site Features** | |
|---|---|
| Topography/Terrain | Gentle sloping land at the top of the catchment;<br>Situated below the 1110 contour between 2 peaks, which rise to approximately 1160 metres;<br>No significant rock outcrops visible; |
| Capacity To Accept Defined Waste | The site has less capacity due to restrictive topography, however a capacity of at least 50 years should be available subject to detailed design and analysis;<br>Opportunity for expansion into Site 3; |
| **Criterion Ranking** | **3** |

| **Criterion 8 - Set-up Costs** | |
|---|---|
| Land Area Requirement | Approximately 50 hectares would be required for site development;<br>Additional land could be purchased for future expansion (being Site 3); |
| Land Cost | Site 3 property of 225 hectares on sale for $1778 / hectare (stated by Uphill & Schaefer Real Estate);<br>Property owner stated an estimated price in the region of $3200 per hectare; |

| | |
|---|---|
| | Purchase of 50 hectares estimated at $125,000 (at $2500 per hectare); |
| Infrastructure Costs | Approximately 1.0 kilometre of new access road will be required from the New England Highway at a cost of approximately $350,000 (at a rate of $410 per linear metre);<br>A new intersection will also be required to RTA standards, which will impose additional costs relative to the RTA assessment and approval process;<br>No on-site infrastructure and all necessary services will require connection - comparable to all sites with the exception of Site 1; |
| Leachate Control | Suitable liner and cover material available on site subject to further investigation;<br>Consideration of either sourcing clay or synthetic liners required for balance of required lining for leachate barrier; |
| **Criterion Ranking** | **8** |

| **Criterion 9 - Operational Costs** | |
|---|---|
| Compaction | Presence of suitable cover materials on site; subject to further investigation;<br>Compaction costs will be lower than those sites where intermediate daily cover is not readily available; |
| Transfer Operations | Haulage costs amongst the lowest of the sites evaluated due to lower distances to areas serviced (taking into account average haulage levels) and good quality road access; |
| Operation and Maintenance | Cover and construction materials appear to be available in the short to medium term, but detailed investigation is required;<br>Topsoils would need to be collected and stored for future use in rehabilitation; |
| **Criterion Ranking** | **5** |

| **Criterion 10 - Social Issues** | |
|---|---|
| Regional Economy | Impacts on regional economy will be consistent across all sites under evaluation; |
| Sensitive Landuses | Adjoining landuses are predominantly used for grazing stock;<br>EU accredited organic agriculture is located in the surrounding area;<br>Potentially sensitive land is noted with the Duval State Forest, a minimum of 3.0 kilometres to the southwest; |
| Land Values | Land value impacts on adjoining properties will be relatively consistent across all sites under evaluation; |
| Tourism | Potential impacts on tourism can not be foreseen for the site or surrounding area; |

| | |
|---|---|
| Agriculture | Upstream of EU accredited organic agriculture;<br>Additional mitigation measures may need to be imposed in order to ensure negligible impact; |
| Future Development | Opportunity available for expansion into Site 3;<br>Potential for up to 100 years landfill capacity;<br>Possible future development along northern areas of highway due to proximity to Armidale. |
| Heritage | No investigations of Aboriginal significance undertaken, but unlikely due to major land disturbance;<br>Would require European and Indigenous cultural heritage assessment at EIS stage; |
| **Criterion Ranking** | **4** |

## Other Issues

Due to the location of the site at the head of the catchment directly above Site 3, it is not recommended to look at the feasibility of Site 4 in isolation, without considering potential impacts on the Site 3 area and feasibility of combining both sites as one landfill.

It would therefore be recommended that should these sites progress beyond this stage of the study, that only Site 3 and Site 4 combined landfill be investigated further.

Both sites are considered as a single site in Option 4A.

### 3.4.1 Site 4A (the combined Site 3 and Site 4): 'Annaleey' and 'Tillbuster West'

**Location:** Dumaresq 9237-3-S; 389713
1.0 kilometre west of the New England Highway; 19 kilometres north of Armidale;
**Ownership:** 'Annaleey' and Tillbuster West', Neil Clayton;
**Property Details:** Parts of Lot 1 DP 585523 (Lot 121 & Pt Lot 87 DP 755823, Parish of Exmouth; Lot 1 DP 585523, Lot 7 DP 755823, Lot 1 DP 102773, Parish of Exmouth, Pt Lot 3 DP 800611, Parish of Exmouth/Duval, in Mackney 1997);
**Site Area:** 876.3 hectares; (225 hectares for sale plus negotiable land area required from 'Annaleey'
**Development Area:** Approximately 100 hectares required;
**Situation:** 2 adjoining properties under the same ownership;

## Evaluation – Sites 4A

| **Criterion 1 - Strategic Planning Guidelines** | |
|---|---|
| EPA Guidelines | Not included in any areas deemed sensitive or unsuitable; |
| DUAP Guidelines | Not included in any areas deemed sensitive or unsuitable; |
| **Criterion Ranking** | **6** |

| **Criterion 2 - Statutory Planning Issues** | |
|---|---|
| Council Zoning | Rural 1(A) – Development consent required, subject to consistency with aims and objectives;<br>Subdivision can be created with an area between 2 and 200 hectares subject to Council approval;<br>The access road would be located within the 1(B) Rural Arterial Road Frontage corridor; |
| Aims and Objectives | Reasonably consistent with aims and objectives providing ideal site design and compatibility with surrounding landuses;<br>Consideration of the objective of restricting inappropriate traffic generating uses along main road frontages may be relevant due to proposed access from New England Highway; |
| SEPPs & REPs | SEPP 44 – Koala Habitat Protection; does not appear to fall within this category;<br>SEPP 48 – Major Putrescible Landfill Sites, potentially applicable; |
| Other Constraints | RTA approval is required for a new intersection with access from the New England Highway; |
| **Criterion Ranking** | **6** |

| **Criterion 3 - Ground and Surface Water Environment** | |
|---|---|
| Regional Geology | Located within PRLSS target area (CSX 7);<br>Situated close to isolated units of Palaeozoic metasediments; |
| Local Geology | Lack of soil and clay cover depth to basement rock on Site 3;<br>Geological records describe a series alluvial muds, silts and sands over parts of the site with bedrock as close as 300mm to the surface;<br>Proximity of the basement confining layer has created extremely wet surface conditions;<br>Geology from borelog at nearest DIPNR registered groundwater well approx 5km south west of site show clay to 2.74m then basalt bedrock to 11.28m bgs;<br>Geology from borelog at nearest DIPNR registered groundwater well approx 5km north of site show clay to 14.3 m then basalt/shale/gravel. |
| Hydrology/Groundwater | No work on groundwater quality;<br>Assumption that any potential groundwater quality is good;<br>Nearest DIPNR registered groundwater well approx 5km south west of site showed no water bearing zones to approx 15m.<br>Nearest DIPNR registered groundwater well approx 5km north of site show groundwater present at approximately 40m bgs;<br>Groundwater used for domestic stock watering purposes;<br>Anecdotal advice from neighbouring landowners of closer registered bores used for stock watering and other domestic uses; |
| Land Capability | Land Class 4; |
| Leachate Control | Effective leachate management possible if designed in accordance with EPA Solid Waste Guidelines; |
| Flooding | Site is elevated and flood-free; |
| Surface Water Control | The topography of the site will allow effective surface drainage and stormwater management, though some ponding may be evident down-catchment; |
| Erosion Protection | Limited external catchment allows good erosion control opportunities;<br>Some care requires over control of potentially dispersive soils;<br>Limited evidence of soil erosion; |
| Distance from Waterways | Nearest permanent water is Duval Creek, which passes close to the south of the site (the distance is not clear as there is no proposed landfill boundary), however;<br>EPA Guidelines for minimum distances to waterways can be adhered to; |

| | |
|---|---|
| | Direct waterways down-catchment (stormwater flow only) into Duval Creek;<br>Recommend Minister of Fisheries be consulted at EIS stage, due to proximity of Duval Creek; |
| **Criterion Ranking** | **5** |

| **Criterion 4 - Local Amenity and Environmental Considerations** | |
|---|---|
| Visual Amenity | Immediate vicinity is generally well protected to the west, north and east, with a relatively open vista towards the south;<br>Nearest visible dwelling is 'Taits Gully' located approximately 3.0 kilometres to the southeast;<br>Nearest adjoining property is approximately 500 metres to the south and is partially visible from the potential landfill site;<br>Nearest dwellings include 'Annaleey' approximately 700 metres to the northeast, 'Tillbuster North' 1.2 kilometres to the northeast, and 'Varuna' 1.5 kilometres to the southeast, none of these dwelling are visible from the site;<br>Mount Duval (1393 metres) and Duval State Forest Park situated a minimum of 3.2 kilometres to the southwest;<br>The site would require some visual screening on the buffer zone from the southwest round to the southeast.<br>Anecdotal information supplied on an approved building site on adjoining land with potential views over the development area; |
| Flora and Fauna | Observation suggests site is extensively disturbed through clearing and grazing;<br>Little additional impact on flora and fauna;<br>Likelihood of increased vermin if not managed correctly;<br>Further studies are recommended should the site progress to EIS stage; |
| Land Environment | Immediately surrounding land is grazed farmland;<br>Dam located on northern perimeter adjoining Site 4; |
| Land Compatibility | Use as landfill should not impact on surrounding landuse provided the landfill is managed correctly and adequate buffer distances are maintained; |
| Noise | Adequate buffer zone will mitigate potential noise impacts; |
| Orientation | Site exposed to south-easterly to south-westerly winds;<br>More protected from westerly / north-westerly winds (which the owner states are predominant);<br>The relatively open aspect to the south gives the site increased potential for wind exposure; |

| | |
|---|---|
| Atmospheric Protection | Control of dust/debris will be required to mitigate potential effects; |
| Landfill Gas Control | Potential impacts can be mitigated if catered for in design and licencing; |
| **Criterion Ranking** | **5** |

| **Criterion 5 - Level of Service** | |
|---|---|
| Distance to Areas Serviced | 19 kilometres north of Armidale on the New England Highway;<br>42 kilometres from Uralla via Armidale and New England Highway;<br>21 kilometres south of Guyra on the New England Highway; |
| Land Area | Property size is 225 hectares plus an additional 50 hectares required from the 'Annaleey' property ( out of 644.6 hectares);<br>Approximately 100 hectares would be required and is available from the 2 sites for the potential development area;<br>An additional 2 hectares is required for the access road; |
| Level of Site Access | Landfill access would be restricted to transfer vehicles and commercial contractors (i.e. no public access facilities available); |
| Needs of Processing, Handling, Recycling | The site area available will provide sufficient capability for the envisaged needs of processing, handling and recycling; |
| Level of Existing Road Service / Impacts | New England Highway (from Armidale, Uralla and Guyra) is an arterial road of excellent condition and carriageway width;<br>Existing unsealed 'paper road' from the highway into the site with adequate sightlines in terms of location and road safety;<br>Access road would require extending and upgrading over a total length of approximately 1.0 kilometre;<br>Intersection would require appropriate construction and treatment; |
| Bush Fire Hazard | Relatively low bush fire hazard as largely clear of vegetation;<br>Risk can be managed appropriately by use of dams/tanks and site management practices. |
| **Criterion Ranking** | **8** |

| **Criterion 6 - Adequacy of Existing Services** | |
|---|---|
| Infrastructure | No existing services;<br>Power and telephone is presumably available from New England Highway (1.0 kilometre);<br>Potable water and wastewater treatment can be provided on-site;<br>Requirement for fire-fighting provisions can be covered by on-site detention tank or |

| | |
|---|---|
| | dam with emergency storage; |
| **Criterion Ranking** | **4** |

| **Criterion 7 - Site Features** | |
|---|---|
| Topography/Terrain | Gentle sloping land approximately half-way down the catchment, towards Duval Creek;<br>Situated below the 1090 contour between 2 peaks, which rise to approximately 1160 metres;<br>No significant rock outcrops visible; |
| Capacity To Accept Defined Waste | Capacity of at least 100 years is available subject to detailed design and analysis; |
| **Criterion Ranking** | **6** |

| **Criterion 8 - Set-up Costs** | |
|---|---|
| Land Area Requirement | Approximately 50 hectares required from the 225 hectares available at 'Tillbuster West', plus approximately 50 hectares of the 'Annaleey' property; |
| Land Cost | Total land cost estimated at $225,000;<br>Purchase of 50 hectares of 'Tillbuster West' estimated at $100,000 (at $2000 per hectare) plus 50 hectares of 'Annaleey' estimated at $125,000 (at $2500 per hectare); |
| Infrastructure Costs | Approximately 1.0 kilometre of new road will be required from the New England Highway, at a cost of approximately $350,000 (at $350 per linear metre);<br>A new intersection will also be required to RTA standards, which will impose additional costs relative to the RTA assessment and approval process;<br>No on-site infrastructure and all necessary services will require connection - comparable to all sites with the exception of Site 1; |
| Leachate Control | Small quantity of clays may be available on Site 4 for excavation, subject to further investigation;<br>Consideration of either sourcing clay or synthetic liners required for balance of required lining for leachate barrier; |
| **Criterion Ranking** | **7** |

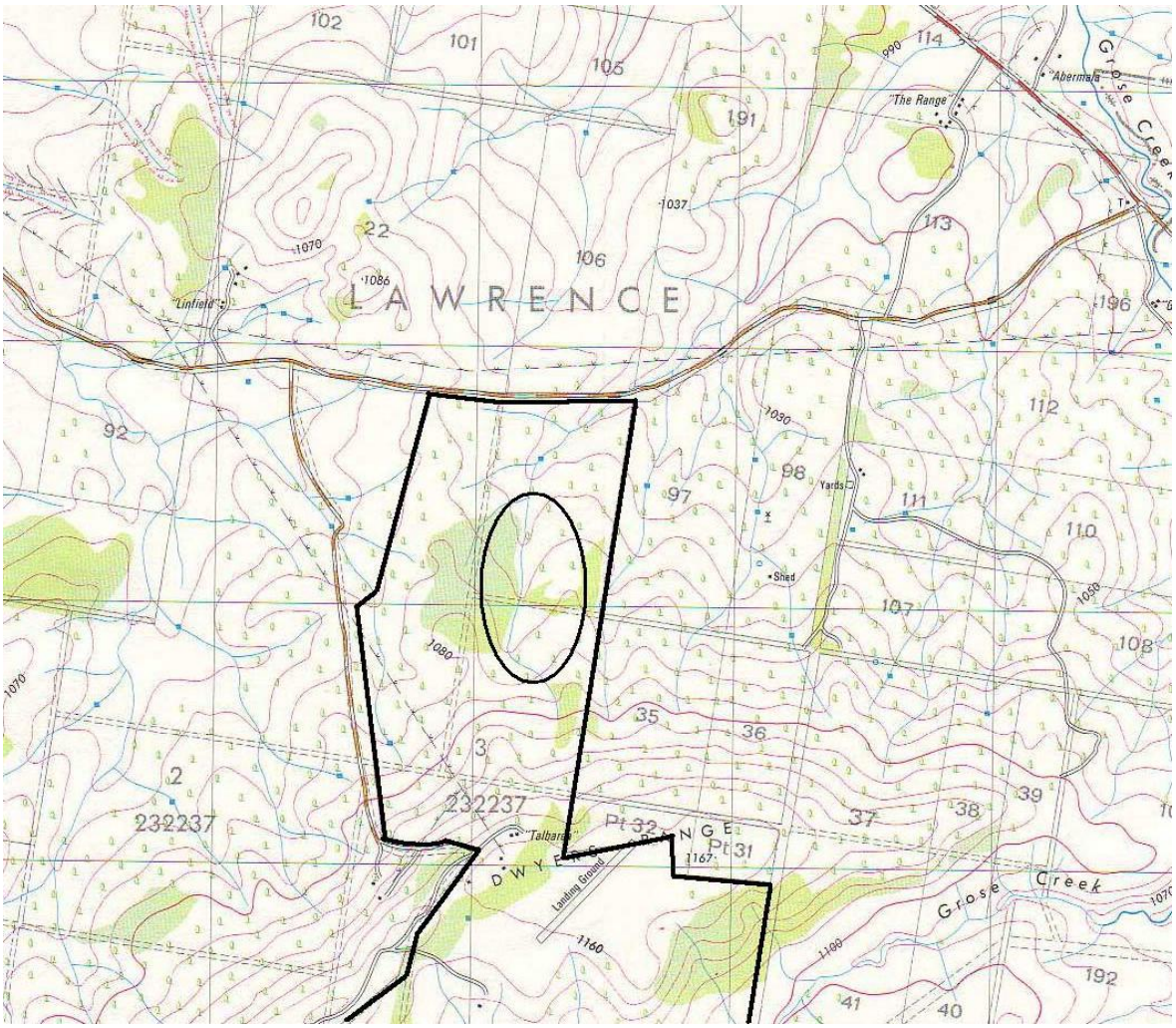
| **Criterion 9 - Operational Costs** | |
|---|---|
| Compaction | Presence of suitable cover materials on site; subject to further investigation;<br>Compaction costs will be lower than those sites where intermediate daily cover is not readily available; |

| | |
|---|---|
| Transfer Operations | Haulage costs amongst the lowest of the sites evaluated due to lower distances to areas serviced (taking into account average haulage levels) and good quality road access; |
| Operation and Maintenance | Poor availability of materials for operation and maintenance costs;<br>Topsoil would need to be collected and stored for future use in rehabilitation; |
| **Criterion Ranking** | **5** |

| **Criterion 10 - Social Issues** | |
|---|---|
| Regional Economy | Impacts on regional economy will be consistent across all sites under evaluation; |
| Sensitive Landuses | Adjoining landuses are predominantly used for grazing stock;<br>EU accredited organic agriculture is located in the surrounding area;<br>Potentially sensitive land is noted with the Duval State Forest, a minimum of 2.5 kilometres to the southwest; |
| Land Values | Land value impacts on adjoining properties will be relatively consistent across all sites under evaluation; |
| Tourism | Potential impacts on tourism can not be foreseen for the site or surrounding area; |
| Agriculture | Upstream of EU accredited organic agriculture;<br>Additional mitigation measures may need to be imposed in order to ensure negligible impact; |
| Future Development | Potential for up to 100 years landfill capacity;<br>Possible future development along northern areas of highway due to proximity to Armidale. |
| Heritage | No investigations of Aboriginal significance undertaken, but unlikely due to major land disturbance;<br>Would require European and Indigenous cultural heritage assessment at EIS stage; |
| **Criterion Ranking** | **4** |

## 3.5 Site 5: 'East Mihi'

| | |
|---|---|
| **Location:** | Gostwyck 9236-IV-S; 997754 |
| | 1.0 kilometre east of Dwyers Range Road/ Enmore Road, Uralla |
| | 23 kilometres east of Uralla; 31 kilometres south of Armidale; |
| **Ownership:** | 'East Mihi', David & Patricia Frizell, 257 Castledoyle Road; Armidale |
| **Property Details:** | Part of Lot 3 DP 232237; |
| **Site Area:** | 463.2 hectares; |
| **Development Area:** | Approximately 100 hectares required; |
| **Situation:** | Farmland; |



## Evaluation – Site 5

| **Criterion 1 - Strategic Planning Guidelines** | |
|---|---|
| EPA Guidelines | Not included in any areas deemed sensitive or unsuitable; |
| DUAP Guidelines | Not included in any areas deemed sensitive or unsuitable; |
| **Criterion Ranking** | **6** |

| **Criterion 2 - Statutory Planning Issues** | |
|---|---|
| Council Zoning | Rural 1(B) Agricultural Protection – (Uralla LEP);<br>While the site is located within the Agricultural Protection zone, the property is classified as 'Class II' which will allow the siting of a landfill subject to Council consent;<br>Consistency with aims and objectives will be a key issue;<br>Subdivision can be created down to 400 hectares subject to Council approval;<br>Smaller land-holdings may be considered for 'special uses';<br>Not 'Environmental Protection Zone', 'Environmentally Sensitive', 'Rural Residential', Rural Small Holdings', 'Prime Agricultural Grazing', 'Crop Land', special uses, or forestry. |
| Aims and Objectives | Given the more restrictive zoning than 'General Rural' consistency with the aims and objectives of the zone will be more problematic; This will increase the likelihood of less positive assessment by Council and will may cause potential conflict at DA stage; |
| SEPPs & REPs | SEPP 44 – Koala Habitat Protection; does not appear to fall within this category;<br>SEPP 48 – Major Putrescible Landfill Sites, potentially applicable; |
| Other Constraints | Nil |
| **Criterion Ranking** | **4** |

| **Criterion 3 - Ground and Surface Water Environment** | |
|---|---|
| Regional Geology | Located within PRLSS target area 6 (CSX);<br>Indicated as suitable geology; |
| Local Geology | Moderate depth of clay (0.9 to 2.0 metres) overlying metasediments;<br>Clays appear suitable for liner construction, cover material and rehabilitation;<br>Geology from borelogs at two DIPNR registered groundwater wells to proposed fill area approx 1.5km east of proposed fill area show topsoil to 0.6m, clay to 1.8 m and slate to end of hole at approx 30m bgs. |

| | |
|---|---|
| Hydrology/Groundwater | No work on groundwater quality;<br>Assumption that any potential groundwater quality is good;<br>Nearest DIPR registered groundwater well approx 1.5km east of proposed landfill area, installed June 1980. Used for stock watering purposes. Groundwater present at approximately 20m bgs;<br>Little groundwater due to local geology;<br>A sizeable basalt knob immediately to the south provides a recharge source that may present management problems;<br>Alluvial deposits may provide a pathway for groundwater migration through the site, which may be problematic for design; |
| Land Capability | Land Class 4; |
| Leachate Control | Groundwater is likely to emanate from surrounding basalt formations which may present problems for leachate management;<br>Potential concern is groundwater from the up-gradient basalts penetrating into the landfill;<br>Effective leachate management possible if designed in accordance with EPA Solid Waste Guidelines; |
| Flooding | Located towards the base of the local catchment therefore the potential for flooding exists; |
| Surface Water Control | The topography of the site will allow effective surface drainage and stormwater management;<br>Area of catchment uncertain, may be some surface water impacts from the surrounding area; |
| Erosion Protection | Limited (but not fully contained) external catchment allows reasonable erosion control opportunities;<br>Some care requires over control of potentially dispersive soils; |
| Distance from Waterways | Mihi Creek is located a minimum of 2.5 kilometres to the west and 3.0 kilometres to the north;<br>Grose Creek is located a minimum of 2.5 kilometres to the east; |
| **Criterion Ranking** | **6** |

| **Criterion 4 - Local Amenity and Environmental Considerations** | |
|---|---|
| Visual Amenity | The nearest adjoining properties seem to be close to the site, at approximately 300 metres to the west, and north (including Dwyers Range Road), 100 metres to the east and 600 metres to the south ('Talbarea'); |

| | |
|---|---|
| | Generally well protected from land towards the south, and is not likely to be visible form 'Talbarea' due to the undulating topography and vegetation;<br>The site is likely to be visible from a considerable length of public road, therefore retaining and supplementing existing trees and vegetation will be important; |
| Flora and Fauna | Observation suggests site is extensively disturbed through clearing and grazing;<br>Little additional impact on flora and fauna;<br>Likelihood of increased vermin if not managed correctly;<br>Further studies are recommended should the site progress to EIS stage; |
| Land Environment | Immediate land is subject to clearance and grazing;<br>Basalt soils surrounding the site are valuable for agriculture; |
| Land Compatibility | Use as landfill should not impact on surrounding landuse provided the landfill is managed correctly and adequate buffer distances are maintained;<br>The 100 metre buffer zone to the east is minimal but adequate; |
| Noise | An adequate buffer zone will mitigate potential noise impacts; however distances to adjoining properties may require additional mitigation measures to be implemented; |
| Orientation | North-facing site, with topography offering protection from the west, south and east;<br>Vegetation offers some protection form the north to northwest. |
| Atmospheric Protection | Control of dust/debris will be required to mitigate potential effects; |
| Landfill Gas Control | Potential impacts can be mitigated if catered for in design and licencing; |
| **Criterion Ranking** | **6** |

| **Criterion 5 - Level of Service** | |
|---|---|
| Distance to Areas Serviced | 23 kilometres east of Uralla via East Street and Gostwyck;<br>31 kilometres south of Armidale via Dangarsleigh Road and Enmore Road;<br>71 kilometres south of Guyra via New England Highway and Armidale;<br>Road condition from Uralla may be prohibitive; |
| Land Area | Property size is 463.2 hectares;<br>Approximately 100 hectares would be required for the potential development area plus an additional 1.5 hectares for the access road; |
| Level of Site Access | Landfill access would be restricted to transfer vehicles and commercial contractors (i.e. no public access facilities available); |

| | |
|---|---|
| Needs of Processing, Handling, Recycling | The site area available should provide sufficient capability for the envisaged needs of processing, handling and recycling; |
| Level of Existing Road Service / Impacts | The road between Uralla and Mihi comprises approximately 13 kilometres of sealed bitumen road of reasonable standard and 7.0 kilometres of unsealed road through mostly unfenced grazing land; The site is a further 2.5 kilometres from Mihi on unsealed road of relatively poor standard;<br>The sealed section of road would require widening and upgrading while the unsealed sections would require significant and costly upgrading; Possibility the unfenced sections would require fencing; A number of wooden bridges on this route may require upgrading to acceptable load standards;<br>If the route Uralla was deemed unacceptable and prohibitively expensive to upgrade the alternative route would be via Armidale;<br>Dangarsleigh Road from Armidale (and Guyra via Armidale) is a sealed bitumen road of reasonable standard, though widening and pavement improvement is likely to be required along much of this route;<br>The 2.5 kilometres from Dangarsleigh Road to the site access is unsealed road of poor quality; Significant upgrading and some intersection improvements are likely to be required;<br>The construction of approximately 700 metres of access road would be required; |
| Bush Fire Hazard | Relatively low bush fire hazard as largely clear of vegetation;<br>Risk can be managed appropriately by use of dams/tanks and site management practices. |
| **Criterion Ranking** | **2** |

| **Criterion 6 - Adequacy of Existing Services** | |
|---|---|
| Infrastructure | No existing services;<br>Power and telephone is available at reasonable cost as site appears to be considerable distance from nearest power lines;<br>Potable water and wastewater treatment can be provided on-site;<br>Requirement for fire-fighting provisions can be covered by on-site detention tank or dam(s) with emergency storage; |
| **Criterion Ranking** | **4** |

| **Criterion 7 - Site Features** | |
|---|---|
| Topography/Terrain | Sloping topography from approximately 1080 metres towards the road at approximately 1030 metres;<br>Dwyers Range is located approximately 600 metres to the south with an elevated plateau of 1160 metres; |

| | |
|---|---|
| Capacity To Accept Defined Waste | Capacity between 50 and 100 years could be made available subject to detailed design and analysis; |
| **Criterion Ranking** | **6** |

| **Criterion 8 - Set-up Costs** | |
|---|---|
| Land Area Requirement | Approximately 100 hectares would be required for development; |
| Land Cost | Approximate land cost is likely to be in the range of $1730 to $2220 per hectare;<br>Purchase of 100 hectares estimated at $200,000 (at $2000 per hectare); |
| Infrastructure Costs | Approximately 700 metres of new access road will be required at a cost of approximately $245,000 (at a rate of $350 per linear metre);<br>Approximately 13 kilometres of unsealed road would require significant upgrading which is likely to add a prohibitive cost to the development of the site;<br>Much of this road from Uralla may also require fencing;<br>A number of existing wooden bridges may also require upgrading;<br>The sealed roads from Uralla and Armidale may require widening and/or surface strengthening;<br>No on-site infrastructure and all necessary services will require connection - comparable to all sites with the exception of Site 1; |
| Leachate Control | Apparent abundance of suitable liner and cover material available on site;<br>Basalt outcrops have potential for extraction and crushing for use in road construction;<br>Consideration of either sourcing clay or synthetic liners required for balance of required lining for leachate barrier; |
| **Criterion Ranking** | **3** |

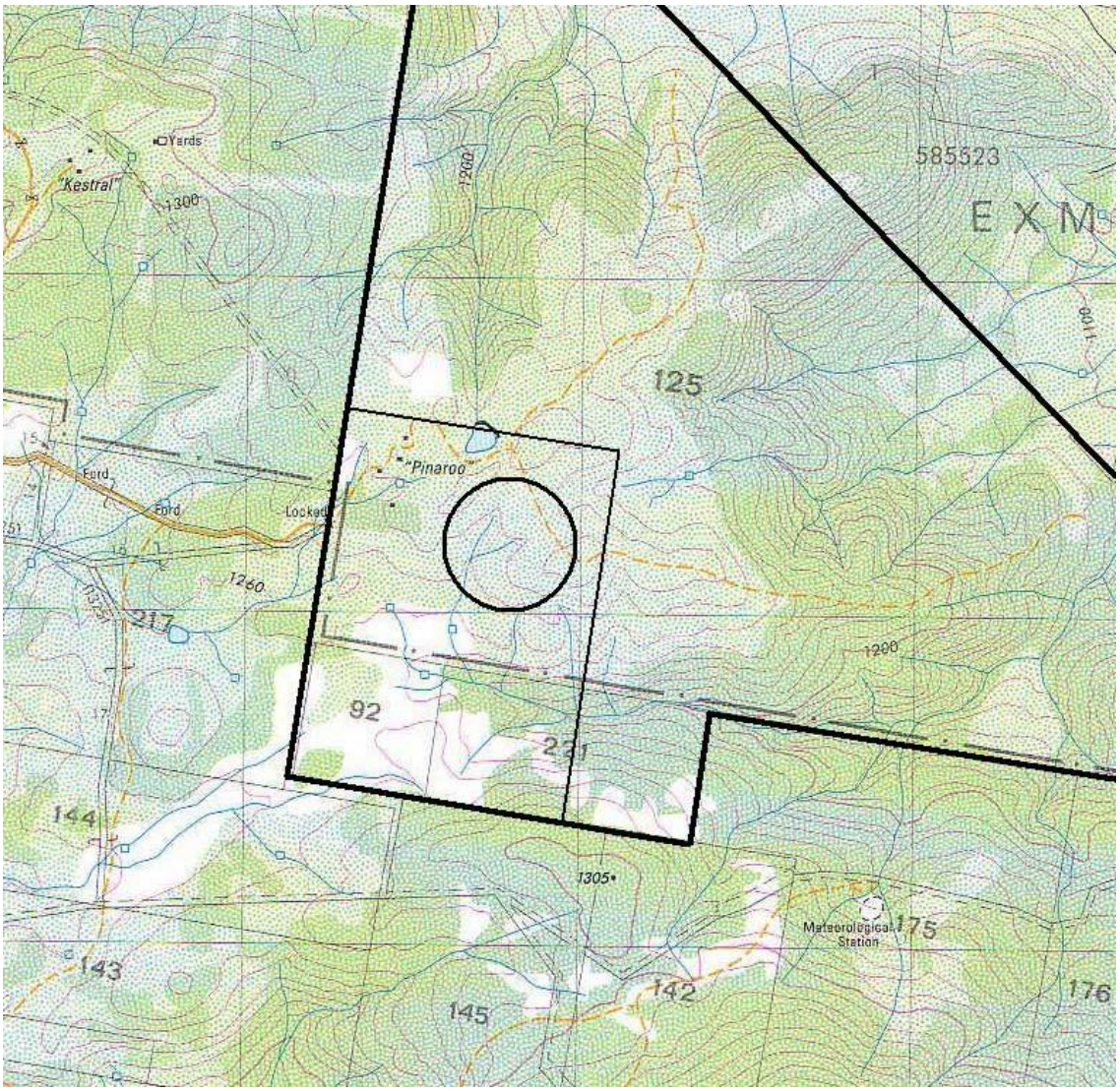
| **Criterion 9 - Operational Costs** | |
|---|---|
| Compaction | Presence of suitable cover materials on site; subject to further investigation;<br>Compaction costs will be lower than those sites where intermediate daily cover is not readily available; |
| Transfer Operations | Haulage costs amongst the highest of the sites evaluated due to longer distances to areas serviced (taking into account average haulage levels) and poor quality road access; |
| Operation and Maintenance | Cover and construction materials appear to be available;<br>Management of groundwater infiltration would be costly, though is not a confirmed problem at this stage;<br>Abundant topsoils and cover materials for site closure and rehabilitation; |

| | |
|---|---|
| **Criterion Ranking** | **4** |

| **Criterion 10 - Social Issues** | |
|---|---|
| Regional Economy | Upstream of EU accredited organic agriculture though potential impacts can be mitigated; |
| Sensitive Landuses | Adjoining landuses are predominantly used for grazing stock;<br>Nearest residential dwellings located approximately 700 metres to the south; |
| Land Values | Land value impacts on adjoining properties will be relatively consistent across all sites under evaluation; |
| Tourism | Road from Uralla is a popular tourist drive;<br>Potential for adverse effects if truck numbers are considerable; |
| Agriculture | Potential impact on surrounding agricultural activities can be mitigated; |
| Future Development | Expansion to a larger site is possible;<br>Not considered an area for large scale future development |
| Heritage | No investigations of Aboriginal significance undertaken, but unlikely due to major land disturbance;<br>Would require European and Indigenous cultural heritage assessment at EIS stage; |
| **Criterion Ranking** | **7** |

## 3.6 Site 6: 'Pinaroo'

| | |
|---|---|
| **Location:** | Dumaresq 9237-3-S; 675374<br>Eastern end of Exmouth Road, via Boorolong Road; 26 kilometres northwest Armidale; |
| **Ownership:** | 'Pinnaroo', Al Pearson, 659 Exmouth Road; |
| **Property Details:** | Parts of Lots 92 & 221 DP 755819; Lot 125 DP 755823; |
| **Site Area:** | 474.7 hectares; |
| **Development Area:** | Approximately 100 hectares required; |
| **Situation:** | Farmland property; |



## Evaluation – Site 6

| **Criterion 1 - Strategic Planning Guidelines** | |
|---|---|
| EPA Guidelines | Not included in any areas deemed sensitive or unsuitable; |
| DUAP Guidelines | Not included in any areas deemed sensitive or unsuitable; |
| **Criterion Ranking** | **6** |

| **Criterion 2 - Statutory Planning Issues** | |
|---|---|
| Council Zoning | Rural 1(A) – Development consent required, subject to consistency with aims and objectives;<br>Subdivision can be created with an area between 2 and 200 hectares subject to Council approval; |
| Aims and Objectives | Reasonably consistent with aims and objectives providing ideal site design and compatibility with surrounding landuses; |
| SEPPs & REPs | SEPP 44 – Koala Habitat Protection; does not appear to fall within this category;<br>SEPP 48 – Major Putrescible Landfill Sites, potentially applicable; |
| Other Constraints | Nil |
| **Criterion Ranking** | **6** |

| **Criterion 3 - Ground and Surface Water Environment** | |
|---|---|
| Regional Geology | Located within PRLSS target area (CSX 7);<br>Situated close to isolated units of Palaeozoic metasediments; |
| Local Geology | Site located near the interface between a mix of granitic intrusions and carboniferous metasediments, overlain by weathered tertiary basalts typically moist and poorly compacted;<br>Geology from borelogs at nearest DIPNR registered groundwater well approximately 4.5 kilometres south west of the site show clay to 2.74m, basalt to 11.28m bgs and grey rock to end of hole at 15.85m bgs. |
| Hydrology/Groundwater | No work on groundwater quality;<br>Assumption that any potential groundwater quality is good;<br>Nearest DIPNR registered groundwater well approximately 4.5km south west of site, installed March 1979. Used for stock watering purposes. No Groundwater bearing zones present at approximately 15m bgs;<br>Nearby down slopes offer potential for discharge of groundwater at the geological interface; |

| | |
|---|---|
| | Basalts may provide a recharge source that may present management problems; |
| Land Capability | Land Class 4 |
| Leachate Control | Effective leachate management possible if designed in accordance with EPA Solid Waste Guidelines, which may be more difficult to achieve given the site geology; |
| Flooding | Site is elevated and flood-free; |
| Surface Water Control | The topography of the site will allow effective surface drainage and stormwater management; |
| Erosion Protection | Limited external catchment allows good erosion control opportunities;<br>Some care requires over control of potentially dispersive soils; |
| Distance from Waterways | Private lake or dam located 100 metres to the north of the site;<br>No streams or waterways within a number of kilometres; |
| **Criterion Ranking** | **4** |

| **Criterion 4 - Local Amenity and Environmental Considerations** | |
|---|---|
| Visual Amenity | The site appears to be situated approximately 100 metres from 'Pinaroo' but at least 500 metres from the property adjoining to the west and 800 metres from the property to the south;<br>From a topographical map the site appears to be relatively well protected from all directions, but maybe more open towards the south; |
| Flora and Fauna | Observation (Mackney 1998) suggests the site is extensively disturbed through clearing and grazing;<br>Little additional impact on flora and fauna;<br>Likelihood of increased vermin if not managed correctly;<br>Further studies are recommended should the site progress to EIS stage; |
| Land Environment | Immediate land is subject to clearance and grazing;<br>Small lake located immediately to the north; |
| Land Compatibility | Appears compatible with surrounding landuses, subject to adequate buffer distances and investigating groundwater movement; |
| Noise | Adequate buffer zone will be required; |
| Orientation | Exposure to prevailing south-westerly to westerly winds is not ideal; |

| | |
|---|---|
| Atmospheric Protection | Control of wind blown debris will be difficult; |
| Landfill Gas Control | Potential impacts can be mitigated if catered for in design and licencing; |
| **Criterion Ranking** | **6** |

| **Criterion 5 - Level of Service** | |
|---|---|
| Distance to Areas Serviced | 26 kilometres from Armidale via Boorolong Road;<br>49 kilometres from Uralla via Armidale and New England Highway;<br>66 kilometres from Guyra via New England Highway and Armidale; |
| Land Area | Property size is 474.7 hectares;<br>Approximately 100 hectares would require subdivision for the potential development area and access road; |
| Level of Site Access | Landfill access would be restricted to transfer vehicles and commercial contractors (i.e. no public access facilities available); |
| Needs of Processing, Handling, Recycling | The site area available should provide sufficient capability for the envisaged needs of processing, handling and recycling; |
| Level of Existing Road Service / Impacts | Boorolong Road is a sealed bitumen road of reasonable quality between Armidale and 'Exmouth' Road (20 kilometres), however the carriageway width and pavement quality is adequate in a number of locations and a significant length of road may require upgrading;<br>An upgraded intersection would be required at 'Exmouth' Road;<br>Exmouth Road is an unsealed rural road of poor quality between Boorolong Road and the property entrance at 'Pinaroo'; All 6.5 kilometres of this road would require significant upgrading;<br>A further 400 metres of access road to the site from the property boundary would be required;<br>All weather access would not be available if the road was not upgraded; |
| Bush Fire Hazard | Relatively low bush fire hazard as largely clear of vegetation;<br>Risk can be managed appropriately by use of dams/tanks and site management practices. |
| **Criterion Ranking** | **2** |

| **Criterion 6 - Adequacy of Existing Services** | |
|---|---|
| Infrastructure | No existing services;<br>Power and telephone is available from extension from nearest residence; |

| | |
|---|---|
| | Potable water and wastewater treatment can be provided on-site;<br>Requirement for fire-fighting provisions can be covered by on-site detention tank with emergency storage; |
| **Criterion Ranking** | **4** |

| **Criterion 7 - Site Features** | |
|---|---|
| Topography/Terrain | Flat to sloping topography situated between 1240 and 1260 metres;<br>Located midway between Mount Duval (1393m) 2.3 kilometres to the southeast and Little Duval (1404m) 2.3 kilometres to the northwest; |
| Capacity To Accept Defined Waste | Capacity between 50 and 100 years could be made available subject to detailed design and analysis; |
| **Criterion Ranking** | **6** |

| **Criterion 8 - Set-up Costs** | |
|---|---|
| Land Area Requirement | Approximately 100 hectares would be required from the 463.2 hectare site; |
| Land Cost | Purchase of 100 hectares estimated at between $100,000 and $150,000 (at between $1000 and $1500 per hectare); |
| Infrastructure Costs | Approximately 500 metres of access road would also require construction at a cost of approximately $175,000 (at a rate of $350 per linear metre);<br>Approximately 6.5 kilometres of unsealed road would require significant upgrading which is likely to add a prohibitive cost to the development of the site;<br>The sealed road from Armidale (Boorolong Road) may require widening and/or surface strengthening;<br>No on-site infrastructure and all necessary services will require connection - comparable to all sites with the exception of Site 1; |
| Leachate Control | Clays appear readily available;<br>Consideration of either sourcing clay or synthetic liners required for balance of required lining for leachate barrier; |
| **Criterion Ranking** | **3** |

| **Criterion 9 - Operational Costs** | |
|---|---|
| Compaction | Location of extractable aggregates is unknown, and subject to further investigation;<br>Compaction costs will be lower than those sites where intermediate daily cover is not readily available; |
| Transfer Operations | Haulage costs amongst the highest of the sites evaluated due to longer distances |

| | |
|---|---|
| | to areas serviced (taking into account average haulage levels) and poor quality road access; |
| Operation and Maintenance | Road base and aggregate materials may not economically available;<br>Groundwater management costs may not be feasible for development;<br>Topsoils would need to be collected and stored for future closure and rehabilitation; |
| **Criterion Ranking** | **4** |

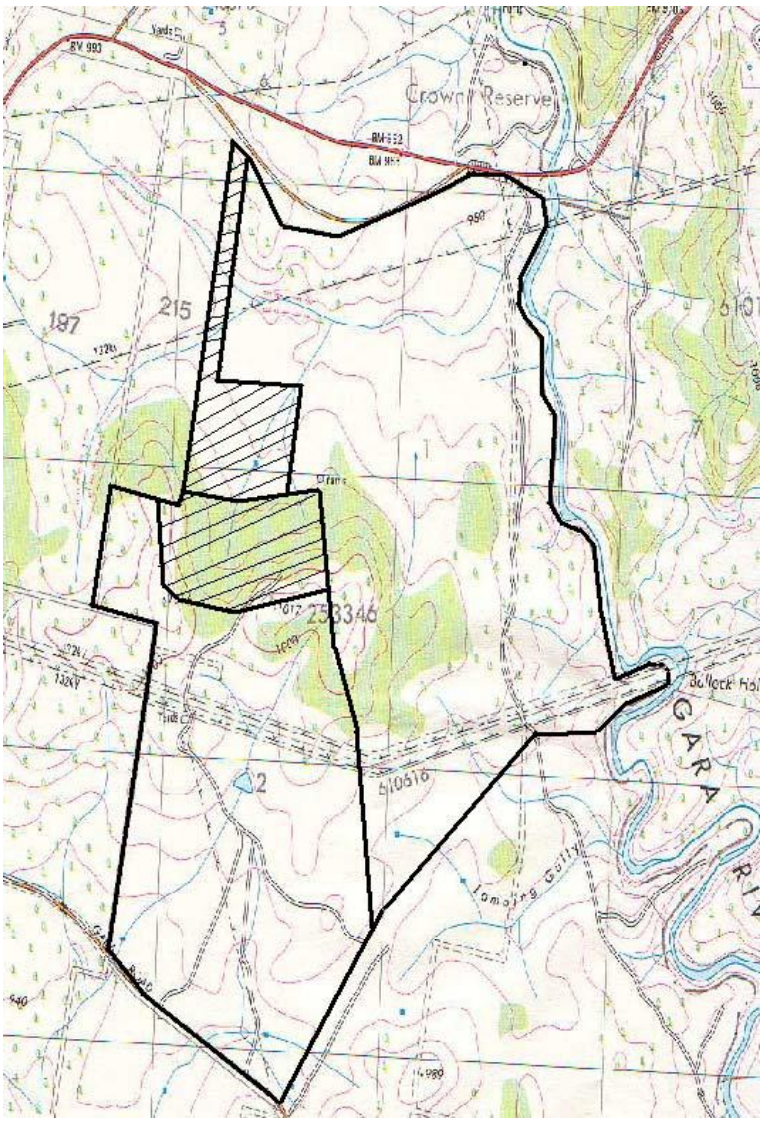
| **Criterion 10 - Social Issues** | |
|---|---|
| Regional Economy | Impacts on regional economy will be consistent across all sites under evaluation; |
| Sensitive Landuses | Adjoining landuses are predominantly used for grazing stock; |
| Land Values | Land value impacts on adjoining properties will be relatively consistent across all sites under evaluation; |
| Tourism | No evidence of local tourism therefore negligible impact; |
| Agriculture | Potential impact on surrounding agricultural activities can be mitigated; |
| Future Development | Little potential for large scale development; |
| Heritage | No investigations of Aboriginal significance undertaken, but unlikely due to major land disturbance;<br>Would require European and Indigenous cultural heritage assessment at EIS stage; |
| **Criterion Ranking** | **7** |

## Other Issues

Access onto the property was not possible with this site, therefore it was not possible to visually confirm geology and terrain conditions.

## 3.7 Site 7: 'Sherraloy'

| | |
|---|---|
| **Location:** | Hillgrove 9236-I-N; 195835; |
| | Approximately 1.0 kilometre south of Grafton Road; 12 kilometres east of Armidale; |
| **Ownership:** | Property 1: 'Sherraloy', DW & GM Crisp; |
| | Property 2: 'Edington', KP & DA Waters; |
| **Property Details:** | Property 1: Lot 2 DP 253346; Lot 1 DP 820246; Parish of Gara, County of Sandom; |
| | Area: 193.3 hectares; |
| | Property 2: Lot 1 DP 253346; Area: 274.6 hectares; |
| **Site Area:** | 467.9 Ha (total area); |
| **Development Area:** | Total site area of approximately 100 hectares required; |
| **Situation:** | Contained over 2 farmland properties; |



## Evaluation – Site 7

| **Criterion 1 - Strategic Planning Guidelines** | |
|---|---|
| EPA Guidelines | Not included in any areas deemed sensitive or unsuitable; |
| DUAP Guidelines | Not included in any areas deemed sensitive or unsuitable; |
| **Criterion Ranking** | **6** |

| **Criterion 2 - Statutory Planning Issues** | |
|---|---|
| Council Zoning | Rural 1(A) – Development consent required, subject to consistency with aims and objectives;<br>Subdivision can be created with an area between 2 and 200 hectares subject to Council approval;<br>Site access from Grafton Road will be located within the 1(B) Rural Arterial Road Frontage corridor;<br>Part of the required property may be zoned 1(B) Rural Arterial Road Frontage - if this is the case a minimum 200 metre road-frontage width may be required by proposed subdivision; |
| Aims and Objectives | Reasonably consistent with aims and objectives providing ideal site design and compatibility with surrounding landuses;<br>Consideration of the objective of restricting inappropriate traffic generating uses along main road frontages may be relevant due to proposed access form Grafton Road; |
| SEPPs & REPs | SEPP 44 – Koala Habitat Protection; does not appear to fall within this category;<br>SEPP 48 – Major Putrescible Landfill Sites, potentially applicable; |
| Other Constraints | RTA approval is required for a new intersection with access from Grafton Road; |
| **Criterion Ranking** | **6** |

| **Criterion 3 - Ground and Surface Water Environment** | |
|---|---|
| Regional Geology | Located within target area of PRLSS - Zone 4 (CCGS);<br>Preferable geological area;<br>Geotechnical investigations to be carried out during EIS stage to determine effective construction techniques due to possible location of fault line; |
| Local Geology | Good depth of potentially suitable soil and clay cover;<br>Geology from borelogs. 8 wells within 5km radius of site - nearest DIPNR registered groundwater well approx 4km east of site shows topsoil to 0.6m, and clay to end of hole at 16m bgs. |

| | |
|---|---|
| | Other wells with borehole data show clays at varying depths. |
| Hydrology/Groundwater | No work on groundwater quality;<br>Assumption that any potential groundwater quality is good;<br>Nearest DIPNR registered groundwater wells used for stock watering or irrigation purposes. Groundwater present at approximately 30-40m bgs;<br>Underlying metasediments should provide an adequate barrier to groundwater movement through the site;<br>Some shallow groundwater may occur due to surrounding basalts;<br>Presence of soaks following wet weather due to relatively impervious underlying clays and bedrock; |
| Land Capability | Land Class 4-5; |
| Leachate Control | Effective leachate management possible if designed in accordance with EPA Solid Waste Guidelines; |
| Flooding | Site is located mid-catchment therefore potential for flooding exists;<br>Previous evidence of flooding; |
| Surface Water Control | The topography of the site will allow effective surface drainage and stormwater management;<br>Located near the head of the catchment allowing adequate routing of stormwater;<br>Anecdotal localised flooding evidence near site access – may require additional measures to mitigate potential surface water impacts; |
| Erosion Protection | Limited external catchment allows good erosion control opportunities;<br>Some care requires over control of potentially dispersive soils; |
| Distance from Waterways | Nearest permanent water is Gara River located a minimum of 1.0 kilometre to the east of the site;<br>Situated downstream of the Gara Dam;<br>Other waterways are Commissioners Waters, a minimum of 2.0 kilometres to the south / southwest, and Burying Ground Creek 2 .5 kilometres to the west; |
| **Criterion Ranking** | **7** |

| **Criterion 4 - Local Amenity and Environmental Considerations** | |
|---|---|
| Visual Amenity | Generally protected from surrounding land towards the west, south and east with partially inhibited views towards the north;<br>Partial views of Grafton Road from the site, including a rest-area and shelter;<br>The site will require additional screening towards the north in order to minimise |

| | |
|---|---|
| | potential impacts from Grafton Road;<br>Surrounding residential dwellings include the 'Crisp' residence approximately 700 metres to the south; the 'Quaife' residence approximately 900 metres to the northwest; a number of dwellings approximately 1.5 kilometres to the north (on the northern side of Grafton Road), and the 'Waters' residence approximately 2.0 kilometres to the northeast;<br><br>While a number of properties (including the 'Quaife" residence) are visible from near the 'Crisp' property boundary, it is not likely that any residential dwelling would be able to view the operational landfill area;<br>The required buffer distance of at least 250 metres to the nearest dwelling can be met; The adequacy of a visual buffer (i.e. planting of trees to provide visual screening around the site will be addressed in more detail at EIS stage); |
| Flora and Fauna | Observation suggests site is extensively disturbed through clearing and grazing;<br>Little additional impact on flora and fauna;<br>Likelihood of increased vermin if not managed correctly;<br>Further studies are recommended should the site progress to EIS stage; |
| Land Environment | Immediate land is subject to clearance and grazing;<br>Partially vegetated with several rock outcrops and surface rocks; |
| Land Compatibility | Use as landfill should not impact on surrounding landuse provided the landfill is managed correctly and adequate buffer distances are maintained;<br>The Quaife property contains an orchard which is the only evident non-grazing use, care may have to be taken to prevent potential impacts including vermin and insects; |
| Noise | An adequate buffer zone will mitigate potential noise impacts; however distances to adjoining properties may require additional mitigation measures to be implemented |
| Orientation | Site has a north-facing orientation and is protected against prevailing south / southwest winds by topography; |
| Atmospheric Protection | Control of dust/debris will be required to mitigate potential effects; |
| Landfill Gas Control | Potential impacts can be mitigated if catered for in design and licencing; |
| **Criterion Ranking** | **4** |

| **Criterion 5 - Level of Service** | |
|---|---|
| Distance to Areas | 12 kilometres from Armidale (GPO) via Grafton Road; |

| | |
|---|---|
| Serviced | 35 kilometres from Uralla via Armidale and the New England Highway;<br>52 kilometres from Guyra via Armidale and the New England Highway; |
| Land Area | Crisp Property is 193.3 hectares;<br>Waters property size is 274.6 hectares;<br>Approximately 100 hectares is required for the potential development area and access road; |
| Level of Site Access | Landfill access would be restricted to transfer vehicles and commercial contractors (i.e. no public access facilities available); |
| Needs of Processing, Handling, Recycling | The site area available should provide sufficient capability for the envisaged needs of processing, handling and recycling; |
| Level of Existing Road Service / Impacts | Access via Grafton Road rather than Gara Road is proposed in order to avoid potential impact on local roads and local amenity;<br>Grafton Road is a good quality Arterial Highway;<br>A new intersection on Grafton Road will be required to enable site access;<br>An access road up to 1.0 kilometre in length will be required; |
| Bush Fire Hazard | Relatively low bush fire hazard as largely clear of vegetation;<br>Risk can be managed appropriately by use of dams/tanks and site management practices.<br>Proximity to water main could provide additional fire fighting measures; |
| **Criterion Ranking** | **8** |

| **Criterion 6 - Adequacy of Existing Services** | |
|---|---|
| Infrastructure | No existing services;<br>Power and telephone is available as extension from Grafton Road or Quaife property, subject to service provider assessment;<br>Potable water and wastewater treatment can be provided on-site;<br>Requirement for fire-fighting provisions can be covered by on-site detention tank, dam(s) with emergency storage and /or water main; |
| **Criterion Ranking** | **4** |

| **Criterion 7 - Site Features** | |
|---|---|
| Topography/Terrain | Sloping site from maximum 990 metre elevation to 960 metres;<br>Some of the site contains relatively steep gradients of up to 30%; |
| Capacity To Accept Defined Waste | Capacity between 50 and 100 years could be made available subject to detailed design and analysis; |

| | |
|---|---|
| **Criterion Ranking** | **6** |

| **Criterion 8 - Set-up Costs** | |
|---|---|
| Land Area Requirement | Approximately 100 hectares would be required for development; |
| Land Cost | Purchase of 100 hectares estimated at $250,000 (at $2500 per hectare); |
| Infrastructure Costs | Approximately 1.0 kilometre of new sealed access road would be required at a cost of approximately $350,000 (at $350 per linear metre);<br>A new intersection will also be required to RTA standards, which will impose additional costs relative to the RTA assessment and approval process;<br>No on-site infrastructure and all necessary services will require connection - comparable to all sites with the exception of Site 1; |
| Leachate Control | Suitable liner materials available on site;<br>Site topography and local geology appears to lend itself well to long term control and monitoring of leachate;<br>Consideration of either sourcing clay or synthetic liners required for balance of required lining for leachate barrier; |
| **Criterion Ranking** | **7** |

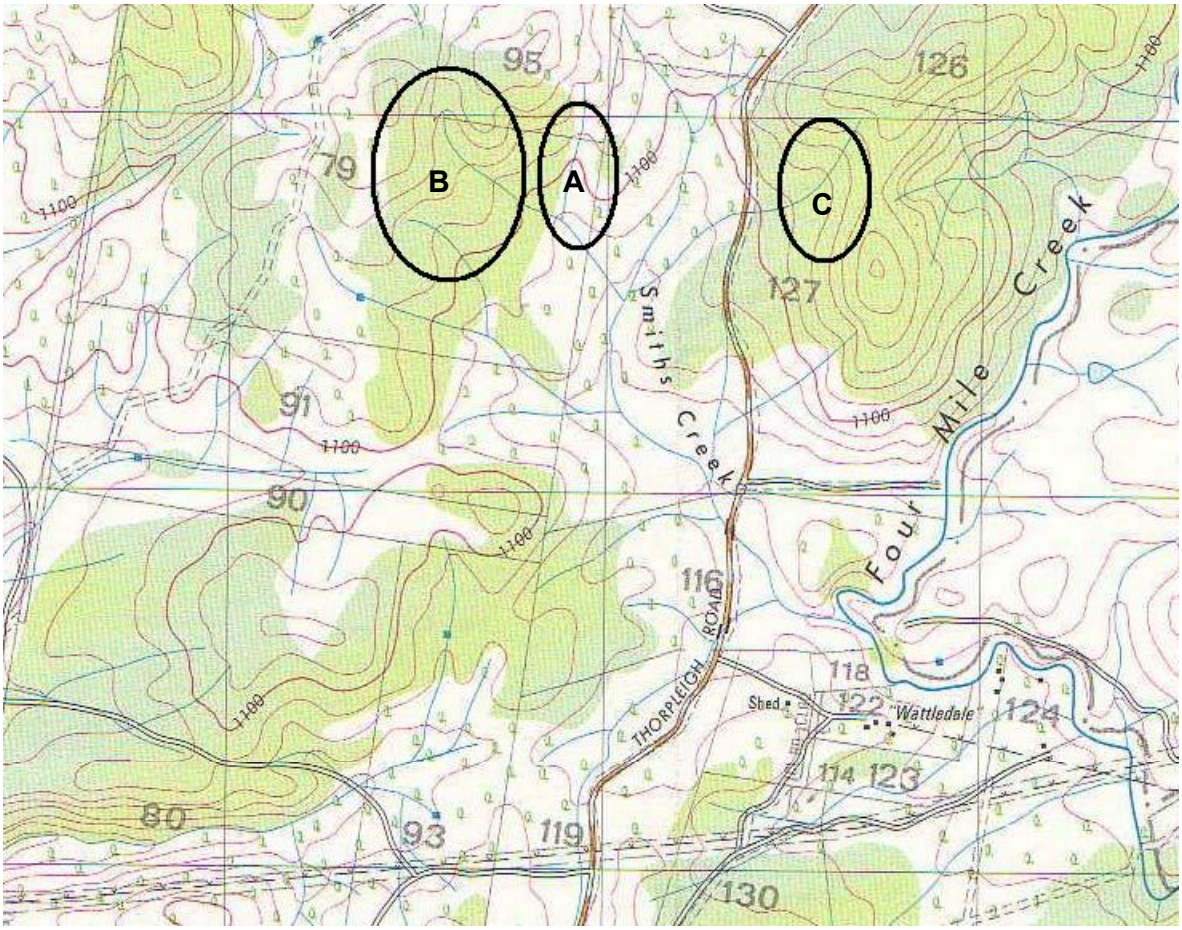
| **Criterion 9 - Operational Costs** | |
|---|---|
| Compaction | Presence of suitable cover materials on site; subject to further investigation;<br>Compaction costs will be lower than those sites where intermediate daily cover is not readily available; |
| Transfer Operations | Haulage costs amongst the lowest of the sites evaluated due to lower distances to areas serviced (taking into account average haulage levels) and good quality road access; |
| Operation and Maintenance | All base materials appear to be in good supply;<br>Topsoils would need to be collected and stored for future closure and rehabilitation; |
| **Criterion Ranking** | **8** |

| **Criterion 10 - Social Issues** | |
|---|---|
| Regional Economy | Impacts on regional economy will be consistent across all sites under evaluation; |
| Sensitive Landuses | Adjoining landuses are predominantly used for grazing stock;<br>Orchard located on adjoining site (Quaife Property) approximately 900 metres to the north west – mitigation measures would be require assessment at EIS stage; |

| | |
|---|---|
| Land Values | Land value impacts on adjoining properties will be relatively consistent across all sites under evaluation; |
| Tourism | Increased truck movements on Grafton Road which is the main route to the coast;<br>Potential loss of visual amenity (can be screened); |
| Agriculture | Additional mitigation measures may need to be imposed in order to ensure negligible impact on adjoining sensitive landuses; |
| Future Development | Potential area for future development, due to location; |
| Heritage | No investigations of Aboriginal significance undertaken, but unlikely due to major land disturbance;<br>Would require European and Indigenous cultural heritage assessment at EIS stage; |
| **Criterion Ranking** | **4** |

## 3.8 Site 8: 'Waioma'

| | |
|---|---|
| **Location:** | Hillgrove 9236-I-N; 250985<br>Three potential locations on one property (Areas A, B and C) previously investigated, east and west of Thorpleigh Road, north of Grafton Road; 35 kilometres east of Armidale;<br>Area B is most likely to be acceptable with expansion into Area A possible;<br>Area C has previously been ruled out; |
| **Ownership:** | 'Waioma', MM & HA Stewart, Thorpleigh Road; |
| **Property Details:** | Parts of Lots 120 & 127 DP 755847; Lots 2-3 DP 800571; Lots 4-5 DP 822712; Parish of Uratah, County of Sandon; |
| **Site Area:** | 169.6 hectares; |
| **Development Area:** | Approximately 100 hectares required plus 6.0 hectares for access road (if required) |
| **Situation:** | Farmland, two properties available; |



## Evaluation – Site 8

The following evaluation concentrates on Area B as the main site with potential expansion into Area A or other adjoining land.

| **Criterion 1 - Strategic Planning Guidelines** | |
|---|---|
| EPA Guidelines | Not included in any areas deemed sensitive or unsuitable; |
| DUAP Guidelines | Not included in any areas deemed sensitive or unsuitable; |
| **Criterion Ranking** | **6** |

| **Criterion 2 - Statutory Planning Issues** | |
|---|---|
| Council Zoning | Rural 1(A) – Development consent required, subject to consistency with aims and objectives;<br>Subdivision can be created with an area between 2 and 200 hectares subject to Council approval; |
| Aims and Objectives | Reasonably consistent with aims and objectives providing ideal site design and compatibility with surrounding landuses;<br>Consideration of the objective of restricting inappropriate traffic generating uses along main road frontages may be relevant due to proposed access from Grafton Road; |
| SEPPs & REPs | SEPP 44 – Koala Habitat Protection; does not appear to fall within this category;<br>SEPP 48 – Major Putrescible Landfill Sites, potentially applicable; |
| Other Constraints | RTA approval is required for a new intersection with access from Grafton Road; |
| **Criterion Ranking** | **6** |

| **Criterion 3 - Ground and Surface Water Environment** | |
|---|---|
| Regional Geology | Located within target area of PRLSS - Zone 4 (CCGS); |
| Local Geology | Moderate depth of clay (0.8 – 1.5 metres) overlying metasediments;<br>Surficial evidence of clays was not apparent during site inspection (though it is stated at moderate depth based upon previous test excavations);<br>Geology from borelogs at nearest DIPNR registered groundwater well approx 4m south west of site show topsoil/granite to 0.45m, then clay to 3.65m and boulders/Basalt to end of hole at 39.93m bgs. |
| Hydrology/Groundwater | No work on groundwater quality;<br>Assumption that any potential groundwater quality is good; |

| | |
|---|---|
| | Nearest DIPNR registered groundwater well licenced for domestic & stock watering purposes. Groundwater present at approximately 40m bgs;<br>Relatively shallow and impervious underlying rock results in perched water table and wet ground conditions caused by heavy rain; |
| Land Capability | Land Class 6; |
| Leachate Control | Effective leachate management possible if designed in accordance with EPA Solid Waste Guidelines; |
| Flooding | Site is elevated and flood-free; |
| Surface Water Control | The topography of the site will allow effective surface drainage and stormwater management;<br>May require construction of substantial erosion control infrastructure and detention basins;<br>Located at the head of the stormwater catchment; |
| Erosion Protection | Limited external catchment allows good erosion control opportunities;<br>Some care requires over control of potentially dispersive soils; |
| Distance from Waterways | Four Mile Creek is located a minimum distance of 2.0 kilometres to the east / southeast of the site; |
| **Criterion Ranking** | **6** |

| **Criterion 4 - Local Amenity and Environmental Considerations** | |
|---|---|
| Visual Amenity | Well protected from surrounding land in all directions, though potentially more open towards the south;<br>Care will be required to maintain visual protection to the south;<br>Nearest adjoining property is located approximately 400 metres to the south;<br>There are no residential dwellings visible from the vicinity of the proposed landfill area; |
| Flora and Fauna | Observation suggests site is extensively disturbed through clearing and grazing;<br>Little additional impact on flora and fauna;<br>Likelihood of increased vermin if not managed correctly;<br>Further studies are recommended should the site progress to EIS stage; |
| Land Environment | Immediate land is subject to clearance and grazing; |
| Land Compatibility | Use as landfill should not impact on surrounding landuse provided the landfill is |

| | |
|---|---|
| | managed correctly and adequate buffer distances are maintained; |
| Noise | An adequate buffer zone will mitigate potential noise impacts; |
| Orientation | Site orientated towards the south, with topography offering protection from the north, west and east; |
| Atmospheric Protection | Control of dust/debris will be required to mitigate potential effects; |
| Landfill Gas Control | Potential impacts can be mitigated if catered for in design and licencing; |
| **Criterion Ranking** | **6** |

| **Criterion 5 - Level of Service** | |
|---|---|
| Distance to Areas Serviced | 35 kilometres from Armidale via Grafton Road;<br>58 kilometres from Uralla via Armidale and the New England Highway;<br>75 kilometres from Guyra via Armidale and the New England Highway; |
| Land Area | Property size is 169.6 hectares;<br>Approximately 100 hectares is required for the potential development area and access road; |
| Level of Site Access | Landfill access would be restricted to transfer vehicles and commercial contractors (i.e. no public access facilities available); |
| Needs of Processing, Handling, Recycling | The site area available should provide sufficient capability for the envisaged needs of processing, handling and recycling; |
| Level of Existing Road Service / Impacts | Grafton Road is an Arterial Road with an ideal level of service;<br>Thorpleigh Road is an unsealed rural road that will require significant upgrading over the 2.0 kilometres from Grafton Road;<br>An upgraded intersection will be required for Thorpleigh Road (requiring RTA approval);<br>Approximately 1.0 kilometre of access road will need to be constructed over relatively steep terrain;<br>Alternative access may be provided via a new access road approximately 1.0 kilometre to the south of the existing accessway along Thorpleigh Road, however this option would require the construction of approximately 1.0 kilometre of access road down-catchment of the proposed site; |
| Bush Fire Hazard | Existing levels of vegetation may require some clearance to lessen the potential impact of bushfire hazard; |

| | |
|---|---|
| | Risk can be managed appropriately by use of dams/tanks and site management practices. |
| **Criterion Ranking** | **5** |

| **Criterion 6 - Adequacy of Existing Services** | |
|---|---|
| Infrastructure | No existing services;<br>Electricity and telephone is available at normal cost from the nearest dwelling;<br>Potable water and wastewater treatment can be provided on-site;<br>Requirement for fire-fighting provisions can be covered by on-site detention tank or dam(s) with emergency storage; |
| **Criterion Ranking** | **4** |

| **Criterion 7 - Site Features** | |
|---|---|
| Topography/Terrain | Sloping terrain with some steep gradients in the catchment;<br>Situated in a natural depression between 1150 and 1100 metres in elevation; |
| Capacity To Accept Defined Waste | Capacity between 50 and 100 years could be made available subject to detailed design and analysis; |
| **Criterion Ranking** | **6** |

| **Criterion 8 - Set-up Costs** | |
|---|---|
| Land Area Requirement | Approximately 100 hectares would be required for development;<br>Outright purchase of both properties is a condition of sale by the landowner however not considered within the scope of the valuation within this report;<br>Additional land (approximately 6.0 hectares) would be required if a new access road were to be constructed between the site and Grafton Road; |
| Land Cost | Estimated value stated by the landowner is in the vicinity of $2500 per hectare;<br>Purchase of 100 hectares estimated at $250,000 (at $2500 per hectare); |
| Infrastructure Costs | A new sealed access road from Thorpleigh Road (between 1.0 and 2.0 kilometres depending on the access location to Thorpleigh Road) will be required at a cost of between $350,000 and $700,000 (at a rate of $350 per linear metre);<br>Thorpleigh Road between the new access road and Grafton Road (between 1.0 and 2.0 kilometres depending on the access road location) would also require upgrading at additional cost;<br>An alternative access would comprise a new access road between the site and Grafton Road (approximately 3.0 kilometres of new access road estimated at $1.05 million);<br>A new intersection will also be required to RTA standards, which will impose |

| | |
|---|---|
| | additional costs relative to the RTA assessment and approval process;<br>No on-site infrastructure and all necessary services will require connection - comparable to all sites with the exception of Site 1; |
| Leachate Control | Suitable liner and construction materials appear available on site - Consideration of either sourcing clay or synthetic liners required for balance of required lining for leachate barrier;<br>Site topography and local geology appears to lend itself well to long term control and monitoring of leachate; |
| **Criterion Ranking** | **5** |

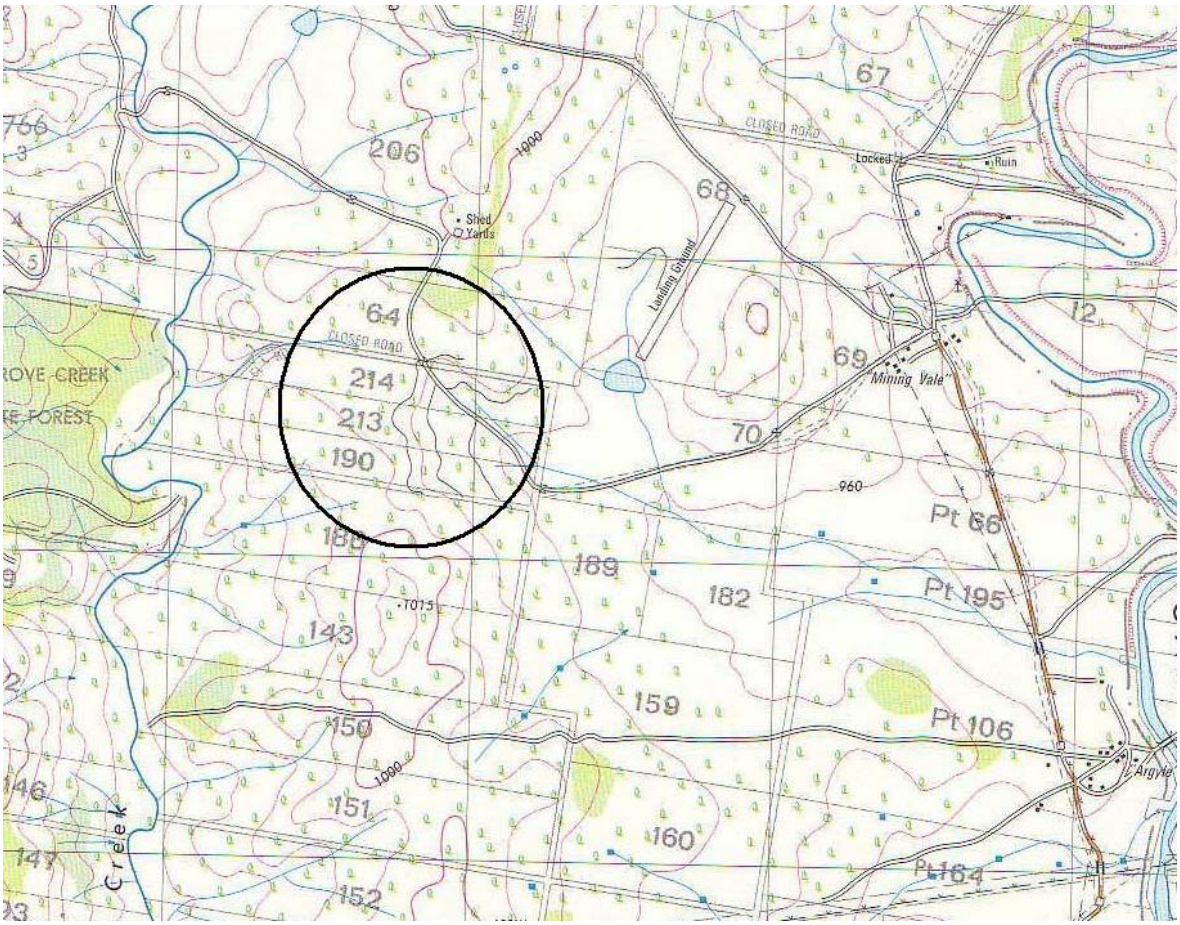
| **Criterion 9 - Operational Costs** | |
|---|---|
| Compaction | Presence of suitable cover materials on site; subject to further investigation;<br>Compaction costs will be lower than those sites where intermediate daily cover is not readily available; |
| Transfer Operations | Haulage costs amongst the higher of the sites evaluated due to longer distances to areas serviced (taking into account average haulage levels), though generally good quality road access; |
| Operation and Maintenance | All base materials appear to be in good supply;<br>Topsoils would need to be collected and stored for future closure and rehabilitation; |
| **Criterion Ranking** | **6** |

| **Criterion 10 - Social Issues** | |
|---|---|
| Regional Economy | Impacts on regional economy will be consistent across all sites under evaluation; |
| Sensitive Landuses | Adjoining landuses are predominantly used for grazing stock; |
| Land Values | Land value impacts on adjoining properties will be relatively consistent across all sites under evaluation; |
| Tourism | Increased truck movements on Grafton Road which is the main route to the coast;<br>Negligible impact expected from site development; |
| Agriculture | Potential impact on surrounding agricultural activities can be mitigated; |
| Future Development | Potential for development in area due to location; |

| | |
|---|---|
| Heritage | No investigations of Aboriginal significance undertaken, but unlikely due to major land disturbance;<br>Would require European and Indigenous cultural heritage assessment at EIS stage; |
| **Criterion Ranking** | **5** |

## 3.9 Site 9: 'Miningvale Road'

| | |
|---|---|
| **Location:** | Hillgrove 9236-I-N; 235815;<br>2.0 kilometres west of Miningvale, Miningvale Road; 16 kilometres east of Armidale; |
| **Ownership:** | 'Ballantrae', Mrs J. Erratt |
| **Property Details:** | Lot 2 DP 1045080 |
| **Site Area:** | 555.3 hectares (236 hectares for sale- site recently divided) |
| **Development Area:** | Approximately 100 hectares required plus 8.0 hectares for access road (if required) |
| **Situation:** | Farmland; |



## Evaluation – Site 9

| Criterion 1- Strategic Planning Guidelines | |
|---|---|
| EPA Guidelines | Not included in any areas deemed sensitive or unsuitable; |
| DUAP Guidelines | Not included in any areas deemed sensitive or unsuitable; |
| **Criterion Ranking** | **6** |

| Criterion 2 - Statutory Planning Issues | |
|---|---|
| Council Zoning | Rural 1(A) – Development consent required, subject to consistency with aims and objectives;<br>Subdivision can be created with an area between 2 and 200 hectares subject to Council approval; |
| Aims and Objectives | Reasonably consistent with aims and objectives providing ideal site design and compatibility with surrounding landuses;<br>Consideration of the objective of restricting inappropriate traffic generating uses along main road frontages may be relevant due to proposed access form Grafton Road; |
| SEPPs & REPs | SEPP 44 – Koala Habitat Protection; does not appear to fall within this category;<br>SEPP 48 – Major Putrescible Landfill Sites, potentially applicable; |
| Other Constraints | RTA approval is required for a new intersection with access from Grafton Road; |
| **Criterion Ranking** | **6** |

| Criterion 3 - Ground and Surface Water Environment | |
|---|---|
| Regional Geology | Located within PRLSS target area 6 (CSX); |
| Local Geology | Thin depth of clays and clayey gravels (1.0 to 1.5 metres) overlying metasediments;<br>Clay appears suitable for liner construction, cover material and rehabilitation;<br>Geology from DIPNR registered borelogs within 5km radius:<br>▪ 3 bores to south east of site, very shallow topsoil & Clay<br>▪ Bore to west of site, 0-0.3 soil, 0.3-3.57m clay then shale & basalt to end of hole at 54.87m<br>▪ 7 bores to the west and north west of site<br>▪ 4 to north west from 1968, no good detail, shallow clays then heavy metamorphosed to approx 35m<br>▪ Bore to furthest north of site topsoil to 0.1m, clay to 17.4m, then granite to EOH at 73m. |

| | |
|---|---|
| Hydrology/Groundwater | No work on groundwater quality;<br>Assumption that any potential groundwater quality is good;<br>Underlying metasediments should provide an adequate barrier to groundwater movement through the site;<br>Groundwater in nearest wells to site present at approximately 40-50m bgs to south and west of site and approx 70m bgs to north of site;<br>No sign of potential groundwater seepage or shallow underlying rock that might cause a perched water table and wet ground conditions; |
| Land Capability | Land Class 4; |
| Leachate Control | Effective leachate management possible if designed in accordance with EPA Solid Waste Guidelines; |
| Flooding | Site is elevated however there is some evidence of down-catchment flooding; |
| Surface Water Control | The topography of the site will allow effective surface drainage and stormwater management;<br>Located near the head of the catchment allowing adequate routing of stormwater;<br>Provision of surface contour banks and erosion control likely to compliment on-site farm management of water storages;<br>There is evidence below the site (within the subject catchment) of overland stormwater flow; Photographs taken after rainfall confirm that surface water could be a potential problem; |
| Erosion Protection | Limited external catchment allows adequate erosion control opportunities;<br>Local soils do not appear dispersive, but subject to testing;<br>Some evidence of soil erosion within the catchment; |
| Distance from Waterways | Located a minimum of 800 metres east of Burying Ground Creek;<br>A minimum of 1.5 kilometres west of Gara River which flows into the Gara Dam approximately 3.0 kilometres southeast of the site;<br>The Gara Dam has been confirmed by Council as a reserve source of potable drinking water supply; |
| **Criterion Ranking** | **6** |

| **Criterion 4 - Local Amenity and Environmental Considerations** | |
|---|---|
| Visual Amenity | Relatively open site with potential views in all directions;<br>The site is oriented towards the southeast, and the catchment does provide some screening from land towards the north / northwest; |

| | |
|---|---|
| | The nearest residential dwelling is located approximately 800 metres to the east of the site, and is within view of the proposed landfill area;<br>Further residential properties are located a minimum distance of 1.0 kilometre to the east of the site, though views would be partially or fully restricted by topography<br>The nearest dwellings are located in Miningvale a minimum of 1.0 kilometre to the east;<br>Hillgrove Creek State Forest is located approximately 800 metres to the west of the site with relatively open views;<br>Visual protection can be maintained by retaining and supplementing trees and vegetation, though there are no significant natural landforms that could be considered to provide a reasonable level of screening;<br>Potential views from adjoining properties and public land (parts of Miningvale Road and Hillgrove Creek State Forest) are more significant than any other site; |
| Flora and Fauna | Observation suggests site is extensively disturbed through clearing and grazing;<br>Little additional impact on flora and fauna;<br>Likelihood of increased vermin if not managed correctly;<br>Further studies are recommended should the site progress to EIS stage; |
| Land Environment | Predominantly extensive grazing quality land;<br>Dam located towards the bottom of the catchment form the site; |
| Land Compatibility | Use as landfill should not impact on surrounding landuse provided the landfill is managed correctly and adequate buffer distances are maintained; |
| Noise | An adequate buffer zone will mitigate potential noise impacts; however distances to adjoining properties may require additional mitigation measures to be implemented |
| Orientation | Orientation to the southeast with topography offering an adequate -but not ideal- level of protection from the north and west; |
| Atmospheric Protection | Control of dust/debris will be required to mitigate potential effects; |
| Landfill Gas Control | Potential impacts can be mitigated if catered for in design and licencing; |
| **Criterion Ranking** | **2** |

| **Criterion 5 - Level of Service** | |
|---|---|
| Distance to Areas Serviced | 16 kilometres from Armidale via Miningvale Road and Grafton Road;<br>39 kilometres from Uralla;<br>56 kilometres from Guyra via New England Highway and Armidale; |

| | |
|---|---|
| Land Area | Property size is 236 hectares;<br>Approximately 100 hectares would be required for the potential landfill area, plus an additional 1.5 hectares for the access road;<br>An additional 8.0 hectares could be required if a new access road from Grafton Road is necessary; |
| Level of Site Access | Landfill access would be restricted to transfer vehicles and commercial contractors (i.e. no public access facilities available); |
| Needs of Processing, Handling, Recycling | The site area available should provide sufficient capability for the envisaged needs of processing, handling and recycling; |
| Level of Existing Road Service / Impacts | Grafton Road is an Arterial Road with an ideal level of service (approximately 11 kilometres from Armidale to the Grafton Road / Miningvale Road intersection);<br>Miningvale Road is an unsealed rural road that will require significant upgrading over the 4.0 kilometres from Grafton Road to Miningvale;<br>Site access is via an existing dirt/metal vehicular track approximately 1.5 kilometres west from Miningvale; This access would require significant upgrading and extending several hundred metres into the site;<br>An upgraded intersection will be required for Grafton Road / Miningvale Road (requiring RTA approval);<br>Overall impacts of additional truck movements along Miningvale Road is considered significant due to the number of dwellings located within a close proximity of the road, including the communities of Argyle and Miningvale;<br>Potential impacts including noise and adverse road safety conditions may necessitate alternative access which could be provided via a new accessway south of Miningvale or Argyle;<br>Alternative access would comprise upgrading less of Miningvale Road and constructing new access over additional private farmland to the south of the site;<br>It is recommended that alternative access be investigated should the site progress beyond the current study; |
| Bush Fire Hazard | Relatively low bush fire hazard as largely clear of vegetation;<br>Risk can be managed appropriately by use of dams/tanks and site management practices. |
| **Criterion Ranking** | **7** |

| **Criterion 6 - Adequacy of Existing Services** | |
|---|---|
| Infrastructure | No existing services;<br>Electricity and telephone would be available as extension from road (nearest residence-Miningvale; |

| | |
|---|---|
| | Potable water and wastewater treatment can be provided on-site;<br>Requirement for fire-fighting provisions can be covered by on-site detention tank or dam(s) with emergency storage; |
| **Criterion Ranking** | **4** |

| **Criterion 7 - Site Features** | |
|---|---|
| Topography/Terrain | The site generally has a flatter gradient than other sites, contains less vegetation and is generally more open;<br>It is situated between 980 and 990 metres in elevation;<br>No obvious rock outcrops are evident; |
| Capacity To Accept Defined Waste | Capacity between 50 and 100 years could be made available subject to detailed design and analysis; |
| **Criterion Ranking** | **6** |

| **Criterion 8 - Set-up Costs** | |
|---|---|
| Land Area Requirement | Approximately 100 hectares would be required for development;<br>Additional land (approximately 8.0 hectares) would be required if a new access road were to be constructed between the site and Grafton Road; |
| Land Cost | Purchase of 100 hectares estimated at $250,000 (at $2500 per hectare); |
| Infrastructure Costs | A new sealed access road from Miningvale Road (approximately 1.5 kilometres) will be required at a cost of approximately $525,000 (at a rate of $350 per linear metre);<br>An upgraded access road between Miningvale Road and Grafton Road (approximately 3.0 kilometres) is likely to be required at additional significant cost;<br>An alternative access would comprise a new access road between the site and Grafton Road (4.0 kilometres of new access road estimated at $1.4 million);<br>A new intersection will also be required to RTA standards, which may be costly but dependant on RTA assessment and approval process;<br>On-site infrastructure costs comparable to all sites with the exception of Site 1; |
| Leachate Control | Suitable liner and construction materials appear available on site - Consideration of either sourcing clay or synthetic liners required for balance of required lining for leachate barrier; |
| **Criterion Ranking** | **5** |

| **Criterion 9 - Operational Costs** | |
|---|---|
| Compaction | Presence of suitable cover materials on site; subject to further investigation; |

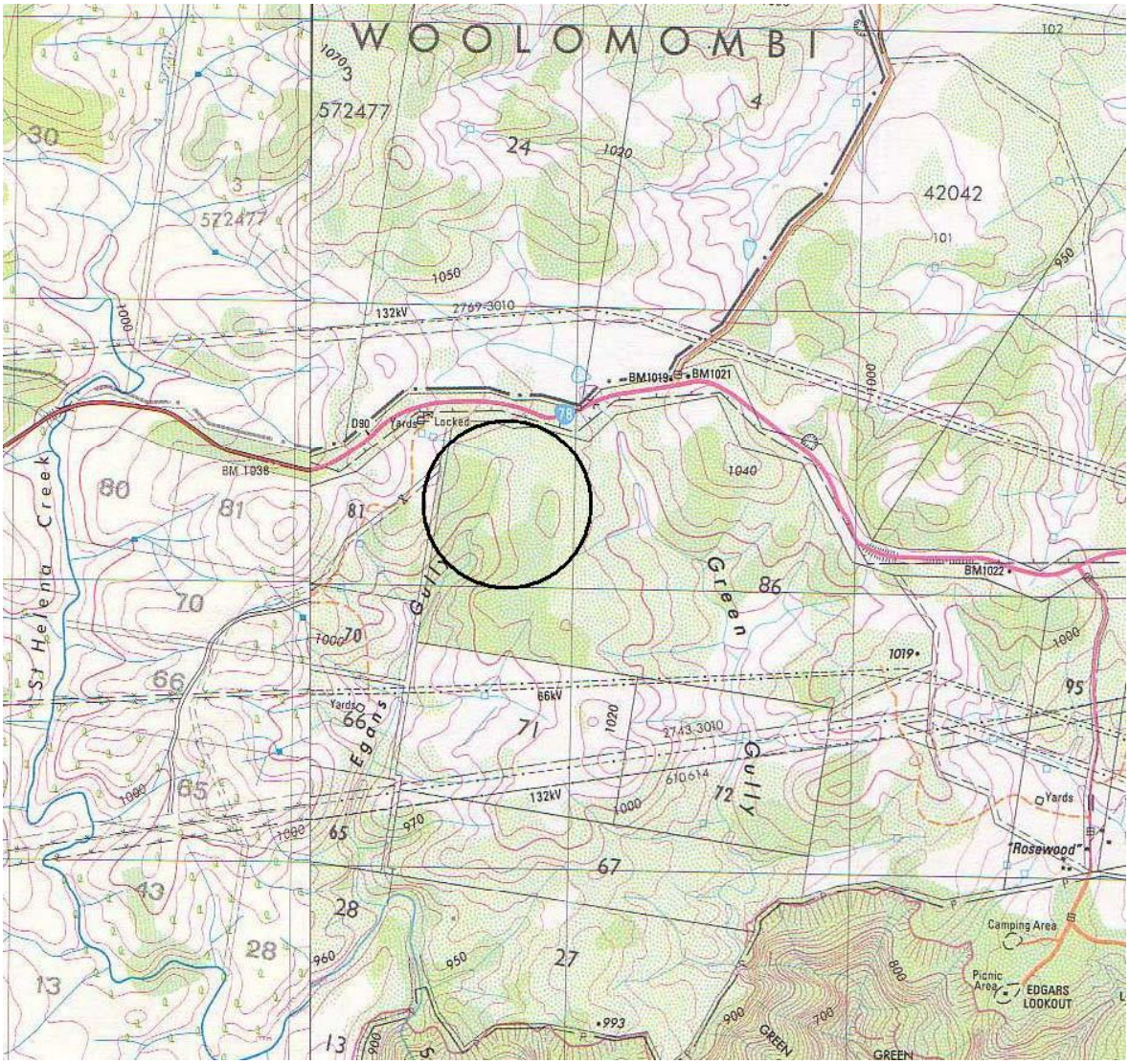
| | |
|---|---|
| | Compaction costs will be lower than those sites where intermediate daily cover is not readily available; |
| Transfer Operations | Haulage costs amongst the lowest of the sites evaluated due to lower distances to areas serviced (taking into account average haulage levels) and good quality road access; |
| Operation and Maintenance | All base materials appear to be in good supply;<br>Topsoils would need to be collected and stored for future closure and rehabilitation; |
| **Criterion Ranking** | **7** |

| **Criterion 10 - Social Issues** | |
|---|---|
| Regional Economy | Impacts on regional economy will be consistent across all sites under evaluation;<br>EU accredited organic agriculture within locality however potential impacts can be mitigated; |
| Sensitive Landuses | There are a number of surrounding properties and dwellings considered to be adversely affected due to site visibility and potential traffic impacts, including noise, nuisance and road safety; |
| Land Values | Land value impacts on adjoining properties will be relatively consistent across all sites under evaluation. However Miningvale is the nearest 'settlement' to any of the sites evaluated. An adequate buffer zone would mitigate potential effects, however, a number of surrounding properties are likely to view the site or be affected by noise and nuisance, which may have more impact on land values / leasibility values than other sites; |
| Tourism | The site may be visible from Hillgrove Creek State Forest to the west;<br>Increased truck movements on Grafton Road which is the main route to the coast; |
| Agriculture | Potential impact on surrounding agricultural activities can be mitigated; |
| Future Development | Potential for development in the area due to proximity to Armidale and topography; |
| Heritage | No investigations of Aboriginal significance undertaken, but unlikely due to major land disturbance;<br>Would require European and Indigenous cultural heritage assessment at EIS stage;<br>'European' ruins consisting of early settler graveyard of reasonable local historical significance are located within the property but either in buffer zone or further away from proposed landfill area. Unlikely to be any issues with this. |

| Criterion Ranking | 3 |
|---|---|

## 3.10 Site 10: 'Greenhill'

| | |
|---|---|
| **Location:** | Hillgrove 9236-I-N & Jeogla 9336-4-N<br>Grafton Road, approximately 32 kilometres east of Armidale. |
| **Ownership:** | 'Greenhill', not investigated further |
| **Property Details:** | Lot 81 DP 572477; |
| **Site Area:** | not investigated further for purposes of this investigation |
| **Development Area:** | 100 hectares required |
| **Situation:** | Farmland; |



## Site Issues

This site recently came on sale within an area acceptable for landfill siting consideration. Little is known about site geology or hydrology however it was decided by Council to include the site in a desktop review to explore potential suitability.

While the majority of the property is zoned General Rural 1(1) in the Armidale Dumaresq Preliminary Plan, much of the land area suitable for landfill (identified within a natural depression) is likely to be located within the Arterial Road Corridor zoned Rural 1(2). This zone covers a 400 metre-wide corridor along arterial roads whereby 'landfill' is a prohibited activity. In the case the proposed landfill can avoid this probative zoning, vehicular access from the highway and proximity to the Green Gully Watercourse would become potentially restrictive issues.

It is recommended that this evaluation and site is not pursued due to the potentially prohibitive zoning.

# 4.0 Results and Discussion

After assessment against each of the sub criteria and ranking on a scale of 1-10 against the primary criteria, the rankings for each of the criteria were transposed into the site evaluation matrix shown in **Appendix A.**

From this matrix, once the weightings for each of the criteria as recommended by Maunsell (2003) are applied, the sites obtain the overall evaluation scores as shown in **Table 4.1** below.

**Table 4.1: Site Evaluation Scores and Overall Suitability Ranking**

| Site | Evaluation Score | Comparative Suitability Ranking |
|---|---|---|
| Site 7 - Sherraloy | 372 | 1 |
| Site 4A (Site 3 & 4 combined) | 340 | 2 |
| Site 8 - Waioma | 328 | 3 |
| Site 9 - Miningvale Road | 322 | 4 |
| Site 2 - Bannaweera | 304 | 5 |
| Site 4 - Tillbuster | 292 | 6 |
| Site 1 – Metz Quarry | 278 | 7 |
| Site 3 - Annaleey | 272 | 8 |
| Site 5 - East Mihi | 266 = | 9 |
| Site 6 - Pinaroo | 266 = | 9 |
| Site 10 - Greenhill | 0 | NA |

From these evaluation scores, the sites have been ranked from 1 to equal 9 in order of their suitability for use as a regional landfill site.

Based upon this assessment. Site 7, Sherraloy is the best site of the eleven sites considered for location of a regional landfill facility.

It must be re-iterated at this point that there is no 'ideal' score above which a site becomes the ideal location for a landfill, nor is there a threshold score over which a site becomes suitable for a landfill. This result is purely based upon comparative evaluation of the eleven sites in question, giving the most suitable site out of these eleven.

The use of this weighted evaluation process, helps separate sites, which otherwise may have been difficult to distinguish suitability. The preferred site obtained an evaluation score, which was 32 points greater than Site 4A (Sites 3 & 4 Combined), ie in terms of this evaluation was ahead by 9.4%.

We also wish to highlight the fact that for the purposes of evaluation of sites, Maunsell were reliant upon data from previous site assessment and information supplied by various stakeholders being reasonably reliable. Examples of the data that was incorporated into this assessment, included:

- site geological investigation data ;
- land values;
- potential development of certain areas;
- advice regarding the impacts of tourism; and
- photos supplied and anecdotal evidence of soil erosion and flooding.

Maunsell, through our examination of this data, attempted to only include what we believed was relevant, reliable or accurate information.

For the purposes of cost evaluation for both the site setup and operational, Maunsell has performed comparative cost evaluations only, not detailed estimates. As such, we adopted a base case cost and based on relevant factors determined during the site evaluations, utilised our experience to determine the comparative costs between sites. This was performed by using a site that had existing indicative cost details (ie Site 1 for which the most detailed indicative costing has been performed), updating the land purchase costs for each site as accurately as possible, and then evaluating each of the other site's positive and negative features and their impact on this cost. This produced an indicative cost per site, which was then ranked as per the recommended ranking scale. As these were comparative costs only, performed in order to ascertain which sites were more/less costly than others, the costing details have not been included in this report and further costings of the selected site(s) should be performed.

# 5.0 Consultation

During the site evaluation desktop and field studies, discussions and interviews with stakeholders were held. Stakeholders consulted included the following:

- Council Employees;
- Landowners of sites under evaluation (where available);
- Neighbouring landowners (where available);
- ADLCCC members;
- Local DIPNR employees;
- Planners from Armidale Dumaresq and Uralla Shire Councils; and
- Local Real Estate agents.

Discussions with these stakeholders sought to identify regional and site specific issues, relating to technical and social considerations for each site.

The information obtained during these discussions was noted on the site evaluation work sheets, assessed by Maunsell and taken into consideration during the site assessment process were deemed relevant.

As part of the consultation process, Maunsell has presented the draft evaluation report to both Council and the ADLCCC in order to answer questions about the evaluations and 'fine-tune' the rankings according to any further recommendations.

After a presentation of the draft report on 8 December 2003 at a special ADLCCC meeting, a motion was passed by the ADLCCC to release the draft report for public comment. A review period was set by Council, which concluded 27 January 2004.

As a result of ADLCCC review of the draft report and the public review period, submissions from the following parties were received:

1. J. Lax
2. L. Davis – Mining Vale
3. R. Glencross-Grant - University of New England
4. D. Laird
5. M.R. & P. Patton – Varuna
6. R.B. & J.A. Johnson – Wave Hill
7. L.M. & C.E. Pulley – Portion 157
8. Institute for Rural Features - University of New England
9. S. & D. Brunckhorst – Tilbuster North
10. C. Quaife
11. Dr. R. Patterson
12. J.V. & M.A. Martin – Snake Gully
13. P. & S. Coop – Ravensworth
14. S. Lasker – Achill West

15. J. & D. Fittler – Bunji View
16. B. & B. Coop – Smith House Pty. Ltd.

A summary of each of the issues raised relating to each site, the number of submissions received regarding each of these issues selection criterion affected by each of the issues raised is supplied in **Appendix C**. These submissions were reviewed and incorporated into the report as appropriate, and the matrix was adjusted in accordance with relevant comments.

# 6.0 Conclusions

From the 11 sites assessed, based upon evaluation against the criteria, site 7 would be the most appropriate site at which to establish a regional landfill.

This does not necessarily mean that it is the best available site in the region, nor does it mean that it is an ideal site.

Unless a site is specifically excluded by way of legislation/planning, it could always be developed into a landfill, dependent upon what mitigation measures are required to make it comply with both the DUAP and EPA Guidelines. In these instances however, cost considerations then become increasingly important.

It is recommended that should Council wish to proceed with the preferred site or any other option, that concept design and estimates are undertaken as the next step.

Should Council then wish to proceed further with the preferred or any other selected site, then in accordance with SEPP48 and the DUAP Guidelines, an EIS should be performed. The Director General should be formally contacted to ascertain DIPNR's requirements in the EIS. All issues that have been noted within the site selection criteria will then be required to be addressed in detail within the EIS.

As SEPP48 requires the Planning Minister to be the consent authority, the development application and EIS would be required to be assessed by DIPNR.

A Planning focus meeting should be held to obtain all regulatory stakeholder requirements.

Should council wish to evaluate other sites, it is recommended that they follow the site identification procedure outlined in Maunsell, (2003).

# 7.0 References

The following references were used in this report. These documents should be read in conjunction with this report:


**Armidale Dumaresq Council (2003):** Review Criteria and Strategy Used for Locating Sites for a Regional Landfill – Project Brief A03/1436.

**Armidale Dumaresq Council (2003):** Preliminary Armidale Dumaresq Plan 2004.

**Armidale Dumaresq Council (2002-2003):** Minutes 21 October 2002, 18 November 2002, 16 December 2002 and 20 January 2003.

**Armidale Dumaresq Council (2002):** Strategy for obtaining a site for a new regional landfill - Discussion paper February 2002.

**Armidale Dumaresq Council (1988):** Armidale City Local Environment Plan 1988.

**Coffey Partners (1996):** Armidale Landfill Siting Study-Geological Criteria for Regional screening in site selection – Coffey Partners International, May 1996.

**Department of Mineral Resources (1992):** Geological survey of NSW – Dorrigo-Coffs Harbour 1:250 000 Metallogenic Map (SH/56-10, SH/56/11).

**DIPNR (2003):** Draft Soil Landscape Series – Soil Landscapes of the Armidale 1:100 000 sheet, Armidale, Walcha, Hillgrove, Winterbourne, Dacre.P.King, Armidale Lands Office, Department of Infrastructure, Planning and Natural Resourses.

**Dumaresq Shire Council (1988):** Dumaresq Shire Local Environment Plan No.1, 1988.

**EPA South Australia (1998):** Guidelines for Major Solid Waste Landfill Depots, Issue: October 1998.

**EPA Victoria (2001):** Best practice Environmental management – Siting, design, operation and Rehabilitation of Landfills, Publication 788, Issue: October 2001.

**ERM (1999):** Metz Quarry Landfill – Investigation, ERM Mitchell McCotter Pty Ltd, 29 January 1999.

**ERM (2001):** Concept Design-Proposed Landfill Site, Metz Quarry, Environmental Resources Management Australia Pty Ltd, May 2001.

**Guyra Shire Council (1988):** Guyra Shire Local Environment Plan 1988, (plus amendments).

**Mackney (1996a):** Preliminary Regional Landfill Siting Study – A joint Study commissioned by Armidale City, Uralla and Dumaresq Shire Councils- Brian J. Mackney & Associates Pty. Ltd

**Mackney (1996b):** Preliminary Site Assessment Metz Quarry Site- Brian J. Mackney & Associates Pty. Ltd, December 1996.

**Mackney (1997):** Preliminary Site Assessment Sites 2,3 and 4- Brian J. Mackney & Associates Pty. Ltd, 1997.

**Mackney (1998):** Preliminary Site Assessment Sites 5, 6 and 7- Brian J. Mackney & Associates Pty. Ltd, July 1998.

**Mackney (2000):** Preliminary Geotechnical and Hydrogeological Investigation - Metz Quarry - Brian J. Mackney & Associates Pty. Ltd, May 2000.

**Maunsell (2003):** Review of Criteria and Strategy used for locating Sites for a Regional Landfill – Maunsell Australia Pty Ltd, September 2003

**NSW DPWS (2001a):** Landfill Siting Study – Site 8 Assessment - NSW Department of Public Works and Services, June 2001.

**NSW DPWS (2001b):** Armidale Dumaresq Council Landfill Facility Peer Review, NSW Department of Public Works and Services, June 2001.

**NSW DPWS (2002a):** Landfill Siting Study – Site 9 Assessment – NSW Department of Public Works and Services, April 2002.

**NSW DPWS (2002b):** Armidale Dumaresq Council Landfill Facility Aerial Photographic Survey, NSW Department of Public Works and Services, June 2002.

**NSW DUAP (1996):** Landfilling EIS Guideline, Issue: October 1996.

**NSW EPA (1996):** Environmental Guidelines: Solid Waste Landfills, Issue: January 1996.

**NSW State Legislation:** Environmental Planning and Assessment Regulation 2000.

**NSW State Legislation:** Environmental Planning and Assessment Act 1979.

**State Environmental Planning Policy No. 48:** Major Putrescible Landfill Sites.

**Uralla Shire Council (1988):** Uralla Shire Local Environment Plan 1988, (plus amendments).

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