Gerringong to Bomaderry
Princes Highway upgrade

ROUTE OPTIONS DEVELOPMENT
APPENDIX M - PRELIMINARY LAND USE ISSUES REPORT
NOVEMBER 2007
Gerringong to Bomaderry
Princes Highway Upgrade

Preliminary Land Use Issues Report

The Roads and Traffic Authority

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Prepared by: Denise Connors
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<td>Jay Stricker</td>
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<td>Reviewing Officer</td>
<td>Ron de Rooy</td>
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1.0 Background

Maunsell was engaged by the RTA in December 2006 to carry out an Options and Route Selection Study, Concept Development and Environmental Assessment (EA) for upgrading the Princes Highway between 42.6 km to 74.6 km south of Wollongong. Maunsell has engaged a number of prominent sub-consultants to contribute to the delivery of this project.

The work includes development of route options and concept development based on the identified preferred route, environmental assessment, public displays and handover period to allow for finalisation of all activities and reports following the announcement and display of the Preferred Route, the Environmental Assessment and the Conditions of Approval.

The project will provide a bypass of Berry. The northern extremity of the project is in the vicinity of the Mount Pleasant Lookout (north of Gerringong at the termination of the four lane configuration) and the southern extremity of the project is the intersection (roundabout) of the Princes Highway with Cambewarra and Moss Vale Roads at Bomaderry.

Community involvement is a key aspect of this project and will afford the broader community the opportunity to make a demonstrable input to the process and to ensure that the requirements and aspirations of the community are adequately and appropriately addressed. This is particularly relevant to:

a) Any potential impacts on rural and residential areas within the study area;
b) Social and economic impacts;
c) Accessibility of the road network for local and through traffic;
d) Potential impacts on water quality;
e) Potential impacts on wetlands;
f) Potential impact on flooding;
g) Potential impacts on land uses;
h) Threatened flora and fauna species;
i) Indigenous and non-indigenous heritage;
j) Visual impact;
k) Noise; and
l) Air quality.

Several studies have been undertaken since the early 1990s to identify a preferred route to upgrade sections of the Princes Highway between Kiama and Nowra including a bypass around the town of Berry.

These studies include:

m) The 1991 Gerringong to Berry Route Study;
n) 1998 North Street Berry Bypass Corridor; and
o) 2004/05 Quantm Study from Kiama to Nowra.

Sections of the highway between Gerringong and Bomaderry have a poor accident record and limited safe overtaking opportunities.

Due to the significant changes in traffic, land use and population since 1991, the NSW state government, in March 2006 committed to investigating an area where it is likely a preferred route would be located to upgrade the Princes Highway between Mount Pleasant at Gerringong and Moss Vale/Cambewarra Road at Bomaderry to meet current road standards.
2.0 Objective of report

This report presents the key findings of the preliminary land use analysis carried out by Maunsell as input to the selection of route options for the upgrade of the Princes Highway between Gerringong and Bomaderry.

Specifically the key objectives of this report are to:

a) Determine current land uses in the study area, the nature and boundary locations of properties and enterprises including major agricultural components;
b) Assess current land uses including a description of likely impacts of the upgrade feasible mitigation measures of those impacts;
c) Determine impacts on agricultural production and value derived from a average yield data and potential severance impacts in combination with the Preliminary Social-Economic Impact Report, which is included in Appendix F of the Route Options Development Report; and
d) Undertake broad scale estimation of land capability for potential enterprises; and determine potential impacts of feasible options on future land use and potential for alienation from agricultural use

This report will be further developed to integrate with the selection of a preferred route and will assess the impacts of that route as part of the environmental assessment and concept design stages.

In terms of land area, the study area is predominantly made up of agricultural land uses, including vineyards, dairy and crop farming. As far as practical the types of agriculture as well as all other key land uses in the study area are shown in Appendix A. These figures provide a reasonable basis for the analysis of potential key land use issues associated with either widening existing highway alignments or establishing new highway alignments as part of the upgrade.


2.1 Information sources

This analysis is based on the following data sources:

a) Aerial photography (photography flown 23 February 2007 and Google Earth);
b) Site inspection (28 March 2007);
c) Internet directories (including Yellowpages, local community group websites, State and Commonwealth Government Agency websites, local council websites, etc.);
d) Agricultural land classifications;
e) GIS data provided by Kiama Council, Shoalhaven City Council, MapData and Maunsell Pty Ltd;
f) Gerringong to Bomaderry Planning Focus Meeting, 29 September 2006, attended by key stakeholders to identify planning issues for the Gerringong to Bomaderry Princes Highway Upgrade;
g) State Infrastructure Strategy 2006-2007 to 2015-2016;
h) South Coast Regional Strategy and Illawarra Regional Strategy;
i) Nowra / Bomaderry Structure Plan;
j) Shoalhaven – An Enterprising Alternative, An Economic Development Strategy (2005); and
Land ownership information was provided by the RTA and included GIS datasets for the Kiama and Shoalhaven Local Government Areas (the data was obtained from the Department of Lands in July 2006). The datasets provided Lot and DP information, with property ownership contact information provided by Kiama and Shoalhaven Councils.

A verification exercise was carried out by comparing the Department of Lands data with information provided by councils, with any discrepancies verified by the RTA Property Services. Where particularly sensitive issues arise during the route selection process, this data will be ground-truthed including as necessary contact with the land owner(s), and/or tenants.
3.0 Land use strategies

This section describes the key areas that are identified in regional strategic planning documents and guidelines as being locations of urban release, rezoning or planned development that impact on the ability of such areas to be developed for the upgrade.

3.1 State Infrastructure Strategy

The State Infrastructure Strategy 2006-2007 to 2015-2016 identifies infrastructure projects in the short-to-medium term that, among other things, support population growth and demographic change on the South Coast (Department of Planning, 2007). The Gerringong to Bomaderry Princes Highway Upgrade is one of the projects identified. This demonstrates its regional significance and that it is a priority for the State Government.

3.2 Regional strategies

The Illawarra and South Coast regional strategies were released in January 2007. They outline the region’s objectives for the next 25 years. They are relevant for an understanding of the future plans for the regions.

Extracts from the regional strategy(ies) are included in Appendix B.

3.2.1 Illawarra Regional Strategy

The Illawarra Regional Strategy recognises the importance of the region’s transport networks in supporting economic growth and maximising the efficiency of freight transport.

The Illawarra Regional Strategy recognises Gerringong as a town with small to medium concentrations of retail, health and other services, and lower density residential. The town is reliant on higher order centres for shopping and employment. “The scale and character of the region’s towns will be protected” (Department of Planning, 2007).

3.2.2 South Coast Regional Strategy

The South Coast is dependent on the Princes Highway for connecting communities, supporting economic development and linking to neighbouring regions. “The Princes Highway is a critical north-south link between Sydney, Wollongong and communities along the South Coast down to the Victorian border. The Princes Highway is the primary land transport route servicing the South Coast as the railway does not extend south of Bomaderry in the Shoalhaven local government area” (Department of Planning, 2007).

The South Coast Regional Strategy recognises Nowra / Bomaderry as a major regional centre. “Shoalhaven is projected to grow by an additional 34,000 people, the majority of which will be concentrated in Nowra / Bomaderry, strengthening its role as the major residential, employment and administrative centre for the northern part of the region. Parts of Nowra will be revitalised and consolidated providing residents access to employment, transport and services” (Department of Planning, 2007).

Berry is not recognised as a major regional centre or major town in the South Coast Regional Strategy. This suggests that there are no major plans for residential growth in Berry.
3.3 Local settlement and development strategies

3.3.1 Draft Nowra / Bomaderry Structure Plan (Shoalhaven City Council, 2006)
Shoalhaven City Council adopted the Nowra Bomaderry Structure Plan on 24 October 2006. This plan identifies a future western bypass of these towns that would connect to the Princes Highway. The bypass does not include the last section of the Princes Highway to the extent of the study area. This has been taken into consideration in selection of the route options.

3.3.2 Shoalhaven – An Enterprising Alternative (An Economic Development Strategy) 2005
The report entitled Shoalhaven – An Enterprising Alternative, an Economic Development Strategy (2005) was developed by Shoalhaven City Council, NSW Department of State and Regional Development, the Commonwealth Department of Transport and Regional Services and the Shoalhaven Area Consultative Committee. The upgrade is generally consistent with the Shoalhaven Economic Development Strategy as outlined below.

A key transport focus area identified in Shoalhaven Economic Development Strategy is to “significantly improve access between Shoalhaven, Sydney, Canberra and Wollongong with respect to movement of goods and people” (Shoalhaven Economic Development Strategy, 2005). The upgrade will improve access between Gerringong and Bomaderry which will improve access between Sydney and Shoalhaven, and Wollongong and Shoalhaven.

A key tourism focus area identified in the Shoalhaven Economic Development Strategy is to “foster higher levels of visitation and increased visitor yield” (Shoalhaven Economic Development Strategy 2005). The upgrade will improve access and reduce travel times which will have the effect of increasing visitation to the region.

3.3.3 Blueprint Shoalhaven
Blueprint Shoalhaven is a strategic planning instrument funded by three levels of government and acts to guide economic development in the Shoalhaven region whilst supporting local businesses through advice and mentoring. It has the support of the Shoalhaven City Council, the NSW Department of State and Regional Development, the Commonwealth Department of Transport and Regional Services, and the Shoalhaven Area Consultative Committee.

Blueprint Shoalhaven is providing guidance and advice to the Berry Rural Co-operative Society Limited and its 11 dairy farmer shareholders (eight of these 11 farmers are located within the study area). This ‘co-op’ plans to expand the South Coast Dairy’s milk processing factory in Berry’s Old Creamery Lane. It will have a secondary role as a tourist attraction where visitors will be able to see and sample several styles of milk as well as flavoured milks, creams, yoghurts and the range of boutique cheeses produced in the plant (www.blueprintshoalhaven.com.au).
3.4 Planned and future land uses

3.4.1 Planning Focus Meeting

At the planning focus meeting (29 September 2006) a number of stakeholders provided comment relating to planned future land uses. These are discussed below.

As part of the planning focus meeting summary the RTA stated that there are “no known specific development proposals within the project area which impact the planning process of the highway upgrade”. The Department of Planning stated in this meeting that the focus for future development in the area will be on existing villages and not the expansion of settlements into rural lands. This reinforces the current initiatives to protect productive farming land in this area.

Kiama Council stated that there is no urban growth planned along the Princes Highway corridor (the only urban expansion area being to the south of Gerringong, outside the study area). The Department of Planning Major Development Assessment Branch can provide ongoing updates on the status of any planned developments in the study area.

Shoalhaven City Council has stated that minor development is envisaged around Berry. In this regard, it is assumed that pockets of land on the periphery of Berry will be developed and such areas would need to be considered as part of any route selection. Council also suggests that retirement villages south of Berry will be expanded.

The planning focus meeting identified a number of future land use proposals that are expected, which may impact on the capability of some areas to accommodate the upgrade. These future proposals include:

a) Future residential development is limited to minor expansion around the Berry township (refer Section 4.5.2);

b) The MR92 development and the Nowra / Bomaderry Structure Plan will increase traffic volumes to the highway and will continue to increase the role of Nowra / Bomaderry as the major regional centre;

c) Ongoing upgrade / maintenance to cabling, power, gas pipeline within existing alignments. This will impact on the services required to be located within the corridor and would be considered at the design stage rather than route selection;

d) Possible installation of a new electricity transmission line into Gerringong; and

e) Long term plan for electrification and duplication of the rail line from Kiama to Bomaderry. Further discussion with Australian Rail Track Corporation (ARTC) would be required should an alignment alongside the existing rail line be considered.

The Department of Planning has stated, as part of the planning focus meeting and within the recently released regional strategies, that there are no new towns proposed within the study area. Further, no new residential development will be supported by the Department of Planning unless part of a structure plan. To date, there are no publicly available structure plans for lands within the study area apart from the Nowra / Bomaderry Structure Plan (see Appendix B).
4.0 Existing land use

4.1 Introduction

Existing land uses of relevance to the selection of a preferred route are split between the following:

a) Agriculture
   - Dairy;
   - Vineyards; and
   - Horticulture

b) Rural living and commerce
   - Rural residential dwellings (non-productive dwellings in rural area, typically larger lots than urban areas);
   - Motels / hotels / bed and breakfast; and
   - Industrial and other commercial.

c) Tourism
   - Amalgamation of above.

d) Urban areas
   - Residential;
   - Community uses (includes open space, health care and community infrastructure);
   - Berry town centre retail; and
   - Industrial and other commercial.

e) Infrastructure
   - Railway;
   - Utilities; and
   - Existing roads.

f) Environmental protection and conservation
   - Environmental protection (lands zoned or identified in Local Environmental Plans as being significant ecological area); and
   - Bushland and riparian vegetation.

The existing land uses recorded in the study area are described in the following sections. Maps to support the discussion are provided in Appendix A.

4.2 Land ownership

A map showing land ownership of the rural lands within the study area is provided in Appendix C. Once a preferred route is selected, the individual ownerships within or near any route within existing urban areas will be considered in more detail.

The land ownership map demonstrates the constraints that land ownership places on the potential for some lands to be developed as part of the upgrade. Routes that sever any land holdings have been carefully considered. In particular, the following key issues arise from this analysis:

a) The existing and potential future land uses, particularly any productive agricultural land uses, with the view to protecting the productive use of that land and not creating land holdings that are too small for continuation of productive agricultural uses.
b) The potential for land holdings to be subdivided to create a concessional allotment must be protected, which means retaining the ability to subdivide a smaller parcel of land (of not more than 4,000 m$^2$ in area) for the construction of a dwelling. Generally land holdings that are greater than 60.4 ha have the ability to create a concessional allotment. If a particular land holding is severed to the extent that concessional allotment is no longer possible, it is likely that compensation would be required either in the form of amendments to the Local Environmental Plans or financial/land compensation.

c) In urban areas, the large number of affected land owners generally preclude the creation of a new alignment where alternatives exist to widen the existing alignment. The impact of a new alignment that necessitated acquisition of urban land in small/regional settlements such as Bomaderry, Berry and Gerringong would be significant in relation to:
- Displacement and potential loss of dwellings;
- Cost of replacement housing/commerce;
- Potential loss of employment by purchasing commercial land;
- Adverse impacts on amenity to remaining urban land uses; and
- Potential community severance.

Land ownership is a key issue in determining the potential route options along the following sections of the study area:

d) Toolijooa – The number of medium and small land holdings along with the varied boundary alignments limit the options for a corridor without severing existing farming or rural residential land uses;

e) Railway line – The railway line presents an opportunity in relation to land ownership as it provides an existing corridor with a relatively straight and flat alignment. Acquisition would be minimised along this corridor, as widening of the corridor is required, compared with a new alignment through land where no corridor exists; and

f) Urban areas – Refer to (c) above.

Land ownership in rural areas is generally fragmented (high number of small landholdings) in the following locations:

g) The area surrounding David Berry Hospital (Tannery Road, Beach Road and Agars Lane);

h) Toolijooa (north of the existing highway alignment);

i) Princes Highway on approach to Berry from the north;

j) Pulman Street, north of Berry;

k) Near Jaspers Brush Road and O’Keefe Lane, east of the highway to the south of Berry;

l) Near Croziers Road and Mullers Lane to the west and east respectively of the highway between Bomaderry and Berry;

m) Large development areas fronting the existing highway, to the east and west of the highway immediately south west of Berry (refer Section 4.5.2 of this report for discussion of these areas); and

n) Scattered land holdings north of Bomaderry.

The number of land holdings in these areas limits the potential for a new alignment due to the required acquisition and the number of residents that would be displaced or impacted upon (through reduction in amenity and/or partial loss of land).
Large land ownerships, comprising mainly large dairy or general rural land uses are in the following locations:

o) To the north, west and south-west of Gerringong;
p) Between Gerringong and David Berry Hospital to the south of the existing highway;
q) Immediately north of Berry;
r) South of Berry, beyond Creamery Lane;
s) To the south of the railway line between Bomaderry and Berry (apart from O'Keefe Lane); and
t) Scattered large land holdings between Berry and Bomaderry, which are dispersed by small ownerships, which may or may not be linked to the larger allotment (to be confirmed if necessary during route options assessment).

Notwithstanding potentially productive agricultural land uses, large land holdings are more conducive to severance resulting from a new highway alignment due to their size. Furthermore, larger land holdings along the existing highway are easier to negotiate for partial acquisition for road widening than smaller land holdings.

Generally, near Bomaderry and some locations near Berry, the existing highway is adjoined by larger land ownerships. Between Gerringong and Berry the existing highway is almost exclusively adjoined by larger land holdings.

4.3 Agriculture

The predominant land use in the study area, in terms of land area, is agriculture. Of the range of agricultural uses, dairy is the most prevalent, due to the region's soil, previous availability of land and climate being well suited to use for dairy farming. Other agricultural uses include horticultural activities such as corn, olives, coffee and nurseries. In recent decades, the region has experienced a shift towards diversification of agricultural land uses, from traditional regional farming towards alternative uses of agricultural land, including organic farming and vineyards.

4.3.1 General

Severance of land uses

Severance of land use occurs if the highway traverses a contiguous land holding bisecting the ownership into distinct parts. This does not include acquisition of land through widening of existing road / rail corridors. The impacts of the severance of land could include (but are not limited to):

a) Reduction or elimination of land productivity if commercial activities (agriculture, retail, industrial and the like), due either to the reduction in size of the overall ownership or restricting access between the two separated parcels of land (e.g. for stock access or for crop maintenance);
b) Creation of residual lots that, due to their small size or characteristics, have little or no productive use (e.g. steep land that was otherwise used for grazing and now has limited accessibility);
c) Impacts on amenity of dwellings or commercial operation (e.g. restaurants in rural areas); and
d) Increased “highway-edge” effects such as water quality and air quality impacts on sensitive land uses that are adjacent to the upgrade (e.g. organic farms and vineyards).

The proposed upgrade will attempt to minimise fragmentation of productive agricultural land to retain land resource values. Some farms operate over several land titles so, whilst a particular land holding is not bisected, it could have an effect on the operation of the farm.

It is important to preserve agricultural areas for food production and diversification and to support the dairy industry.
In the planning focus meeting, councils advised that they would seek to restrict or limit non-productive
development in agricultural areas and provide diversification activities for existing farming areas.
Severance of productive land holdings in the study area that generates significant impacts such as
those discussed above would be inconsistent with the council’s objectives.

Land classification

The Department of Primary Industries data classifies land on its suitability for agricultural production.
Land classification maps are produced by evaluating biophysical, social and economic factors that
influence the use of land for agriculture. Appendix D provides a map that shows the agricultural land
classifications for the study area and the definitions of land classifications.

In general, Class 1 lands are most suitable for agricultural production whilst Class 6 lands are least
suitable. Classes 1, 2 and 3 apply to lands that are suitable for productive agriculture (horticulture,
dairy, vineyards and the like) and, according to Department of Primary Industries, should be protected
from development for non-productive land uses where possible. The selection of the preferred route
will consider the impacts of any alignment on land that is identified as suitable for regular cultivation
(either Class 1, 2 or 3 in the Land Classification Map, Appendix D). (There is no Class 1 land in the
study area).

In the study area, lands that are identified as either Classes 2 or 3 are located in:

e) The area to the north east of Gerringong (mainly Class 2 with some Class 3 land);
f) A large portion of the study area south of Gerringong, from Gerringong along the railway line to
Beach Road (Class 2);
g) A large portion of the study area from north of Toolijooa along the south of the existing highway to
Berry (Class 2 with a small pocket of Class 3);
h) The area to the north of Berry (Class 2 with a small area of Class 3);
i) A significant portion of the study area to the south of Berry extending both sides of the railway line
and the highway (Class 2);
j) The area generally to the south of the existing highway, north of Bomaderry (Class 2); and
k) Significant portion of the study area immediately north of Bomaderry (Class 2).

Most of the study area between Bomaderry and Berry is Class 2 land, whereas between Gerringong
and Berry approximately half of the study area is either Class 2 or 3 land. The following sections
provide further discussion on the implications for productive agricultural land uses in the study area.
The selection of the preferred route selection will consider the impacts of route options on the
continued productive use of all rural lands, with particular emphasis on the Class 2 and 3 lands
identified in the agricultural land classification map contained in Appendix D.

4.3.2 Dairy

Dairy land uses in the study area are generally concentrated in the areas:

a) To the west of the highway near Gerringong;
b) Near the railway line from Gerringong to the southern extent of the study area; and

c) To the north and northeast of Bomaderry.

There are eight farmers (located within the study area) in the Berry Dairy Co-op who produce milk for
South Coast Dairy.
Dairy farming occurs primarily on areas of Agricultural Land Class 2, which is described as being suitable for regular cultivation and would be sensitive to fragmentation (refer to Section 4.3.1). Furthermore, in the planning focus meeting, Kiama Council (2006) stated that council does not wish to fragment agricultural land into smaller parcels.

Another consideration is that there are potentially different land values within the one farm. For example higher elevation ground is generally considered more valuable than the lower lying land due to the associated flood immunity qualities i.e. residences and machinery / milking sheds are generally located on the high ground and cattle are moved to the high ground for shelter during flood events. There is also different value placed on different paddocks i.e. “night” paddocks are generally located close to the farmstead and the farmers move the cattle there every night for the increased security and protection they offer.

According to Kiama Council, land in the study area has increased in value which puts pressure on agricultural land uses to remain productive in order to avoid sale as non-productive land in smaller allotments. Council referred to a Commonwealth Scientific & Industrial Research Organisation report completed in 2005, which states that the climate will generally be hotter and drier, but rainfall will increase in the Kiama / Gerringong / Berry areas. This means that agricultural land will again increase in value for use as farming. This requires protection of larger productive land holdings in this area to offset potential reductions in productivity in other areas of the state or region. It is understood that Council is aiming to restrict or prohibit urban development in agricultural areas and provide opportunities for diversification.

Fragmentation of productive agricultural land is a key issue for the selection of a preferred route, particularly as the locations of productive farming units identified in this study generally match the locations of Class 2 agricultural land. Potential mitigation measures for retaining the productivity of dairy farms include (but are not limited to) the establishing of under passes or over passes to enable farmers to transfer stock from one paddock to the next.

Any over / under pass would require extensive discussions with the landowner to identify the most suitable location and design for the stock route. Construction of the upgrade through dairy farms will need to protect the productivity of the farm for the duration of the construction period.

It is important to retain access for trucks and other machinery to dairy farms in the area. Any route options will need to ensure that access to farms is not eliminated through closing of roads or altering of geometry to the extent of restricting access.

4.3.3 Organic farming

There is one organic farm identified in the study area. This farm is located in the Toolijooa area between the existing highway and railway and is registered with the Organic Growers of Australia. It is certified for edible bamboo, fruit and nut trees, Australian bush food, tropical fruit, livestock, poultry, eggs, gingko biloba, horses, goats and cattle.

This farm is particularly significant as it is also used for a mentoring program for children as well as a working farm.

There are no organic farms in the study area that are registered with the Biological Farmers Association (Australian Certified Organic is the certification arm for the Biological Farmers Association) or the National Association Sustainable Agriculture Australia.

There is significant investment in the establishment of organic farms as the soil needs to rest for several years before it is ready for cultivating. The land is particularly sensitive and adjacent land uses must not introduce pollutants which could affect the soil quality and hence the organic produce. Run off and emissions are considered pollutants that would be taken into account if the upgrade were to be located adjacent to an organic farm.
4.3.4 Vineyards

There are five vineyards located in the study area:

a) Roselea Vineyard, 310 Princes Highway, Gerringong;
b) Crooked River Boutique Winery and Vineyard, 11 Willowvale Road, Gerringong;
c) Jasper Valley Wines, 152 Croziers Road Jaspers Brush;
d) Silos Winery, 640B Princes Highway, Jaspers Brush; and
e) Woodhill Mountain Wines, 141 Woodhill Mountain Road, Berry.

There is significant investment in the establishment of vineyards as the grapes take several years to grow and establish themselves to a point where they are able to be used for wine making. Vineyards are also tourist attractions as some of them have function centres, art galleries, accommodation and restaurants in addition to wine tastings and wine available for purchase. Part of the attraction for tourists is the aesthetics associated with the location. An example of this is Crooked River Boutique Winery and Vineyard which is set on a hill overlooking the vineyard and surrounding landscape. The Silos Estate similarly has views from the cottages overlooking the vineyards.

Severance of vineyards should be avoided where possible, as severance of such activities would significantly restrict productivity / viability and, without mitigation, would generate adverse impacts on scenic quality of the locality. Mitigation measures would be necessary for any route option that is located in close proximity to vineyards as run off and vehicle emissions have the potential to impact on grape growing as well as the amenity of the vineyard for visitors.

4.4 Rural living and commerce

“Rural living and commerce” is used to describe the non-agricultural land uses in the rural land areas of the study area. Such uses include hotels / motels, bed and breakfast accommodation, residential dwellings, retail and other similar land uses. At a study area wide level, these land uses are described in the following sections. A detailed review of commercial activities that would be potentially affected by a preferred route will be developed to integrate with the value management process and inform the preferred route selection process.

4.4.1 Other commercial activities

In rural areas, there are a number of additional commercial activities that would need to be considered regarding suitability of highway locations. Such land uses include motels / hotels, resorts and bed and breakfasts. Key commercial activities in the study area include five motels/ hotels and 21 bed and breakfasts.

Motel / hotel accommodation is typically in built up areas that have visual exposure to the passing traffic as well as easy access to the main cities via major transport links. All of the motels / hotels except the Woodbyne Private Hotel are located in the Berry town centre. The Woodbyne Private Hotel, although not located in the Berry town centre has visual exposure to the passing traffic as well as easy access via major transport links as it is located on the corner of the Princes Highway and O’Keefes Lane.

Bed and Breakfast accommodation is typically distributed through non-urban areas rather than concentrated in the centre of town. Some of the main attractions for guests in bed and breakfasts are the scenery and the serenity.

Visual exposure and easy access are key economic drivers for motels / hotels. Mitigation measures must be considered to preserve the amenity of motels / hotels. The rural aesthetic and landscape heritage value of the study area are important to the identity of the area for residents and visitors.
**4.4.2 Rural residential dwellings**

Residential development comprises low density or isolated rural dwellings that are not part of a larger farm. Rural dwellings are generally scattered throughout the study area with little or no clustering.

The key issues in relation to rural residential dwellings in the study area are described below:

a) Impacts on lifestyle and setting – The rural aesthetic and landscape heritage value of the study area, particularly in rural areas are important to the identity of the area for residents and visitors. Small lot dwellings in rural areas would need particular consideration in relation to preserving amenity in proximity to the preferred route;

b) Acquisition – There is potential for acquisition of small lot residential. However, any acquisition of land from rural residential properties would either be for road widening (along frontage to property) or acquisition of entire parcel (in the case of a route bisecting the allotment);

c) Noise and vibration – Rural areas experience low levels of noise, particularly at night. Preserving the amenity of all residences would necessitate noise mitigation during construction and possibly (dependent on the proximity of dwellings to the selected highway alignment) during operation;

d) Visual impacts – Adequate visual amelioration would be essential to preserve the existing character of residential areas. Such amelioration could include landscaping or earth mounds, where appropriate, to obscure the view of the highway; and

e) Access – Access to all residential properties would be required to remain and establishing a limited access highway near residential land uses would necessitate design solutions.

**4.5 Urban areas**

The urban areas within the study area are Gerringong, Berry and Bomaderry. Gerringong has the character of a small coastal village, whereas Berry is a rural farming village. Bomaderry is part of Nowra / Bomaderry regional centre, but the study area retains a peri-urban character. This section describes the key issues associated with land uses in the three unique urban areas within the study area.

**4.5.1 Tourism**

Tourism is an economic asset for the region. The study area is particularly popular for weekend trips for tourists from Sydney. Some of the attractions of the area include:

a) Landscape and escarpment views;

b) Scenic quality of the existing route;

c) The historic township of Berry with its arts and crafts, antiques and markets; and

d) Accessibility and proximity from Sydney.

Tourism is dependent on the natural environment and is playing an increasingly important role in the region.

**4.5.2 Residential**

*Existing urban residential*

Key characteristics of the residential components of Berry, Gerringong and Bomaderry are described in Table 4.1 below.
### Table 4.1: Residential characteristics

<table>
<thead>
<tr>
<th>Urban area</th>
<th>Characteristics</th>
</tr>
</thead>
</table>
| Bomaderry  | • Peri-urban’ residential character.  
              • Low density residential to east and west of highway, with development to west being of lower density.  
              • Cul de sacs are prevalent in residential neighbourhoods, reducing accessibility. |
| Berry      | • Rural hamlet comprising low density residential.  
              • Residential surrounds Berry town centre in a distinct urban area, with small pockets of residential to east (Pulman Street) and west (along Kangaroo Valley Road). Note: there is a large pocket of residential along Kangaroo Valley Road outside the study area, which is not considered in this analysis.  
              • Some larger estates (rural residential type allotments) on edge of Berry urban area.  
              • Residential generally on a grid road layout with good access. |
| Gerringong | • Coastal village residential character.  
              • Residential separated from the Princes Highway by the Southern Railway Line.  
              • Cul de sacs dominate the road layout.  
              • Dwellings are generally low density detached. |

Residential land uses are extremely sensitive to the development / expansion of roads and highways. Impacts of particular concern, which would need to be considered as part of selecting the preferred route and that would be the focus of mitigation measures, include:

a) Impacts on lifestyle and setting – The rural aesthetic and landscape heritage value is important to the identity of the area for residents and visitors. In particular, the character of Berry is important to retain for its cultural heritage values;  
b) Noise and vibration – The study area is almost entirely rural in nature and rural areas experience low levels of noise, particularly at night. Preserving the amenity of all residences would necessitate noise mitigation during construction and possibly (dependent on the proximity of dwellings to the selected Highway alignment) during operation;  
c) Visual impacts – Adequate visual amelioration would be essential to preserve the existing character of residential areas;  
d) Access – Access to all residential properties would be required to remain. Establishing a limited access highway near residential land uses would necessitate design solutions;  
e) Retirement villages – A number of retirement villages are situated on the southern periphery of Berry (refer to Appendix A and section below). These uses are sensitive to safety and other amenity impacts and has been avoided where possible;  
f) Existing urban areas in Berry – It is preferable that any route be separated from existing residences in Berry, alternatively, mitigation measures implemented to preserve amenity (both perceived and actual); and  
g) Existing urban areas in Bomaderry – Established areas of Bomaderry would be unsuitable for development of a new highway alignment due to the high number of separate land ownerships and potential impacts on amenity of existing residents.

The RTA’s Land Acquisition Policy would be followed where partial or full land acquisition is required. Compensation would be in accordance with the Land Acquisition (Just Terms Compensation) Act 1991.

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1 low density housing and road development on the periphery of urban areas, still retaining small areas of rural land within networks of suburban building (www.deh.gov.au)
Planned future residential

Residential growth is planned in Gerringong and south of Gerringong (Kiama Council, Planning Focus Meeting 2006). There are also two significant residential developments in the study area, both of which have current development consent from Shoalhaven City Council. These are:

h) Huntingdale Estate and Graham Park Land Release Area; and
i) The Arbour, Berry Retirement (seniors living) Development.

These two sites are described below.

**Huntingdale Estate and Graham Park**, located on the Princes Highway immediately west and south west of Berry has recently received development consent (circa 2004) for a subdivision into 243 residential allotments (see Appendix A). This area of land has not as yet been developed, but the initial works, comprising road and roundabout works, have been undertaken. **Figure 4.1** shows an indicative boundary of the Huntingdale Estate as advised by Shoalhaven City Council as part of the verification of the Land Use Constraints map.

**Figure 4.1: Huntingdale Estate early works**

![Image of Huntingdale Estate early works](image)

Source: Google Earth, 2007. Indicative Huntingdale Estate Boundary only, not to scale.

**The Arbour, Berry** is a recently approved retirement (over 55 years of age) village development with an area of 18 ha and situated on the east side of the Princes Highway immediately to the south-west of Berry. The development is generally comprises freestanding three bedroom homes as well as a range of nursing facilities, open space and communal facilities.
An extract from Shoalhaven City Council’s Management Plan 4th Quarterly Operating Report 1st April 2004 to 30th June 2004 is provided below as a synopsis of The Arbour, Berry development.

“In May, 2004 Council considered a Master Plan application lodged by Noosphere Ideas Pty Limited for housing for Aged and Disabled Persons under State Environmental Planning Policy No. 5 comprising 110 self-care dwellings, 40 care apartments, an 80-bed nursing home and ancillary communal/recreational facilities, parking and landscaping and two-lot subdivision at Clarence Street, Berry. The proposal attracted the broad support of the Berry Community.

The development was approved by council and is proposed to be completed in two (2) stages as follows:

a) Stage 1 – Central Precinct
- A maximum of 65 self care units;
- The village centre – retail, business and community / recreational uses;
- The nursing home, care apartments and common facilities;
- Main causeway access road and landscaping of public open space at the entrance off Victoria Street;
- Off site works to Victoria Street – proposed improvements to Victoria Street/Princes Highway junction, pedestrian footpath, street trees; and
- Structural landscaping to open areas, surrounding creeks and central space.

b) Stage 2 – Eastern Precinct
- A maximum of 45 self-care units located to the east of Stage 1, including remaining roads;
- Final landscaping work to open landscape areas and creeks, including walking tracks and landscape pavilion buildings; and
- Construction and landscaping of B-way access to George Street.”


The Arbour, Berry site is shown in Figure 4.2.

Figure 4.2: The Arbour, Berry

Because these two large parcels of land are subject to existing development consent for subdivision, there is limited potential for establishing a new alignment for the Princes Highway to the south-west of Berry. It is assumed that, as part of the application for development consent, the proponent consulted with the RTA in accordance with State Environmental Planning Policy 11 and the Roads Act 1993, which would ensure the subdivision was carried out in a manner that preserves the ability for the upgrade to be constructed.

In the case of The Arbour, Berry, the main access would appear to be from Victoria Road, rather than the Princes Highway, which facilitates the widening of the existing highway through this locality.

Other future land use considerations

Grand Pacific Drive is a tourist drive that extends from Sydney to Wollongong and beyond. Beyond Wollongong, tourists have the opportunity to extend their trip to the Shoalhaven via Fern Street, Gerroa Road and Bolong Road ("the Sandtrack"). The impact of Grand Pacific Drive will be further assessed through later stages in the project.

There are a number of current and proposed developments within the study area. Some current proposals include:

- Crooked River Golf Club at Foy’s Swamp; and
- A caravan park in the Toolijooa area.

The impact of these proposals will be further assessed through later stages in the project.

4.5.3 Community uses

Community oriented land uses and the implications of those uses for the upgrade are described in the Preliminary Social-Economic Impact Report. That report should be referred to for description of the relevant locations and implications of community and social infrastructure in the study area.

Existing community uses are shown as yellow properties in the Land Use Map (see Appendix A). In general, these lands are not suitable for highway upgrade. It may be possible for a new or expanded highway to be located adjacent to these uses, provided safety, access and amenity for the community use are preserved.

Generally, the majority of community oriented facilities are located in or near the centre of Berry, with some community facilities in Bomaderry. Of particular note is the David Berry Hospital, which is located in Tannery Road a short distance from the Berry town centre.

It is important not to significantly impact any of the existing community land uses in the study area, particularly the larger land uses such as David Berry Hospital.

4.5.4 Open spaces

Formal open space lands (parks and reserves) are shown on the land use map (Appendix A). There are a number of open spaces for the use of all residents and visitors. Gerringong has sportsgrounds located to the north of the residential area, east of the railway line and approximately one kilometre south on the eastern side of the railway adjacent to the existing commercial / industrial area. Berry has open space in the form of playgrounds, a showground, and sportsground near to the town centre. Bomaderry has sportsgrounds amongst residential areas and adjacent to the school in the south-east of the study area.

Open space areas should be protected as far as practical from development as these areas are generally located in existing urban areas and perform an important community function. If open space areas are proposed to be acquired for highway purposes, it would be appropriate that lands be identified for offsetting the loss of land within the park / reserve.
For further analysis of community open space areas, refer to the Preliminary Social-Economic Assessment Report.

### 4.5.5 Commercial / industrial

Key commercial centres in the region are in the Berry town centre, Old Creamery Lane (located to the south of the Berry town centre and railway line) and in Bomaderry on the Princes Highway. Gerringong’s commercial area is located outside of the study area.

The commercial area in Berry is bordered by Albany Street in the west, Albert Street in the north, Prince Alfred Street in the east, and Princess Street in the south.

There are a large number of businesses in this area which generally fall into the following categories:

- a) Antiques and collectables;
- b) Craft, design and art;
- c) Health and beauty;
- d) Real estate;
- e) Restaurants and cafes; and
- f) Retail.

The Berry Chamber of Commerce and Industry has produced a full listing and map of businesses in the Berry town centre which can be downloaded from [www.berry.org.au](http://www.berry.org.au)

Businesses in Bomaderry are clustered around the roundabout at the corner of the Princes Highway and Cambewarra Road in the far south end of the study area. Businesses include a restaurant, kindergarten, motel, caravan park, a homes showroom and a petrol station.

Whilst commercial centres provide for local employment, Nowra / Bomaderry is recognised as the major regional centre and main employment centre for the region.

Key industrial areas in the study area are in the north near Gerringong just east of the railway line, and south of the railway line near Berry in Old Creamery Lane. No industries are located in the Berry town centre.

The commercial and industrial operations in Old Creamery Lane include:

- g) Berry Rural Co-Operative Society Limited;
- h) South Coast Dairy (a division of the Berry Rural Co-operative Society Limited);
- i) Strongbuild Pty Limited – construction company;
- j) The Treat Factory – chocolates & confectionery, jams, sauces and chutneys;
- k) Cool Candles;
- l) Ecopaper – Recycled stationery supplies;
- m) Shore Computer Services;
- n) Berry Automotive Repairs;
- o) Berry Rural Co-op Self Storage;
- p) Snug Rug Saddlery; and
- q) Matt Sperring Personal Training.

It is likely to be more costly and inconvenient to relocate businesses which utilise specific machinery rather than office space. Businesses which operate within offices without specific machinery could more easily be relocated. Acquisition has the potential to lead to job losses if businesses are unable to relocate and there are a number of prerequisites to relocating to a new area.
These include the appropriate zoning and also the ability for heavy vehicles to access the new premises. There are limited areas in both the Kiama and Shoalhaven Local Environmental Plans that allow for industrial and commercial operations.

Currently the businesses in Old Creamery Lane are identified as being part of a commercial strip. The proximity of other businesses creates the potential to get new customers from neighbouring businesses. If the businesses were no longer able to be co-located these benefits would be lost. It is also expensive for businesses to relocate as they would need to ensure their customers are aware of their new location or it is possible that they will lose clients.

Commercial and industrial areas preferably are avoided in the planning of the proposed route.

For further analysis of commercial and industrial impacts, refer to the Preliminary Social-Economic Assessment Report.

4.5.6 Infrastructure

Key infrastructure in the study area that influence the route options selection process includes:

a) Utilities (Eastern Gas Pipeline, Sydney to Melbourne fibre optic cable and local utility networks);
b) South Coast railway line; and
c) Existing roads.

Generally, it is important to retain access for maintenance and expansion works for all relevant infrastructure in the study area. A preferred route must maintain the ability of the relevant authority to maintain its asset. The mitigation measures can comprise design solutions or management measures and due consideration of these has been undertaken as part of route selection.

For full description, including mapping, of the issues associated with utilities in the study area refer to the Preliminary Public Utilities and Services Report. This section provides a general description of issues arising from the land use analysis only and should be read in conjunction with the Preliminary Public Utilities and Services Report.

4.5.6.1 Utilities

Telstra

At the planning focus meeting the Telstra representative stated that the known issues for the study area were:

a) Sydney to Melbourne fibre optic cable – The cable generally runs along the rail corridor from Gerringong to Bomaderry so there is not expected to be any significant issues for road construction. Telstra suggested that they would conduct detailed investigations once the potential routes have been selected;
b) Other Inter-exchange Network cables carry high volumes of data between Berry and Kangaroo Valley and Berry to Nowra. The only significant problem could be in the vicinity of Meroo Meadow, which is quite close to the road; and
c) There are large amounts of Telstra buried copper cables throughout the whole study area.

Eastern Gas Pipeline

The Eastern Gas Pipeline presents a significant constraint with regards to route selection, construction and operation of the upgrade. The pipeline is 450 mm in diameter and buried approximately 900 mm to 1,200 mm underground.
The following comments were provided by Alinta at the planning focus meeting held in September 2006:

d) South Gerringong – the pipe crosses the Princes Highway and continues along railway land;
e) Agriculture and water logging – a road in these types of soils near the pipeline may cause structural problems for the pipeline;
f) Vibrations during construction could cause damage to pipe coating, which can crack and allow corrosion to occur and increase the risk of rupture;
g) It is important to select an alignment that would not impact on the pipeline;
h) Alinta may locate another pipe alongside the existing pipe (a process known as looping), which would lie approximately 6 m from the existing pipe. This would likely need 20 m corridor for future development;
i) If the upgrade is proposed through Harley Hill - geology reports (Alinta) suggest that the basalt geology in this area may be able to support a cut of up to 30 m, which may expose the pipeline;
j) If a preferred route lowers the existing alignment at Tindalls Lane’s vertical alignment, it could have problems with a lack of cover for the pipe, which would require design solutions (for cover) to reduce pipe stresses. For example, excavating and recoating the pipe in the proximity of Tindalls Lane would alleviate future problems; and
k) Moving the existing pipe is likely to cost around $10 million and requires one year’s notice (Alinta).

**South Coast railway line**

In the planning focus meeting, RailCorp stated that the existing rail line through the study area may be subject to expansion. The potential for an expanded rail corridor, for duplication and electrification, would need to be considered as part of any proposal to follow the existing rail corridor.

There are also benefits of co-locating road and rail in the same corridor due to:

l) Promotion of public transport availability to road users (achieving Ecologically Sustainable Development and Government objectives to promote public transport);
m) Station interchange access;

n) A fixed publicly owned boundary and one authority to negotiate with;
o) Co-location of services;
p) Cost sharing in construction e.g. drainage, earthworks, noise walls; and
q) Impact management synergy e.g. visuals, noise, property access.

**Existing roads**

It is important that continued easy access to existing towns (Gerringong and Berry) is maintained for access to services (by rural dwellers) and for commuting to work in regional centres (Nowra and Wollongong areas).

Access to existing towns and key service areas would need to be retained through use of clear and convenient intersections or access lanes. Where widening of the existing alignment is proposed, the design would need to provide access to properties fronting the Princes Highway, including measures such as construction of service roads where appropriate.
There are a number of sections of the existing Princes Highway where the existing width of the road reserve would allow widening without additional land take. These include:

r) A section of the Princes Highway in the north of the study area, directly north of the Crooked River Estuary; and
s) The majority of the highway south of Berry.

Under the Shoalhaven and Kiama Local Environmental Plans, sections of the highway are zoned for arterial road widening. Under these zonings any development must not restrict the ability of the land to be used as a road in the future. Proposals on land identified for road widening in the Local Environmental Plans require RTA concurrence prior to granting consent for any development. These areas include the section of the highway:

t) Between Rose Valley and the southern extremity of Gerringong;
u) Between the eastern edge of Berry, along North Street and connecting with the existing highway in the proximity of Kangaroo Valley Road; and
v) Between the northern edge of Bomaderry to the intersection of the Princes Highway and Moss Vale Road.

Where there is a land use zone that provides for road widening the community expectation would be that the road will be widened along this alignment.

A further factor for consideration is the user benefits and land-use application of the current Princes Highway where an alternative route can be located and it becomes available for scenic and local access, bicycle and motor bike riding and other recreational activities.

4.5.7 Environmental protection and conservation

There are a number of areas that have high ecological, scenic or conservation values. It is important that the proposed road upgrade retain existing natural vegetation and protect threatened species and water quality where possible.

Agreements and plans of management under the National Parks and Wildlife Act 1974 and the Threatened Species Conservation Act 1995 have not been considered in this report. Such agreements and plans will be incorporated into subsequent stages of assessment through consultation with relevant agencies.

4.5.7.1 Regional and local strategies

Land in the Kiama Local Government Area is covered in the Illawarra Regional Strategy. The land surrounding the existing road at the northern end of the study area is covered by the Illawarra Regional Strategy (Figure 4.3) as being a Rural and Natural Resource Area. Further to the north of the existing road the land area is identified as being Significant Native Vegetation.

The pink line in Figure 4.3 represents an indicative habitat corridor, identified in the Illawarra Regional Strategy, which should be maintained (through design solutions where possible) as part of any proposed highway upgrade. The strategy also identifies the Werri Lagoon and the Crooked River as two key ecological areas worthy of preservation.
Land in the Shoalhaven Local Government Area is covered in the South Coast Regional Strategy. The southern section of the study area is covered by the South Coast Regional Strategy. There are two dominant biodiversity characteristics (Figure 4.4). These characteristics are:

a) Land classified as Biodiversity Assets Outside of Conservation Reserves, which is prominent to the north of the existing road; and
b) Land classified as Rural Land and Environmental Asset, which is prominent adjoining and to the south of the existing road.
Kiama Council stated (planning focus meeting) that key issues for the study area include:

c) Retaining existing vegetation;
d) Protecting threatened species;
e) Re-establishing links in the National Park and estuary; and
f) Water quality in the Crooked River estuary.

4.5.7.2 Implications of ecologically sensitive land uses

Areas identified for environmental protection and/or conservation in the relevant Local Environmental Plans should be avoided where possible. However, where avoidance is not possible, mitigation measures can be introduced to minimise environmental impact. Such mitigation measures would be dependent on the significance of the protected or sensitive area and the extent of impact generated by the proposed road upgrade. In this regard, the Preliminary Biological Report – Terrestrial Flora and Fauna and Aquatic Ecology and Water Quality reports have been considered in detail for the route options stage of the project.

The key areas of potential environmental protection and conservation include:

a) Toolijooa – Toolijooa has cultural heritage and ecological significance. Mitigation measures would be formulated that preserve the archaeological and landscape heritage values as well as biodiversity and ecological corridors should a route option be considered in this area.

b) Werri Lagoon (wetland) – This is located to the north of Gerringong in the north east of the study area. It is described as “Large areas of low-lying land border the western shores of Werri Lagoon - approximately 25% of the catchment is wetland, some of which has been artificially drained for agricultural purposes” (Department of Natural Resources). It is identified in the Illawarra Regional Strategy as a highly vulnerable estuary.

c) Crooked River Estuary – The estuary is located south of Gerringong in the north-east of the study area. It is identified in the Illawarra Regional Strategy as a highly vulnerable estuary.

Any construction works near to sensitive ecological areas, such as Werri Lagoon or Toolijooa should consider mitigation measures to safeguard the area from soil and water quality impacts, such as:

d) Spill containment integrated into road / pavement design;
e) Effective management of stormwater;
f) Edge treatments and appropriate planting of suitable local endemic species;
g) Best practice construction management; and
h) Consultative involvement of local community and stakeholders.

Implementation of best practice design to issues arising will be carried out in sensitive ecological areas. Where conservation values are compromised without the ability to avoid, mitigate or off set impacts, sensitive land areas should be avoided where possible.

For further analysis of ecologically sensitive land uses, refer to Preliminary Biological Report – Terrestrial Flora and Fauna and Aquatic Ecology and Water Quality reports.
5.0 Summary

5.1 Key opportunities

With regards to land use, some beneficial opportunities exist and include:

a) The width of the existing highway corridor in sections between Berry and Bomaderry may minimise land acquisition;

b) The land adjacent to the railway line is flat and relatively straight which presents an opportunity for establishing a new co-location with the rail corridor; and

c) As also stated in the Preliminary Planning and Zoning Issues Report, a key opportunity for the upgrade between Berry and Bomaderry is the configuration of the existing road and the potential for future widening of the existing alignment.

5.2 Key issues

There are some areas that should be avoided when selecting possible route locations based on current land use in the study area. Development or severance of the following areas will influence the preferred route development process:

a) Vineyards;
b) Approved subdivisions e.g. the Huntingdale Estate subdivision and The Arbour;
c) Productive farming land (Land Classification 1-3);
d) Community and urban areas within the Berry urban area;
e) Organic farms; and
f) Werri Lagoon and Crooked River Estuary.

These issues will continue to be considered and will integrate with the value management and preferred route selection process as the project progresses.
Appendix A  Land use map
Appendix A Land use map

LEGEND
- Existing Princes Highway
- Study area
- Other roads
- Eastern gas pipeline
- South Coast Railway
- Property boundaries
- Waterbody
- Wetland
- National parks/reserves
- Elevated areas
- Council boundary
- Local Aboriginal Land Council

LAND USE
- Sydney Water re-use irrigation area

INFRASTRUCTURE
- Existing roads
- Railway

RURAL AGRICULTURE
- Dairy
  - Nowra Dairy Co-op
  - Berry Dairy Farmers Co-op
  - Gerringong Dairy Farmers Co-op
- Cattle
- Dry T-Calf Farm
- Horticulture
- Vineyard

RURAL
- General
- Industrial/Commercial
- Masts/Hotels/B&B
- Residential

URBAN
- Community use
- Industrial/commercial
- Retail
- Masts/Hotels/B&B
- Residential
- Residential (planned development)

The representation of the Eastern Gas Pipeline shown on this map uses data supplied by Narta Asset Management (AAM). AAM takes no responsibility as to the accuracy of the pipeline shown on this map.
Appendix B  Regional strategy map
Appendix C  Land ownership map
Appendix D  Agriculture land classification map and definitions
### Appendix D Agricultural land classification definitions

<table>
<thead>
<tr>
<th>CODE</th>
<th>LAND CLASSIFICATION DESCRIPTOR</th>
<th>SOIL CONSERVATION PRACTICES</th>
<th>INTERPRETATIONS AND IMPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SUITABLE FOR REGULAR CULTIVATION</td>
<td>No special soil conservation works or practices.</td>
<td>Land suitable for a wide variety of uses. Where soils are fertile, this is land with the highest potential for agriculture, and may be cultivated for vegetable and fruit production, cereal and other grain crops, energy crops, fodder and forage crops, and sugar cane in specific areas. Includes ‘prime agricultural land’.</td>
</tr>
<tr>
<td>2</td>
<td>SUITABLE FOR REGULAR CULTIVATION</td>
<td>Soil conservation practices such as strip cropping, conservation tillage and adequate crop rotation.</td>
<td>Usually gently sloping land suitable for a wide variety of agricultural uses. Has a high potential for production of crops on fertile soils similar to Class I, but increasing limitations to production due to site conditions. Includes ‘prime agricultural land’.</td>
</tr>
<tr>
<td>3</td>
<td>SUITABLE FOR REGULAR CULTIVATION</td>
<td>Structural soil conservation works such as graded banks, waterways and diversion banks, together with soil conservation practices such as conservation tillage and adequate crop rotation.</td>
<td>Sloping land suitable for cropping on a rotational basis. Generally used for the production of the same type of crops as listed for Class I, although productivity will vary depending upon soil fertility. Individual yields may be the same as for Classes I and II, but increasing restrictions due to the erosion hazard will reduce the total yield over time. Soil erosion problems are often severe. Generally fair to good agricultural land.</td>
</tr>
<tr>
<td>4</td>
<td>SUITABLE FOR GRAZING WITH OCCASIONAL CULTIVATION</td>
<td>Soil conservation practices such as pasture improvement, stock control, application of fertiliser and minimal cultivation for the establishment or re-establishment of permanent pasture.</td>
<td>Land not suitable for cultivation on a regular basis owing to limitations of slope gradient, soil erosion, shallowness or rockiness, climate, or a combination of these factors. Comprises the better classes of grazing land of the State and can be cultivated for an occasional crop, particularly a fodder crop, or for pasture renewal. Not suited to the range of agricultural uses listed for Classes I to III. If used for ‘hobby farms’, adequate provision should be made for water supply, effluent disposal and selection of safe building sites and access roads.</td>
</tr>
<tr>
<td>5</td>
<td>SUITABLE FOR GRAZING WITH OCCASIONAL CULTIVATION</td>
<td>Structural soil conservation works such as absorption banks, diversion banks and contour ripping, together with the practices as in Class IV.</td>
<td>Land not suitable for cultivation on a regular basis owing to considerable limitations of slope gradient, soil erosion, shallowness or rockiness, climate, or a combination of these factors. Soil erosion problems are often severe. Production is generally lower than for grazing lands in Class IV. Can be cultivated for an occasional crop, particularly a fodder crop or for pasture renewal. Not suited to the range of agricultural uses listed for Classes I to III. If used for ‘hobby farms’, adequate provision should be made for water supply, effluent disposal, and selection of safe building sites and access roads.</td>
</tr>
<tr>
<td>6</td>
<td>SUITABLE FOR GRAZING WITH NO CULTIVATION</td>
<td>Soil conservation practices including limitation of stock, broadcasting of seed and fertiliser, prevention of fire and destruction of vermin. May include some isolated structural works.</td>
<td>Productivity will vary due to the soil depth and the soil fertility. Comprises the less productive grazing lands. If used for ‘hobby farms’, adequate provision should be made for water supply, effluent disposal, and selection of safe building sites and access roads.</td>
</tr>
<tr>
<td>CODE</td>
<td>LAND CLASSIFICATION DESCRIPTOR</td>
<td>SOIL CONSERVATION PRACTICES</td>
<td>INTERPRETATIONS AND IMPLICATIONS</td>
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<tr>
<td>7</td>
<td>OTHER</td>
<td>Land best protected by green timber.</td>
<td>Generally comprises areas of steep slopes, shallow soils and/or rock outcrop. Adequate ground protection must be maintained by limiting grazing and minimising damage by fire. Destruction of trees is not generally recommended, but partial clearing for grazing purposes under strict management controls can be practised on small areas of low erosion hazard. Where clearing of these lands as occurred in the past, unstable soil and terrain sites should be returned to timber cover.</td>
</tr>
<tr>
<td>8</td>
<td>OTHER</td>
<td>Cliffs, lakes or swamps and other lands unsuitable for agricultural and pastoral production.</td>
<td>Land unusable for agricultural or pastoral uses. Recommended uses are those compatible with the preservation of the natural vegetation, namely: water supply catchments, wildlife refuges, national and state parks, and scenic areas.</td>
</tr>
</tbody>
</table>

Subscript “c”

Terrain developed for a specific crop (capability class range IV to VII) as a result of the combination of particular soil, terrain, climatic and economic conditions. The class includes such crops as grapes, bananas, avocados and pineapples.

Subscript “d”

Terrain developed for intensive agricultural production and associated with flood irrigation. The class includes land developed for cotton and rice production.

| U   | Urban areas                  | N/A |
| M   | Mining and quarrying areas   | N/A |
| FI  | Flood Irrigation             | N/A |
| NP  | National Park                | N/A |
| NR  | Nature Reserve               | N/A |
| TR  | Timber Reserve               | N/A |
| SF  | State Forest                 | N/A |
| Specific Foreshore Areas       | e.g.: Copeton Dam Foreshores | N/A |