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LANDSCAPE DESIGN REPORT

Proposed development:
Central West Regional Road/Rail Freight Terminal

SLOBOBAX Pty. Ltd

5th August 2005: Revision B

1.0 Introduction

This report was commissioned by Mellor Gray Architects on behalf of Slobobax P/L**.**
This landscape design report in conjunction with the landscape plan supports the EIS and development application for a proposed freight handling terminal. The proposed terminal is situated between the Great Western Highway and the Great Western Railway, approximately four kilometres east of Bathurst. The site, which covers an area of approximately 30 hectares, has a northern frontage to the Great Western Highway of approximately 900 metres.

2.0 Site Analysis

2.1 Site context

The area referred to as the site includes the 30-hectare site proposed for the Bathurst Freight Handling Terminal.

The study site is lightly undulating open agricultural land with the Great Western Highway forming the northern frontage. An intermittent watercourse, Raglan Creek bisects the site. The south-eastern portion of the study area comprises a granite gravel quarry with numerous tracks and prior stockpiling sites. Shed remnants and dumps are located mid-way along the main Raglan Creek course.

The aspect of the site tends to be toward the northwest on a slight slope of less than 7 percent. Local relief across the study area is less than 25m.

The areas immediately surrounding the site are used for agricultural, industrial, residential, commercial and transport purposes. Land to the east and south is predominantly open rural land.

The site has had a long history of agricultural use and as such has been extensively cleared of native trees and shrubs with exotic trees largely confined within the two unnamed watercourses. Native tree species are scarce in the immediate locality.

Both drainage ditches on the northern boundary and Raglan Creek contain semi-permanent waterhole soakage areas. The drainage ditches are located near the top of the catchment area and extend upstream no further than two kilometres to the east of the study area. These watercourses are weed infested and have been accessed by stock.

2.2 Geology & Soils

The site is situated entirely within an extensive Palaeozoic unit of the Bathurst Batholith group known as the Bathurst Granites. This is comprised of coarse grained porphyritic biotite granite. Soils in the area are essentially gravely and quartz rich, being the result of decaying granite.

2.3 Flora

The original native woodland found in the locality is likely to have consisted of Yellow Box and *Allocasuarina* open woodland community. This original community has been extensively cleared and highly modified throughout the locality. No trace of this community has been identified in the site in the Flora and Fauna Assessment Report prepared by Geolyse (April 2005). A combination of grazing pressure and dense groundcover vegetation has prevented the successful regeneration and establishment of any native trees or shrubs. No native species revegetation has been carried out on or near the study area.

As part of the preliminary investigations for the EIS/Development Application, a Flora and Fauna Assessment Report was prepared by Geolyse (April 2005) This indicates that the site contains two dominant vegetation communities. These communities include agriculturally modified grassland or pastureland and a degraded riparian corridor

Geolyse (April 2005) list these as follows:

i. Riparian community

The riparian corridor present on the site consists of a narrow and connective belt of willow dominated vegetation, restricted to within the watercourse channels and on the immediate upper banks. This community is mostly connective, however openings occur where trees have been removed from the channel or where dense blackberry has restricted growth.

Other tree and shrub species to occur within this community include poplar, fruit trees, ash, Ulmaceae species, Blackberry, African Boxthorn, Sweet Briar (Rosa rubiginosa) and assorted garden associated shrubs. The willow dominated community of the watercourse extends into the lower bed of the creek and forms a dense mat of fallen trunks and roots in several stretches of the channel. The dense configuration of this vegetation provides a thick canopy which restricts ground cover and shrub species growth within the watercourse. Many bare areas on the upper banks show evidence of active erosion.

Species growing on the banks and dry bed of the channels include many robust pastureland species and also include species typically associated with ephemeral watercourses. These include Knob Sedge, Tall Spike Rush (Eleocharis sphacelata), Common Rush (Juncus usitatus), Yorkshire Fog (Holcus lanatus) andCumbungi (Typha domingensis).

Dense upper canopy structure typically restricts the growth of aquatic associated species to scattered individuals. Areas where the canopy has been removed by clearing has allowed for small areas to become vegetated by small stands of reeds and sedges. Much of the watercourse bed and banks remain free of vegetation due to sediment deposition, dense mats of fallen willow leaves and roots, eroded bank walls and low light conditions. Standing pools located within the watercourse are located immediately north of the disused farm sheds centrally located on the study area. These pools may be semi-permanent, soak-fed ponding areas. The dense willows have restricted the growth of any aquatic or waters-edge vegetation. No aquatic associated reed or sedge-beds are present on the study area.

ii. Grassland (agriculturally modified)

The open pastureland structure is typical of the unimproved agricultural lands of the undulating lower hills in the Raglan locality. It consists of open cleared country with isolated corridors of planted exotic tree species typically located on paddock and road fringes as screen plantings and shelter-belts and also within or adjacent to watercourses. The existing trees and shrubs in the study area are strongly dominated by a range of exotics including Poplar, Willow, Radiata, Stone-fruit trees, Elm, African Boxthorn and Blackberry. Fenced paddocks in the site are likely to have been grazed in the past. Ground cover species exhibits a prolonged grazing or cultivation history. Ground-cover composition is patchy and reflects the on-site changes in grazing regime, aspect, slope and drainage. Grazing has not occurred on the site for at least two years.

3.0 Design Principles

3.1 General Principles

Design measures to promote sustainability will include:

i. Use of endemic and ecologically appropriate plant species will reduce irrigation, maintenance requirements, and the use of pesticides and herbicides. Planting will attempt to reinstate some of the remnant endemic vegetation on site and suitability for local fauna.

ii. The planting of lawns will be minimised and more drought tolerant native groundcovers and grasses will be encouraged as an alternative to lawns.

iii. Water harvesting from both on stormwater and rainwater collection will be used as a water source for irrigation. Irrigation systems will utilise drip irrigation systems where appropriate.

iv. Using quality, long lasting materials manufactured or extracted locally if possible.

v. Using soils and mulches manufactured with recycled waste.

vi. No noxious plants or plants known to be invasive or which become invasive will be planted.

vii. Shading area where staff congregate and public areas with vegetation will be incorporated in landscape design.

viii. Tree planting to shade roadways and paved areas to reduce heat absorption will be will be incorporated in landscape design.

ix. Using macrophytes to assist in biofiltration of water in on site detention ponds where possible.

x. Generally soft landscaping will be preferred to large areas of hard landscaping.

3.2 Indigenous Vegetation

A wide variety of indigenous plants from local plant communities will be used during revegetation of the site, (Refer indicative plant schedules). These will be used to provide both screen planting and amenity planting in addition to providing revegetation and erosion control to all areas not required for operations.

The two major plant communities represented will be:

White Box, Yellow Box, Blakely's Red, Gum Woodland (Box Gum Woodland)
To all general vegetation areas.

Allocasuarina Open Woodland Community
To Riparian revegetation areas

3.3 Riparian Zone Restoration

Full details of riparian restoration will be provided in a Vegetation Management Plan (VMP) that will accompany future Development Applications as relevant.

Generally design principles will be as follows:

All weed species will be progressively removed from site, creek works implemented and a number of riparian vegetation zones planted to recreate the endemic plant communities. (Refer Appendix A: Indicative Plant Schedules).

This section of the report identifies measures that are recommended to be undertaken as part of the proposed development in order to improve water quality, minimise impacts on flora and fauna and provide beneficial outcomes in terms of biodiversity values.

A. Objectives of revegetating the creekline:

- To revegetate the creekline on site to create higher quality habitat for existing and restorable wildlife using locally native plant species.
- To implement the revegetation of the Creekline in stages to protect where possible existing habitat in the short term.
- To enhance the development of functional wildlife corridors in the region.
- To recreate as far as possible the original vegetation communities and habitats of the area.

B. Proposed construction

Broadly, proposed works are to remove exotic weed vegetation and replace with endemic riparian species; and reduce the steep batters of the creek banks.

i. Period of work

It is proposed that the preliminary recreation of native vegetation communities for the Creekline be carried out over a period of five (5) years. Following the completion of revegetation plus continued weed control and supplementary planting over the five year period, it is anticipated that the bushland areas of the Creekline will be in such condition (health) as to be placed onto a low level maintenance weeding program. Maintenance weeding and further planting will be required indefinitely and provision for the implementation of such a program will be made by terminal management.

ii. Revegetation

Works are proposed to remove exotic vegetation occurring along the creek banks, replacing it with appropriate endemic plant communities that would have occurred along the creekline prior to European development.

Prior to earthworks, a program of herbicide treatment will be used to eradicate existing weed growth on creek banks. Qualified contractors will supervise the eradication and control of persistent/ noxious weeds to ensure problem species are targeted and removed to minimise future infestation of the revegetated areas and surrounding areas. Weed monitoring and management is required during and after works. Invasive species including African Boxthorn, Blackberry, Cathead and Serrated Tussock must be controlled and removed from site.

Of particular concern is the willow trees found throughout the creekline.

iii. Willow Removal

Staged removal of the willows will commence in the upper reaches of the watercourse and work downstream. It is recommended that there be the removal of 20 per cent of willows per year, and the removal of any young seedlings by hand along the entire watercourse.

A detail survey will record willows identified for removal on a map and given a priority ranking for removal. Priorities will reflect the capacity for seed set and the physical impact on the watercourse, as well as impacts on biodiversity. The priority rankings for staged removal are as follows:

a. High Priority

- Willows growing in bed of watercourse.
- Willows blocking or diverting water flow.
- Willows confirmed setting viable seed.

b. Medium Priority

- Willows growing on banks of watercourse.
- Willows affecting low and medium flows.
- Willows likely to be producing viable seed.

c. Low Priority

- Willows growing away from watercourse.
- Willows not producing seed or contributing to seed set.

It is proposed in the initial construction stage that the upper section of creekline adjacent to the main entry be restored as demonstration of the restoration potential in this more visible section of the site.

iv. Regrading of Creek Banks

The banks of the creek in the proposed works area are steep ranging from slopes of 1:2 to greater than 1:1. Where willow removal and the site layout permits the current steep batters will be reduced to 1:3 and 1:4, with erosion control installed.

The soil on the banks will be improved to suit the establishment of native vegetation and then stabilised with jute matting in the toe sections.

Preliminary hydraulic analysis of the proposed creek bank and pasture fill works suggests that there would be no major impact to current flood levels. The battering back of the creek banks would potentially improve the flood conveyance in this reach of the creek.

v. Revegetation

Where possible only site specific endemic plant species will be used in the revegetation works. This is consistent with the objectives and planning principals behind Bathurst Regional Council's Vegetation Management Plan, 2003 (Terra Consulting 2003).

All revegetation and landscaping work within the site will be carried out with regard to the the suggested plant species listed in Appendix A – Indicative Plant Schedules. Seeds and plant

cuttings should continue to be collected and planted as supplementary plantings over the 5 year management period by the management / maintenance contractor. This will ensure the diversity of species collected, and will continue until a representative range of plant species in each association has been attained. Community groups/ Council may assist in this activity.

Seeds and propagation material should be sourced from the local area. Collection within the broad Bathurst area is considered a benchmark for this project given the difficulty of finding all species within a more immediate area.

Consideration should be given to utilising a nursery outlet for the site that deals specifically with locally endemic plant species cultivated from local seed stock.

vi. Other issues

The Flora and Fauna Assessment Report prepared by Geolyse (April 2005) identifies the following issues to be considered in the restoration of the creek corridor;

- *Works undertaken within the watercourses would be carried out during periods of nil to low flow and during seasonal conditions where the likelihood of high flow events is low.*
- *Any in-stream reed or sedge areas would be retained during in-stream works to provide habitat opportunities for aquatic species. The existing semi-permanent pool areas located within the main watercourse central to the site should also be conserved until final in-stream work is completed.*
- *Car-bodies, metal and dumped rubbish would be removed from the riparian zone.*
- *The fish passage within the watercourses would be maintained at all times throughout the proposed works.*
- *Appropriate and recommended culverts/ crossings would be used for the Class 2 and Class 3 channel types based on guidelines for fish passage (Fish Passage Requirements for Waterway Crossings/ Fishnote: Policy and Guidelines for Fish Friendly Waterway Crossings) NSW Fisheries 2003.*
- *Energy dissipation structures would be installed at all stormwater discharge points into the watercourses located within the site.*

3.4 On site detention areas

Areas identified as On Site Detention basins will be planted with a range of endemic macrophytes to assist in biofiltration of stormwater and to create wildlife habitat. Given the steep sides to the retention basins to maximise detention capacity opportunity for these fringe plantings may be limited.

Adjacent areas to basins will be revegetated in a combination of Box Gum woodland and Allocasuarina Open Woodland species. However care will be taken to ensure macrophyte plantings are not shaded out by tree plantings.

3.5 Streetscape

The landscaped frontage of the development will make a contribution to the streetscape by way of the design of any structures or vegetation.

Bathurst Regional Council's *Vegetation Management Plan, 2003 (Terra Consulting 2003)* identifies the section of the great Western Highway on the site's northern boundary as gateway/main access vegetation. *(Map B; Terra Consulting 2003).*
The Plan further details the streetscape treatment in *Figure 4—Concept plan of eastern approach gateway.* This map indicates that the northern frontage of the highway from

Ashworth Drive towards Bathurst should be planted in a single row of Lombardy Poplars. The eastern section towards Raglan is indicated in endemic natives. This appears to be due to the location of the existing drainage ditch adjacent to the roadway at this point and the concern over the suckering of poplars in this waterway.

However further east at the top of the rise towards Raglan the row of Lombardy Poplars is continued. It is our intention to continue the poplars right through this section as the development intends to remove the drainage ditch in the council road reserve in line with Councils comments and to relate to future road widening anticipated in this location.

The main elements of landscaping and streetscape include the following:

- Landscaping will reinforce Bathurst's rural identity and cultural heritage as identified in the Bathurst Regional Council's *Vegetation Management Plan, 2003 (Terra Consulting 2003)*
- Create a sense of arrival to Bathurst from the countryside.
- Create a transition between a rural environment and Bathurst's urban environment.
- Reinforce the line of Lombardy Poplars. As stated in the VMP *"these feature trees provide a significant entrance statement into Bathurst because of their linear form and line of direction*"
- Retain road reserve as a grassy verge in keeping with the character of the surrounding "grassy Bathurst plains"
- Landscaping will be used to soften the impact of buildings and as a visual screen between the Great Western Highway and the developments built form.
- Plant species will generally follow guidelines indicated in Appendix A: Indicative Plant Schedules.

3.6 Entry Statement

It is considered appropriate that the strong planting of lombardy poplars be reinforced at the main entry to the site. An entry statement is envisaged at this point and strong plantings of exotic species appropriate to the cultural heritage of Bathurst will create a point of difference to the simple roadside plantings.

Behind the entry statement the entry road will travel in to the site through an orchard of fruit trees (eg. *Malus sp./Prunus sp.*). This will relate to the site's previous usage and create a changing display with spring blossom, summer foliage and the bare branched trees in winter.

3.7 Commercial/Retail Areas

Areas located in public zones and staff amenity areas including the highway uses and light industry, petrol station and facility administration areas will be landscaped in a range of both ornamental exotic and native species to provide visual interest and amenity to both visitors, customers and workers in the facility.

Provision of shade by planting of both exotic deciduous trees and evergreen natives will assist in ameliorating the harsh western plains summer temperatures and the local; extremes generated by large areas of hardstand and large industrial buildings.

Seating areas in small areas of lawn will provide respite for travellers and a point to take a break or picnic before continuing their journey.

4.0 Plant Materials

A selection of plant species is proposed (Refer Appendix A: Indicative Plant Schedule).

4.1 Streetscape Planting

Planting design along the frontage to the Great Western Highway will create a simple, bold planting theme with both native and endemic species.

Lombardy Poplars and areas of native both native and pasture grasses will form the main roadside plantings on the council road reserve with feature planting located at entry points. This will be kept simple with a view to the possible removal due to future road widening works.

Endemic species will be planted behind on the site in groupings carefully located not to disrupt sight lines.

4.2 Commercial/Retail Areas

Areas located in public zones and staff amenity areas including the highway uses and light industry, petrol station and facility administration areas will be landscaped in a range of both ornamental exotic and native species to provide visual interest and amenity to both visitors, customers and workers in the facility. (Refer Appendix A: Indicative Plant Schedule).

Primarily deciduous trees will provide summer shade and winter sun to the carpark areas and adjacent to the buildings so as to increase comport and maintain solar access.

4.3 Indigenous Vegetation

A wide variety of indigenous plants from local plant communities will be used during revegetation of the site, (Refer Appendix A: Indicative Plant Schedule).These will be used to provide both screen planting and amenity planting in addition to providing revegetation and erosion control to all areas not required for operations.

The two major plant communities represented will be:

White Box, Yellow Box, Blakely's Red Gum, Woodland (Box Gum Woodland)
To all general vegetation areas.

Allocasuraina Open Woodland Community
To Riparian revegetation areas

5.0 Landscape Materials

5.1 Paving

Pavements will have a visual appearance that is sympathetic with the design intent of the development and use local manufactured materials, extracted products and trades where possible.

The following pavements are proposed:

- Local decomposed granite to small, low trafficked pedestrian areas.
- Concrete or brick unit paving as trims in high profile pedestrian zones.
- Mass concrete with cementitious finishes (e.g. Oxides/exposed aggregates) to large paved areas.
- Permeable paving (eg. Ecoloc pavers) in car park bays etc where tree planting will benefit from increased groundwater.

APPENDIX A: Indicative plant schedules

Botanic Name	Common Name

RIPARIAN VEGETATION

Trees

Casuarina cunninghamiana	River she-oak
Callistemon citrinus	Bottlebrush

Shrubs

Bursaria spinosa	Native Blackthorn

Groundcovers

Eleocharis sphacelata	Tall Spike Rush
Holcus lanatus	Yorkshire Fog
Juncus usitatus	Common Rush
Lomandra longifolia	Lomandra
Typha domingensis	Cumbungi

BOX GUM WOODLAND

Trees

Eucalyptus albens	White Box
Eucalyptus blakelyii	Blakely's Red Gum
Eucalyptus bridgesiana	Apple Box
Eucalyptus melliodora	Yellow Box
Eucalyptus polyanthemos	Red Box
Eucalyptus vinimalis	Ribbon Gum, Manna Gum

Groundcovers

Austrostipa scabra	Speargrass
Bothriocholoa macra	Redgrass
Joycea pallida	Silvertop Wallaby Grass
Poa sieberiana	Snowgrass
Themeda australis	Kangaroo Grass

BOX GUM WOODLAND & SCREEN PLANTING

Trees

Eucalyptus albens	White Box
Eucalyptus blakelyii	Blakely's Red Gum
Eucalyptus bridgesiana	Apple Box
Eucalyptus melliodora	Yellow Box
Eucalyptus polyanthemos	Red Box
Eucalyptus vinimalis	Ribbon Gum, Manna Gum

Shrubs

Acacia buxifolia	Box Leaf Wattle
Acacia dealbata	Silver Wattle
Acacia lanigera	Wooly Wattle
Acacia paradoxa	Kangaroo Thorn
Acacia pravissima	Ovens Wattle
Acacia spectablis	Mudgee Wattle
Astroloma humifusum	Native Cranberry
Banksia marginata	Silver Banksia
Bursaria spinosa	Native Blackthorn
Brachyloma daphnoides	Daphne Heath
Callistemon citrinus	Bottlebrush
Calytrix tetragona	Common Fringe Myrtle
Grevellia lanigera	Wooly Grevillea
Persoonia linearis	Narrow-leaved Geebung

STREETSCAPE PLANTING

Trees

Populus nigra 'Italica'	Lombardy Popular

Groundcovers

Austrostipa scabra	Speargrass
Bothriocholoa macra	Redgrass
Joycea pallida	Silvertop Wallaby Grass
Poa sieberiana	Snowgrass
Themeda australis	Kangaroo Grass

ORNAMENTAL PLANTING

Trees

Acer pseudoplatanus	Oregon Maple
Brachychiton populneum	Kurrajong
Fraxinus excelsior "Aurea"	Golden Ash
Fraxinus griffithii	Evergreen Ash
Fraxinus oxycarpa "Raywoodii"	Claret Ash
Lagerstroemia indica	Crepe Myrtle
Malus floribunda	Crab Apple
Prunus x blireana	Plum
Pyrus "Bradford"	Bradford Callery Pear
Pyrus ussuriensis	Manchurian Pear
Sapium sebiferum	Chinese Tallow Tree
Quercus pallustris	Pin Oak

Shrubs

Callistemon sp.	Bottlebrush
Convolvulus cneorum	Silver bush
Dietes grandiflora	Dietes
Echium fastuosum	Pride of Maderia

Grevillea sp.	Spider Flowers
Lavandula x stoechas 'Allardii'	Lavender
Melaleuca sp.	Paperbarks
Nerium oleander "dwarf"	Dwarf oleander
Rosa 'White Flower Carpet'	White Flower Carpet Rose
Rosmarinus officinalis	Rosemary
Teucrium fruitcans	

Groundcovers/ Grasses

Anigozanthos sp.	Kangaroo Paw
Baeckea virgata (minature)	
Brachycome multifida	Swan River daisy
Convolvulus mauritanicus	
Cerastium tomentosum	Snow in summer
Dianella sp.	Flax Lillies
Gazania sp.	Gazania
Grevillea lanigera 'Mt Tamboritha'	Mt Tamboritha Grevillea
Grevillea x gaudichaudii	
Grevillea "Royal Mantle"	
Hardenbergia violaceae	False sasparilla
Lomandra sp.	Mat Rushes
Myoporum parvifolium	
Nepetax faasenii	Catmint
Rosa 'White Flower Carpet'	Carpet rose