



# Landscape Management Plan - Stage AB Water Recycling Plant

## Googong Township Integrated Water Cycle Project

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Document Status

Version	Purpose of Document	Orig	Review	Review Date
Rev 1	Draft for GTPL review	KB/NG	RS	3/06/2014
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Rev 4	Updated with additional QCC comments	NG	RS	5/09/2014
Rev 5	Updated following detailed design, GTPL updates and QCC comments	KB	HS	14/12/2015

Approval for Issue

Name	Signature	Date
Hugh Swinbourne		14/12/2015

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## 1.0 Introduction

### 1.1 Background

Googong Township Proprietary Limited (GTPL) – a partnership between CIC Australia and Mirvac, is responsible for the development of the new Googong Township that will be located in the Canberra region, around seven kilometres south of Queanbeyan in NSW. The new Googong Township will be home to about 16,000 people and developed over the next 25 years. The township is designed around an integrated water cycle (IWC), with a dedicated water recycling plant (WRP) that will reduce the consumption of potable water in the community by around 60 per cent and recycle the township's water for non-potable use.

The *Googong Township Water Cycle Project Environmental Assessment* (November, 2010) (EA) was prepared under (the now repealed) Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) to assess the impacts of construction and operation of infrastructure for the potable water, recycled water and sewage system required to service the township.

Concept Approval for the ultimate development (Stage 1 and Stage 2) and a Project Approval for Stage 1 of the Googong Township IWC Project (which includes the WRP) were granted by the NSW Planning Assessment Commission, under delegation from the Minister for Planning and Infrastructure on 24 November 2011, and subject to conditions.

Condition of Approval (CoA) B16 of the Project Approval requires the preparation and implementation of a Landscape Management Plan/s (LMP) for the management of visual amenity issues arising from the IWC Project works.

### 1.2 Purpose of the Landscape Management Plan

This LMP has been developed to meet the requirements of CoA B16 of the Project Approval. It covers the Stage AB WRP, which comprises of a number of buildings and facilities that will eventually treat sewage and produce recycled water that will be reused in the township for non-potable use. There is Concept Approval under the EP&A Act for future stages of the IWC Project that includes expansion of the WRP (Stage C and D), however a Project Approval is yet to be obtained for these augmentations. In the interim, areas proposed for development at the WRP site will be grassed and stabilised with the endorsement of QCC.

The WRP site is located off Googong Road on the north-eastern boundary of Neighbourhood 1A, adjacent also to Neighbourhood 1B. The WRP includes the following:

- Various structures and buildings to process and treat sewage:
  - Inlet works to receive and screen sewage
  - Bioreactor tanks
  - Digesters
  - Membrane tanks
  - Chemical storage and dosing area
  - Sludge dewatering building
  - Motor control centre (MCC) building
  - Blower building
  - Administration building

- Vent stack and odour control units.
- Pipework and pumps to transfer sewage to the WRP and recycled water to interim recycled water reservoir.
- Discharge structures to Montgomery Creek (for emergency discharges) and pipeline to existing discharge structure at Googong Creek (for discharge of recycled water not approved for use in the township e.g. during commissioning).
- Berm (earth embankment) to provide visual screening installed on the western and southern boundary of the WRP.
- Access roads, crane pad and car parking areas.

This LMP and landscape drawings have been prepared to provide a design that will screen suburban development from the WRP along the western and southern boundaries, while providing visual aesthetics and environmental qualities that integrate into the surrounding landscape.

Other design objectives of the LMP include planting on the northern street side to complement the rest of the landscape planting along Googong Road and grassed areas within the WRP site so that the site is stabilised but allows for flexibility to expand the WRP in the future.

Landscaping is not proposed along the eastern side of the WRP, given that the WRP directly adjoins the Googong Foreshores buffer and boundary. The permanent WRP fence will be erected along the eastern boundary of the site and all land to the east of the fence will be managed as part of the the Googong Foreshores Interface Management Strategy.

### 1.3 Consultation

CoA B16 states that the LMP must be prepared in consultation with Queanbeyan City Council (QCC). A copy of the LMP has been provided to QCC for their review and GTPL has updated the LMP to address the comments. The LMP will also be submitted to the Department of Planning and Environment (DP&E) prior to the commencement of works that are part of the Detailed Design and Construct contract for the WRP, as agreed by DP&E via correspondence dated 2/06/2014.

### 1.4 Implementation of the Landscape Management Plan

The Stage AB WRP (including landscaping) will be delivered by a number of contractors. The WRP contractor will be responsible for works inside the WRP site and area adjacent to Googong Road (construction of buildings, lighting and hard landscaping). All soft landscaping within the site will be installed by a separately engaged landscape contractor. The berm and associated landscaping outside the WRP site will be delivered by the Stage 4b subdivision civil and landscape contractors.

GTPL and its contractor/s will be responsible for complying with the LMP requirements during the construction and associated plant establishment period.

The WRP will be handed over to QCC who will be responsible for the ongoing operation of the WRP and maintenance of landscaped areas (including the berm). Such timing is dependent on the construction program, but it is likely that there will be a staged handover with the berm handed over as part of the Stage 4b subdivision landscaping in around March 2016, and the WRP handed over in mid 2016.

## **I.5 Review of the Landscape Management Plan**

With the completion of the construction of the WRP and associated rising main works from sewage pumping station 2 (SPS 2), the plant has progressed into full operation. Accordingly the LMP has been revised in accordance with previous undertakings. There will be no need in the future to further review the LMP.

## 2.0 Visual mitigation and landscaping requirements

### 2.1 Project elements and potential visual impacts

This section addresses CoA B16 (a): identification of the project elements, which may impact on the visual amenity impacts to sensitive receiver locations, including residents of the Googong Township urban development area.

The main visual elements of the WRP include:

- Low-rise structures and buildings.
- Vent stack/s (maximum height 15 metres) as part of the odour control system.
- A 2.4 metre high cyclone-mesh security fence (1.8m mesh with 0.6m high cranked post with 3 strands of barbed wire) around the WRP site boundary.

A Visual Impact Assessment was undertaken by Clouston and Associates in 2010 for the Environmental Assessment (EA) for the IWC Project. It was noted that the landscape around the WRP site was sloping ground in the form of a broad gully running south-west from Googong Road.

As such, it was considered that the location of the WRP and associated vent stack, on relatively steep land with a westerly facing aspect, would limit its visibility from within Neighbourhood 1A and 1B, nearby existing residences and Googong Road. The impact assessment concluded that the visual impacts associated with the WRP were limited, and were mainly related to the vent stack. However a berm was proposed in the early design stages to provide additional visual mitigation. This commitment is the focus for the landscape design for the WRP (refer Section 2.2.1 for more information).

### 2.2 Visual mitigation measures

This section addressed CoA B16 (b): measures to minimise and/or avoid visual amenity impacts to sensitive receiver locations.

#### 2.2.1 Landscape design

Landscape architects Spacelab have prepared the landscape drawings (and design report) for the WRP, which are included at Appendix 1. There are three main elements to the landscape design:

- Grass planting within the WRP site and some small pockets of native grass planting in the car parking areas.
- Re-establishment of grass to the Googong Road frontage.
- Berm establishment and planting to the western and southern boundaries.

Windblown material that could increase housekeeping requirements at the WRP site has been avoided and should be avoided with any landscaping design amendments.

##### 2.2.1.1 Grass planting within the WRP site

Available areas for landscaping inside the WRP site will be rehabilitated and grassed to ensure the site is stable and easily maintained while allowing for flexibility to expand the WRP in the future. The landscaping will comprise bitumen straw mulch and dryland grass as outlined in Table 1 (and in the design drawings at Appendix 1).

**Table 1 Proposed grass mix for landscaped areas**

Summer (September – February)		Winter (March – August)	
Plant species	Quantity (kg/ha)	Plant species	Quantity (kg/ha)
<i>Festuca arundinacea</i> Schreb. (Tall Fescue)	140	<i>Festuca arundinacea</i> Schreb. (Tall Fescue)	140
<i>Lolium perenne</i> (Perennial Ryegrass)	50	<i>Lolium perenne</i> (Perennial Ryegrass)	50
<i>Festuca rubra</i> (Creeping Red Fescue)	40	<i>Festuca rubra</i> (Creeping Red Fescue)	40
<i>Trifolium repens</i> (White Clover)	20	<i>Trifolium repens</i> (White Clover)	20
<i>Elymus repens</i> (Couch Grass, hulled)	30		
Total	280	Total	250

### 2.2.1.2 Re-establishment of Googong Road frontage

In accordance with the requirements of QCC there will be no additional tree or shrub planting to the Googong Road frontage. All areas disturbed along Googong Road during construction of the WRP and associated rising mains work will be re-grassed with the dryland grass mix identified in Table 1.

### 2.2.1.3 Berm establishment and planting

A berm, approximately one metre high and three metres wide, will be constructed along the contour of the south and west boundaries of the WRP. Following berm establishment, planting of trees will take place to provide visual screening from suburban development. There will also be a three-metre unplanted corridor between the WRP fence and berm plantings (refer Appendix 1 for cross section).

The plants chosen for the berm will provide a multi-level visual screen, with shrubs providing intermittent and lower level screening and trees providing an upper level screening. The proposed tree and shrub species for the berm plantings are provided in Table 2 and will be planted in groups of 3-7 with like species planted together. *Eucalyptus cinerea* has been selected to blend in with the existing species windbreak at the intersection of Googong Road and Caragh Road. The use of the Eucalyptus species provides an opportunity to draw on the heritage and cultural use of the site.

The mid and lower level berm screen planting will be established within five years. The upper level tree growth will have an approximate height of 10 metres, around 15 years after planting. This will provide an effective visual screen of the WRP within the first five years after planting.

Forest litter mulch will be placed on the three metre wide top of berm, in association with the shrub and tree plantings.

Mowable dryland grass will be established on the berm slopes and verge areas. The proposed grass seed mix for these areas (outlined in the design drawings at Appendix 1) is provided in Table 1. The low growing seed mix will stabilise the areas disturbed by the construction works and naturalise well into the existing landscape, with minimal maintenance requirement.

**Table 2 Proposed species for berm planting**

Plant species	Growth rate	Mature height (m)	Mature spread (m)
<i>Eucalyptus cinerea</i>	Moderate	10-15	8-10

(Argyle Apple)			
<i>Eucalyptus polyanthemos</i> (Red Box)	Moderate	15-20	8-12
<i>Callistemon linearis</i> (Narrow-leaved Bottlebrush)	Fast	3	3
<i>Westringea fruticosa</i> (Coastal Rosemary)	Fast	1.5	1.5
<i>Grevillea sericea</i> (Silk Spider Flower)	Moderate	2	1.5

### 2.2.2 Built elements and proposed treatments/finishes

The vent stack/s are required to reduce odour impacts and must be of a certain height to ensure effective mitigation of potential odour impacts. The detailed design for the odour control system is underway, but may comprise 1-2 vent stacks up to 15 metres high, sited to minimise visibility.

The surfaces of above ground infrastructure elements, such as buildings and the vent stack/s, will be treated with sympathetic treatments and colour schemes that blend with the local environment to assist in minimising the visual impacts. For example:

- Coloursteel sheeting or similar roofing material will be used on buildings, which will be typically painted a dull grey.
- Vent stack will be painted dull grey/white.

Refer next section for treatment of lighting poles.

### 2.2.3 Lighting

Detailed design for lighting for the WRP has yet to be completed however the following is known:

- Overhead site lighting will comprise of pole-mounted lights approximately six metres in height.
- Lighting will be positioned away from sensitive receivers at critical locations around the site to allow for emergency / essential maintenance activities to be carried out at night if required.
- All external lighting will be manually controlled, vandal-proof and easily maintained using a proprietary articulated light pole configuration.
- Lighting poles will consist of VicPole proprietary poles in Dulux charcoal 32999 with silver transition. Product specification for proposed lighting is included in this report at Appendix 2.

## 2.3 Program and timing

This section details the timing and progressive implementation of the visual mitigation works as required by CoA B16 (c).

The program for works is likely to take place in the following sequence:

- **Installation of berm:** Construction of the berm will commence in mid 2014 as part of the Stage 4b subdivision works.
- **Berm planting:** As soon as the berm is established, GTPL will arrange for the planting to maximise the establishment time. The plant establishment period will commence from this point and extend until the berm and associated landscaping is formally handed over to QCC (around March 2016).

- **Installation of built elements at WRP:** Construction of the WRP will take place from mid 2014 to end 2015. Finishes and treatments of buildings, and installation of lighting will take place towards the end of the construction program in early 2015.
- **Landscaping at WRP site** (onsite and entry planting): Landscaping is scheduled to occur at the end of the construction once all earthworks and road works are complete at the start of 2016. The plant establishment period will commence from this point and extend until the WRP is formally handed over to QCC (around March 2016).

## 2.4 Monitoring and maintenance

This section provides information on the procedures and methods to monitor and maintain landscaped or rehabilitated areas as required by CoA B16 (d).

As noted in Section 1.4 GTPL and its contractors will be responsible for monitoring landscaped areas until handover to QCC. It is likely that there will be a staged handover with the berm and associated landscape works handed over March 2016, and the WRP handed over in mid 2016 (subject to construction program).

### 2.4.1 Plant establishment period – GTPL

#### 2.4.1.1 Weeds

For each of the areas (berm and WRP), there will be a plant establishment period during which time the planted areas will need to be managed to ensure achievement of the required outcome for a dense, weed resistant cover of endemic native grass species with a low incidence of weeds.

The landscaping contractor/s will be responsible for management of the works to facilitate grass establishment within the seeded areas, to achieve a plant cover of 100 per cent (all dead plants replaced), with minimal weed cover of less than 10 per cent for seasonal / temporary weeds.

For perennial weeds that present a long-term threat to the integrity of the native grass population, e.g. Blackberry, Serrated Tussock and Sweet Briar, the landscaping contractor will carefully monitor the progression of these weeds, and ensure eradication of these weeds within the WRP work areas.

Weed management by GTPL and its contractors will cease upon completion of the plant establishment period. Ongoing weed management would then be undertaken by QCC in accordance with their council-wide maintenance schedule.

#### 2.4.1.2 Plants and grass

All of the trees and shrubs selected have low maintenance requirements and thrive in harsh climates. Establishment watering will only be required during the initial establishment phase and pruning will be undertaken as required. Areas of dry land grass will require slashing/mowing from time to time and will be undertaken by the landscaping contractor during the plant establishment period until handover to QCC.

### 2.4.2 Ongoing maintenance and access to berm - QCC

To ensure the berm plantings maintain their effectiveness, inspections should be undertaken on a six-monthly basis and any rectification works should be undertaken in a timely manner. Regular maintenance of grassed areas will help to enhance the public presentation of the WRP.

The berm will be situated on private land not under the control of QCC (i.e. located outside the WRP site). However ongoing access to adjacent lots will be required if QCC staff are to undertake maintenance activities for the berm. GTPL may enact a Section 88B Instrument (under the NSW *Conveyancing Act 1919*),

or arrange for an alternative form of access such as the establishment of a dedicated easement. This will allow QCC ongoing access to the berm and restrict future property owners from adversely affecting the grass, shrub and tree plantings (ie chopping/pruning/poisoning or damaging of the screen planting in any way).

In addition, GTPL would look to enact a Section 88B Instrument that requires future property owners to maintain the land immediately adjacent to the berm to an agreed standard. Further consultation with QCC will be undertaken to confirm maintenance and access arrangements, and this plan will be revised to provide further details relating to access, once an appropriate arrangement has been agreed.

### 3.0 Design standards

All works have been designed in accordance with the relevant Australian standards and local requirements set out by:

- Queanbeyan City Council Design standards.
- Googong Township Design Guidelines.

# Appendix I

## Landscape design drawings

# GOOGONG WATER RECYCLING PLANT LANDSCAPE PLANS

FOR DA APPROVAL

JOB NUMBER 14/1047

## DRAWING SCHEDULE

### LANDSCAPE DRAWINGS:

Drawing NO.	Drawing Title	Scale @A1	Revision
L502.1	PLANTING PLAN- SHEET 1	1:200	F
L502.2	PLANTING PLAN- SHEET 2	1:100	F
L503.1	DETAILS - SHEET 3	Varies	F

CONSULTANT:

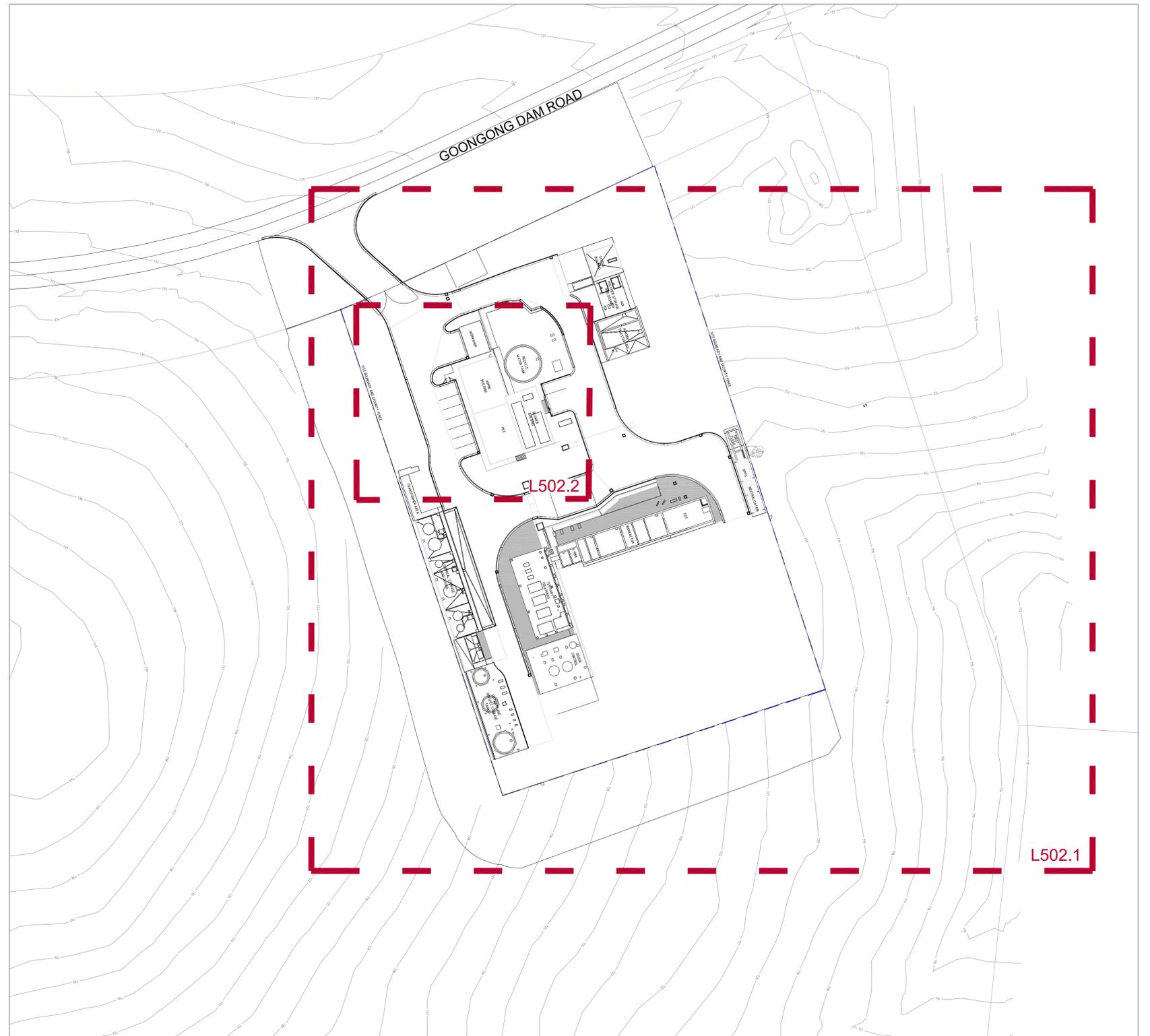


**SPACELAB**  
CREATING TIMELESS PLACES

CLIENT:



ISSUE DATE: 14.12.15  
ISSUE: F



**GOOGONG WATER RECYCLING PLANT KEY MAP**  
Scale: 1:700@A1

### PLANTING LEGEND

-  WRP boundary and 2.3m Height Chain Wire Fence with double security gate.
-  Mulched garden bed extents
-  **EXISTING VEGETATION**  
Existing vegetation to be undisturbed with no damages incurred through construction period.
-  Dryland grass see detail 2/503.1  
Apply to all disturbed areas, sow on 100mm depth site or imported topsoil. All grass areas not to exceed 1:3 slope. 1:4 slope is preferred.
-  Concrete Slab
-  DGS20 sub base gravel at 75mm thickness
-  Concrete footpath
-  7mm single coat seal
-  Mulched shrub bed. 200mm imported topsoil on cultivated subgrade. 75mm depth mulch

#### PROPOSED TREES

Code	Plant Species	TOTAL	Minimum Stock Size	As shown Rate
Ep	Eucalyptus polyanthemos	35	200mm SR	As shown
Ec	Eucalyptus cinerea	31	200mm SR	As shown

#### PROPOSED BERM NATIVE SHRUBS

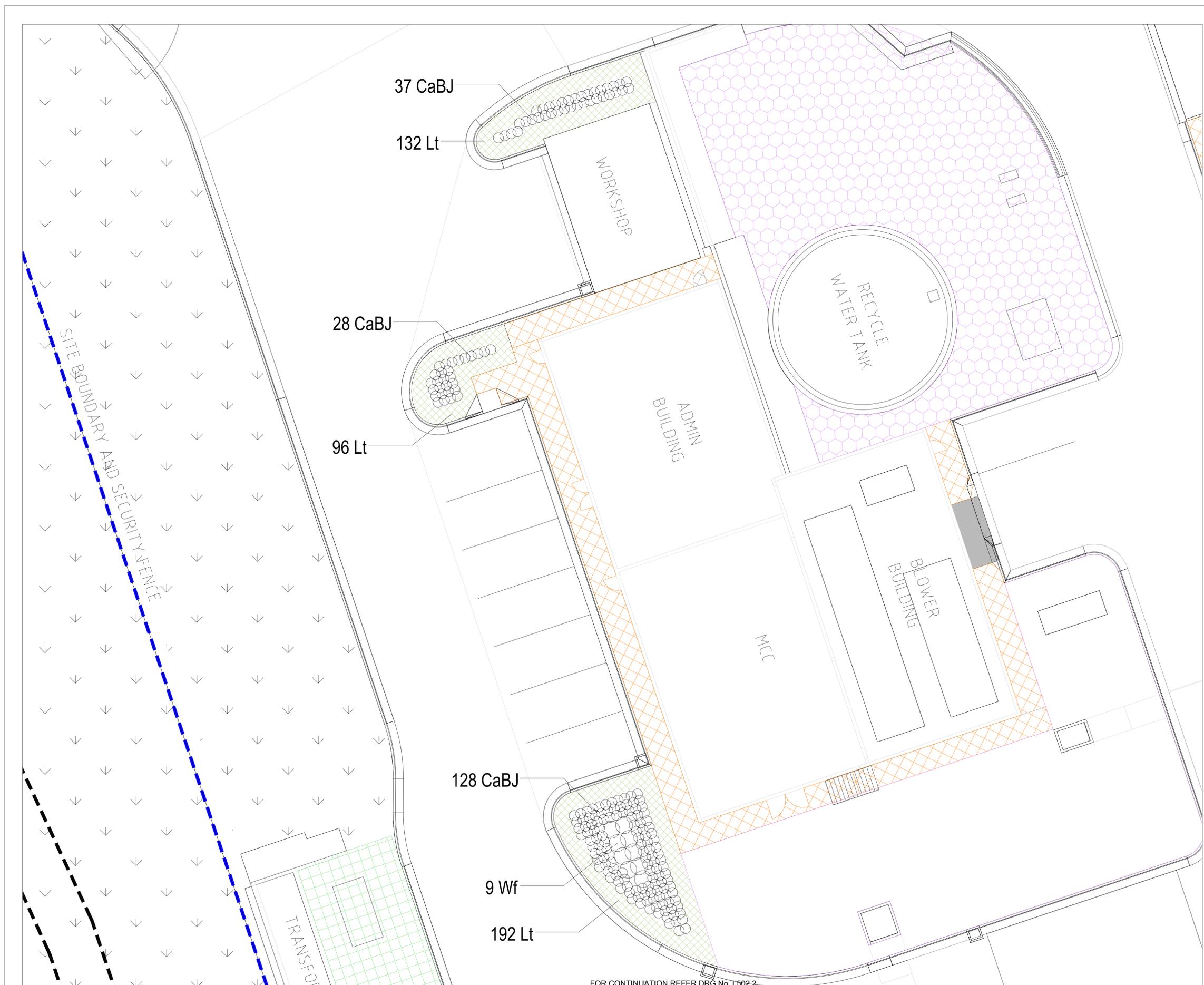
Plant Species	TOTAL	Minimum Stock Size	As shown Rate
CaJ	Callistemon linearis	42	200mm pots
	Narrow Leaved Bottlebrush	266	tube
Wf	Westringia fruticosa	242	200mm pots
	Coastal Rosemary	667	tube
Gs	Grevillea sericea	142	200mm pots
	Silk Spider Flower	667	tube
CaKf	Callistemon Kings Park Special	100	200mm pots
		401	tube

#### INTERNAL SHRUB BED NATIVE SHRUBS

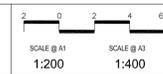
Plant Species	TOTAL	Minimum Stock Size	As shown Rate
CaBJ	Callistemon 'Better John' Bottlebrush	193	140mm pots
Lt	Lomandra tanika	420	140mm pots
Wf	Westringia fruticosa	9	140mm pots
	Coastal Rosemary		

- Notes:
- Plant berm native species in groups of 3-7 with like species grouped together.
  - Any disturbance caused to existing grassed areas throughout the construction works is to be remediated to the standard of QCC Place Management.
  - All weed species to be removed from site. Woody weeds\* must not be mulched and spread on site.

**GENERAL NOTE:**  
ENSURE ALL PLANTINGS ADJACENT ROAD ARE PLANTED CC MATURE WIDTH OF PLANT + 0.5m SETBACK.



FOR CONTINUATION REFER DRG No. L502.2

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### PLANTING LEGEND

-  WRP boundary and 2.3m Height Chain Wire Fence with double security gate.
-  Mulched garden bed extents
-  **EXISTING VEGETATION**  
Existing vegetation to be undisturbed with no damages incurred through construction period.
-  Dryland grass see detail 2/503.1  
Apply to all disturbed areas, sow on 100mm depth site or imported topsoil. All grass areas not to exceed 1:3 slope. 1:4 slope is preferred.
-  Concrete Slab
-  DGS20 sub base gravel at 75mm thickness
-  Concrete footpath
-  7mm single coat seal
-  Mulched shrub bed. 200mm imported topsoil on cultivated subgrade. 75mm depth mulch

#### PROPOSED TREES

Code	Plant Species	TOTAL	Minimum Stock Size	As shown Rate
Ep	Eucalyptus polyanthemos	35	200mm SR	As shown
Ec	Eucalyptus cinerea	31	200mm SR	As shown

#### PROPOSED BERM NATIVE SHRUBS

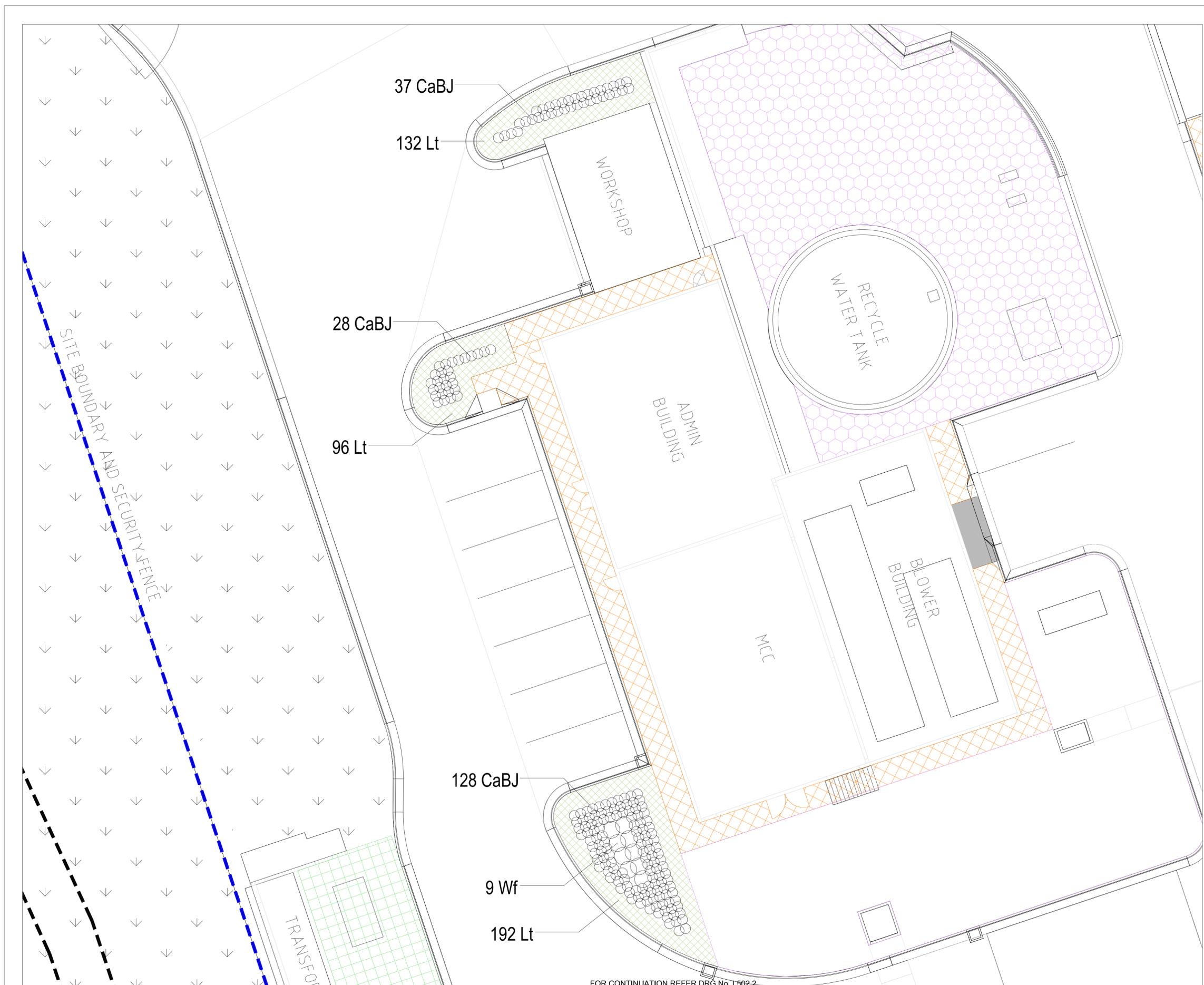
Plant Species	TOTAL	Minimum Stock Size	As shown Rate
<b>Ca</b> Callistemon linearis Narrow Leaved Bottlebrush	42	200mm pots	800mm cc
<b>Wf</b> Westringia fruticosa Coastal Rosemary	242	200mm pots	500mm cc
<b>Gs</b> Grevillea sericea Silk Spider Flower	667	200mm pots	500mm cc
<b>CaKf</b> Callistemon Kings Park Special	100	200mm pots	500mm cc
	401	tube	TBC

#### INTERNAL SHRUB BED NATIVE SHRUBS

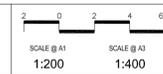
Plant Species	TOTAL	Minimum Stock Size	As shown Rate
<b>CaBJ</b> Callistemon 'Better John' Bottlebrush	193	140mm pots	400mm cc
<b>Lt</b> Lomandra tanika Lomandra	420	140mm pots	6 per m <sup>2</sup>
<b>Wf</b> Westringia fruticosa Coastal Rosemary	9	140mm pots	1m cc

- Notes:
- Plant berm native species in groups of 3-7 with like species grouped together.
  - Any disturbance caused to existing grassed areas throughout the construction works is to be remediated to the standard of QCC Place Management.
  - All weed species to be removed from site. Woody weeds\* must not be mulched and spread on site.

**GENERAL NOTE:**  
ENSURE ALL PLANTINGS ADJACENT ROAD ARE PLANTED CC MATURE WIDTH OF PLANT + 0.5m SETBACK.



FOR CONTINUATION REFER DRG No. L502.2

	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>ISSUE</th> <th>REASON FOR ISSUE</th> <th>DATE</th> <th>DESIGN</th> <th>DRAWN</th> <th>CHECKED</th> <th>APPROVED FOR ISSUE</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>FOR DA APPROVAL</td> <td>16.09.13</td> <td>BC</td> <td>GM</td> <td>JE</td> <td>JE</td> </tr> <tr> <td>B</td> <td>FOR DA APPROVAL</td> <td>06.11.13</td> <td>PG</td> <td>PG</td> <td>JE</td> <td>JE</td> </tr> <tr> <td>C</td> <td>FOR DA APPROVAL</td> <td>20.05.14</td> <td>BC</td> <td>BC</td> <td>JE</td> <td>JE</td> </tr> <tr> <td>D</td> <td>FOR DA APPROVAL</td> <td>26.06.14</td> <td>BC</td> <td>BC</td> <td>JE</td> <td>JE</td> </tr> <tr> <td>E</td> <td>FOR DA APPROVAL</td> <td>26.11.15</td> <td>BC</td> <td>IM</td> <td>IM</td> <td>JE</td> </tr> <tr> <td>F</td> <td>FOR DA APPROVAL</td> <td>14.12.15</td> <td>BC</td> <td>IM</td> <td>IM</td> <td>JE</td> </tr> </tbody> </table>	ISSUE	REASON FOR ISSUE	DATE	DESIGN	DRAWN	CHECKED	APPROVED FOR ISSUE	A	FOR DA APPROVAL	16.09.13	BC	GM	JE	JE	B	FOR DA APPROVAL	06.11.13	PG	PG	JE	JE	C	FOR DA APPROVAL	20.05.14	BC	BC	JE	JE	D	FOR DA APPROVAL	26.06.14	BC	BC	JE	JE	E	FOR DA APPROVAL	26.11.15	BC	IM	IM	JE	F	FOR DA APPROVAL	14.12.15	BC	IM	IM	JE	<p><b>DRAWING STATUS</b> Warning unless there is an authorised JEA signature in the approved for issue column, this drawing is not approved for issue.</p> <p><b>COPYRIGHT</b> This drawing remains the property of J Easthope and Associates Pty Ltd. It may be used for the purpose for which it was commissioned &amp; in accordance with the terms of engagement for that commission. Unauthorised use of the drawing is prohibited.</p>	<p><b>DEVELOPER</b> </p>	<p><b>CONSULTANTS</b> </p>	<p><b>CLIENTS</b> </p>	<p><b>TITLE</b> LANDSCAPE PLANS</p>	<p><b>PROJECT</b> GOOGONG WATER RECYCLING PLANT</p>	<p><b>DRAWING</b> LANDSCAPE PLAN SHEET 2</p>	
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<p>PROJECT No J14/1047</p>	<p>DRAWING No L502.2</p>	<p>ISSUE DA</p>	<p>REVISION F</p>																																																							

**1 TYPE 'S' SOIL SPECIFICATION AND SUBGRADE PREPARATION**

Type 'S' Amended Growing Medium for backfilling holes and virocell mass planting on mounds with no provision for sub-soil drainage.  
 Specifications: Type 'B' topsoil amended with 50% aged pine bark fines by volume meeting the following Specification.

**Type 'B' Topsoil Specifications:**

AS Sieve Size (mm)	% Passing by Mass	USGASieve Size (mm)	% Retained By Mass
2.36	100	>2.0	0
1.18	95-100	1.0-2.0	0-10
0.600	75-100	0.106-1.0	55-70
0.300	55-85	<0.106	30-45
0.150	38-55	(with clay<200)	2-15
0.075	25-35		
0.002	2-15		

- (1) Materials should consist of aged bark derived from either Pinus radiata or Pinus patula or from green waste recycling.
- (2) Material should be supplied aged (greater than six months) composted and free from contaminating materials such as soil and pine needles.  
The Contractor will be required to provide a Certificate from the supplier as to these characteristics.
- (3) Wood content should be less than 10%.
- (4) pH should be between 4 and 7.
- (5) Total dissolved salts should not exceed 600 ppm.

Particle Size (mm) % Retained By Mass  
 Greater than 5.00 0%  
 2.0-5.0 Between 30% - 60%  
 0.5 - 2.0 Between 30% - 55% with not less than 20% in the 1.0-2.0mm range  
 0.1-0.5 not to exceed 20%  
 Less than 0.1 not to exceed 5%

**Subgrade Preparation**

Prepare subgrades prior to the spreading of topsoil as specified below. Spray existing weeds with herbicide Glyphosate in any of its registered formulations at the maximum rate specified on the label for the control of weed(s) two weeks before cultivation. Where specified, any materials that are to be incorporated into the insitu soil shall be applied at this stage of soil preparation. Gypsum, if specified or detailed shall be applied to the ripped surface without further disturbance or cultivation. Areas to be ripped shall not be worked when subsoil is wet or plastic.  
 Allow for clearing and removing stones exceeding 25mm and any rubbish brought to the surface during cultivation.  
 Trim surfaces to specified shape after cultivation.  
 (i) Areas to be Grassed / Seeded  
 Rip subgrade to a depth of 100mm across the direction of slope and then cultivate areas to be grassed so that the surface soil can be worked freely to a minimum depth of 50mm.  
 Remove perennial weeds, rocks and rubbish from surface after cultivation.

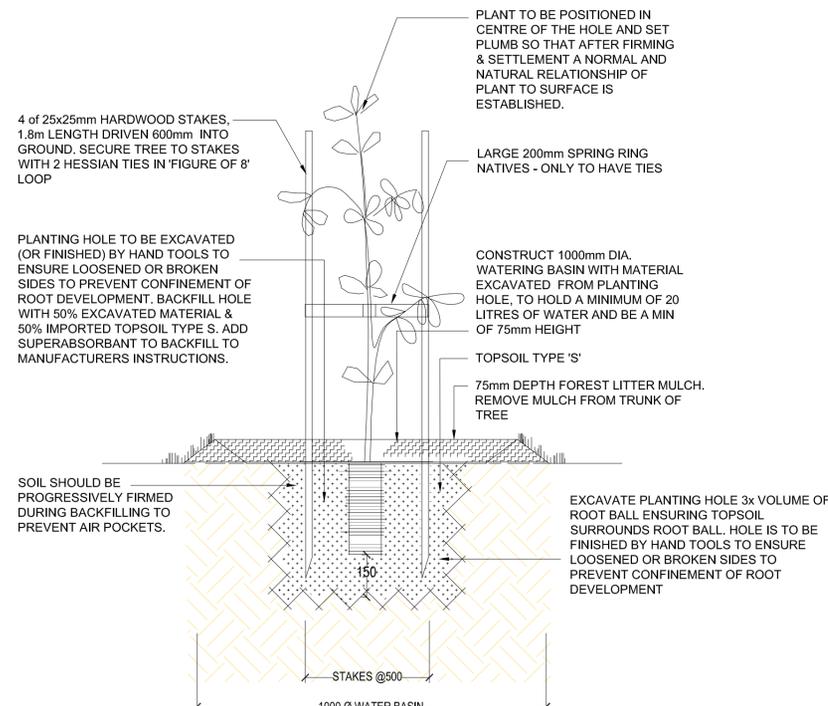
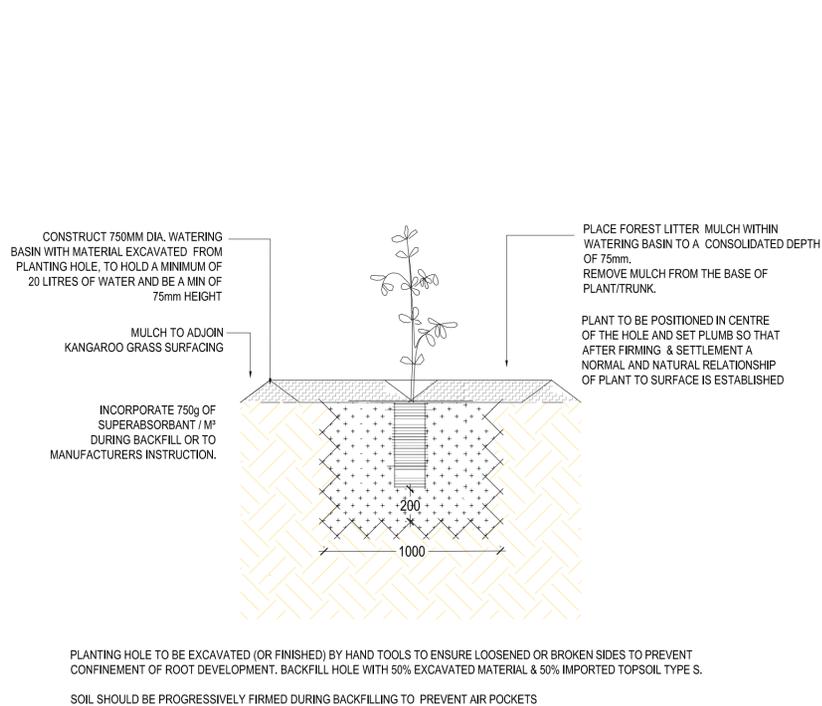
**2 DRYLAND GRASSING AND VERGE GRASSING**

DRYLAND GRASSING - REFER TO SURFACE AND SETOUT & GRADING DRAWINGS - SHEETS L502.1-502.2

DRYLAND GRASS SPECIFICATION  
 DRYLAND GRASS MIX (kg/ha):

SUMMER (SEPT. TO FEB.)		WINTER (MARCH TO AUGUST)	
TALL FESCUE	140	TALL FESCUE	140
PERENNIAL RYE GRASS	50	PERENNIAL RYE GRASS	50
CREeping RED FESCUE	40	CREeping RED FESCUE	40
WHITE CLOVER	20	WHITE CLOVER	20
COUCH GRASS HULLED	30		
TOTAL	280	TOTAL	250

ALL AREAS DISTURBED AS PART OF ENTRY AND DRAINAGE WORKS TO BE REGRASSED.  
 EROSION AND SEDIMENT CONTROL FENCES AND MEASURES TO BE IN PLACE IN THROUGHOUT GRASS ESTABLISHMENT PERIOD.



**3 SHRUB PLANTING - 200mm POT**  
 SCALE - 1:30@A3 1:15@A1

**4 NATIVE TREE ON MOUNDS**  
 SCALE 1:30 @ A3 1:15 @ A1

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TITLE  
**LANDSCAPE PLANS**

PROJECT  
**GOOGONG WATER RECYCLING PLANT**

DRAWING  
**LANDSCAPE DETAILS SHEET 13**

SCALE : AS SHOWN  
 PROJECT No J14/1047  
 DRAWING No L503.1  
 ISSUE DA  
 REVISION F

## Appendix 2

### Example lighting



**Plate 1 Example of lighting pole type - VicPole and Dulux charcoal colour 32999.**