ROOKWOOD NECROPOLIS TRUST

LANDSCAPE MASTERPLAN

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VERSION	DATE	PREPARED BY	COMMENTS
1	25/8/14	FJ	FINAL DRAFT FOR COMMENTS
2	28/1/15	FJ	FINAL REPORT

CONTENTS

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

As a suburb in its own right, Rookwood Necropolis is perched on ridges 15kms west of the Sydney CBD. At 288Ha, it is the largest cemetery in the Southern Hemisphere and one of the largest in the world.

It is also one of the most significant having provided a resting place to the multi-cultural population of Sydney since 1867. The oldest section of the cemetery is listed on the NSW State Heritage Register, while the entire cemetery is listed as a heritage item on the Auburn Local Environment Plan. It is the repository of a range of funerary monuments and landscapes, each representing a religious group or cultural landscape. This uniqueness and history should be cherished.

Whilst it enjoys views onto Homebush Olympic Park, the Blue Mountains and the CBD, its most scenic qualities reside within. Rookwood Necropolis is characterised by undulating hills, historic monuments, canals and structures, large and rare significant trees and Endangered Ecological Communities.

The land presents many constraints including, to name a few:

- State Heritage Register (SHR) listing
- Heritage and Archaeological Planning Control
- Historic layout, roads, canals and buildings which extend beyond the SHR
- Significant landmarks (structures as well as vegetation)
- A management history spanning over nearly 150 years and multiple denominational Trusts which led to…
  - A complex and confusing road system
  - Traffic congestions
  - Inconsistent visual presentation and landscape detailing
- Threatened Ecological Communities and species which established in the last 30 years
- Limited space for burial (less than 30 years left)

This led to the overall cemetery developing as a patchwork of funerary cultural landscapes, each with its own historic or modern character.

As highlighted in the Plan of Management (PoM 2014), Rookwood Necropolis is recognised a historically significant and valuable Open Space for the community of Sydney. As such it requires a Landscape Masterplan which provides a sense of direction towards:

- An improved sense of consistency, beautification and enhancement of the cultural landscape.
- A better provision of recreational activities.
- A sustainable environment including lengthening the life of the cemetery.

Above all, following the recent amalgamation of the previous seven Trusts into two, the site must be considered as a “whole” – a single unified cemetery, whilst respecting its historical, cultural and ecological significance.

The recommendations can be summarised as follows:

- Beautification/ Consistency
  - Improve the site presentation internally and externally (fence, entrances, planting, views)
  - Take advantage of the multitude of heritage features and incorporate into sensitive, creative and respectful designs whilst providing interment options within.
  - Strengthen the various planting characters.
  - Adopt guidelines for the sake of consistency on monument infill, architecture, landscape plantings and maintenance.
- Recreational Activities
  - Set aside some land for recreational paths and provide a network of path throughout accessing an array of points of interest (buffer zones, landmarks, ecology, former railway, canals, views…).
  - Provide social hubs (including at Mortuary 1 Station in the historic section).
  - Implement a tourism strategy including self-guided walks, museums, art galleries and merchandising.
  - Negotiate boardwalks in the Conservation areas.
  - Provide interpretation at key destinations (ecology, railway stations, former building ruins...) whilst considering digital technology.

- Sustainability
  - Bury and memorialise into identified unused areas.
  - Implement steps towards removing flood and groundwater constraints for further land release for burial.
  - Negotiate further land release of ecological areas through PMP or, if not flexible enough, through Bio-banking.
  - Undertake archaeological investigations in key locations and implement designs in the view to incorporate interments within.
  - Rationalise buildings and workshops.
  - Create 2 administrative hubs (RGCRT and CMCT) in separate locations.
  - Intensify burial using redundant roads, infill, revoking and (limited) renewable tenure.
  - Lobby for legislation changes towards a shortening of perpetuity tenure, grave re-use and renewal.
  - Intensify ash interments, including in heritage areas, along canals etc.
  - Consider environmentally sustainable work practices relating to water management, including minimising irrigation.
  - Re-use grave spoil onsite, in particular in buffer zones as part of the landscaping.
  - Improve green waste collection and re-use composted material onsite.
  - Encourage lawn graves and minimise use of stone on graves.
  - Consider possible impacts of climate change.

In summary, the Landscape Masterplan proposals aim at providing:

- Strategic directions which relate to the key PoM's strategies.
- A clear long-term Vision.
- A thorough response to complex and wide-ranging issues, articulated around the above key objectives of the LMP.
- An inspirational look at "what could be" under current or future legislation.

The Vision for the site can be encapsulated in these few words, "*Rookwood will remain a cemetery for as long as possible, as an example of sustainable management. When the time of the last interment comes, the cemetery will be left to the community as a park and public facility of high quality.*"

In order to achieve the vision, Rookwood needs to set itself as:

- A world leading example, not just by its size but its diversity of landscape, cultural and built elements and how it manages them all.
- A green haven for the public and mourners to enjoy.
- A protective yet interactive environment for some ecology to flourish.
- A tourism landmark.
- A sustainable burial ground for many generations to come.

(Image coutesy of SAG & Friends of Rookwood)

BACKGROUND

BACKGROUND

OVERVIEW

On 2nd April 2012 the Minister for Primary Industries announced a new structure for Rookwood Necropolis as part of the cemetery reform in NSW. A new streamlined "two-trust" management structure, overseen by the Rookwood Necropolis Trust (RNT) is now in place.

The two Trusts share the 288Ha site with the Catholic Metropolitan Cemeteries Trust (CMCT) holding approximately 1/3 and the Rookwood General Cemeteries Reserve Trust (RGCRT) holding the remaining 2/3.

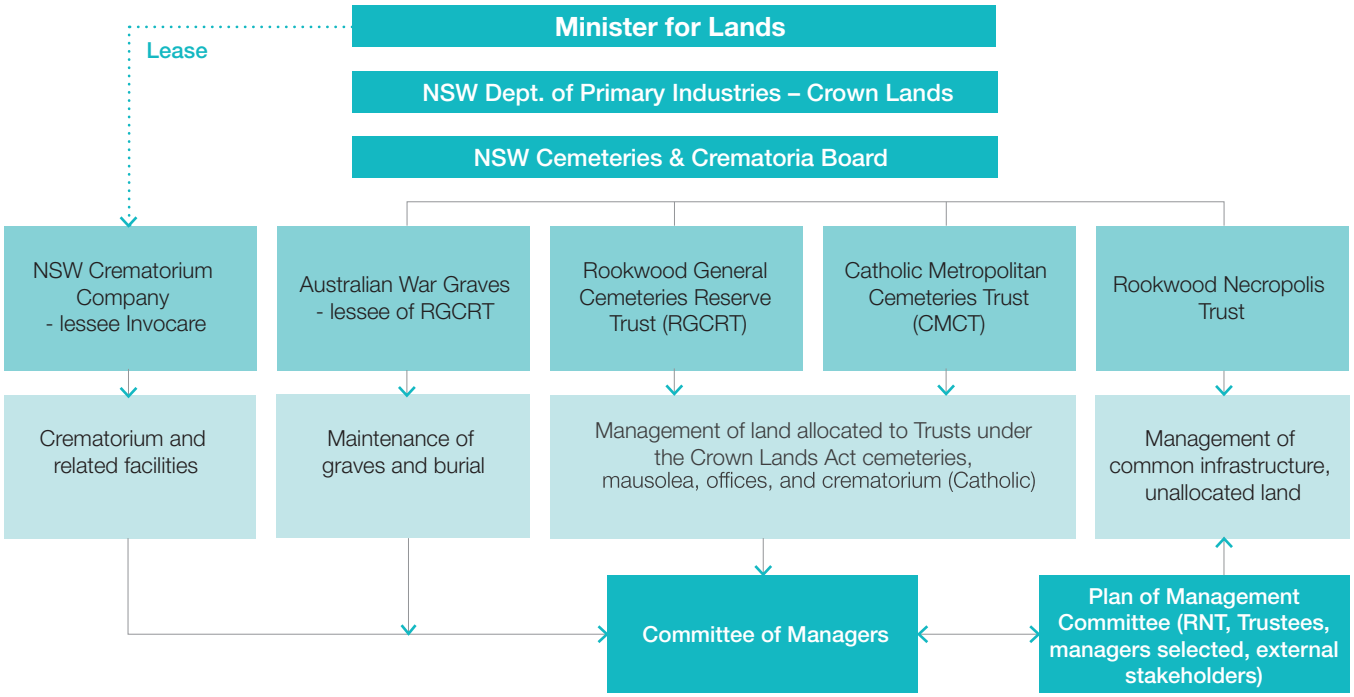
Both Trusts handle a similar number of burial interments per year (approximately 1,200-1,700/year). The CMCT also provides cremation through their crematorium.

The RNT manages unallocated land (Primary roads and buffer zones), services and fences which lay within.

A separate Crematorium (on Crown Land Reserve) is managed and leased by Invocare. Their lease to the RNT expires in 2025.

The Commonwealth War Graves commission manages the NSW Garden of Remembrance and the Sydney War Cemetery, as lessee to the RGCRT.

The governance structure is as below:



SUBJECT SITE

The whole of Rookwood Necropolis shall be addressed. The site is bordered by Railway Street to the North, East Street to the West, Centenary Drive and the Railway line to the East and the railway line to the South.

CONSULTANCY PROCESS

On 27th November 2012 an initial brief for an Expression of Interest was sent to four Landscape consultants, followed by an information Session on 5th December 2012.

A revised brief was sent to the same consultants on 20th December 2012 highlighting a two-phase process:

- Phase 1 – Scope of the consultancy including a Vision for the site, Masterplan and Implementation Plan.
- Phase 2 – Ideas and Opportunities exercise relating to the Vision for Rookwood, its sustainability, Social Equity, Ecological and Historical significance and Infrastructure.

This led to the selection of a consultant team to deliver the Landscape Masterplan for this significant site.

BRIEF

Due to the various interpretations of the word "Masterplan" and the Committee's wish to refine the two briefs to date, a Reverse Brief (Appendix 01 – page 273) was drafted to firm up the process, issues and deliverables for the project so a clearer sense of direction could be had by all involved.

The Reverse brief was formally accepted on 19th March 2014.

KEY OBJECTIVES

The key objectives for the plan are for:

- The **beautification** of the whole site and an increased sense of cohesion and consistency throughout the site.
- An increased provision of **recreational** activities.
- An improved **sustainability** in burial & other practices.

In general the following should be considered:

Best practice/state of the art	A Masterplan which has the potential to serve as a role model worldwide.
Integrated with its surroundings	A site that considers the established neighbouring landscapes and makes use of the "borrowed" landscape beyond its boundaries.
Attractive and inviting	A site which welcomes visitors and takes pride in its appearance.
Recreation	A plan which encourages community recreation and any interest and attachment to the site.
Sustainability	A plan which is environmentally sensitive by limiting its environmental impact, be low maintenance and low running costs.
Accessibility	A plan which considers accessibility by all, DDA compliance, and improved experience by all sectors of the community especially the elderly.
Quality	Provide a high quality experience and memories which generates pride for the users and managers.
Promotion	Create a unique and inspiring site which provides quality amenities in line with the Necropolis' objectives as world leader.
Land use	Maximise the site's yield potential through creativity and rationalisation to ensure that the Necropolis continues to provide for cremation, interment and memorialisation for as long as possible.

PROJECT CONTROL

The project was overseen by the **Project Steering Group (PSG)** which comprises of:

- David Harley – Chair
- Peter O'Meara and John Richardson (CMCT)
- Fiona Heslop (RGCRT)
- Ian McIntosh, Lisa Elliott (RNT)

Throughout the project the consultant met for **Project Meetings (PM)** on a regular basis. The following persons attended and steered these meetings:

- Ian McIntosh – Chair
- John Richardson (CMCT)
- Fiona Heslop (RGCRT)
- Relevant consultants (as required)
- Mark Bundy & Natalie Gane (RGCRT) (on occasion)

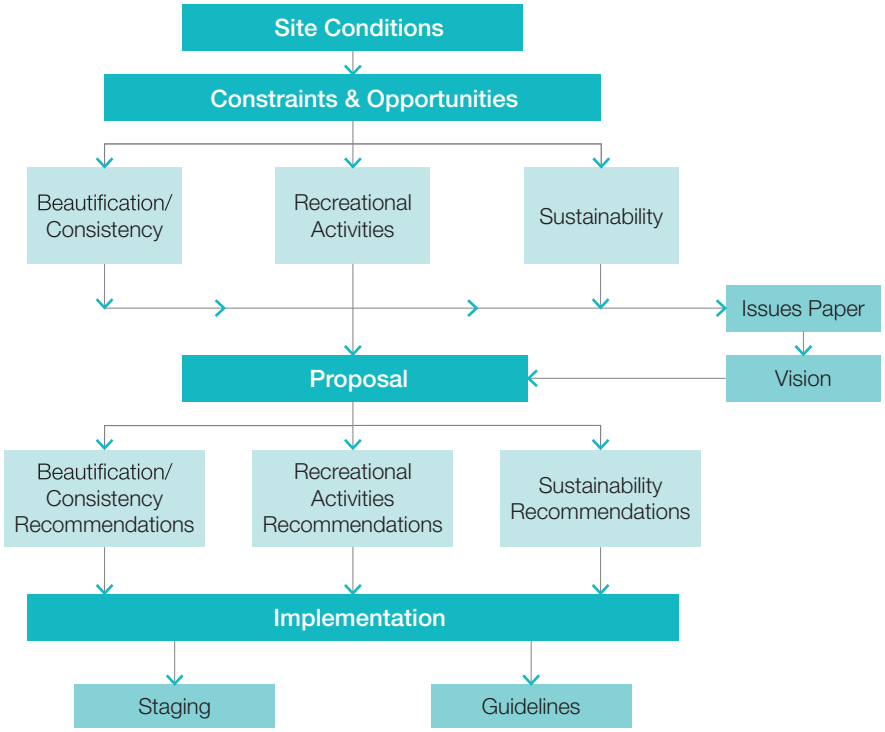
METHODOLOGY

The methodology followed the logic of the thinking process and decision making:

- Familiarisation: The site has been the subject of many investigations and reports in the last 20 years, some relating to stormwater, archaeology, buildings, visual assessment and ecology to name a few. These report were read and key issues noted.
- Analysis: The analysis task is complex and extensive. It has therefore been tackled in "layers", one issue at the time. Each topic (more than 30 overall) identifies the set of issues as well as the Constraints and Opportunities pertaining to it.
- Issues Paper: All issues raised are summarised into an Issues paper which in turn informs the Vision for the site.
- Vision: A clear vision for the site was formulated, building on the Plan of Management's vision.
- Proposals: All Constraints and Opportunities raised in the Analysis result in a set of recommendations for each topic (views, vegetation, buildings, signage etc.). These recommendations are targeted and structured to respond to the 3 specific objectives of the Masterplan, as defined in the brief.
- Implementation: All recommendations are prioritised into logical steps for implementation. A number of guidelines setting out the principles for the next step of implementation are also formulated for reference.

HOW TO USE THE REPORT

The report has been structured so to provide a comprehensive set of information for Management and future consultants to use.



The analysis covers a number of landscape related topics (ie. Views, Planted Avenues, Signage, Buildings, Traffic) which may be of particular concern to Management, and presents the facts and the issues related to them. It also begins to explore possible solutions and the issues related to them.

The proposals are structured to respond to the key 3 objectives of the Masterplan, enabling the implementation items to also be aligned with them. The recommended items can then be selectively implemented based on bilateral support and priorities at the time.

For ease of reference, the recommendations are therefore formulated individually and by themes, thus providing a user-friendly and flexible management tool.

Each recommendation is numbered in order of appearance in the report.

ANALYSIS

(Image coutesy of SAG & Friends of Rookwood)

ANALYSIS

GENERAL

A number of reports were supplied for review and consideration.

It is fair to say that the site had been the subject of intensive recording of existing conditions especially with regards to its former and current buildings, its stormwater canals and its visual amenities.

Building up on the extensive work carried out in the Plan of Management, Ecology reports and the Visual Significance Assessment Report, this report endorses aspects of these reports whilst extending the analysis to areas not covered by existing documents but deemed essential to the production of a Landscape Masterplan.

As the majority of these reports were carried out in isolation, by specialist consultants concentrating on their own disciplines, the Masterplan process aims at consolidating all relevant information and understanding how they affect one another.

List of Reports Supplied:

- *Rookwood Necropolis – Draft Plan of Management*, February 2012 (updated March 2014)
- *Rookwood Necropolis – Management Unit Policies*, November 2011 (updated March 2014)
- *Chair's Introduction*, February 2013 (updated March 2014)
- *Bushland Plan of Management for Rookwood Necropolis*, NPWS Issue, 31 October 2003
- Rookwood Visual Significance Study – Parts 1-7, August 2010
- *Trial Fire Monitoring Program*, January 2013
- *Biodiversity Studies, Flora and Fauna Investigations for Native Bushland at Rookwood Necropolis*, April 2013
- *Drainage Investigation Canals 10a and 10b*, Rookwood, November 1996
- *Haslam's Creek Flood Study* by Auburn Municipal Council, 1989
- *Rookwood Necropolis, Report on the Canals, Ponds, Bridges and Selected Drains*, December 2010
- *Aboriginal Archaeological Potential Desktop Assessment*, June 2010
- *Report on Buildings and Structures at Rookwood Necropolis*, January 2011
- *Archaeological Appraisal of Sites of Former Buildings and Abandoned and Derelict Buildings, Ruins and Structures*, April 1996
- *Tree Assessment Reports for Boundary on Railway Crescent & East Street Lidcombe*, December 2012
- *Tree Assessment Reports for Corner Haslem Drive & Weekes Avenue*, December 2012
- *Tree Management Study,* June 1989
- *Signage Policies*, 1991 & 2006
- *Road Hierarchy Report*, March 1996
- *Road Hierarchy Report*, August 2010
- *Primary Roads Audit Report*, March 2012
- *Secondary Roads Audit Report*, December 2011
- *Traffic Issues, Strathfield Gates*, July 2010
- *Groundwater Review and Contamination Issues, Rookwood Necropolis* by Woodward-Clyde, 1995

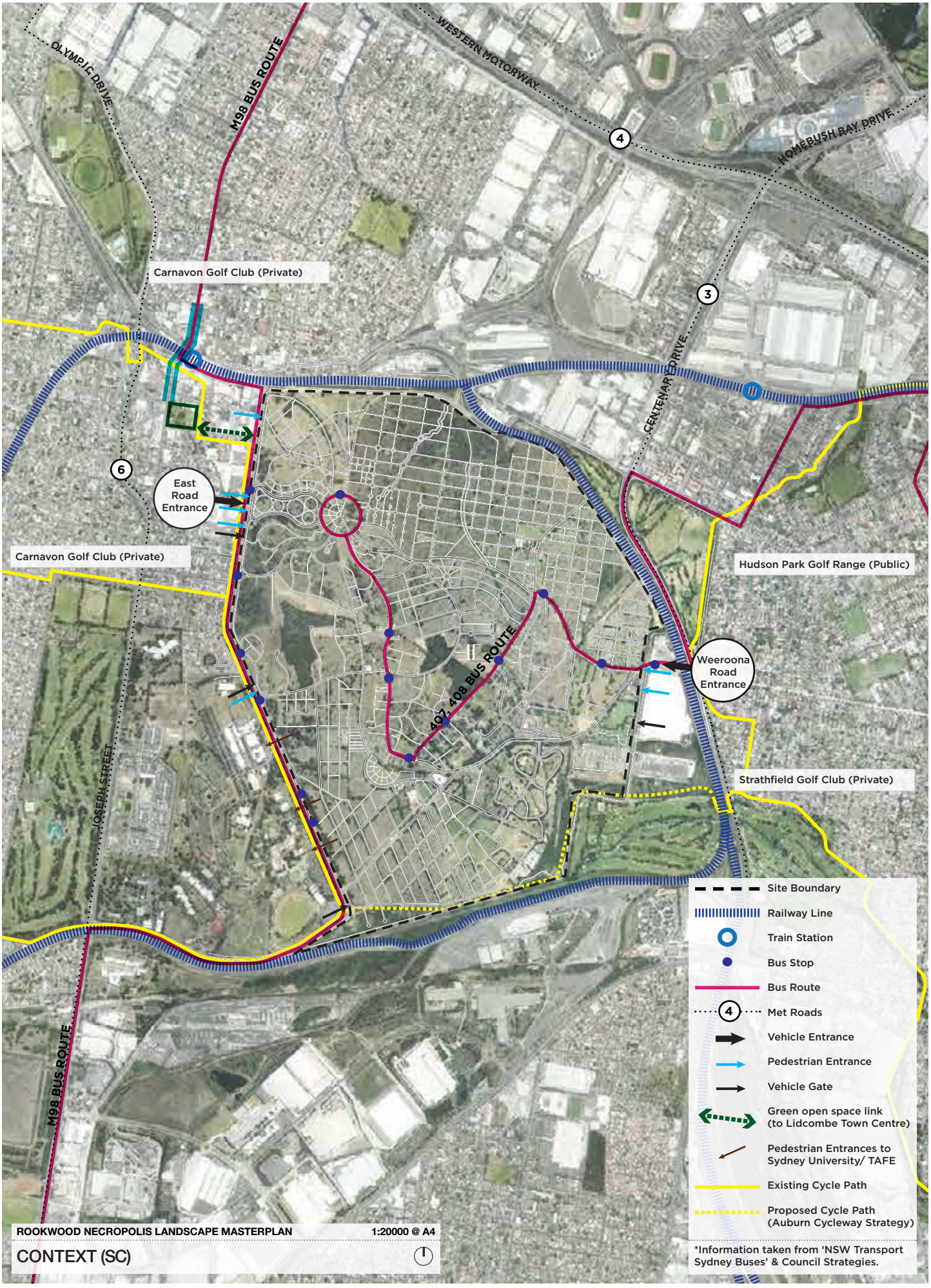
Together with the following records:

- Information plans on Electrical, Water, Gas, Sewerage and Telstra (hand-drawn, 2008)
- Proposed Primary, Secondary and Tertiary Roads Typical Sections

SITE ANALYSIS MAPS

Due to the complexities of the site, the analysis was carried out by "subjects", steadily building up the layers of information. For each subject, the analysis considered:

- The existing site conditions (SC maps) (sometime derived from previous reports, sometimes challenged and modified, sometimes based on new assessment).
- The potential (opportunities) and the restrictions (constraints) (C&O maps) emanating from the observations of the existing conditions.
- How they relate to the three key objectives of the Masterplan.
  - The beautification of the whole site and an increased sense of cohesion and consistency throughout the site
  - An increased interaction with the wider public (other than mourners)
  - Lengthening of the life of the cemetery


OLYMPIC DRIVE
M98 BUS ROUTE
WESTERN MOTORWAY
4
HOMEBUSH BAY DRIVE
Carnavon Golf Club (Private)
3
CENTENARY DRIVE
6
East Road Entrance
Carnavon Golf Club (Private)
Hudson Park Golf Range (Public)
Weeroona Road Entrance
407, 408 BUS ROUTE
JOSEPH STREET
Strathfield Golf Club (Private)
M98 BUS ROUTE
Site Boundary
Railway Line
Train Station
Bus Stop
Bus Route
Met Roads
Vehicle Entrance
Pedestrian Entrance
Vehicle Gate
Green open space link (to Lidcombe Town Centre)
Pedestrian Entrances to Sydney University/ TAFE
Existing Cycle Path
Proposed Cycle Path (Auburn Cycleway Strategy)
*Information taken from 'NSW Transport Sydney Buses' & Council Strategies.
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN
1:20000 @ A4
CONTEXT (SC)

ANALYSIS:
CONTEXT

Site Conditions

As a suburb in its own right, Rookwood is located between Lidcombe, Strathfield and Greenacre, 15kms west of the Sydney CBD. It is perched on ridges that form a watershed to Homebush Bay wetlands and Cook's River.

Access

- Bus: Based on the information available from NSW Transport Sydney Buses, the site is serviced by the M98 bus route along East Street and 407 & 408 bus routes which enters and exits the site through the same gate off Centenary Road. According to management, this bus route receives good patronage.
- Railway: The site is bordered to the East and South by freight rail lines and to the North by a commuter line.
- Roads: The site is in close proximity to three main roads (6-Rookwood Road/ Joseph Street/ Olympic Drive, 4-Western Motorway and 3-Centenary Drive).
- Bicycle: The Auburn Cycleway Strategy highlights the potential for a connection between the Bay to Bay bike trail and East Street.
- Vehicles: The site has 2 entry points. The Weeroona Road entrance is more heavily used (by 50%) than East Street. Traffic monitoring in 2013 indicates:
  - An average of 41,800 entries per month (or 1,390/ day) at the East Street entrance and,
  - 61,600 entries per month (or 2,050/ day) at the Weeroona Road entrance.

  The CMCT are considering a proposal for a new entry gate & statement where East Street & Sheehy Avenue intersect (refer to Traffic Analysis – page 91).
- Pedestrians: A number of pedestrian gates exist around the site. Their use is not monitored.

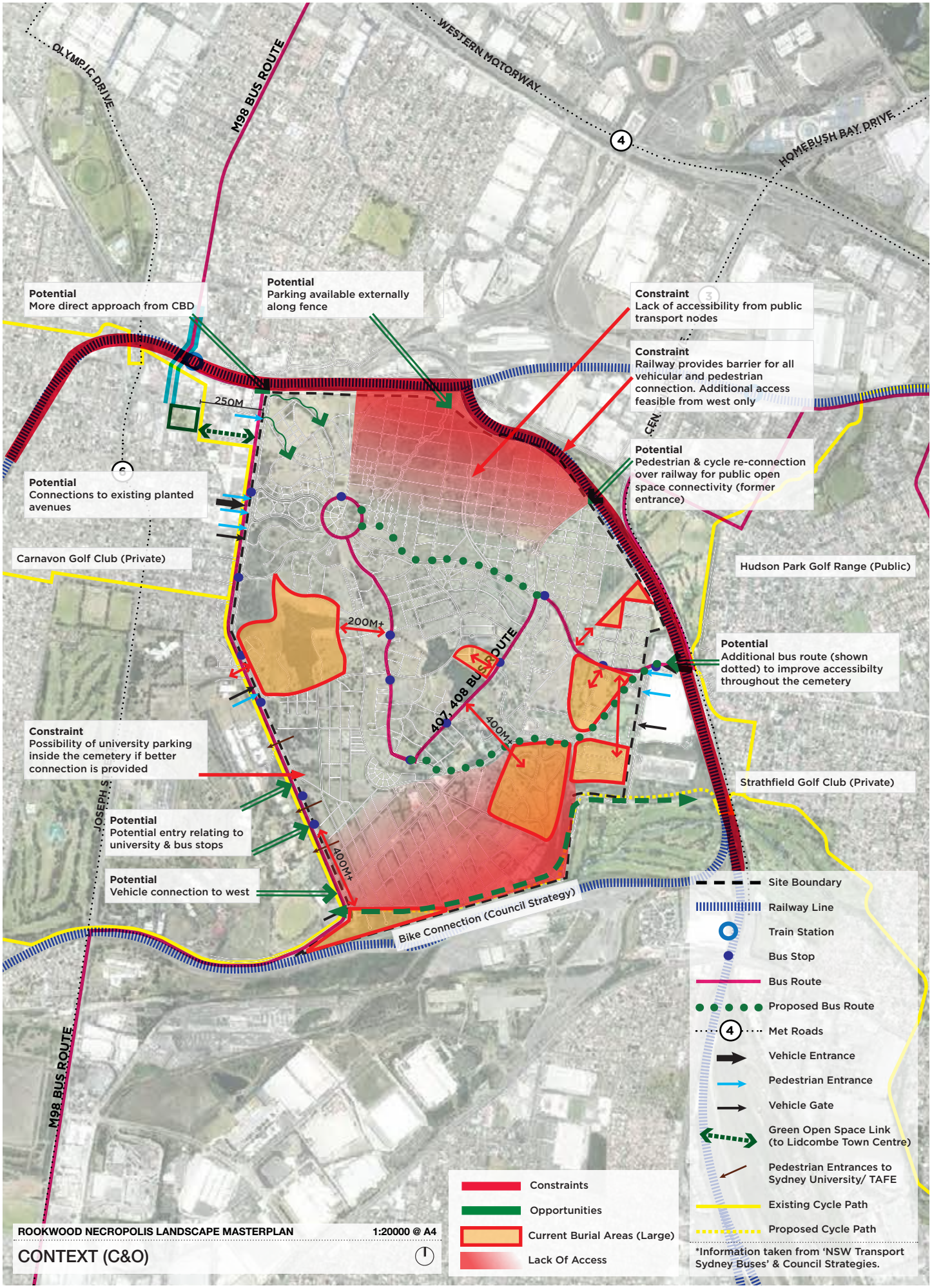
CONTEXT:

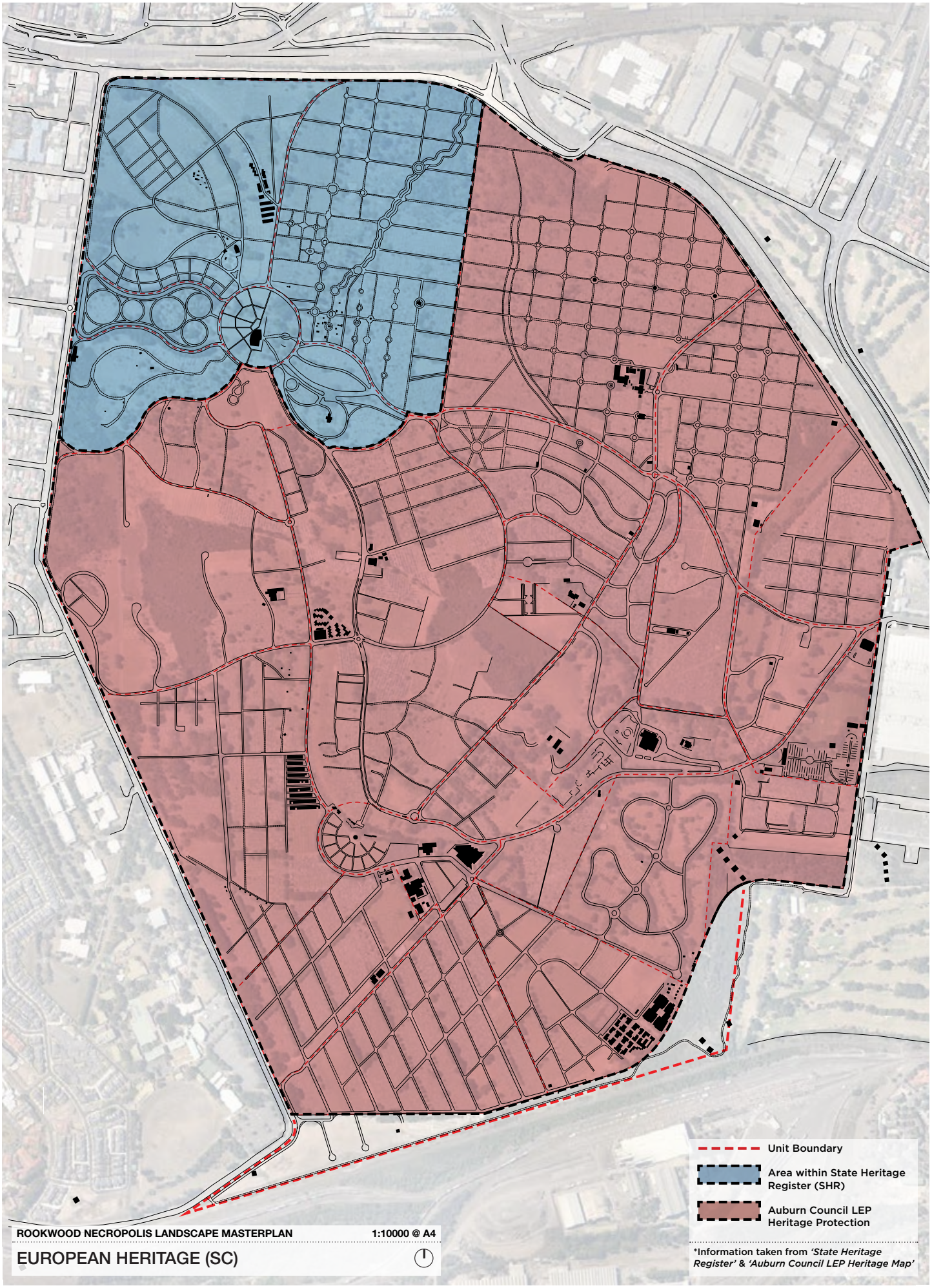
Issues

- Good connections by roads, public transport and green corridors are important to the sustainability of the cemetery.
- Pedestrian and vehicular entrances are an essential part of the cemetery's operations and presentation/ approachability.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency		
Recreational Activities	Railway along Centenary Drive creates a barrier for vehicular & pedestrian connection – additional site access feasible from west only Lack of accessibility from public transport nodes: • Units 3 & 4 (north) • Units 18, 19 & 24 Stronger pedestrian connection risks university parking inside the cemetery Any bus route changes need to be negotiated and be made within the timetable restrictions imposed by bus companies Bus times limited to 9:00am - 3:30pm.	Potential for pedestrian access to the site to better relate to neighbouring uses and public transport connections Potential for public transport connections to better relate to current burial areas Potential: • New pedestrian entrances & signage along Railway & East Street correlating to university, bus stops & cycle routes • Additional & external roadside parking on Railway Street • New entry gate & statement (corner of East Street & Sheehy Avenue) for cemetery connection to the west • Pedestrian & cycle re-connection over railway for public open space connectivity from Hudson Park Golf Range (former Hawthorne Avenue entrance) • Proposed Cycle route along southern boundary • Connection to Lidcombe Town Centre & Remembrance Park (Joseph & John Street) 250m • Additional bus route to create a circle route throughout cemetery along Primary roads (+Memorial Avenue & Necropolis Drive)
Sustainability		


OLYMPIC DRIVE
M98 BUS ROUTE
WESTERN MOTORWAY
4
HOMEBUSH BAY DRIVE
Potential
More direct approach from CBD
Potential
Parking available externally along fence
Constraint
Lack of accessibility from public transport nodes
Constraint
Railway provides barrier for all vehicular and pedestrian connection. Additional access feasible from west only
CEN.
250M
Potential
Pedestrian & cycle re-connection over railway for public open space connectivity (former entrance)
6
Potential
Connections to existing planted avenues
Carnavon Golf Club (Private)
Hudson Park Golf Range (Public)
200M+
407, 408 BUS ROUTE
400M+
Potential
Additional bus route (shown dotted) to improve accessibilty throughout the cemetery
Constraint
Possibility of university parking inside the cemetery if better connection is provided
Strathfield Golf Club (Private)
ST JOSEPH'S
Potential
Potential entry relating to university & bus stops
400M+
Potential
Vehicle connection to west
Bike Connection (Council Strategy)
M98 BUS ROUTE
Site Boundary
Railway Line
Train Station
Bus Stop
Bus Route
Proposed Bus Route
4
Met Roads
Vehicle Entrance
Pedestrian Entrance
Vehicle Gate
Green Open Space Link (to Lidcombe Town Centre)
Pedestrian Entrances to Sydney University/ TAFE
Existing Cycle Path
Proposed Cycle Path
*Information taken from 'NSW Transport Sydney Buses' & Council Strategies.
Constraints
Opportunities
Current Burial Areas (Large)
Lack Of Access
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN
1:20000 @ A4
CONTEXT (C&O)


Unit Boundary
Area within State Heritage Register (SHR)
Auburn Council LEP Heritage Protection
*Information taken from 'State Heritage Register' & 'Auburn Council LEP Heritage Map'
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN
1:10000 @ A4
EUROPEAN HERITAGE (SC)

ANALYSIS:
EUROPEAN HERITAGE

Heritage Significance

The Statement of Heritage Significance for Rookwood Necropolis contained in the NSW Heritage Inventory form includes the following:

The points are ranked in order of priority:

a. Rookwood Necropolis is one of the largest burial grounds in the world and contains the largest 19th century cemetery in Australia;

b. The scale of design, design features, use of plants, gardenesque layout, high quality and diversity of structures, monuments and details of Rookwood Necropolis represent a rare surviving example of mid-late 19th century ideals for a major public cemetery. The choices of plants in these sections also demonstrate 19th century funerary etiquette and fashion by way of plant symbolism;

c. The views and expertise of a number of prominent individuals are manifest in the historic fabric and design of Rookwood Necropolis;

d. The Necropolis memorials form a set of monumental masonry without parallel in Australia. They include examples that are unique in themselves or display a high degree of technical accomplishment, and others which represent changes in social burial customs since 1867;

e. As a social document and genealogical resource, Rookwood Necropolis is unique in its scale and comprehensiveness. The Necropolis is the burial place of a large number of noteworthy individuals;

f. Rookwood Necropolis is of significance in providing habitats for two rare and endangered plant species: downy wattle (Acacia pubscens)(Status: vulnerable) and the small leaved Dillwynia (D.parvifolia)(Status: vulnerable and uncommon). It also contains an unusual ecotone where a pocket of Sydney sandstone associated vegetation occurs in the midst of predominantly Wianamatta shale associated vegetation.

Heritage Management Framework

As illustrated on Figure European Heritage, the north western corner of the overall Rookwood Cemetery is listed on the NSW State Heritage Register. The entirety of the Cemetery POM Management Units 1-24, is listed as a Heritage Item (archaeology) under the Auburn Local Environmental Plan (Auburn LEP 2010).

Under the Clause 5.10.3 especially 5.10.3(b) of Auburn LEP 2010, development consent is not required for the creation of new graves.

For any development in the SHR listed area (Blue)

- Any development proposals for buildings or non-grave works requires approval from Heritage Office and Auburn Council.
- Any work below ground WITHIN the SHR listed portion of Rookwood, especially where there may be former graves, former buildings or former site works such as the drainage patterns, pathways or railway, may impact on State Significant archaeological relics. All proposals for work below ground should be proceeded by an Archaeological Assessment and discussions with the NSW Heritage Division for potential applications under both s60 of the Heritage Act and the Archaeological Management provisions of the Act. Prior approval must be obtained before any significant archaeological relic is disturbed.

For any development within Rookwood but outside the SHR listed land (Pink).

- Any development proposals for buildings or non grave creation works requires the submission of a Development Application to Auburn Council. This should be accompanied by a Statement of Heritage Impact (SHI)
- Any development for new buildings, site works or graves in the peripheral historic areas near the SHR listed boundary should be informally referred to the Heritage Division for comment and advice before the design work is completed. While the Heritage Act does not formally apply beyond the SHR boundary, the expertise of the Heritage Division may prove useful during the formulation of a project proposal.
- Any work below ground OUTSIDE the SHR listed portion of Rookwood, especially where there may be former graves, former buildings or former site works such as the drainage patterns, pathways or railway, may impact on archaeological relics. All proposals for work below ground should be proceeded by an Archaeological Assessment and discussions with the NSW Heritage Division for potential application under the Archaeological Management provisions of the Act. Prior approval must be obtained before any significant archaeological relic is disturbed.

EUROPEAN HERITAGE:

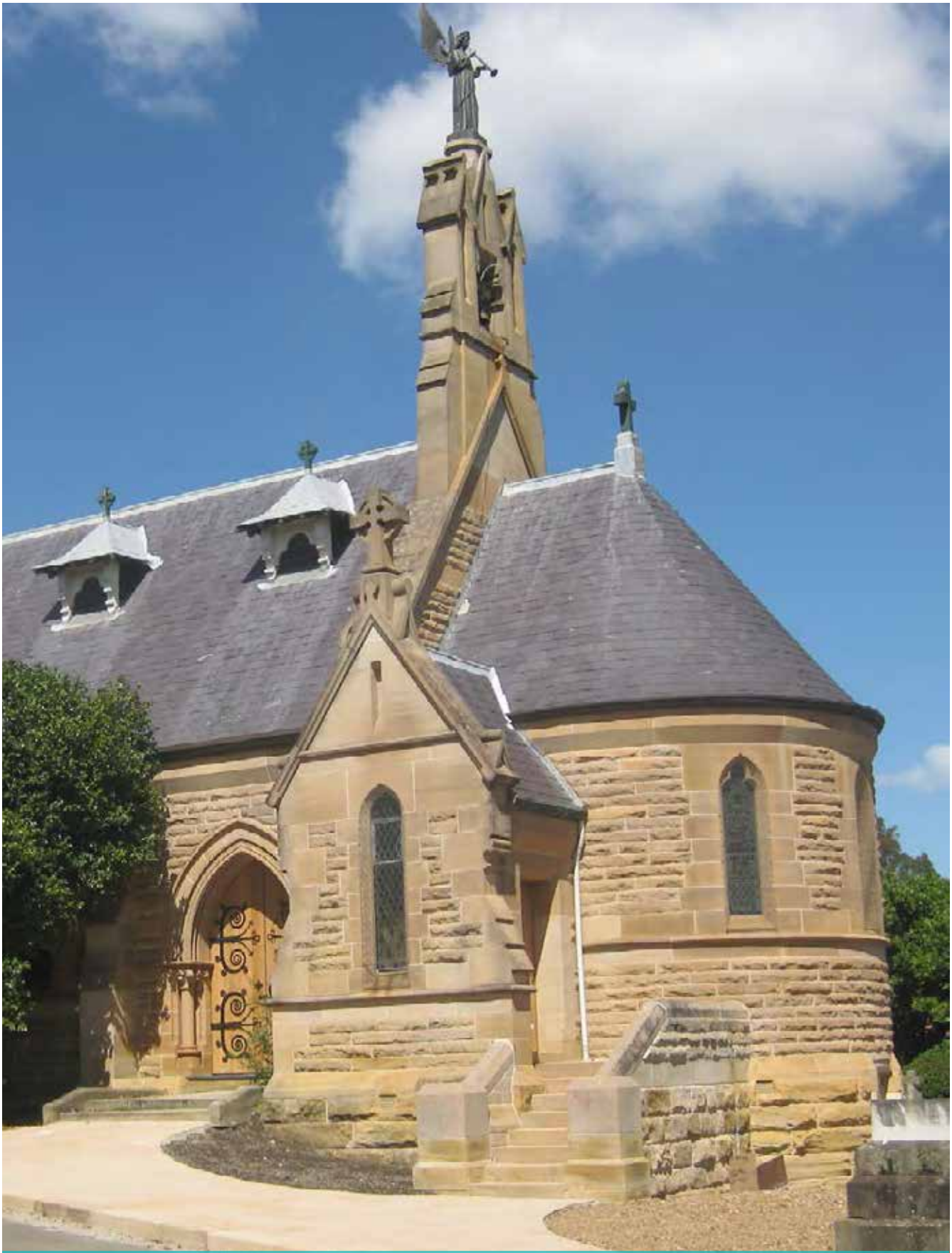
There is no requirement for an application to the NSW Heritage Council for s60 approvals for development projects on land outside the SHR listed land.

Issues

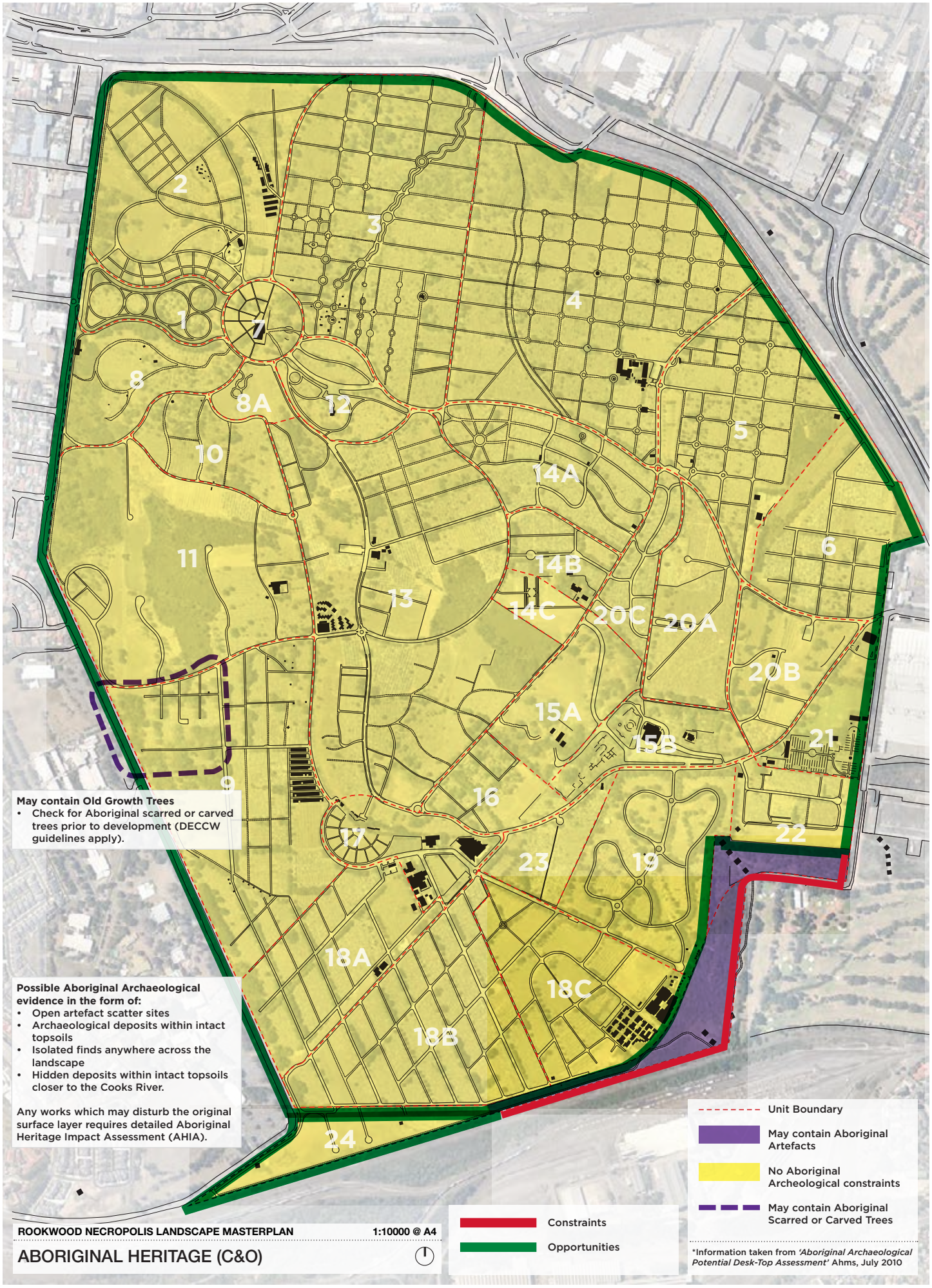
- All of Rookwood (except for Unit 24) is subject to Heritage Protection.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency		
Recreational Activities	Units 1-23 are subject to Heritage protection: • Consent from Heritage Council required in SHR (Blue area) & Statement of Heritage Impact & DA to Council • Consent from Auburn Council required (Pink area) – DA to Council & Statement of Heritage Impact needed	There is no Heritage Protection over Unit 24 Development of new graves is not subject to consent by Council (pink area)
Sustainability		



St Michaels Chapel (Image coutesy of CMCT)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May contain Old Growth Trees
• Check for Aboriginal scarred or carved trees prior to development (DECCW guidelines apply).
Possible Aboriginal Archaeological evidence in the form of:
• Open artefact scatter sites
• Archaeological deposits within intact topsoils
• Isolated finds anywhere across the landscape
• Hidden deposits within intact topsoils closer to the Cooks River.
Any works which may disturb the original surface layer requires detailed Aboriginal Heritage Impact Assessment (AHIA).
Unit Boundary
May contain Aboriginal Artefacts
No Aboriginal Archeological constraints
May contain Aboriginal Scarred or Carved Trees
Constraints
Opportunities
*Information taken from 'Aboriginal Archaeological Potential Desk-Top Assessment' Ahms, July 2010
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN
1:10000 @ A4
ABORIGINAL HERITAGE (C&O)

ANALYSIS:
ABORIGINAL HERITAGE

Site Conditions

Based on the information provided in the "Aboriginal Archaeological Potential Desk-top Assessment" prepared by Archaeological and Heritage Management Solutions Pty Ltd, July 2010, the traditional owners of the Rookwood area were the Wangal people, a Darug language speaking 'clan' group.

Aboriginal occupation of this region dates back well into the Pleistocene period (More than 10,000 years ago).

A search of the DECCW AHIMS database found sixteen (16) sites recorded within a three (3) kilometre radius. All were open camp sites.

Although the topographic information suggests that there is potential for some archaeological artefacts in topsoils and along creek lines, the land-use history of intensive burial (especially in Units 1-23) also suggests that this would have been destroyed, removed or disturbed.

Unit 24 (more recently acquired) was identified in the report as having the potential to contain some artefacts. However, further recent investigations on Lot 10 (representing the western end of Unit 24) identified no aboriginal archaeological constraints and permitted the development of the new Muslim section.

The remainder of Unit 24 has not yet been investigated and, as such, still holds some potential for the presence of artefacts (purple).

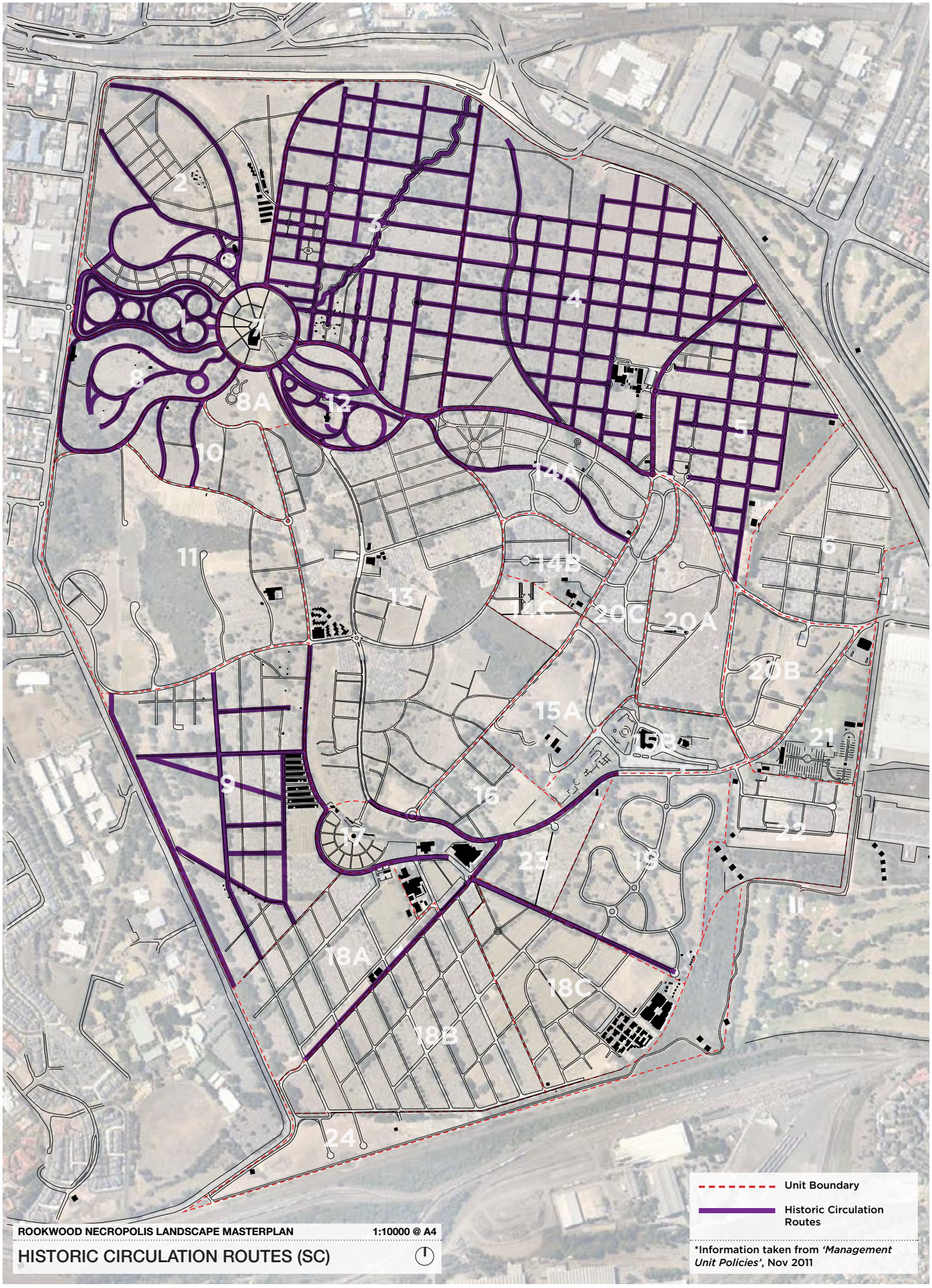
A small treed area within Unit 9 (Dashed purple line) has been identified as having potential to have Aboriginal scarred or carved trees. Further investigation based on the DECCW's "Guidelines for identification of scarred and carved trees" are recommended prior to any development as it is an offence under Section 90 of the National Parks and Wildlife Act 1974 to damage Aboriginal objects without the authorities' consent.

Issues

- Part of Unit 24 requires Aboriginal archaeological investigations prior to development.
- Any scarred or carved trees would require protection.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency		
Recreational Activities	May contain old growth trees. Check for Aboriginal scarred or carved trees prior to development (DECCW guidelines apply): • Unit 9 (top part immediately below Haslem Drive) Possible Aboriginal archaeological evidence: • Conservation areas #6 & #25	Released or previously buried land has no Aboriginal archaeological constraints.
Sustainability		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Unit Boundary
Historic Circulation Routes
*Information taken from 'Management Unit Policies', Nov 2011
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN
1:10000 @ A4
HISTORIC CIRCULATION ROUTES (SC)

ANALYSIS:

HISTORIC CIRCULATION ROUTES

Site Conditions

The Rookwood Visual Significance Study conducted by DEM in August 2010 defines the Cultural landscape within Rookwood and its significance. It identifies within each Unit (1-24) "specific locations of the landscape and visual fabric that should be protected to ensure that the integrity of Rookwood is not lost, as the pressures on the remaining land becomes more intense."

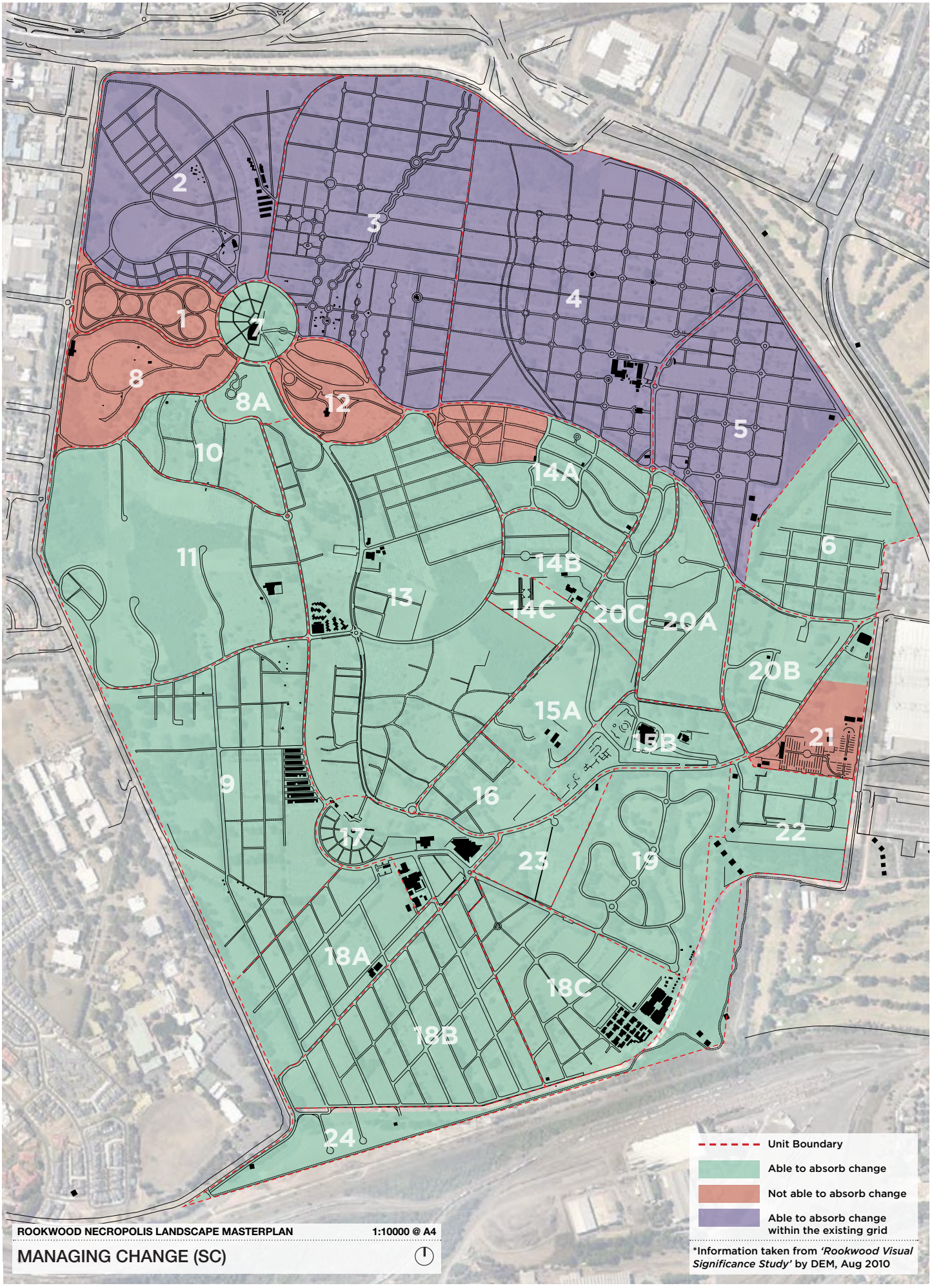
This includes "historic circulation routes" where the setting and material fabric should be maintained.

Issues

- Historic circulation routes are recognised as significant due to their setting and fabric still being present in the landscape.
- Historic circulation routes have been assumed to be linked to the evidence of original brick kerbs and channel, street trees and elements otherwise expected to have been present in the original design.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency		
Recreational Activities		
Sustainability	Requires assessment of extent of original brick features and streetscape Any development should retain, (possibly) restore and protect these elements Complete infilling of roads with new graves as part of an intensification of burials should avoid these roads (purple) Burial infill within roads more limited if deemed significant (subject to Heritage approval)	Potential for reclaiming of roads applies to all other roads Some memorialisation may be possible Some burial may be possible in wide redundant roads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Unit Boundary
Able to absorb change
Not able to absorb change
Able to absorb change within the existing grid
*Information taken from 'Rookwood Visual Significance Study' by DEM, Aug 2010
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN
1:10000 @ A4
MANAGING CHANGE (SC)

ANALYSIS:
MANAGING CHANGE

The Rookwood Visual Significance Study conducted by DEM in August 2010 defines the Cultural landscape within Rookwood and its significance. It identifies within each Unit (1-24) the significance of the existing layout, how one can interpret the historic/original layers. Based on how intact the original layer may be, the report defines how sensitive it may be to change and how vulnerable it may be to development.

It divides the site into 3 Main Categories:

- Areas able to absorb change
- Areas able to absorb change within the existing grid
- Areas unable to absorb change

It is more appropriate to regard change as possible anywhere if managed appropriately - the extent of change will vary based on the units character and its historical significance.

Rookwood's Phases of Development

The Archaeological Appraisal by Siobhan Lavelle identified four major phases of historical development at Rookwood:

PHASE 1: 1865-1888

- Initial Establishment of the 200 acre Necropolis
- Distinctive differences between the fluid cultural landscape characters of early Catholic, Wesleyan, Presbyterian, Jewish and Independent sections, with the rigid grid of the Anglican section
- Different religious areas generally separated by roadways

PHASE 2: 1889-1919

- Extension of the Necropolis to approximately its current boundaries
- Further development of the rail line
- Phase closes at end of WW1
- Burials generally extend eastwards, repeating the dominant grid pattern of the Anglican section and the fluid character of the sections south of Necropolis Drive

PHASE 3: 1920 – 1945

- A period of consolidation and change
- Introduction of the Crematorium reduces intensity of demand for burials
- Progressive opening of burial areas south of Necropolis Drive ridgeline

PHASE 4: 1946 – PRESENT

- Post war closure and dismantling of rail line
- War graves and Garden of Remembrance
- New denominations and burial requirements
- Burial areas extend to the southern sections of the available land
- Disposal of surplus assets

Rookwood's Variable Character Precincts

The long evolution of burials for different religious and community groups has resulted in Rookwood having a unique patchwork character of closely spaced but often distinctly different burial landscapes. With the general exception of the historic Management Units 1, 2, 3, 8 and 12, the majority of the MUs with 19th or early 20th century burials also have pockets of mid to late 20th century burial landscapes. Within individual areas of both modern and historic character, there can be recent burials with monumentation or headstones of distinctly different or subtly different character.

The primary character features of the historic Management Units include major historic chapels and flamboyant monuments or headstones, fluid, gardenesque pathway layouts or rigid axial grids, attractive small funerary buildings and shelters, majority of burial features comprise sandstone, marble or granite, an emphasis on dramatic plantings at axial nodes complemented with secondary planting, roadways and pathways, historic stormwater

drainage channels and planted avenues. In general cultural features and landscape features tend to blend into a dynamic and complementary presentation. Unfortunately, the older graves are often in the most worn and weathered condition, with some loss of the physical clarity of early pathways and planning layouts.

The 20th century burial areas, that generally extend south of Necropolis Drive, have the most varied character derived from the number of religious communities and from different burial techniques over time. Principal characteristics include remnant historic Railway alignment, random planning layouts with fluid and grid-like sub-precincts of varying character, broader range of materials, design and scale, scattering of lawn cemetery style precincts, major features such as 1930s Crematorium, Holocaust Memorial, Crown of Thorns and Commonwealth War Graves, modern Chapels, administration and service buildings, a predominance of natural landscaping.

Issues

- Areas have been assessed (by others) and categorised as having a range of the ability to absorb change
  - Unable to absorb change
  - Able to absorb change within existing grid
  - Able to absorb change

  which is not an appropriate way to categorise possible change.
- Areas have been assessed (by others) and categorised by phases of historical development
  - Phase 1: 1865 - 1888 ┐
  - Phase 2: 1889 - 1919 ┘ Historic phase of development
  - Phase 3: 1920 - 1945 ┐
  - Phase 4 1946 - present ┘ Modern phase of development
- The evolution of burials for different religions and community groups has resulted in a unique patchwork character.
- Change is possible and can be managed if respecting the unique character patchwork of Rookwood.
- Change will bring opportunities for enhancement of historic character.

Constraints & Opportunities

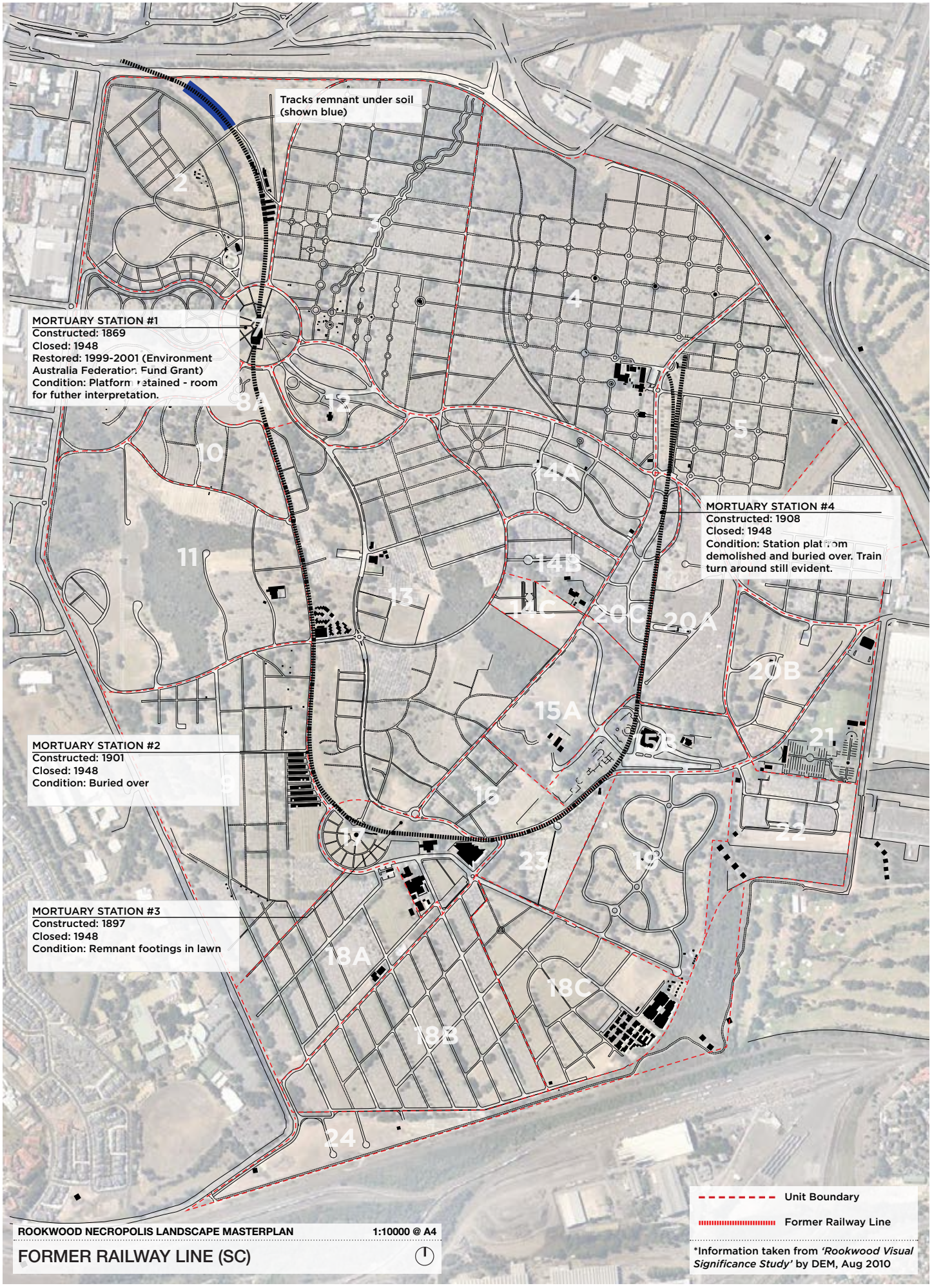
Masterplan Objectives	**Constraints**	**Opportunities**
Beautification/ Consistency		Enhance historic character
Recreational Activities		
Sustainability	Any burial intensification will be the subject of strict approval process in SHR section: • No path layout changes in “pink” zones	Historically significant layout: It is conceivable that burials and memorial gardens (ash interments) may be accommodated within the existing grid whilst respecting any items still present from the original layout (from brick edging to plants to layout). Able to accommodate (subject to sensitive approach & approval): • Memorial gardens • Additional burials • Areas shown in “green” are able to be significantly modified (subject to Heritage approval) • Paths in “purple” zones may be narrowed, re-used or modified, only if the grid pattern can be retained and is still visible

Typical historic burial areas




Typical modern burial areas



ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN 1:10000 @ A4

FORMER RAILWAY LINE (SC)

ANALYSIS:
FORMER RAILWAY LINE

History

As Rookwood was some distance from the centre of Sydney and from the main-line train station at Haslam's Creek, it was considered necessary to establish a railway station at the centre of the cemetery. This line would run as a spur line from the existing station at Haslam's Creek and allow easier movement into and out of the cemetery. The railway line construction began in November 1864 and the trains began their run into the cemetery as part of regular services from the 1st April 1867. It stopped at prearranged stations on the journey from central Sydney in order to pick up mourners and coffins.

At the time of its opening the line went as far as Mortuary Station #1. On 26 May 1897, an extension of the line to Mortuary Station #3 was opened. Another station, Mortuary Station #2 was added in 1901. A final extension, to Mortuary Station #4 opened on 19 June 1908.

The last trains that ran funeral processions all but ceased in the late 1930s. Following this, they were only used for visitors on Sundays and Mother's Day. On 3 April 1948, the service was officially terminated and the rails were pulled up.

Site Conditions

All mortuary station have been demolished with the exception of **Mortuary Station #1** which was relocated to Canberra in 1958, where it is now the All Saints Church.

The sites of **Mortuary Stations #1**, **#3** and **#4** are recorded as archaeologically significant, some exhibiting remnant foundations at ground level (refer to Former Buildings – page 41).

However, the rest lies below established graves (uncoloured sections on C&O map).

The CMCT has advised that during recent excavations within Unit 2, the original railway tracks appear to still present under a thin layer of topsoil (marked blue).

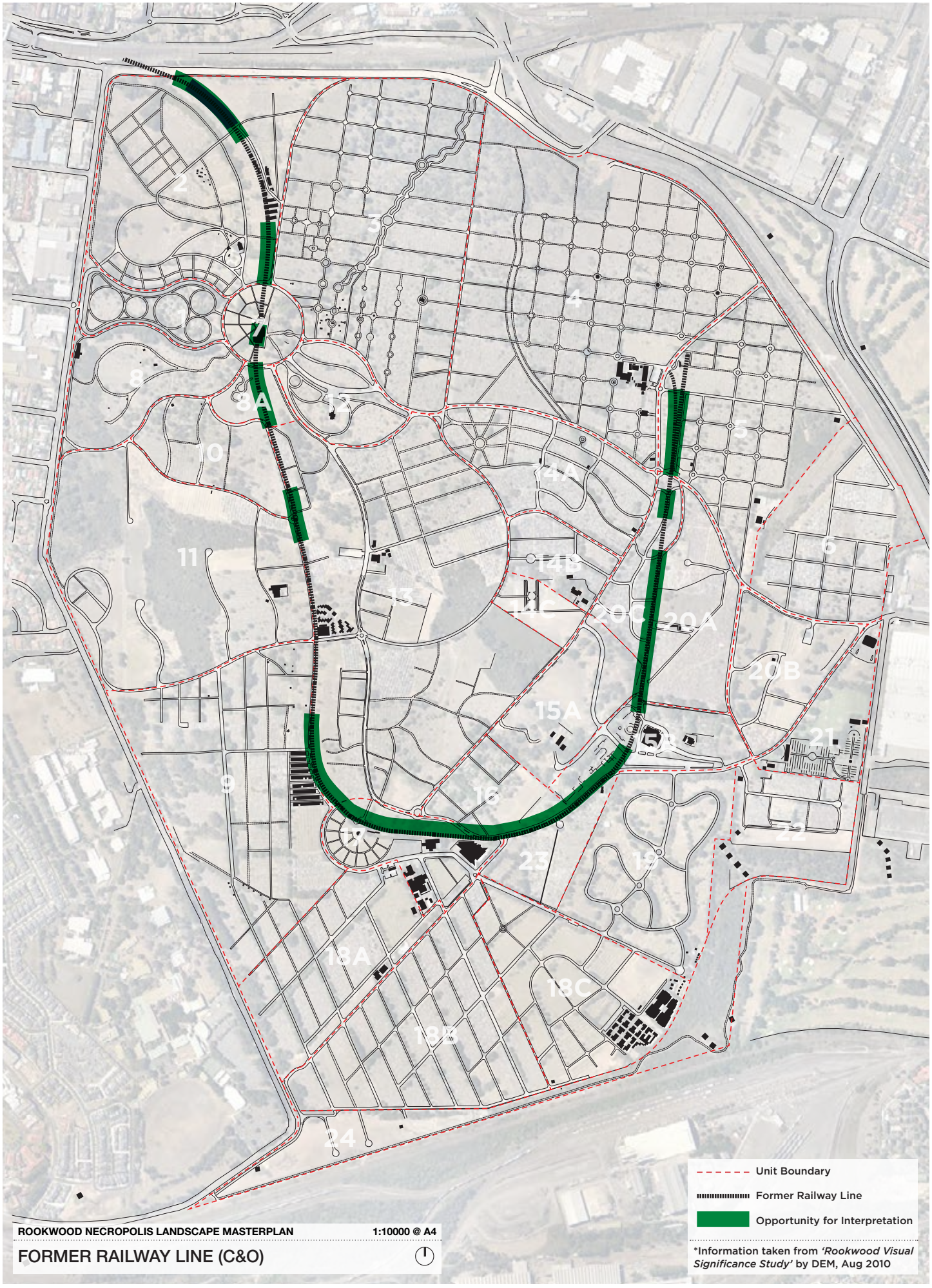
FORMER RAILWAY LINE:

Issues

- The mortuary line and all its stations are significant to the history of Rookwood. Some parts are listed as archeologically significant and therefore under protection.
- Their interpretation will enhance the public's experience of Rookwood.

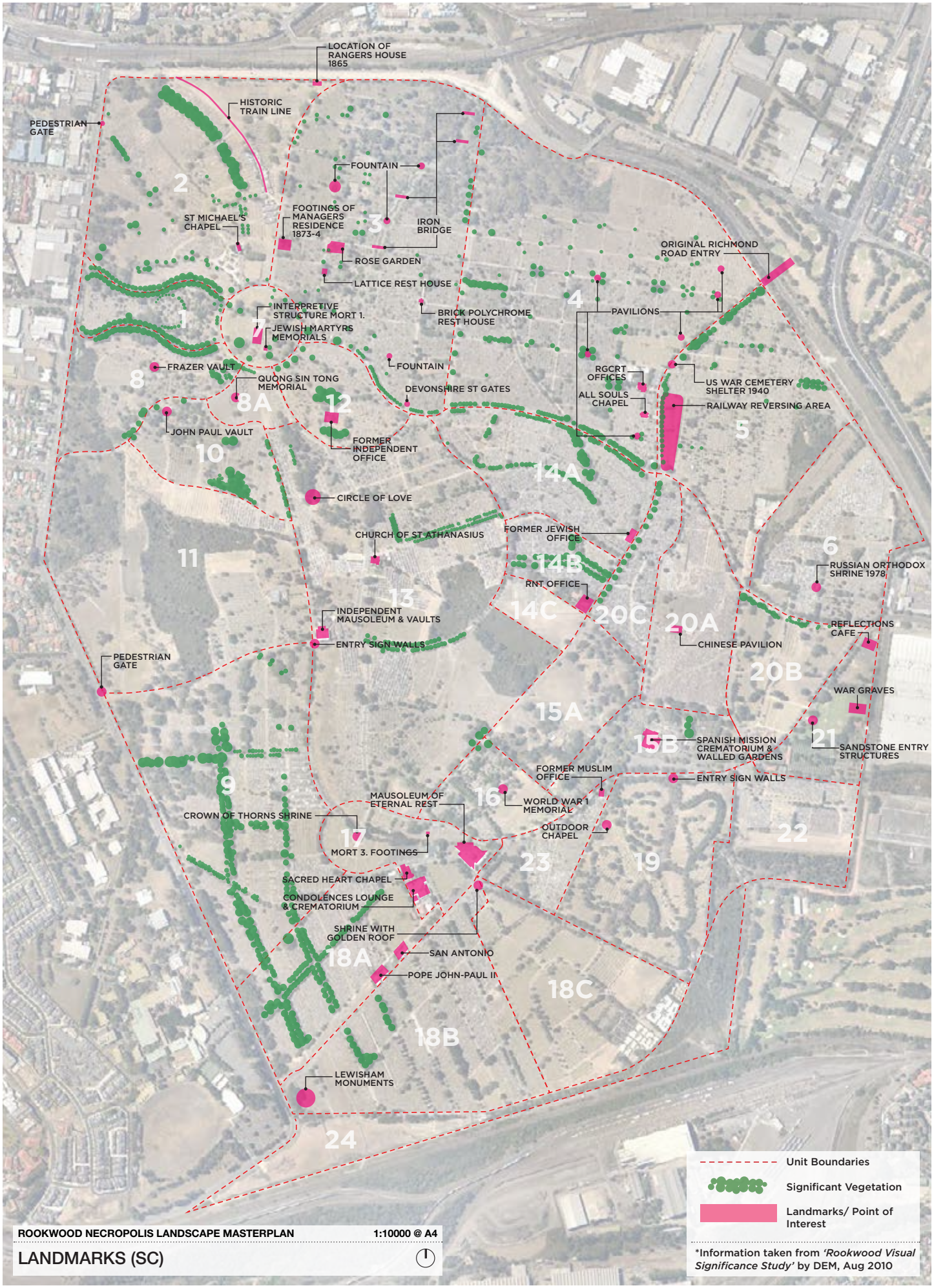
Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency		
Recreational Activities	Limited potential for interpretation where rail alignment is within roads.	High potential for interpretation and education within landscaped settings.
	Mortuary Station #1 interpreted/ restored 1999-2001 (Environment Australia Federation Fund Grant) – can be further enhanced.	As a high profile area, there is potential for memorialisation (ash interments) and some burial.
	Mortuary Station #3 listed as an archaeological item (Category 1) should be retained (refer to Former Buildings – page 41). Railway sidings listed as an archaeological item (Category 2) are recommended for interpretation (refer to Former Buildings - page 41).	Pedestrian precinct over rail alignment as part of improved passive recreation provision.
	Buried (graves) over: • Mortuary Station #2 & #4 • Large portions of the track's alignment	Tracks still remnant with high potential for interpretation: • Unit 2 – tracks under soil • Unit 5 – Railway sidings, currently under unused land • Unit 17 – Mortuary Station #3 – footings visible in lawn area
Sustainability	Due to archaeological significance, potential for burial development will be limited.	



ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN **1:10000 @ A4**

FORMER RAILWAY LINE (C&O)



ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN 1:10000 @ A4

LANDMARKS (SC)

*Information taken from *'Rookwood Visual Significance Study'* by DEM, Aug 2010

ANALYSIS:
LANDMARKS

Site Conditions

According to the Rookwood Visual Significance report (DEM 2010), "Rookwood's planning, both from an historic perspective but also continuing into the 20th Century has utilised some of the higher points within the cemetery to locate important structures that now contribute to landmarks".

"These landmarks are generally located on higher ground or are high structures in themselves and form markers throughout the cemetery that are visible from many areas".

"The landmarks may be seen as items that assist orientation. Maintenance of views towards and from these items is important".

These features may be built or vegetal. The strongest landmarks are the ones visible from beyond the site, such as St Michael the Archangel Chapel, the Crematorium tower and a number of significant trees especially in the older Units.

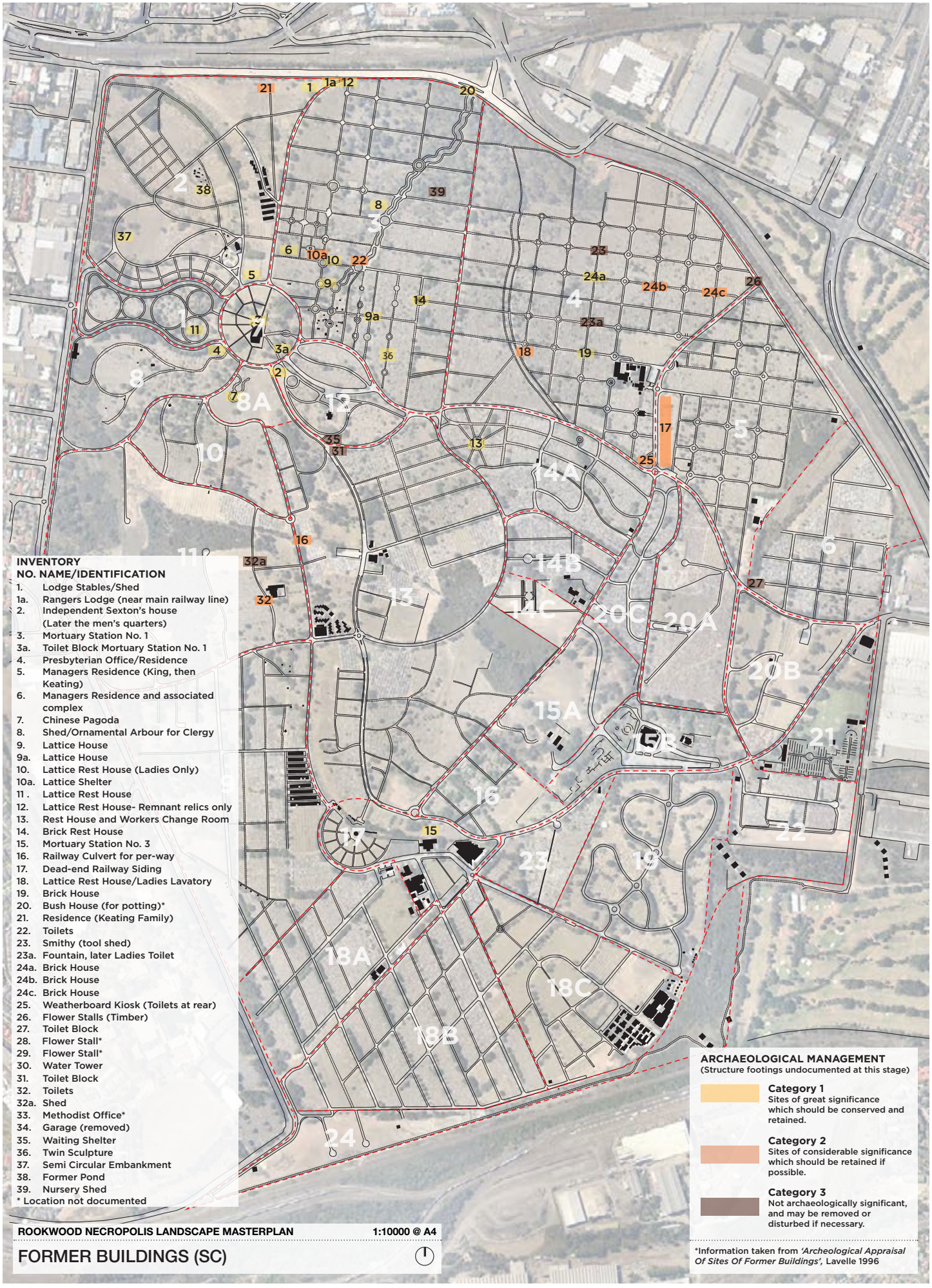
All should be considered as potential points of interest and destinations.

Issues

- All landmarks represent a part of Rookwood's history and as such, are points of interest for visitors.
- Landmark assist with way-finding and enhance views
- The northern part of the site is rich in landmark specimen trees whilst the southern end lacks them.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency	Views to significant landmarks from outside and within the site should be maintained.	Landmarks can be points of interest and destinations for visitors. Opportunities for more buildings on ridges (in line with earlier practices). Potential for viewing platforms over the site and surrounds to act as new landmarks.
Recreational Activities		
Sustainability	Introduction of specimen trees will compete with burial needs.	Potential for more specimen trees in the southern part of site, as part of a long-term tree replacement or in areas not otherwise useful for burial.



INVENTORY
NO. NAME/IDENTIFICATION

1. Lodge Stables/Shed
1a. Rangers Lodge (near main railway line)
2. Independent Sexton's house (Later the men's quarters)
3. Mortuary Station No. 1
3a. Toilet Block Mortuary Station No. 1
4. Presbyterian Office/Residence
5. Managers Residence (King, then Keating)
6. Managers Residence and associated complex
7. Chinese Pagoda
8. Shed/Ornamental Arbour for Clergy
9. Lattice House
9a. Lattice House
10. Lattice Rest House (Ladies Only)
10a. Lattice Shelter
11 . Lattice Rest House
12. Lattice Rest House- Remnant relics only
13. Rest House and Workers Change Room
14. Brick Rest House
15. Mortuary Station No. 3
16. Railway Culvert for per-way
17. Dead-end Railway Siding
18. Lattice Rest House/Ladies Lavatory
19. Brick House
20. Bush House (for potting)*
21. Residence (Keating Family)
22. Toilets
23. Smithy (tool shed)
23a. Fountain, later Ladies Toilet
24a. Brick House
24b. Brick House
24c. Brick House
25. Weatherboard Kiosk (Toilets at rear)
26. Flower Stalls (Timber)
27. Toilet Block
28. Flower Stall*
29. Flower Stall*
30. Water Tower
31. Toilet Block
32. Toilets
32a. Shed
33. Methodist Office*
34. Garage (removed)
35. Waiting Shelter
36. Twin Sculpture
37. Semi Circular Embankment
38. Former Pond
39. Nursery Shed

* Location not documented

ARCHAEOLOGICAL MANAGEMENT
(Structure footings undocumented at this stage)

Category 1
Sites of great significance which should be conserved and retained.

Category 2
Sites of considerable significance which should be retained if possible.

Category 3
Not archaeologically significant, and may be removed or disturbed if necessary.

*Information taken from *'Archeological Appraisal Of Sites Of Former Buildings'*, Lavelle 1996

ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN 1:10000 @ A4

FORMER BUILDINGS (SC)

ANALYSIS:
FORMER BUILDINGS

Site Conditions

Based on the analysis presented in the "Archaeological Appraisal of sites of Former Buildings and abandoned and derelict buildings, ruins and structures" (Lavelle, 1996), a number of historically significant structures (residences, offices, toilets and gardenesque structures) have been identified throughout the site as in need of restoration or further archaeological investigations.

Many structures have long gone although footings remains below ground. These structures will be referred to as "Former Buildings" in the report for the sake of simplification.

The report classifies all former buildings as one of 3 categories:

Category 1: "Sites of great significance within the context of Rookwood Necropolis. Sites should be conserved, with the best action for the archaeological resource usually being that it is retained, preferably undisturbed. If sites need to be disturbed for other reasons such as intervention for conservation works, public safety, or to gain information for site interpretation, etc. appropriate, professional assessment should be obtained. Where original fabric must be disturbed appropriate records should be kept of actions taken and evidence discovered."

For most Category 1 items, further investigation is recommended.

Category 2: Sites of considerable significance within the context of Rookwood Necropolis. Sites should be retained if possible. If sites must be removed or disturbed they should be appropriately investigated and recorded prior to destruction.

Category 3: Sites of some significance within the context of Rookwood Necropolis, but generally not archaeologically significant. Sites may be removed or disturbed if necessary for operational reasons without further archaeological work.

FORMER BUILDINGS:

Issues

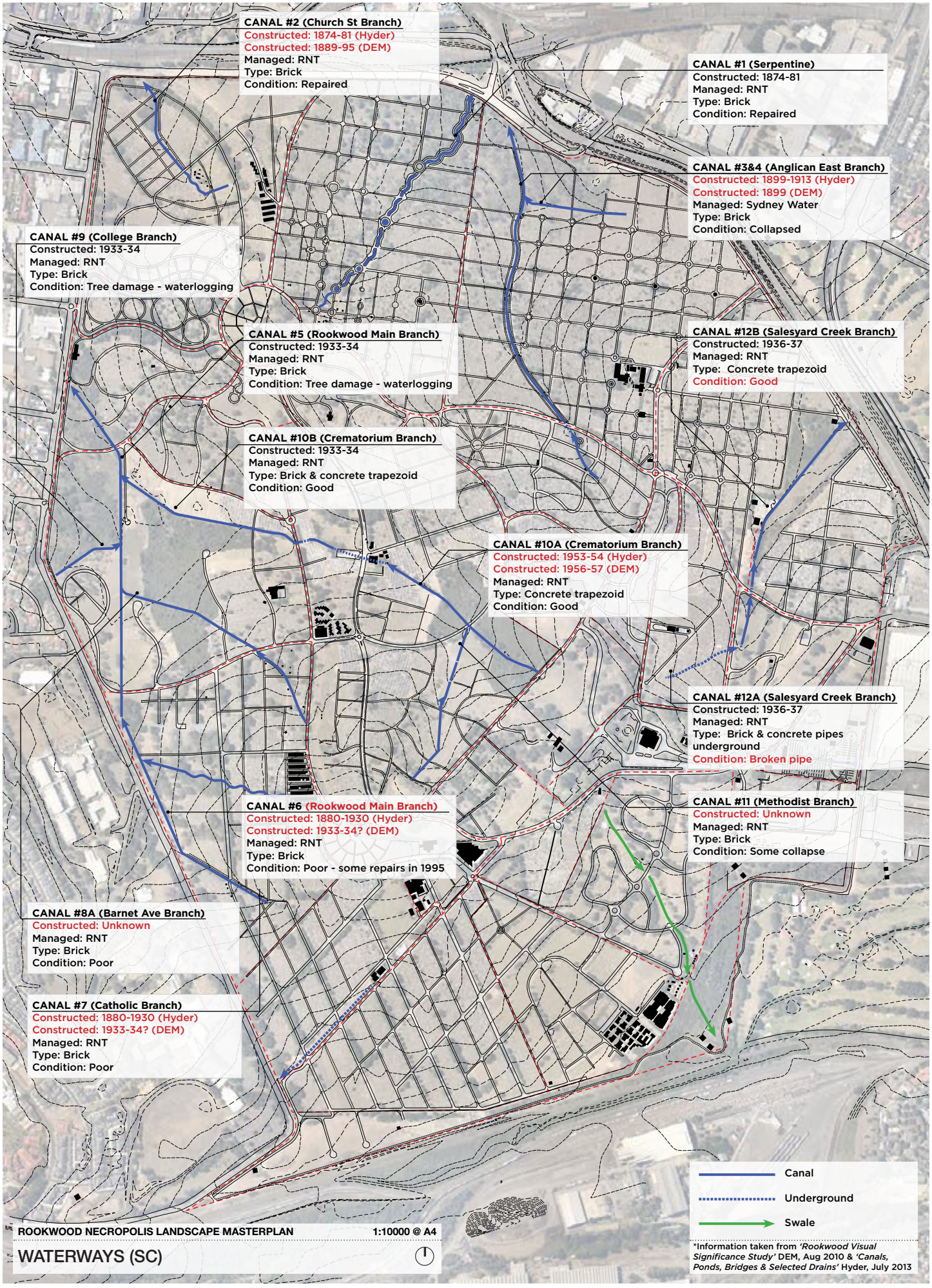
- A number of former buildings have been assessed as archaeologically significant.
- Category 1 and 2 former structures are highly significant.
- Category 3 former structures are deemed non-significant.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency		
Recreational Activities		
Sustainability	Maintain: • Category 1 – Sites of great significance should be conserved, retained and interpreted into landscape. Subject to approval process • Category 2 – Sites of considerable significance should be retained if possible They will impact on and limit the potential to develop the area for interment and be subject to strict approval process. Cost of repairs may be prohibitive if no income can be generated from these areas.	
		Potential to reclaim/ remove structures within Category 3 (not archaeologically significant) and turn into interment sites: • #23 – Smithy tool shed • #23a – Fountain, later ladies toilet • #26 – Flower stall (timber) • #27/28 – Toilet block & flower stall • #31 – Toilet block • #32a – Toilet block • #35 – Waiting shelter • #39 – Nursery shed
	Category 1 & 2 former structures will impact on and limit the potential to develop the area for interment. Their footprint is unknown and requires further investigation.	Potential for: • Promotion & education via interpretation • Unearthing & interpretation in the landscape

Historical station - Mortuary station #1 (Image coutesy of SAG & Friends of Rookwood)

Historical station - Mortuary station #3 (Image coutesy of CMCT)


CANAL #2 (Church St Branch)
Constructed: 1874-81 (Hyder)
Constructed: 1889-95 (DEM)
Managed: RNT
Type: Brick
Condition: Repaired
CANAL #1 (Serpentine)
Constructed: 1874-81
Managed: RNT
Type: Brick
Condition: Repaired
CANAL #3&4 (Anglican East Branch)
Constructed: 1899-1913 (Hyder)
Constructed: 1899 (DEM)
Managed: Sydney Water
Type: Brick
Condition: Collapsed
CANAL #9 (College Branch)
Constructed: 1933-34
Managed: RNT
Type: Brick
Condition: Tree damage - waterlogging
CANAL #5 (Rookwood Main Branch)
Constructed: 1933-34
Managed: RNT
Type: Brick
Condition: Tree damage - waterlogging
CANAL #12B (Salesyard Creek Branch)
Constructed: 1936-37
Managed: RNT
Type: Concrete trapezoid
Condition: Good
CANAL #10B (Crematorium Branch)
Constructed: 1933-34
Managed: RNT
Type: Brick & concrete trapezoid
Condition: Good
CANAL #10A (Crematorium Branch)
Constructed: 1953-54 (Hyder)
Constructed: 1956-57 (DEM)
Managed: RNT
Type: Concrete trapezoid
Condition: Good
CANAL #12A (Salesyard Creek Branch)
Constructed: 1936-37
Managed: RNT
Type: Brick & concrete pipes underground
Condition: Broken pipe
CANAL #6 (Rookwood Main Branch)
Constructed: 1880-1930 (Hyder)
Constructed: 1933-34? (DEM)
Managed: RNT
Type: Brick
Condition: Poor - some repairs in 1995
CANAL #11 (Methodist Branch)
Constructed: Unknown
Managed: RNT
Type: Brick
Condition: Some collapse
CANAL #8A (Barnet Ave Branch)
Constructed: Unknown
Managed: RNT
Type: Brick
Condition: Poor
CANAL #7 (Catholic Branch)
Constructed: 1880-1930 (Hyder)
Constructed: 1933-34? (DEM)
Managed: RNT
Type: Brick
Condition: Poor
Canal
Underground
Swale
*Information taken from 'Rookwood Visual Significance Study' DEM, Aug 2010 & 'Canals, Ponds, Bridges & Selected Drains' Hyder, July 2013
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN
1:10000 @ A4
WATERWAYS (SC)

ANALYSIS:
WATERWAYS (CANALS)

Site Conditions

The site is drained by a series of open canals, swales and pipes. The valleys make up three drainage catchments (Powell's Creek to the north, Cook's River to the south and Haslam's Creek to the west).

The early planning for the cemetery recognised these valleys for drainage and located canals along the invert of the valleys to receive and remove stormwater run-offs from the burial areas (refer to Topography Map – page 55).

According to the "Rookwood Necropolis, Report on the canals, ponds, bridges and selected drains" by Hyder Consulting Pty Ltd in December 2010, the first canals (#1&2) were constructed in 1874-81 with the last one (Canal #10A) constructed in the 1950s.

A number of them were in state of disrepair: The worst one (canal #3) is managed by Sydney Water, whilst the western section of the site (Canals #6, 7, 8A and 9) are in poor conditions with wall collapse and waterlogging. They cater for the "1 in 5 year" storm events only, some have even more limited functions. They are seen to contribute to the waterlogged conditions in Units 8, 10 & 11 (refer to Appendix 03: Surface Water Report - page 325).

Where the canals join together in a "fork" pattern, waterlogging tends to occur, creating even more pressures on the walls to collapse. Some have been repaired with weep-holes to minimise the problem.

The earlier brick canals are historically significant and should be retained and restored. There are no comments available of the significance of the concrete trapezoid canals.

The canals are less than 1m deep in most places.

The swale dissecting through Unit 19 has recently been developed as a landscape feature with memorialisation on the edges. It leads to another swale within Unit 24 which has been identified as potential habitat for a threatened frog, the Green and Golden Bell frog.

WATERWAYS (CANALS):

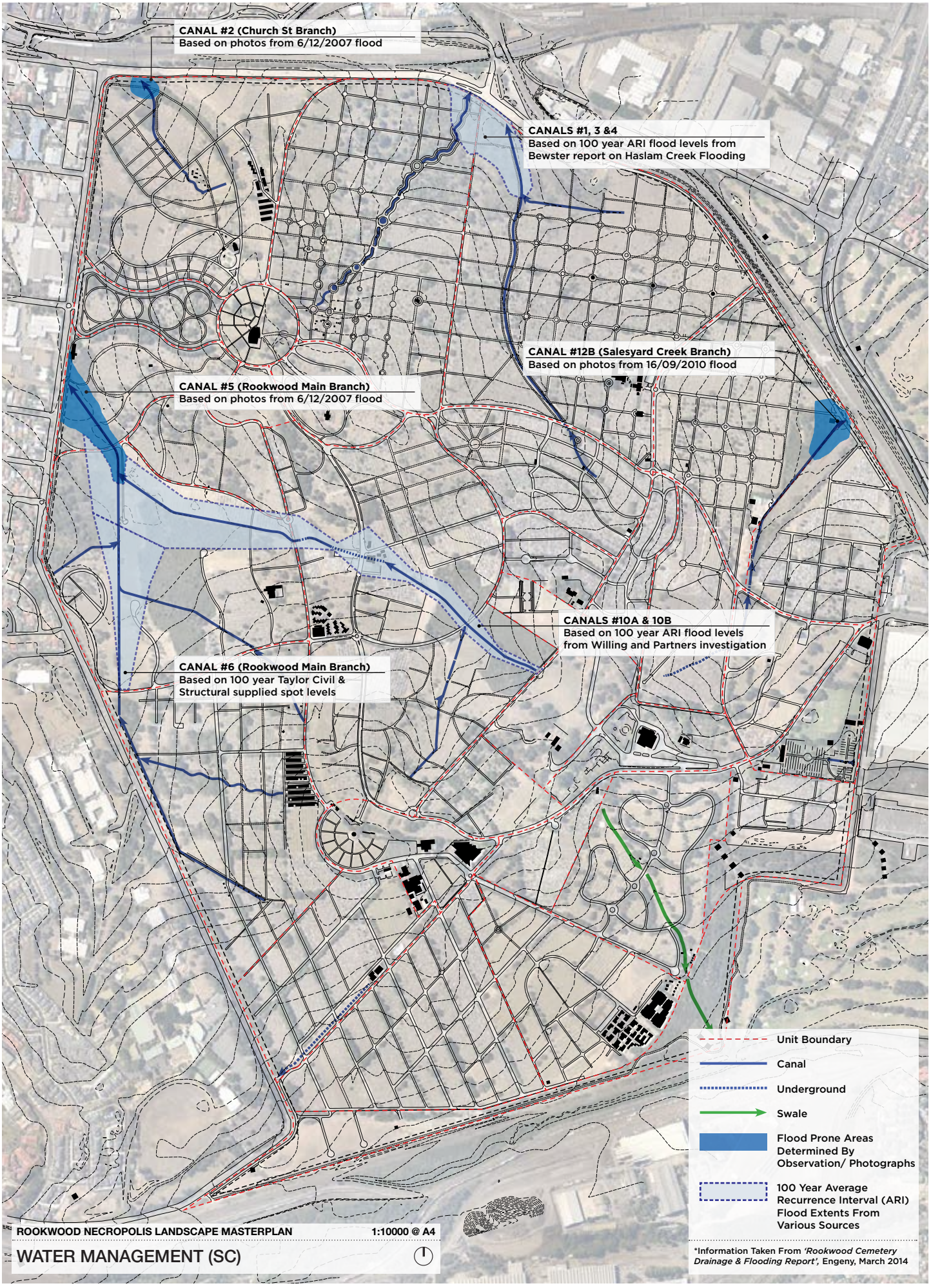
Issues

- The brick canals are a liability.
- They have great appeal from a tourism point of view especially the serpentines.
- A number of canals are in state of disrepair and are recommended for repairs.
- The cracks and collapses within these canals are seen to contribute to flooding and waterlogging.
- Canals form part of service easements, unusable for burials.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency	Historic brick canals are protected. Any modifications and extra connections are subject to approval. Many are not functioning to their potential. Canals in poor condition: • Canals #3&4 (Anglican East) – Collapsed • Canal #5 (Rookwood Main) – Tree damage, waterlogged • Canals #6 (Rookwood Main) – Poor • Canals #7 (Catholic) – Poor • Canals #8A (Barnet Avenue) – Poor • Canals #9 (College) – Tree damage, water logging • Canals #11 (Methodist) – Some collapse • Canals #12A (Salesyard) – Broken pipe	Make the many ornamental features of serpentines and other canals more accessible to the public. More interpretation of items for education and enjoyment of the public. Buffer zones on both sides to limit access and risk of falling in. Potential: • For memorialisation of edges • To pipe non-heritage canals (concrete trapezoid) and use land for recreation (subject to feasibility study Prioritise recommended repairs.
Recreational Activities		
Sustainability	Buffer zones on both sides to limit access and risk of falling in, which takes up potential burial space.	
	Inefficient canals may contribute to excessive groundwater conditions, especially where canals join. Some areas such as Unit 8, 10 & 11 have not yet been buried and suffer from waterlogging and high water tables.	Reconstruct with weep-holes to reduce water pressures against walls and allow groundwater to escape.
	All canals need access to for maintenance purposes and are effectively in “easements” which cannot be buried into. A 3m wide burial-free buffer currently applies on both sides of the canals (easement).	Potential: • Green corridors for recreation and/ or fauna/ flora

Serpentine canal


CANAL #2 (Church St Branch)
Based on photos from 6/12/2007 flood
CANALS #1, 3 &4
Based on 100 year ARI flood levels from Bewster report on Haslam Creek Flooding
CANAL #12B (Salesyard Creek Branch)
Based on photos from 16/09/2010 flood
CANAL #5 (Rookwood Main Branch)
Based on photos from 6/12/2007 flood
CANALS #10A & 10B
Based on 100 year ARI flood levels from Willing and Partners investigation
CANAL #6 (Rookwood Main Branch)
Based on 100 year Taylor Civil & Structural supplied spot levels
Unit Boundary
Canal
Underground
Swale
Flood Prone Areas Determined By Observation/ Photographs
100 Year Average Recurrence Interval (ARI) Flood Extents From Various Sources
*Information Taken From 'Rookwood Cemetery Drainage & Flooding Report', Engeny, March 2014
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN
1:10000 @ A4
WATER MANAGEMENT (SC)

ANALYSIS:
WATER MANAGEMENT

Site Conditions

As described in the "Surface Water Report" by Engeny Water Management, April 2014 (Appendix 03 - page 325):

Surface Water:

- Canals: Surface water is collected by a variety of canals, some heritage listed.
- Most canals work well but some have limited function. They cater for 1:5 year storm events only. The Catholic Branch and adjacent tributary from the Rookwood main are in poor condition.
- Underground drains: The new ones are functioning but the old ones (along the roads) are mostly blocked, which means the road surface itself conveys the small run-offs. This does not affect cemetery functions.
- New buildings: There are now new requirements for on-site detention of rainwater so that there is no net increase in flows from cemetery. The CMCT has made provision for a larger detention basin to cope with current and proposed building works.

Flooding:

- Most of the flooding occurs at the boundaries but it does not stay longer than 24 hours. It is due to branches and debris accumulating between rain events and partially blocking the outlet.
- A number of properties within Auburn Council, downstream of the cemetery, are affected by flooding. (Refer "Haslams Creek Floodplain Risk Management study & plan", by Auburn Council / Bewsher Consulting Pty. Ltd., 2003)
- A number of reports (Bewsher 2003 and Squires 2013) recommend a retarding basin within the cemetery.
- Auburn City Council is considering the proposals but undertaking new flood study which may change the recommendations.
- Flooding on site does not impact on the cemetery's operations and drains quickly.

Groundwater:

- A number of areas within the cemetery are boggy. Some monitoring of the water table has occurred in the CMCT areas and shows the water table at 1.2m below ground.
- This impedes burials in some areas.
- A review of international standards on groundwater pollution in cemeteries reveals the following recommendations:
  - 5-10m buffer zones on boundaries in clay soils, 20m+ in sand.
  - The invert of the grave should be 1m above the known water-table
  - No burial near springs and swampland.
  - Plant deep rooted natives in buffer zones.
- A report carried out by Woodward-Clyde in 1995, reveals that the groundwater in Rookwood is generally 3-6m deep with some "perched" areas. Material contamination in ground water diminishing within 3-5m. Groundwater contains mostly nitrogen contamination. Buffer of 5m minimum should therefore be maintained along drainage channels.

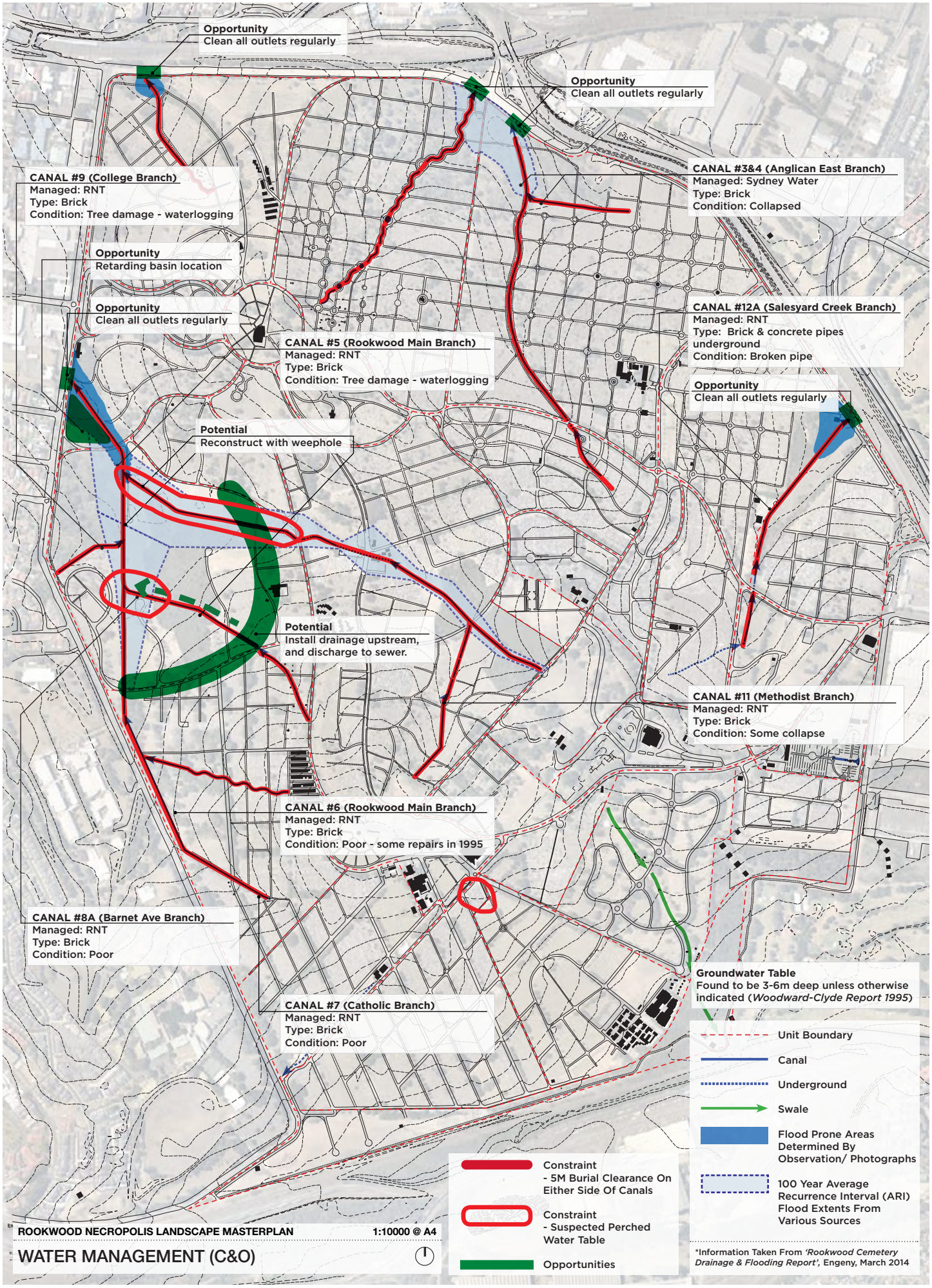
WATER MANAGEMENT:

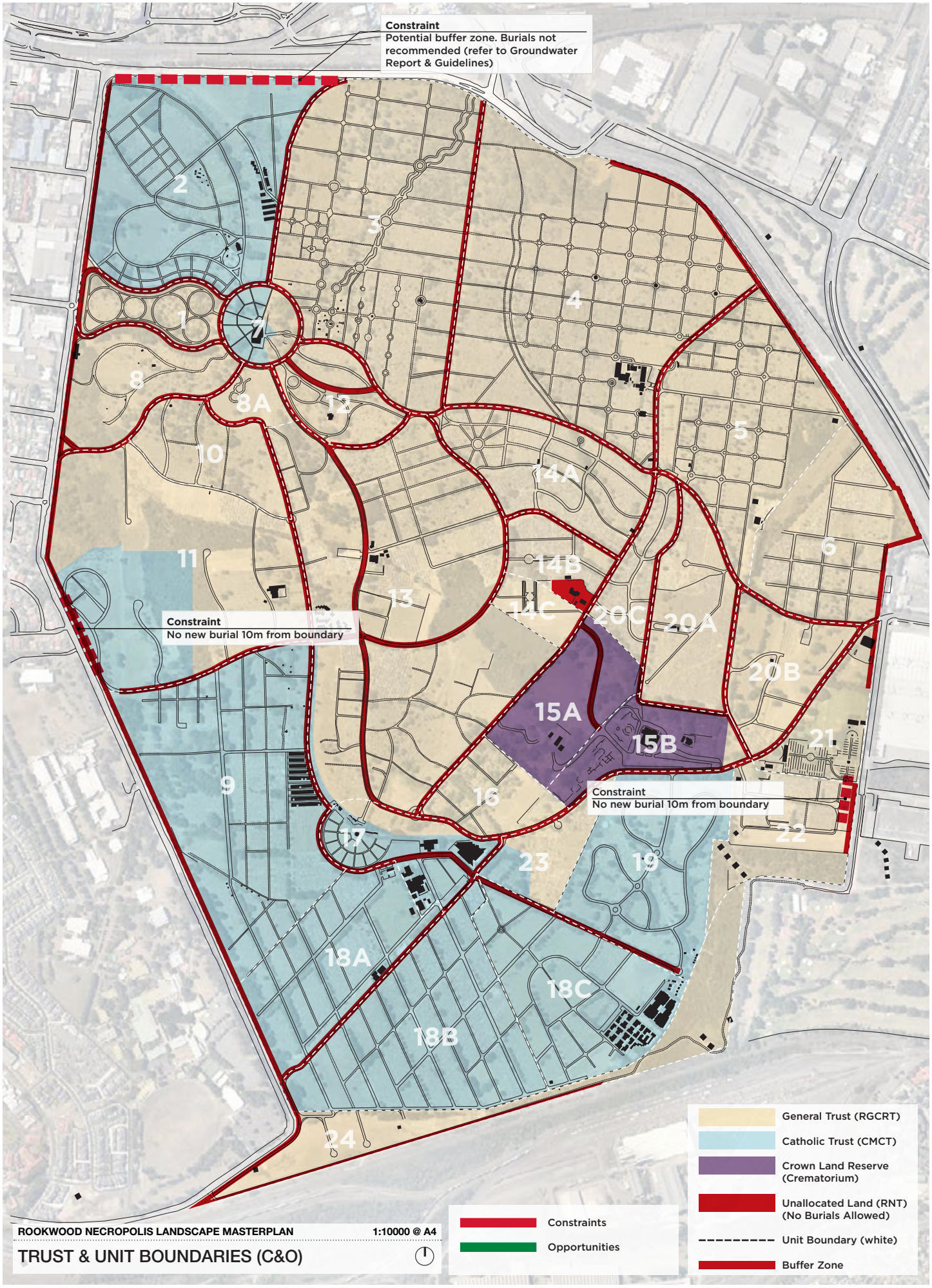
Issues:

- Surface water does not significantly affect the cemetery operations.
- Flooding does not significantly affect the cemetery operations.
- Groundwater affects burial potential in places.
- Soil filling in flood prone areas has detrimental effect on flooding.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency	Pipes are blocked along old roads. Roads pick up surface water. Lowest/ Wettest Points: • Unit 2 – Flood Prone Area • Units 3 & 4 – 100 year average recurrence interval. Anglican East Branch Canal collapsed condition (Unit 4) • Units 5 & 6 – Flood Prone Area • Unit 11 – Flood Prone Area & 100 year average recurrence interval Filling (with soil) of flood prone areas will increase flooding potential downstream and therefore cemetery's liabilities.	Maintenance: • Clean out all outlets regularly Improve stormwater collection as part of road reconstruction. Cease filling in flood prone areas.
Recreational Activities		
Sustainability	3m burial clearance on either side of canals. No burial within 10m of boundary (subject to Council's requirements). Suspected perched water table areas: • Corner of Courtenay & Sheehy Avenue • Intersection of Barnet & Rookwood Main Branch • Crematorium Branch (near Rookwood Main Branch) Ineffective and damaged canals contribute to the groundwater issue. Water table will limit burial potential when less than 1m below grave invert.	Maintenance: • Reconstruct canals with weep-hole along Rookwood Main, Barnet & Crematorium Branches Potential to turn the low point in Units 8 & 11 into a water feature if burial not viable. Where groundwater prevents burials: • Plant deep rooted trees • Install drainage upstream & discharge to sewer Monitor over 12 months & reassess.


Opportunity
Clean all outlets regularly
Opportunity
Clean all outlets regularly
CANAL #9 (College Branch)
Managed: RNT
Type: Brick
Condition: Tree damage - waterlogging
CANAL #3&4 (Anglican East Branch)
Managed: Sydney Water
Type: Brick
Condition: Collapsed
Opportunity
Retarding basin location
Opportunity
Clean all outlets regularly
CANAL #5 (Rookwood Main Branch)
Managed: RNT
Type: Brick
Condition: Tree damage - waterlogging
CANAL #12A (Salesyard Creek Branch)
Managed: RNT
Type: Brick & concrete pipes underground
Condition: Broken pipe
Opportunity
Clean all outlets regularly
Potential
Reconstruct with weephole
Potential
Install drainage upstream, and discharge to sewer.
CANAL #11 (Methodist Branch)
Managed: RNT
Type: Brick
Condition: Some collapse
CANAL #6 (Rookwood Main Branch)
Managed: RNT
Type: Brick
Condition: Poor - some repairs in 1995
CANAL #8A (Barnet Ave Branch)
Managed: RNT
Type: Brick
Condition: Poor
CANAL #7 (Catholic Branch)
Managed: RNT
Type: Brick
Condition: Poor
Groundwater Table
Found to be 3-6m deep unless otherwise indicated (Woodward-Clyde Report 1995)
Unit Boundary
Canal
Underground
Swale
Flood Prone Areas Determined By Observation/ Photographs
100 Year Average Recurrence Interval (ARI) Flood Extents From Various Sources
Constraint
- 5M Burial Clearance On Either Side Of Canals
Constraint
- Suspected Perched Water Table
Opportunities
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN
1:10000 @ A4
WATER MANAGEMENT (C&O)
*Information Taken From 'Rookwood Cemetery Drainage & Flooding Report', Engeny, March 2014



ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN 1:10000 @ A4

TRUST & UNIT BOUNDARIES (C&O)

ANALYSIS:

TRUST & UNIT BOUNDARIES

Site Conditions

CMCT manages 1:3 of the Rookwood Necropolis site. RGCRT manages 2:3 of the Rookwood Necropolis site.

The Crematorium land (Units 15 A & B) is on Crown Land Reserve and as such has not been allocated to either Trust. It is currently the subject of a lease agreement with the RNT until 2025. The War Graves and Remembrance Gardens (part of Unit 21) are on RGCRT's land and is subject to a lease agreement with them. The balance of Unit 24 (excluding Lot 10) is also unallocated and on Severed Crown Land.

Current legislation pertaining to Rookwood (Crown Land) prohibits burial within unallocated land. Although burial is not precluded by Auburn Council (no planning controls on buffer zones), Crown Land legislation changes would be required to enable its use for burial.

All Primary, Secondary roads and buffer zones are unallocated to a cemetery Trust. In practice, the buffers and Primary roads are managed by the RNT, and the Secondary roads are managed by the Trusts. The repartition of maintenance obligations is currently being reviewed by the Trusts, in particular where Secondary roads are shared between the two main Trusts.

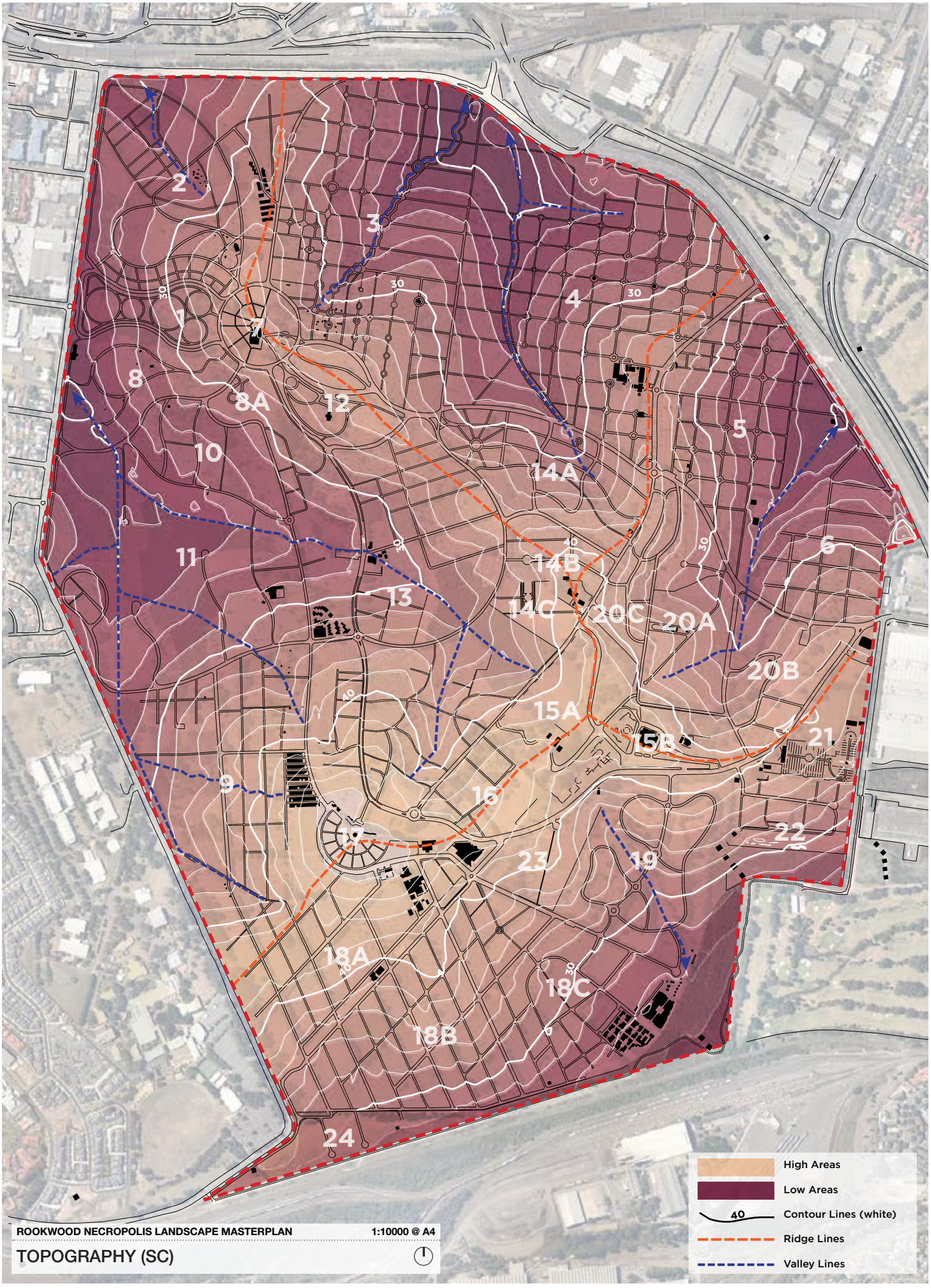
Each Trust manages its own land and cemetery operations independently. There is a memorandum of understanding between all parties with regards to maintenance of common areas and common services. All Trusts report to the RNT Board, including proposed/ future developments which may affect several parties.

Issues

- The land is divided into land allocated to Trusts (for their use), Crematorium and memorial garden purposes, and Common areas (unallocated).
- Buffer zones are inconsistent.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency		
Recreational Activities		
Sustainability	Buffer zones: • Unit 11 (CMCT) not along boundary fence • Unit 2-3, Unit 4 (part of) – no new burial 10m from boundary (subject to Council requirements based on planning controls & health regulations) • Unit 22 – burials up to the fence line • Buffer zones are unallocated land and as such, cannot be buried in. • International & Australian standards on groundwater recommend against burial within 5-10m of the boundaries (refer to page 10 in Appendix 03: Surface Water Report)	Unallocated land on perimeter offers potential use as: • Public open space • Soil recipient, making use of excess soil generated each year, without the expense of carting Unallocated land: • Within the crematorium (Unit 15) may be usable for burial • In buffer zone could be used for burial (subject to legislation changes) There may be benefits in land swaps between the 2 Trusts to simplify boundaries in place (Unit 13 & 17).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30
40
High Areas
Low Areas
40
Contour Lines (white)
Ridge Lines
Valley Lines
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN
1:10000 @ A4
TOPOGRAPHY (SC)

ANALYSIS:
TOPOGRAPHY

Site Conditions

There a four main ridge "branches" which define four valleys. The valleys make up three drainage catchments (Powell's creek to the north, Cook's River to the south and Haslam's Creek to the west)

The early planning for the cemetery recognised these valleys for drainage and located canals along the invert of the valleys to receive and remove stormwater run-offs from the burial areas (refer to Waterways – page 45).

The highest point is approximately 48m above sea level. The main landmark buildings are located on higher grounds:

- Crown of Thorns – Unit 17 at the highest point (approximately 48m AHD)
- CMCT's Office – Unit 17 – (approximately 44m AHD)
- Crematorium – Unit 15 – (approximately 42m AHD)
- RNT's Office – Unit 14 – (approximately 40m AHD)
- Mortuary Station #1 – Unit 7 – (approximately 36m AHD)
- RGCRT's Office – Unit 4 – (approximately 34m AHD)

As identified in the "Rookwood Visual Significance Study" (DEM 2010), these landmarks are generally located on higher ground and form markers throughout the cemetery that are visible from many areas.

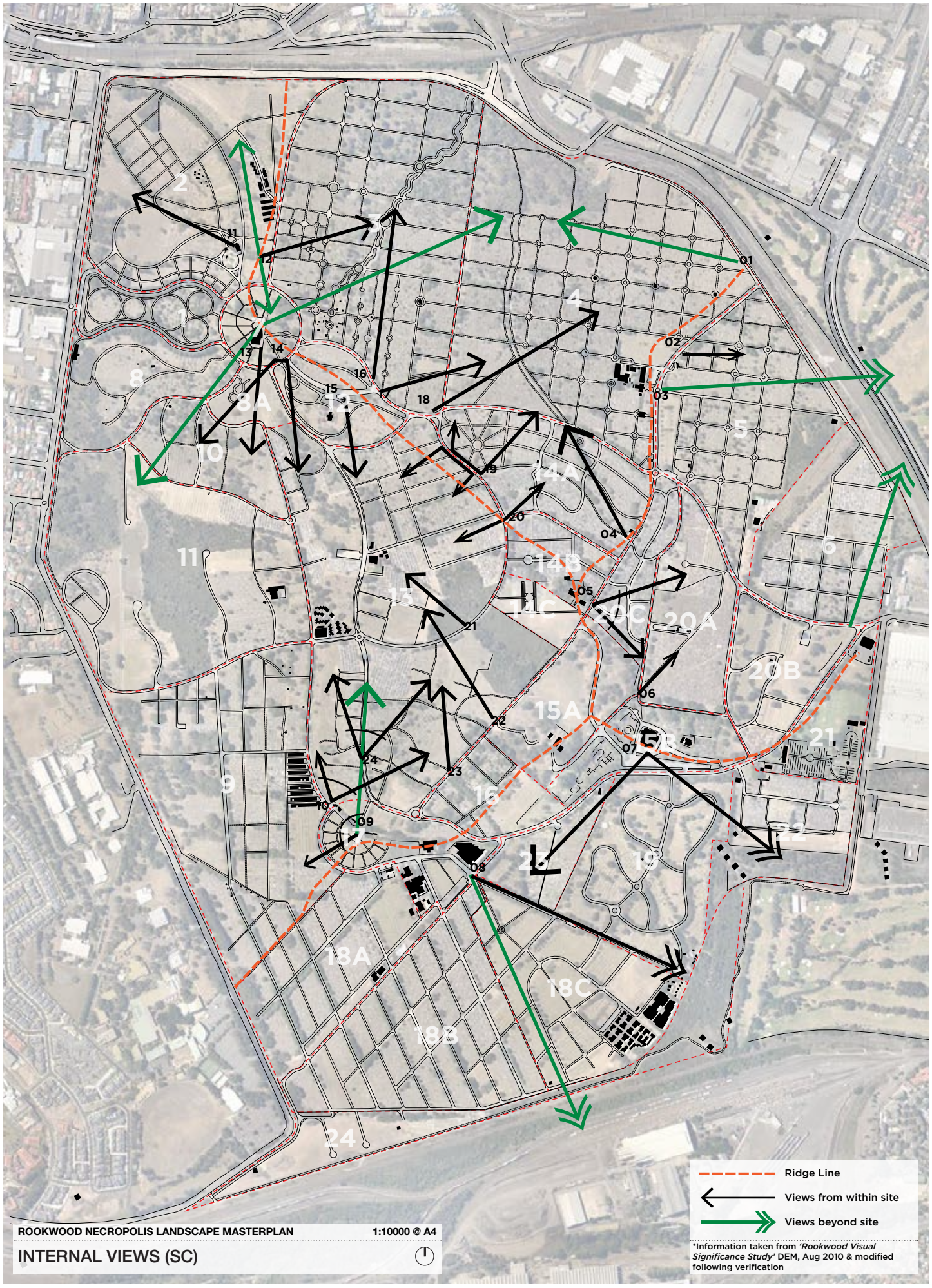
Similarly, the main panoramic views are available from the high points and along the ridges (refer to Internal Views – page 57).

Issues

- The ridges provide multiple vantage points.
- The top of ridges have typically been used for building/landmark positions.
- The top of ridges are currently sought after for burials (especially amongst the Chinese community).
- The low points on site can be less usable for burials.

Constraints & Opportunities

Refer to Internal Views – page 57.



ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN 1:10000 @ A4

INTERNAL VIEWS (SC)

ANALYSIS:
INTERNAL VIEWS

Site Conditions

As identified in the "Rookwood Visual Significance Study" (DEM 2010), the main panoramic views are available from the high points and along the ridges.

Long views beyond the site extend to the Blue Mountains (limited), Chatswood and the CBD. (Long green arrows)

The other views are more internal, "taking in important features of the Cemetery itself".

The undulations within Rookwood Cemetery provide a variety of short, medium and long views which make the visual experience of the cemetery more varied and enjoyable. Most views are mostly green, with planting, grass and trees.

However detracting views within the cemetery still exist. Some are avoidable (such as soil stockpiles, areas with limited maintenance regimes) and others are unavoidable (densely buried areas with stone headstones and ledger). These, however, may be able to be partially screened, especially if along the Primary roads.

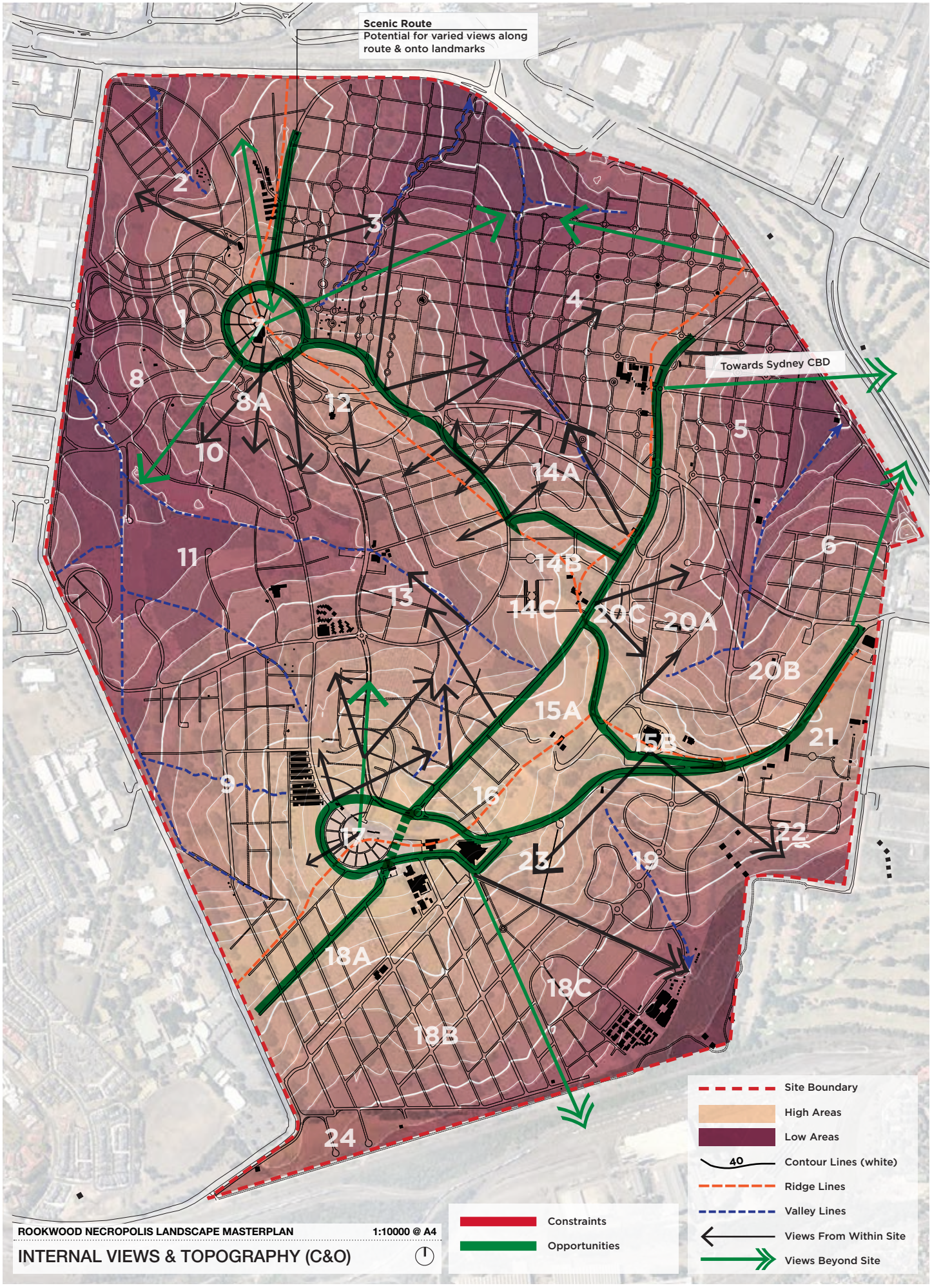
INTERNAL VIEWS:

Issues

- Views within and beyond Rookwood are an important part of Rookwood's character.
- Areas with views are prime burial areas which potentially command higher prices.
- Views along the Primary roads as particular important to the experience of visitors and should be enhanced.
- Densely monumented burial areas detract from the positive visual experience of Rookwood so do soil stockpiles.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency	There is competing land use on ridges (buildings and burial – both with views). Monumental graves on ridges are visually detracting.	Opportunity for a Scenic Route along roads situated on ridgelines: • William Drive • Necropolis Circuit • Necropolis Drive • Hawthorne Avenue • Barnet Avenue (part of) • Memorial Avenue • Sheehy Avenue Opportunities for more buildings on ridges (in line with earlier practices). Key views beyond site: • Sydney CBD from Hawthorne Avenue Potential for viewing platforms over the site and surrounds.
Recreational Activities		
Sustainability		Unused/undeveloped burials on ridges are premium sites especially amongst the Chinese Community.
	Low points tend to be less usable for burials.	Regular maintenance of stormwater outlets will assist usability of low points.


Scenic Route
Potential for varied views along route & onto landmarks
Towards Sydney CBD
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20A
20B
20C
21
22
23
24
Site Boundary
High Areas
Low Areas
40
Contour Lines (white)
Ridge Lines
Valley Lines
Views From Within Site
Views Beyond Site
Constraints
Opportunities
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN
1:10000 @ A4
INTERNAL VIEWS & TOPOGRAPHY (C&O)

ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN **1:10000 @ A4**

EXTERNAL VIEWS (SC)

ANALYSIS:
EXTERNAL VIEWS

Site Conditions

The site is visible mostly from Railway and East Streets.

There are some glimpses available from Albert Street on Unit 4 and onto the War Graves Lawn (Unit 21) from Weeroona Road.

Most of the east and south boundaries are against railway freight lines and do not offer any public views in.

There is tree planting but no low-screen planting along any of boundaries with public interface.

The majority of the views in are onto headstones which is to be expected considering the use for the site. However, when the burial areas are not maintained satisfactorily, this also contribute to a poor image of the cemetery. The maintenance of the boundary burial sections is therefore important.

The areas of bushland (Units 3, 8 & 11) appear unkept in parts.

The fencing consists of a 2m high galvanised chain mesh with barbed wire on top.

Although it provides transparency, it contributes to an unfriendly image of the cemetery, one which says “keep out” rather than “please come in”.

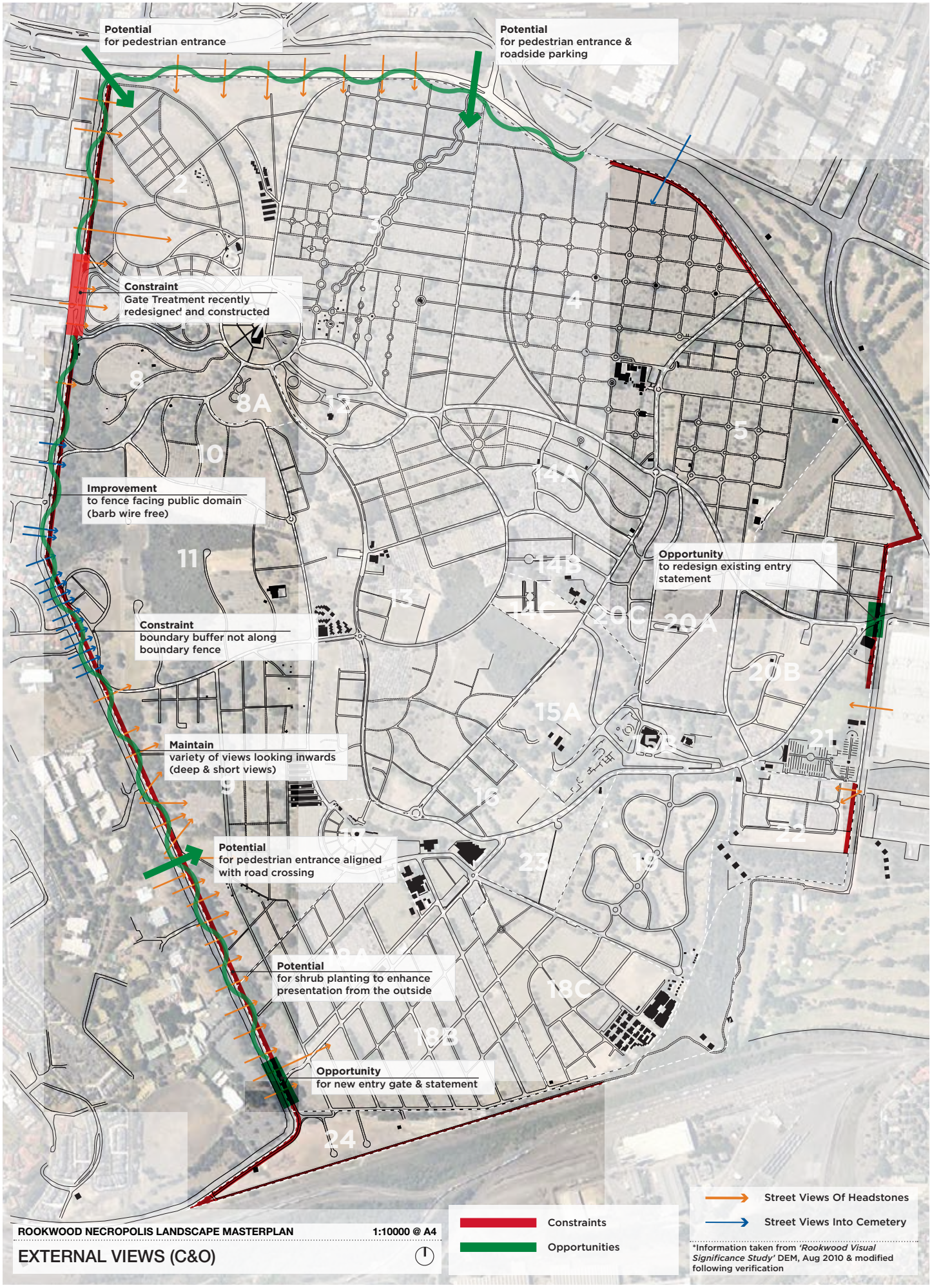
EXTERNAL VIEWS:

Issues

- The site's presentation from the neighbouring public areas is below standard.
- Fences are inhospitable.
- Weeroona Road entrance is not commensurate with the significance and size of Rookwood.
- The bushland area gives an impression of an untidy and uncared landscape.
- The public should be enticed to visit and experience Rookwood, with easier access.
- Views of extensive burial fields may be offensive to outsiders and could be soften and screened in places.
- Buffer zones are not consistent all around the cemetery, potentially showing graves along fence lines.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency	East Street Gate treatment recently redesigned & constructed Buffer zones: • Unit 11 (CMCT) not along boundary fence • Unit 2-3 & part of Unit 4 – no new burial 10m from boundary (subject to Council requirements based on planning controls & health regulations) • Unit 22 – burials up against fence – buffer required?	Potential: • New pedestrian entrances & signage along Railway & East Street • Roadside parking on Railway Street • Shrub planting along entire length of Railway & East Street to enhance presentation from the outside • New entry gate & statement (corner of East Street & Sheehy Avenue) • Redesign existing Weeroona Road entrance statement Improve fence facing public domain (barb wire free) Add interpretation signage to educate the public in bushland zones Maintain variety of views looking inwards (deep & short views) for added interest
Recreational Activities		
Sustainability		


Potential
for pedestrian entrance
Potential
for pedestrian entrance &
roadside parking
Constraint
Gate Treatment recently
redesigned and constructed
Improvement
to fence facing public domain
(barb wire free)
Opportunity
to redesign existing entry
statement
Constraint
boundary buffer not along
boundary fence
Maintain
variety of views looking inwards
(deep & short views)
Potential
for pedestrian entrance aligned
with road crossing
Potential
for shrub planting to enhance
presentation from the outside
Opportunity
for new entry gate & statement
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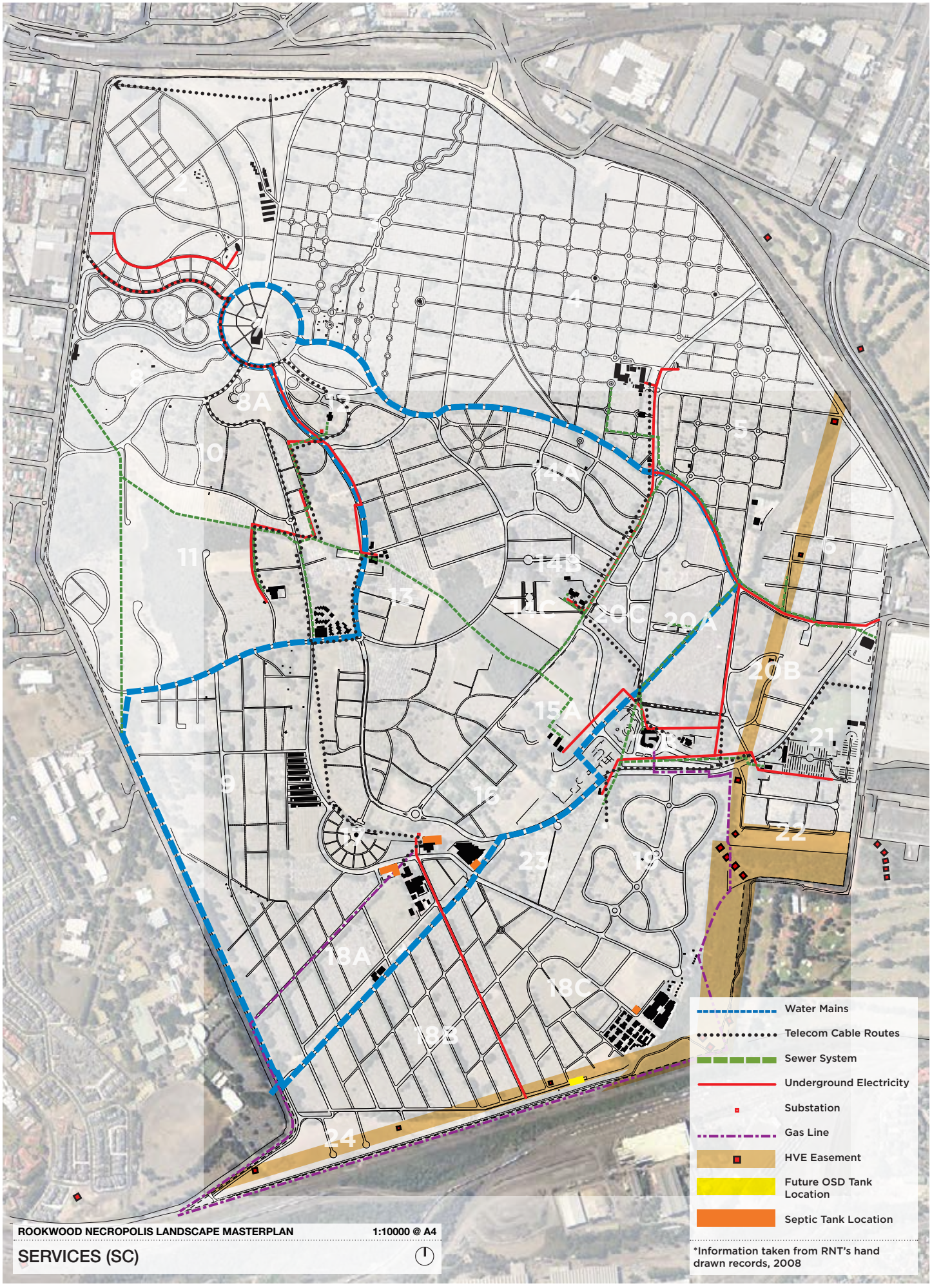
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN
1:10000 @ A4
EXTERNAL VIEWS (C&O)
Constraints
Opportunities
Street Views Of Headstones
Street Views Into Cemetery
*Information taken from 'Rookwood Visual Significance Study' DEM, Aug 2010 & modified following verification



ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN 1:10000 @ A4

SERVICES (SC)

ANALYSIS:
SERVICES

Site Conditions

All services are located within road side or individual easements for maintenance access. These easements are free of burials:

Water mains: One connection off East Street, looping around the site as shown.

Sewer lines: Only one connection allowed into the site, located off East Street. Due topography of the site, the Catholic section is not serviced by the sewer and relies on septic systems.

Electricity: Mostly underground. A number of substations exist on site.

Gas line: Two main branches (one from East Street and the other from Weeroona Road south) services the two crematoriums on site.

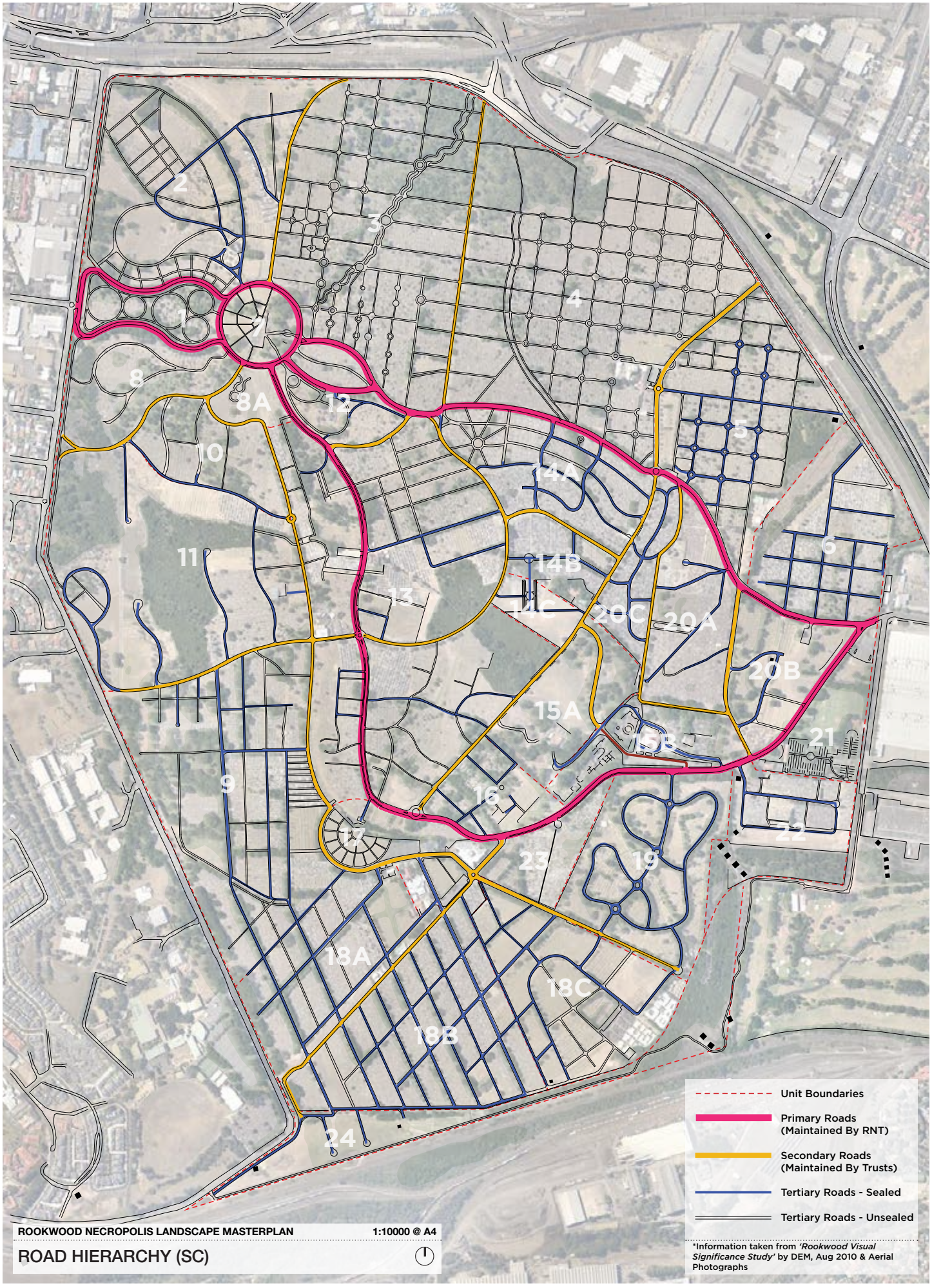
High Voltage Power line: Several easements dissect the site, mostly on the southern portion of the site. A number of pylons/towers exist and the land onto which they sit cannot be buried onto. There appears to be no restriction for burial between pylons (these areas are been mostly buried out). Some height restrictions may apply within the easement.

Issues

- All services are in easements (currently being surveyed and recorded) and are subject to various restrictions.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency		
Recreational Activities		
Sustainability	No burials allowed in all easements (except HVPL?). Services are in easements which take up valuable burial land. Height restrictions may apply to HVPL (soil stockpile and storage of tall equipment).	


Unit Boundaries
Primary Roads (Maintained By RNT)
Secondary Roads (Maintained By Trusts)
Tertiary Roads - Sealed
Tertiary Roads - Unsealed
*Information taken from 'Rookwood Visual Significance Study' by DEM, Aug 2010 & Aerial Photographs
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN
1:10000 @ A4
ROAD HIERARCHY (SC)

ANALYSIS:
ROAD HIERARCHY

Site Conditions

As stipulated in the "Rookwood Visual Significance Study" (DEM 2010), "The road hierarchy for Rookwood identified in the numerous reports and recommendations defines three street types – primary, secondary, tertiary".

Although the term "road" is used, they are thought of in terms of "streets", encompassing all of their characteristics – width, edge and kerb treatment, verge, parking, avenue trees, spacing of trees etc..

The majority of the northern portion of the site still has evidence of original brick kerb and channel. Some roads in the southern portion of the site (especially in Unit 9) also have evidence of original kerbing and as such are thought to be significant routes (refer to the Historic Circulation Routes – page 29).

The Primary roads are the main corridors. They connect the entries and serve as the main routes through the site. Their configuration has been modified (DEM design) to reduce traffic speed and provide grand treed avenues. They are typically two narrow lanes with decomposed granite verges for parking, interrupted by tree planting (refer to comments under Primary Road Treatment – page 71).

The program of reconstruction and re-planting of the Primary roads has been going for approximately 10 years and is still in progress. It is 70% complete and due for completion in 2019.

The Secondary roads are access streets with lower traffic volumes than the Primary roads. They generally divide and service the Units. They allow for two way traffic, sometimes even allowing for one extra parking lane. These roads are the subject of a proposed design (DEM) but few have been upgraded or reconstructed to this design. The current proposal suggests parking on grass verges which is not welcomed by ground staff and arborists.

The current proposals suggest:

- narrowing of the roads,
- planting of new trees within the original road width,
- parking on grass verge between the trees on one side and, pedestrian path on the other.

This presents the following issues:

- The realignment of the avenue trees assumes the demolition of existing established avenues which is not supported.
- parking should not occur on grassed verges as the repetitive parking will both compact the soils leading to tree damage and destroy the turf and create ruts when wet.
- The narrowing of the roads does not increase yield as it replaces gained land with parking and pathway.

As the traffic numbers and patterns have changed, a number of roads have the potential to be downgraded or upgraded. The proposals may also affect the traffic flow and could lead to regrading.

Tertiary roads are access lanes with low traffic volumes. They vary in width from a 3-lane to a single lane width. They generally dissect the Units in manageable size parcels, allowing visitors and personnel to access all graves with reasonable walking distances.

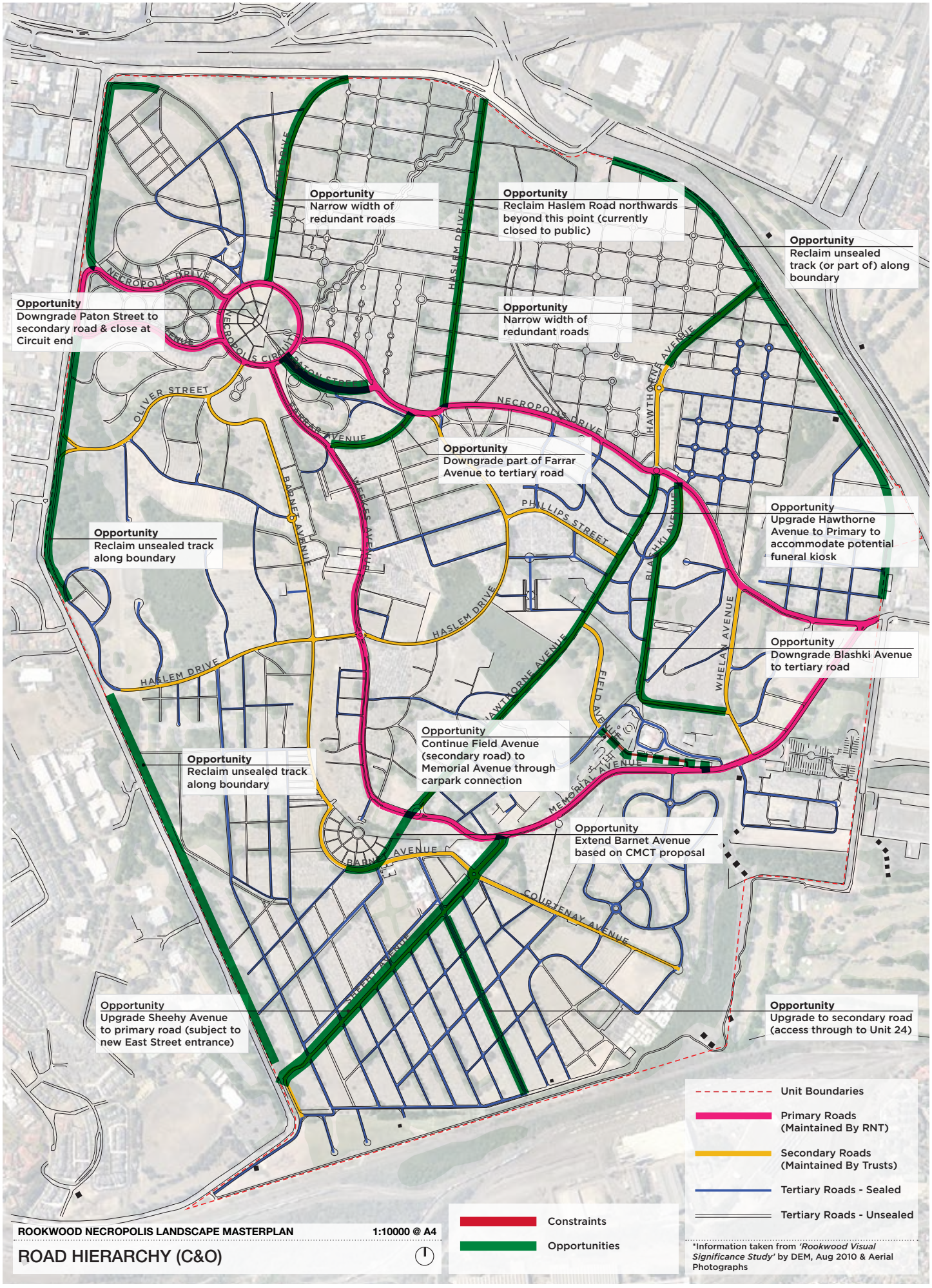
ROAD HIERARCHY:

Issues

- The Secondary road treatment needs to be different to the Primary road to avoid returning to the original orientation confusion (proposal subject to review).
- Ditto with Tertiary roads (no known proposal).
- The Primary road profile is fixed.
- The Secondary and Tertiary road proposed profile requires modification for Trusts' approval.
- The road usage and traffic patterns have changed over the years.

Constraints & Opportunities

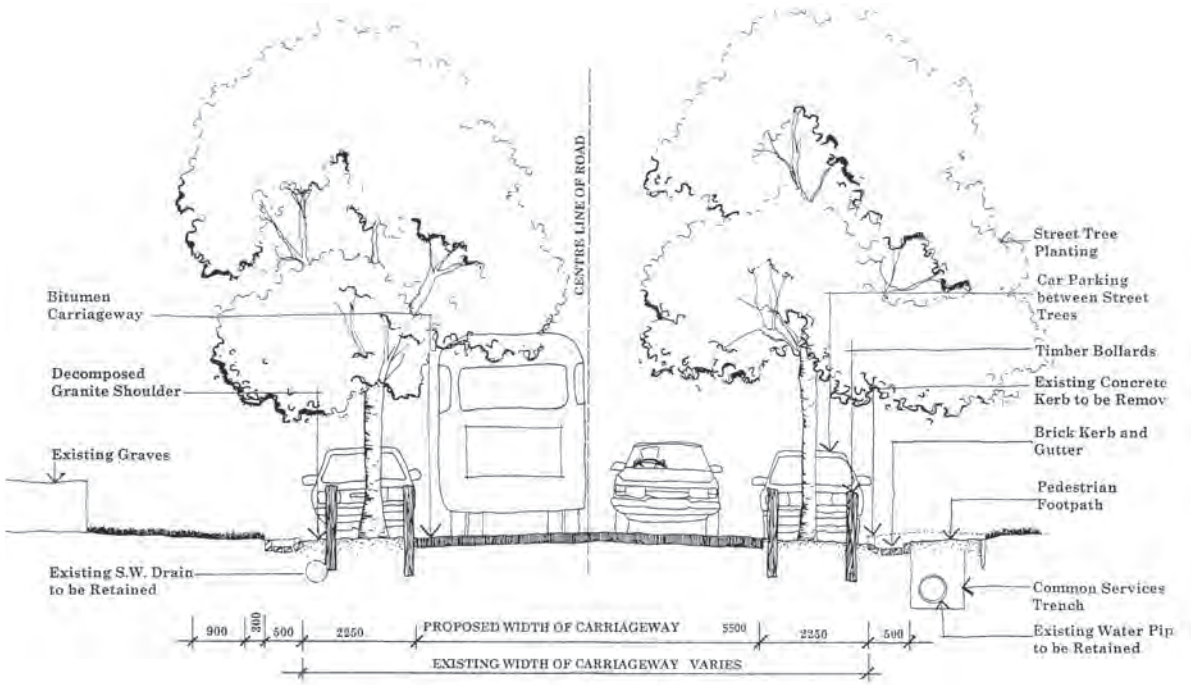
Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency	Existing Primary road layout is already committed. Each road-type profile (Primary/ Secondary/ Tertiary) needs to be sufficiently different to be read by visitor to avoid confusion and disorientation. Existing/ original treed avenues limit the opportunity to reclaim burial land in the short and medium term even if the roads are narrowed.	The proposed Secondary road profile is open to modifications, if required. Tertiary road profile required.
Recreational Activities		
Sustainability		Reclaim unsealed tracks along boundary (or part of) for pedestrian tracks. Narrow width of redundant roads whilst respecting original kerbs: • William Drive • Haslem Drive (north) • Part of Hawthorne Avenue (east) Downgrade: • Primary road to Secondary: Paton Street and close at Circuit end • Secondary road to Tertiary: Part of Farrar Avenue & Blashki Avenue Upgrade: • Secondary road to Primary: Sheehy Avenue (subject to new East Street entrance) & Hawthorne Avenue (between Necropolis Drive and Memorial Avenue) • Tertiary road to Secondary: North-south running road along Sacred Heart Chapel, Condolences Lounge & Crematorium Continue: • Secondary road: Connect Field to Memorial Avenue through carpark & connect Barnet to Memorial Avenue



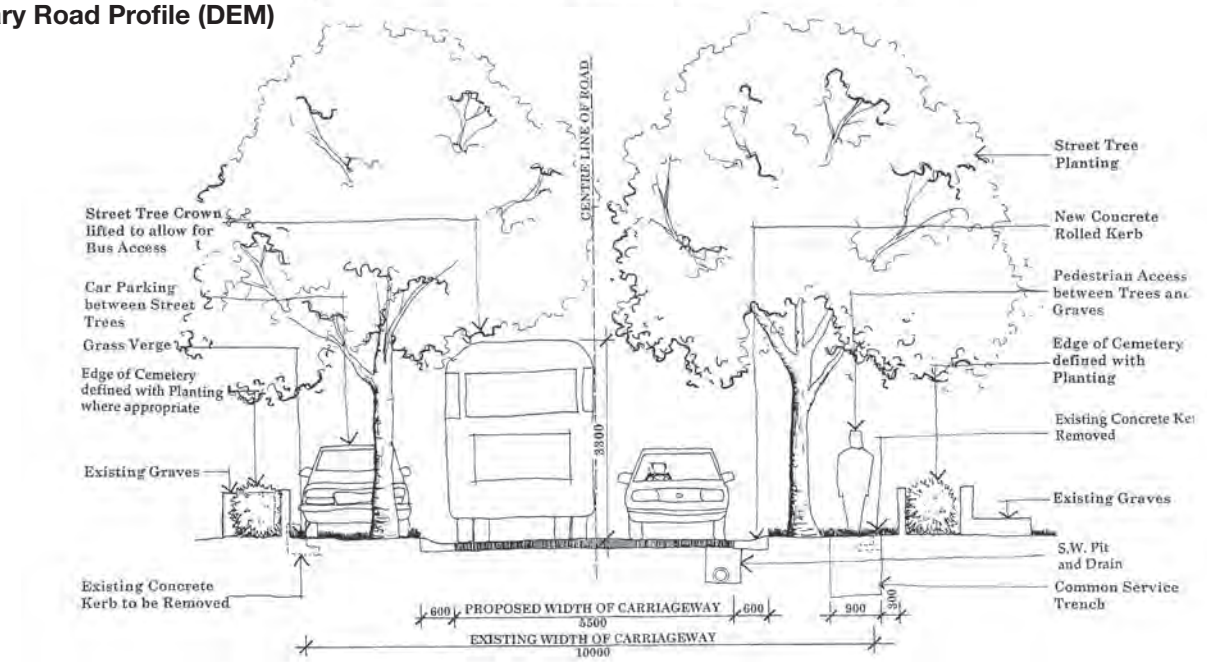
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN 1:10000 @ A4

ROAD HIERARCHY (C&O)

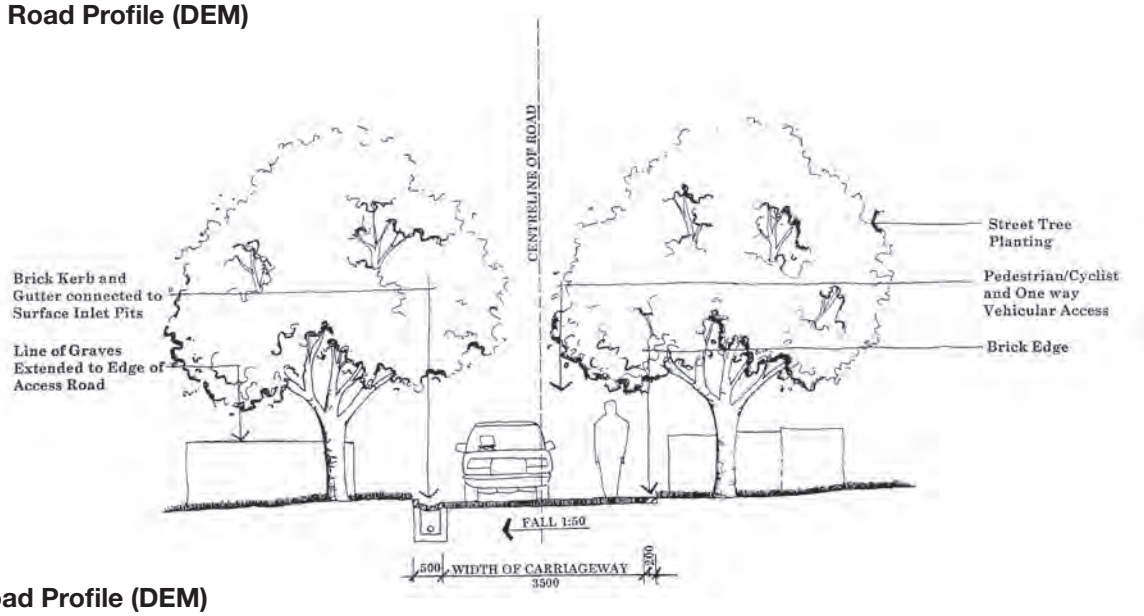
*Information taken from *'Rookwood Visual Significance Study'* by DEM, Aug 2010 & Aerial Photographs



Primary Road Profile (DEM)



Secondary Road Profile (DEM)



Tertiary Road Profile (DEM)

ANALYSIS:
ROAD TREATMENTS

Site Conditions

Primary:

As discussed under Road Hierarchy, the profile of the road has been modified from its original profile to a narrower width with trees planted at regular intervals into a decomposed granite verge set-out for parking purposes.

The decomposed granite surface requires regular maintenance (sweeping of run-offs from the road and filling of eroded portions after heavy rainfall events).

A small portion of the road has black-unit-paver verges (Unit 13 – Weekes Road).

There are currently 6 different kerb & channel and verges options being implemented which lacks consistency.

Rookwood's preferred arborist has expressed concerns about the tree selection (*Eucalyptus microcorys*). In his professional view, the tree is not suitable to be planted within the road as it is a large tree capable to extensive damage on to the road pavement. In places the newly planted trees are establishing very slowly due to the competition (mostly for light) with the existing/ original larger established avenue trees.

Secondary:

The Secondary roads vary significantly throughout the site both in width and planting practices (10m wide in Hawthorne Avenue and no avenue trees to 6.5m wide in Barnet Avenue with trees close to the kerb in a very narrow grass verge). They provide an important parking function as well as a circulation purpose.

The vast majority of Secondary roads are currently adorned with established treed avenues in good health. In areas where drainage has failed, the road surface has deteriorated quickly and requires repairs. For these roads, a redesign of the stormwater and a change of road profile to a typical profile is required.

This new Secondary road profile needs to be significantly different to the Primary to ensure legibility between the two, hence removing the confusion which originally prompted the redesign of the Primary roads.

The current proposals present some issues (as discussed in Road Hierarchy – page 67), in particular:

- The realignment of the avenue trees assumes the demolition of existing established avenues which is not supported.
- Parking should not occur on unconsolidated grassed verges as the repetitive parking will both compact the soils leading to tree damage and destroy the turf and create ruts when wet.
- The narrowing of the roads does not increase yield as it replaces gained land with parking and pathway.

Tertiary:

The Tertiary roads vary significantly throughout the site both in width, materials and planting practices. They typically accommodate parking for funeral events and visitation as mourners seek to park as close to the graves as possible; also serving as a footpath.

Planted Tertiary roads are a minority even though they are the roads where shelter from the elements is most required (shade in summer for parked cars and rain in winter). Where planting does occur it should be retained, in particular along the avenues deemed to be "historic circulation routes".

PRIMARY ROAD TREATMENT:

Issues

- The Primary roads have a role to play in way-finding.
- The majority has been developed as per DEM proposed profile, despite some on-going concerns.
- Rookwood's arborist has concerns about the tree selection for these avenues.
- The trees compete with existing original avenues.
- The verge treatment is maintenance intensive.
- There are multiple kerb treatments being implemented as part of the new design which is inconsistent.
- The Secondary roads must be visually different to Primary to improve way-finding.
- Parking on grassed verges increases maintenance requirements and can detract visually when damage occurs.
- Relaying all roads for aesthetic or way-finding purposes is not warranted.
- Relaying roads to improve drainage and minimise maintenance may be required in places.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency	Maintenance Issue: • Primary roadside parking material (decomposed granite) run-off onto road – slippery, visually messy • *Eucalyptus microcorys* (current Primary road street tree) not suitable long term tree • Parking on grass verges causes damage when wet and compaction around trees • Many Secondary roads are already planted with street trees • Some Tertiary roads are already planted with significant trees New street trees currently planted along Primary roads do not take into consideration surrounding established trees – overshadowing, resulting in stunted growth/ in consistent canopy line.	Unify kerb treatment along Necropolis Circuit in next phase of repairs. Replace decomposed granite with porous unit pavers (contrasting in colour to asphalt) for ease of maintenance. Consider alternative Primary road street tree species for future works. Provide standard profile for Secondary and Tertiary for the sake of unification. Consider modifying existing proposals to minimise maintenance and maximise parking opportunities.
Recreational Activities		Secondary and Tertiary roads may perform as pathways for recreational purposes.
Sustainability	Secondary roads are not suitable for road reclaim. Some roads are historically significant and cannot be reclaimed.	Some Tertiary roads may be suitable for reclaim.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Opportunity
Unify kerb treatment in state heritage area (brick)

Maintenance
Porous unit pavers of contrasting colour in lieu of decomposed granite for ease of maintenance

Opportunity
Unify kerb treatment outside state heritage area (concrete)

Opportunity
Eucalyptus microcorys (currently the primary road street tree) not recommended by the Necropolis Arborist.
Consider alternative species for future works

Maintenance
Sand run-offs, long term issue - slippery

ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN 1:10000 @ A4

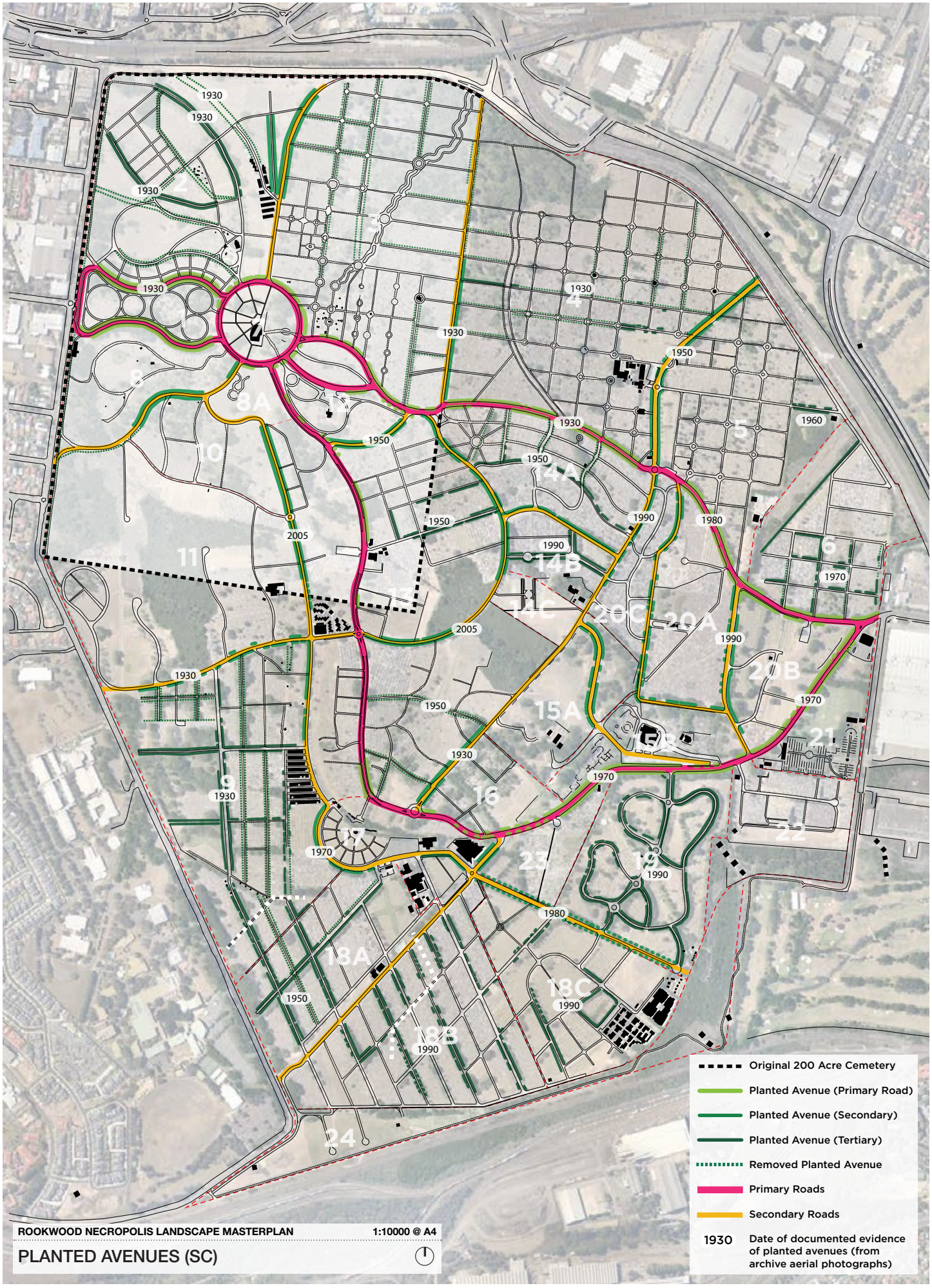
PRIMARY ROAD TREATMENTS (C&O)

Constraints

Opportunities - Primary Roads Still To Be Upgraded

Unit Boundary

Primary Roads


1930
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1990
1990
Original 200 Acre Cemetery
Planted Avenue (Primary Road)
Planted Avenue (Secondary)
Planted Avenue (Tertiary)
Removed Planted Avenue
Primary Roads
Secondary Roads
1930
Date of documented evidence of planted avenues (from archive aerial photographs)
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN
1:10000 @ A4
PLANTED AVENUES (SC)

ANALYSIS:
PLANTED AVENUES

Site Conditions

A number of roads are flanked by trees throughout the site.

A review of archive aerial photos from 1930 to today has identified when these planting may have taken place or when they were evident on aerial photographic records.

Some have since been removed (hatched), others are intact.

Most are planted behind the kerb in a 2m (or more) grassed verge.

With regards to the Primary avenues there is no evidence of plantings on the earliest available map (1930s) except for portions of Necropolis Drive (western section up to Hawthorne Avenue).

However, it has recently become a strategic decision to develop the Primary avenues as green corridors with treed canopies to create a sense of arrival and to assist with way finding in a layout which is highly confusing.

The implementation of the planting along the Primary roads is 70% complete (refer to Primary Road Treatments Map – page 73).

With regards to Secondary and Tertiary roads, although a significant proportion remains, the plantings have gaps or have been removed in large sections, adding to the “patchy” and inconsistent look and experience of the cemetery.

The predominant species are:

Primary Roads:

- *Eucalyptus microcorys* (Tallowood)*
- *Phoenix canariensis* (subject to disease attack, as for a lot of Canary Palms in Sydney)*

Secondary Roads:

- *Lophostemon confertus* (Brushbox) (Barnet Avenue)
- *Eucalyptus microcorys* (Tallowood) (Hawthrone Avenue)*
- *Eucalyptus sideroxylon* (Mugga Ironbark) (Haslem Drive)
- *Platanus hybrid* (Plane tree) (Hawthorne Avenue)*
- *Ficus hillii* (Hawthorne Avenue)*

Tertiary Roads:

- *Lophostemon confertus* (Brushbox) (Clancy Street, Gilroy Avenue)
- *Melaeuca sp.**
- *Lophostemon confertus* (Unit 9 and 18A)
- *Eucalyptus citriodora* (Unit 11, 14A, 19)
- *Eucalyptus eugenoides* (Oliver Avenue)
- *Phoenix canariensis* (subject to disease attack) (Freeman Street)*
- *Camphor laurel* (Unit 2)

The above trees marked with an asterisk (*) have been deemed problematic by Rookwood’s main arborist. As evident with the Canary Palms, a monoculture or prevalence of one specie has the potential to have a huge impact on the avenues when a disease appears for which no known treatment is available.

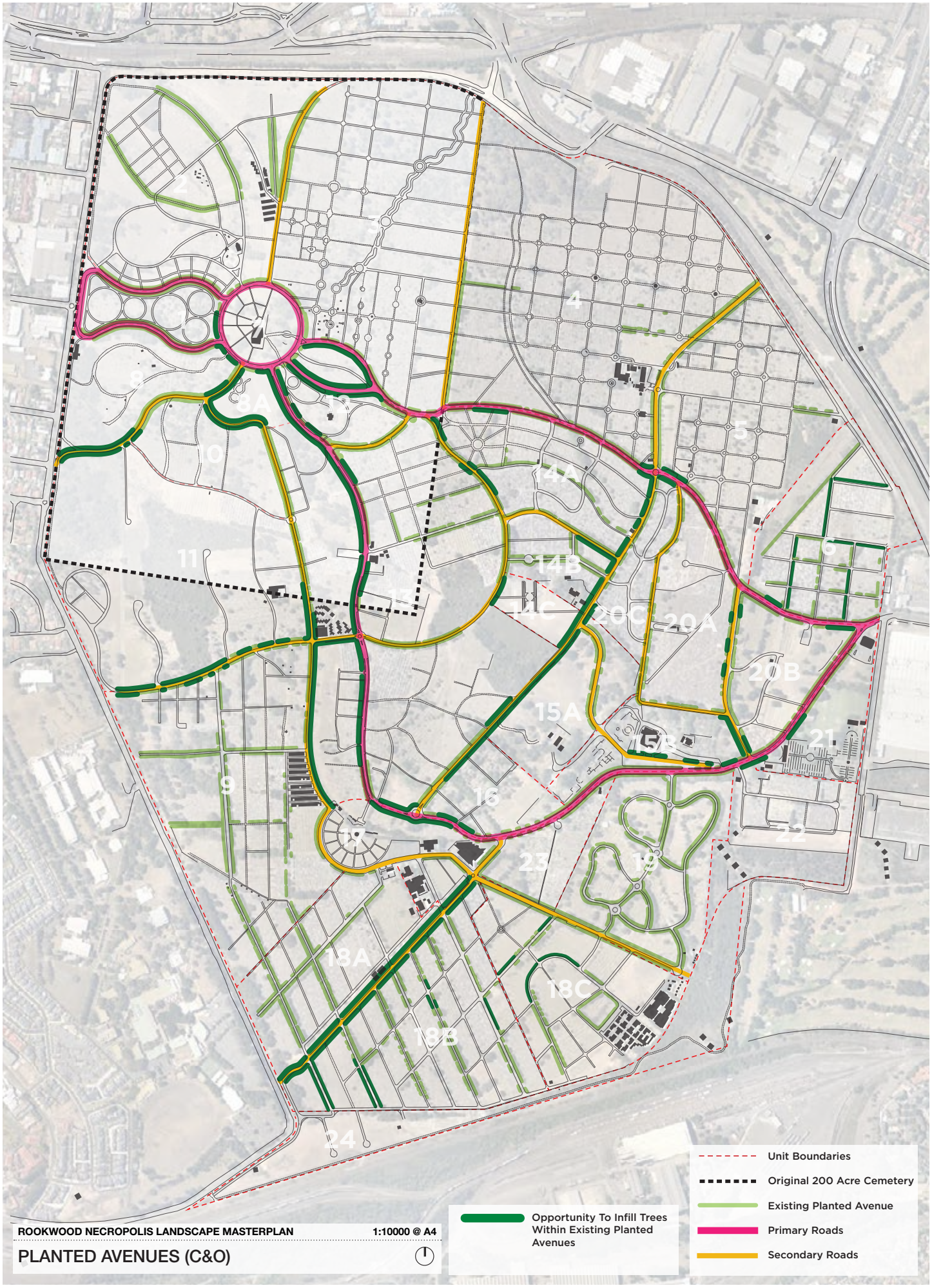
PLANTED AVENUES:

Issues:

- Historic and main avenues are incomplete.
- The attack on significant avenues by an un-treatable disease has a huge visual impact.
- Treed avenues assist with way-finding and defining Primary, Secondary and Tertiary roads (together with their road profile).
- Lack of avenues trees means lack of shade for parked cars.
- Some trees used on site are deemed problematic or unsuitable.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency	Constraints may exist along roads (services, soil quality, burials too close). Some historically significant species attacked by untreatable disease (palm trees). Monoculture leads to high impact when disease strikes (*Eucalyptus microcorys* avenues and palms).	Plant avenues for shade for parked cars. Additional "green" tunnel effect to improve the experience of Rookwood. Increase participation of arborist in the tree selection process. Broader palette of trees for selection. Develop palette of trees to be avoided.
Recreational Activities		
Sustainability		


Opportunity To Infill Trees Within Existing Planted Avenues
Unit Boundaries
Original 200 Acre Cemetery
Existing Planted Avenue
Primary Roads
Secondary Roads
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN
1:10000 @ A4
PLANTED AVENUES (C&O)


01


02


03

Low Planting
Variety: Exotic
Height: Less than 1m

07

08

Low planting
Variety: Exotic/ Native
Height: Less than 1m

01

02

High Planting
Variety: Native
Height: 1.5-2m

Low Planting
Variety: Exotic
Height: Less than 1m

03

Low Planting
Variety: Exotic
Height: Less than 1m

05

04

06

High Planting
Variety: Native
Height: 1.5-2m

Low Planting
Variety: Exotic
Height: Less than 1m


04


05


06


07


08

Unit Boundary

Primary Road

Roadside Screen Planting

ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN 1:10000 @ A4

PRIMARY ROADSIDE SCREEN PLANTING (SC)

ANALYSIS:

PRIMARY ROADSIDE SCREEN PLANTING

Site Conditions

It is evident when driving through the cemetery for the first time that the burial fields have a visual impact on the experience:

- Some sections are densely built and almost all mineral (monumental sections/Chinese in particular);
- Some have been allowed to extend close to the road kerb.
- Some have low monuments (lawn sections) .
- Some have tall monuments (monumental sections).

Some verges have been planted out to screen the monuments either planted with Lomandras and tall grasses (Necropolis Drive) or Grevilleas (Muslim section). This practice greatly enhances the visitors' experience whilst providing some privacy to the mourners within the burial areas.

Some of the roundabouts have been softened by planting whilst retaining sight lines for traffic. Around the Necropolis Circuit the shrubs plant selection seems to take into consideration the heritage significance of the area and more traditional plants usually associated with heritage gardens.

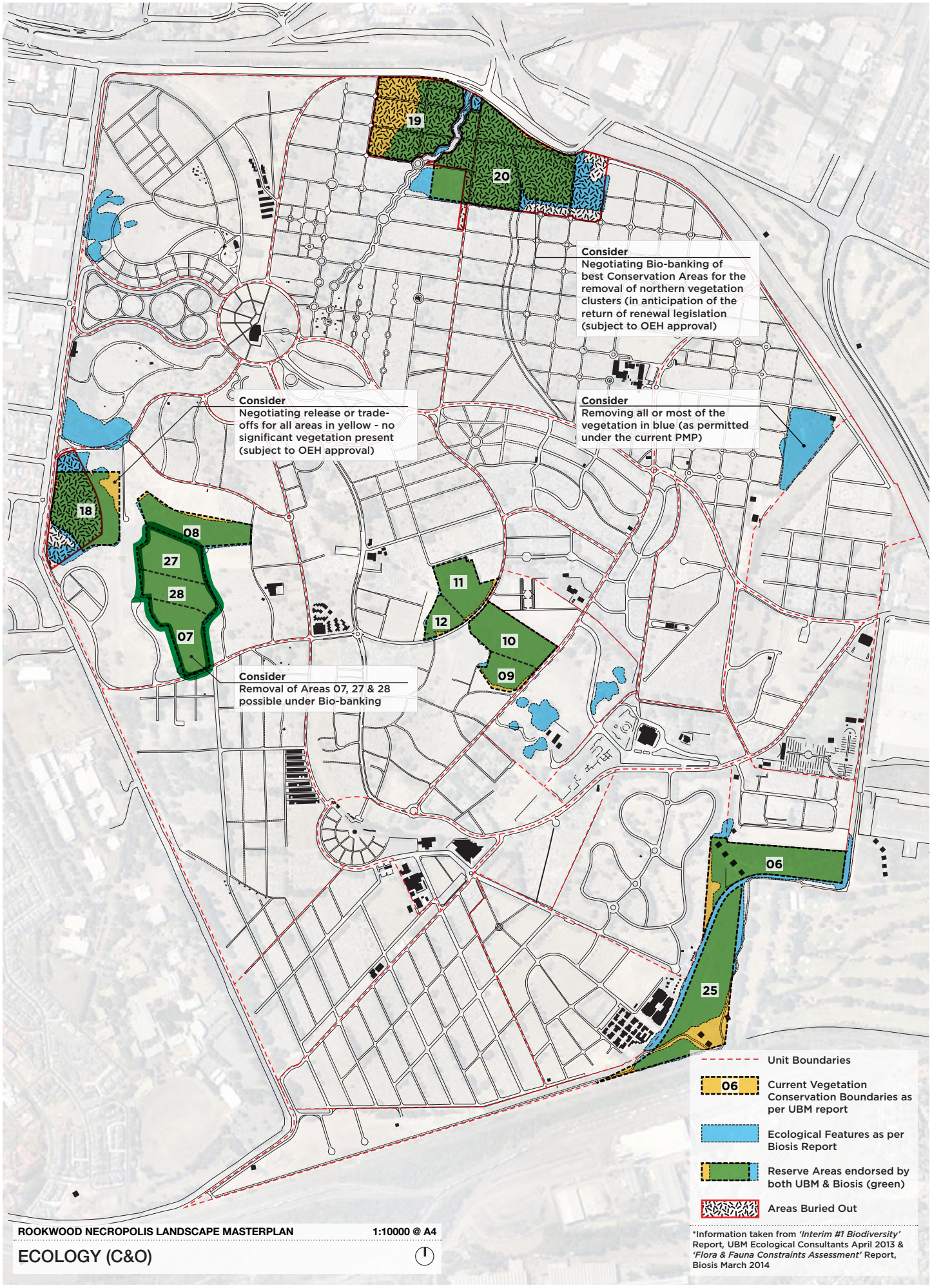
The planting around the prominent Crown of Thorns' lawn is also attempting to soften the edges but is too low to provide headstone screening.

Issues

- Some burial areas are visually obtrusive by either being dense, tall or too close to the road.
- The planting of verges greatly improves the visual aspect of the Primary roads.
- The plant selection varies depending on heritage or cultural factors.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency	Opportunities are limited by space available and how close to kerbs burial has been allowed to take place Planting to reflect cultural groups and heritage significance	Continue planting treatment where possible Low planting to: • Screen headstones from road experience • Spatially separate active and grieving areas • Separate burial areas where necessary (cultural sensibilities) Key Areas which are particularly densely built and monumental in style (emphasis on non-historical areas): • Unit 13 • Unit 16 • Unit 17 • Unit 19 • Unit 20 • Unit 23
Recreational Activities		
Sustainability		



ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN **1:10000 @ A4**

ECOLOGY (C&O)

*Information taken from *'Interim #1 Biodiversity'* Report, UBM Ecological Consultants April 2013 & *'Flora & Fauna Constraints Assessment'* Report, Biosis March 2014

ANALYSIS:
ECOLOGY

Site Conditions

According to the various ecological reports by UBM and in particular the recent one from Biosis which aims at summarising all ecological issues on site, the site is host to:

- Two threatened Ecological Communities (Cumberland Plain Woodlands [CPW] and Cooks River Castlereagh Ironbark Forest [CRCIF].
- The CPW on site represents less than 5% of the total communities in a 10km radius and ranges from poor to moderate-good in condition.
- The CRCIF on site represents close to 25% of the total communities in a 10km radius and will therefore be more difficult to remove due to its significance. It ranges from poor to moderate-good in condition.
- One threatened flora specie of Commonwealth and State significance (*Acacia pubescens*).
- One threatened flora specie of State significance (*Epacris purpurascens var. purpurascens*).
- Two threatened populations of shrubs of State significance (*Pomaderris* and *Wahlenbergia*).
- Various hollow trees which may provide habitat for threatened bird, bat and mammals.
- Foraging resources for threatened Flying Fox and birds.
- Potential habitat for threatened Green and Golden Bell frog.

The removal of any of the above flora species will require a Significant Impact Statement (SIS). Depending of their significance (condition, percentage of overall population etc.), the constraints imposed by their proposed removal will vary.

It is highly possible that the Office of Environment and Heritage will not grant more release of Protected Vegetation land for burial as the PMP has already successfully applied for land release over the last 10 years. This can only be known for sure by making further applications.

The report/ assessment by Biosis found some additional *Acacia pubescens* not previously recorded. Removal of these plants will require an application to OEH but is unlikely to be rejected as there are many examples of these plants on site.

There is discrepancy relating to the extent of the Conservation areas between the Biosis and UBM assessment.

The report explores various options relating to Bio-banking and attempts to present a comparison between PMP and Bio-banking in terms of the future management of these EECs.

ECOLOGY:

Issues

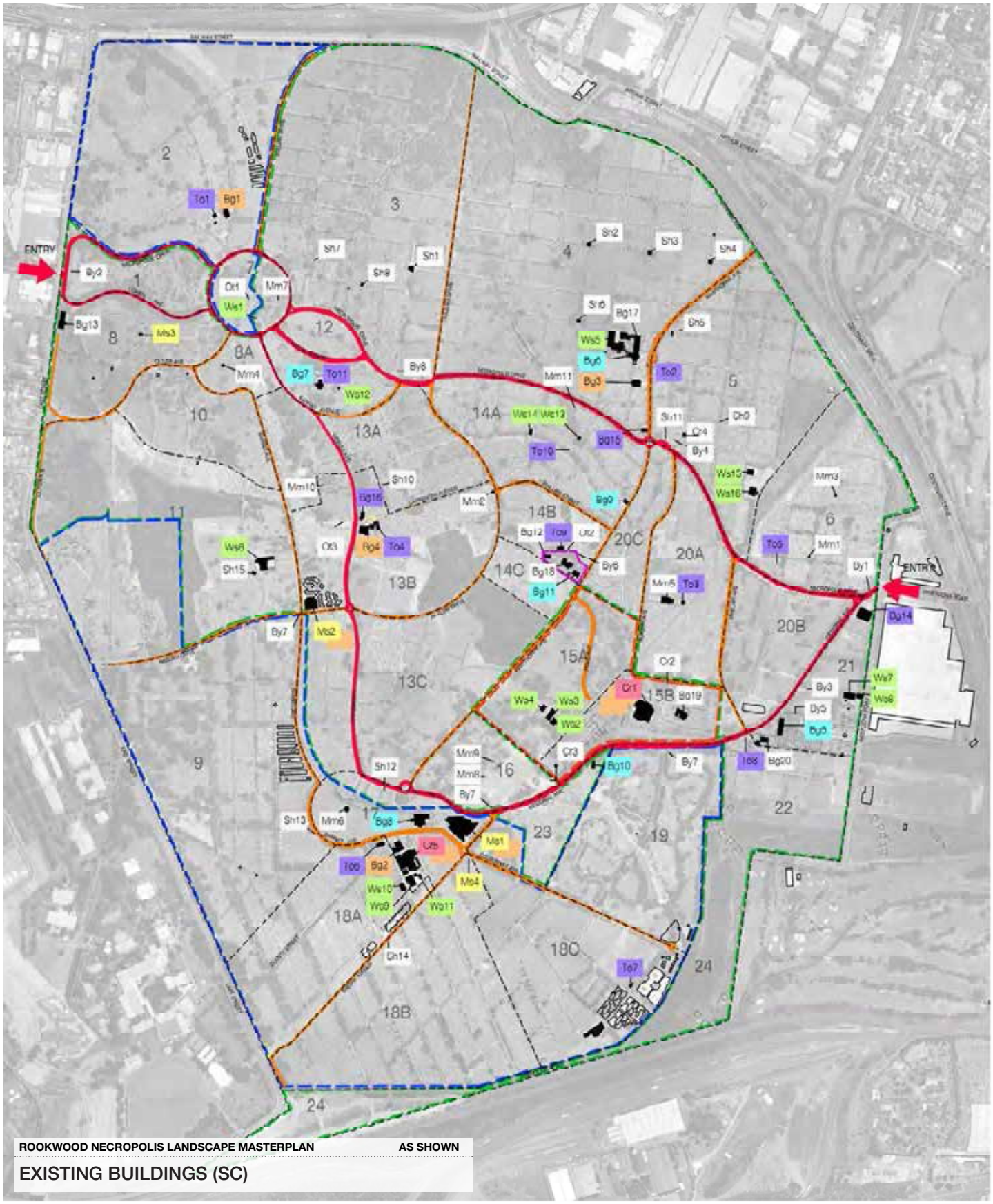
- The site holds 20.3Ha of Conservation areas which are the subject of a PMP.
- Pockets of endangered vegetation (other than Conservation areas) are also present on site.
- New specimens of threatened species were found by Biosis (6 plants).
- The Bio-banking process may offer alternative options for land release.
- The cost of management of these areas is not subsidised and needs to be financed by the cemetery.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency		
Recreational Activities		
Sustainability	The PMP prohibits the development of these areas for burial purposes and are subject to strict controls. PMP unlikely to offer more land release nor allow for paths/ boardwalk and natural burials. Some areas under the PMP have already been buried out and offer no potential for future burials. Some areas under the PMP have already been buried out and offer some potential for renewal in the long-term (No longer permissible – subject to legislation changes). This will require vegetation removal prior to legislation being unacted.	There is a difference in the extent of the Conservation areas between the two ecologists which may need to be explored for release. The PMP process may be more limiting in terms of land release but is only in place for a defined number of years.
	Removal of new specimens of threatened species found (6 plants) will require additional application process.	Removal is likely to be granted due to the high incidence of these plants across the site.
	Bio-banking will lock the land as Conservation areas for perpetuity.	Potential for Bio-banking to generate income through credit points & to open up more: • Burial land • Natural burial land • Boardwalks & paths (Multiple scenarios to be explored)
	Pockets of endangered vegetation (other than Conservation areas) are subject to protection under legislation and will limit or prohibit development within.	Explore thinning out or removal of these pockets of vegetation.
		The Bio-banking process may generate income by “selling” credits to other parties required to offset their vegetation removal. This will assist with the financing of the management of such vegetation.

Signifiant vegetation in Unit 15's lawn

Signifiant vegetation, Unit 11



ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN AS SHOWN

EXISTING BUILDINGS (SC)

ROADS
- PRIMARY ROADS
- SECONDARY ROADS
- TERTIARY / DIRT ROADS

BOUNDARY
- RGCRT - ROOKWOOD GENERAL CEMETERIES RESERVE TRUST
- CMCT - CATHOLIC METROPOLITAN CEMETERIES TRUST
- UNALLOCATED LAND - RNT
- CROWN LAND RESERVE
- UNIT BOUNDARY

STRUCTURE
- OFFICES
- CHAPELS / CONDOLENCE LOUNGES
- CREMATORIA
- MAUSOLEA
- WORKSHOPS / SHEDS
- CAFES / PUBLIC FACILITIES / TOILETS
- MISCELLANEOUS

SCALE BAR

NOTE: Building tags taken from: Howard Heritage Consultancy *"REPORT ON BUILDINGS AND STRUCTURES AT ROOKWOOD NECROPOLIS"* Dated January 2011.

ANALYSIS:
EXISTING BUILDINGS

Site Conditions

The purpose of the Landscape Masterplan, in relation to buildings is to carry out a high level, strategic assessment of the efficacy of the current arrangement of buildings and their functions, rather than to drill down into the condition or architectural quality of each building.

The document entitled "Report on Buildings and Structures at Rookwood Necropolis" dated January 2011 and prepared by Howard Heritage Consultancy contains an audit of the condition and heritage significance of all non-grave structures at Rookwood, and provides a recommendations of actions for each building, based on the findings. This report is still current and valid and should be referred to by both Trusts in implementing their maintenance and renewal projects.

Due to the fact that until recently there were 7 Trusts responsible for managing Rookwood Cemetery, building facilities are scattered all over the cemetery, rather there being a distinct and small number of consolidated hubs of facilities for visitors. This includes buildings such as offices, chapels, condolence lounges and workshops.

Now that a number of Trusts have merged to form the RGCRT, there are opportunities for consolidating facilities and operations within this Trust, and some of this consolidation has already been completed. This report considers these recent changes as representing the "existing" situation. These recent changes include:

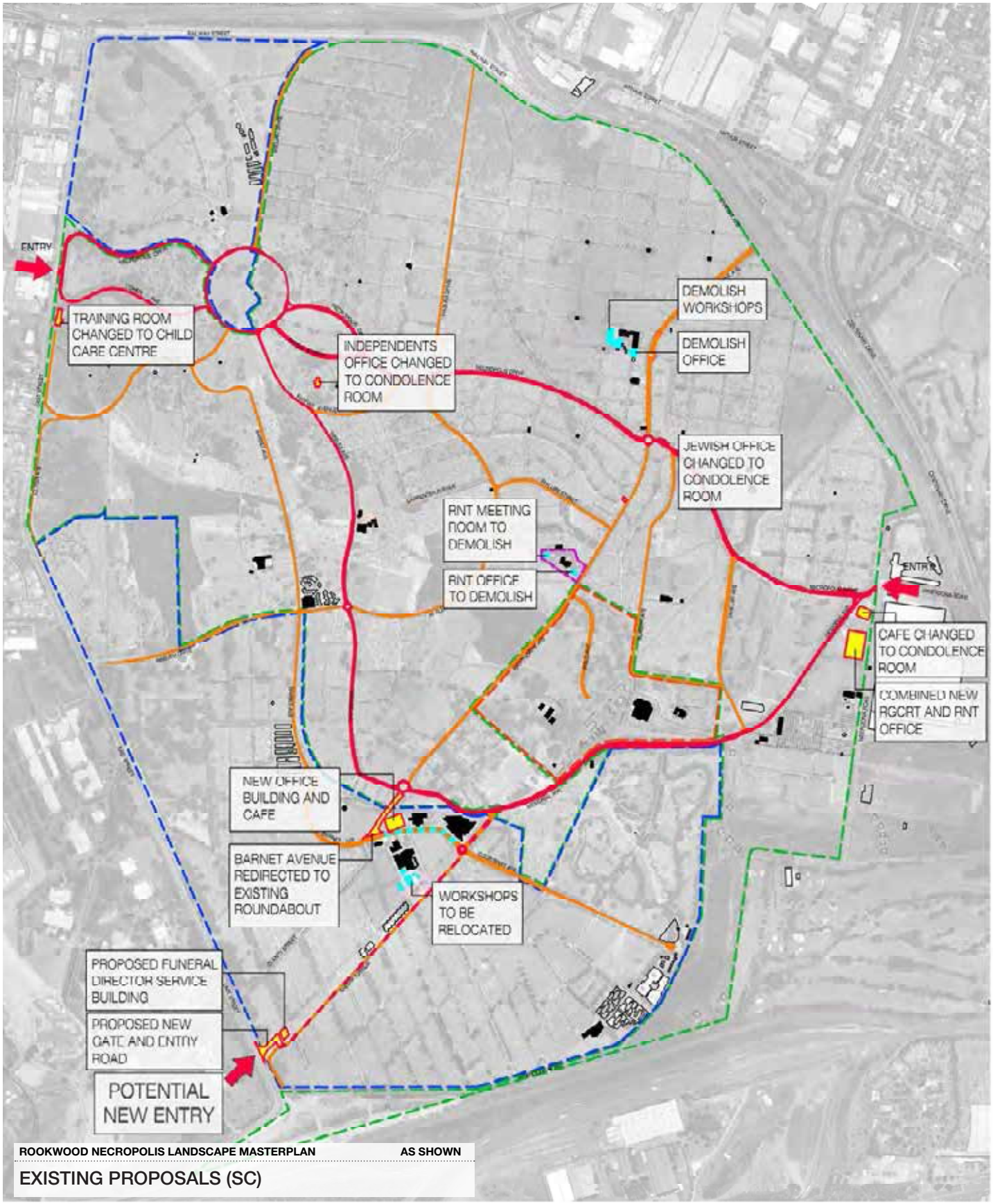
- Discontinuation of a number of workshops and their amalgamation into a new site in the north eastern corner of the cemetery.
- Consolidation of business operations into the former Anglican Office, shown as Building BG6, on Hawthorne Avenue.

Apart from the Australian War Graves section, managed separately, the Invocare Crematorium site, referred to as Crown Land Reserve and the office of the Rookwood Necropolis Trust (RNT), the main facilities that generate activity (chapels, administration offices, condolence lounges, cafes, flower shops, etc.) would appear to be conglomerated as follows:

- Catholic facilities between Barnet Avenue and Sheehy Avenue including a crematorium, mausoleum, chapels, condolence lounges, garden crypt buildings, an office buildings and workshops.
- The RGCRT facilities including the All Souls Chapel and the former Anglican Office (now main office).
- The Mausoleum of Eternal Rest on Barnet Avenue, which includes a chapel.
- The Church of St Athanasius on Weekes Avenue.
- The Reflections Café on Memorial Avenue.

Issues

Refer to Existing Proposals – page 87.



ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN **AS SHOWN**

EXISTING PROPOSALS (SC)

SCALE BAR

ROADS
- PRIMARY ROADS
- SECONDARY ROADS
- TERTIARY / DIRT ROADS
- PROPOSED ROAD
- ROAD TO BE DEMOLISHED

BOUNDARY
- RGCRT - ROOKWOOD GENERAL CEMETERIES RESERVE TRUST
- CMCT - CATHOLIC METROPOLITAN CEMETERIES TRUST
- UNALLOCATED LAND - RNT
- CROWN LAND RESERVE

BUILDING
- EXISTING TO REMAIN
- PROPOSED
- EXISTING TO BE DEMOLISHED

MUSLIM TOILETS & SHELTER (NO INFO SUPPLIED)

ANALYSIS:
EXISTING PROPOSALS

Site Conditions

Each of the two Trusts have a number of proposals currently under consideration for changes to building locations and/or functions. These are summarised and briefly discussed below:

Demolition of RNT facilities

The RGCRT has proposed to demolish the RNT Office and Meeting Room buildings, with a view of consolidating these facilities with the RGCRT office into a new building facility.

Commentary: This proposal would result in streamlining operations, which in turn would lead to land being released for burials, and is therefore aligned with the strategic objectives.

Former Jewish Office conversion to Condolence Room (short term)

Since the Jewish Office functions have been consolidated within the RGCRT operations, this building is now redundant, and the RGCRT has proposed to utilise this building, which is a very good condition, as a condolence room.

Commentary: As this proposal is to reuse an existing, redundant facility, it will preclude the need to grab additional land for this function and is therefore aligned with the strategic objectives.

Former Independents' Office conversion to Condolence Room / Museum (short term)

Since the Independents' Office functions have been consolidated within the RGCRT operations, this building is now redundant, and the RGCRT has proposed to utilise this building as a condolence room.

Commentary: As this proposal is to reuse an existing, redundant facility, it will preclude the need to grab additional land for this function and is therefore aligned with the strategic objectives.

Training Room conversion into Child Care Centre (long term)

The RGCRT has proposed to convert the redundant training centre building into a child care centre.

Commentary: The target market is for cemetery staff in priority to public. No information was received regarding its structural suitability, intended capacity, design proposals, etc. for this facility. In principle, this proposal does not appear to conflict with any strategic objectives.

Demolition of Anglican Workshops

The RGCRT has recently demolished the Anglican Workshops as all the RGCRT workshops have been consolidated into two sites: the RGCRT Eastern and RGCRT Western workshops.

Commentary: This proposal results in streamlining operations, which in turn would lead to land being released for burials, and is therefore aligned with the strategic objectives.

Reflections Café separation (short term)

The RGCRT has proposed to separate the existing Reflections Café into a condolence room with the cafe and flower shop moved out across to the other side of the parking.

Commentary: This proposal would require a new café facility to be provided elsewhere. Currently the split of traffic entering the cemetery through the Weeroona entry on Necropolis Drive and Memorial Avenue is approximately 50/50. Having a condolence room in this location will draw more traffic onto Memorial Avenue, causing congestion at the entry and affecting through traffic into the cemetery. Furthermore, due to its proximity to the Weeroona Road entry, it will exacerbate the existing congestion issues at this entry.

EXISTING PROPOSALS:

Muslim Toilets and Shelter (short term)

(no information supplied)

New RGCRT Office adjacent to Reflections Café (long term)

The RGCRT has proposed to construct a new building to house the RGCRT (and possibly RNT) offices and operations on the site adjacent to the Reflections café.

Commentary: Currently the split of traffic entering the cemetery through the Weeroona entry on Necropolis Drive and Memorial Avenue is approximately 50/50. Having a new business facility in this location will draw more traffic onto Memorial Avenue, causing congestion at the entry and affecting through traffic into the cemetery. Furthermore, due to its proximity to the Weeroona Road entry, it will exacerbate the existing congestion issues at this entry.

New Entry at the Intersection of Sheehy Avenue and East Street

The CMCT has proposed to construct a new entry into the cemetery at the southern end of Sheehy Avenue to provide better and more direct access to the CMCT facilities.

Commentary: The proposal would provide additional capacity of entry into and exit out of the cemetery, and will likely have a significant impact on reducing the strain on the existing entry points, particularly the Weeroona Street entry. Refer also to the section in this report on Traffic for further discussion. As the proposal would reduce congestion and improve accessibility into deep areas of the cemetery, it is aligned with the strategic objectives.

New Funeral Director Service Building

The CMCT has proposed to construct a new funeral director services building at the bottom end of Sheehy Avenue, on the basis that the entry described above would be built. The purpose of this facility is to be able to assist funeral directors with paperwork and directions to prevent them having to take entire processions through the busy parts of the cemetery.

Commentary: The construction of a facility described above could have a significant impact on reducing traffic issues (refer to further discussion in the Traffic section), however, the proposed location would result in congestion issues at the entry. Further, it would not serve any of the other entries, and hence it would appear more logical to have a central facility somewhere within the cemetery.

CMCT Workshops Relocated

The CMCT workshops are currently located within the vicinity of their business operations and premium crypt complexes, and is therefore proposed to relocate the facilities elsewhere.

Commentary: The proposal is to relocate the workshops to a site closer to the current burial grounds. This proposal doesn't appear to conflict with any of the strategic objectives.

Redirection of Barnet Avenue to connect to the roundabout on Weekes Avenue / Memorial Drive

The CMCT has proposed to redirect Barnet Avenue to connect directly the junction of Weekes Avenue and Memorial Drive at the existing roundabout. The purpose of this redirection is to provide a more direct route into the CMCT administrative hub, and to provide for a better layout of facilities within the hub.

Commentary: The proposal will result in improved wayfinding to the CMCT hub and reduced traffic congestion in this area, and is therefore aligned with the strategic objectives.

Construction of New CMCT Office Building and Cafe

Due to the increasing size of the CMCT operations and the constraints of their existing office building, the CMCT has proposed to build a new, larger office building, together with consolidated car parking accessed off the Primary roads, and a café.

Commentary: The proposal is driven by the CMCT's operational requirements. The café will cater for CMCT customers and staff. This proposal does not appear to conflict with any of the strategic objectives.

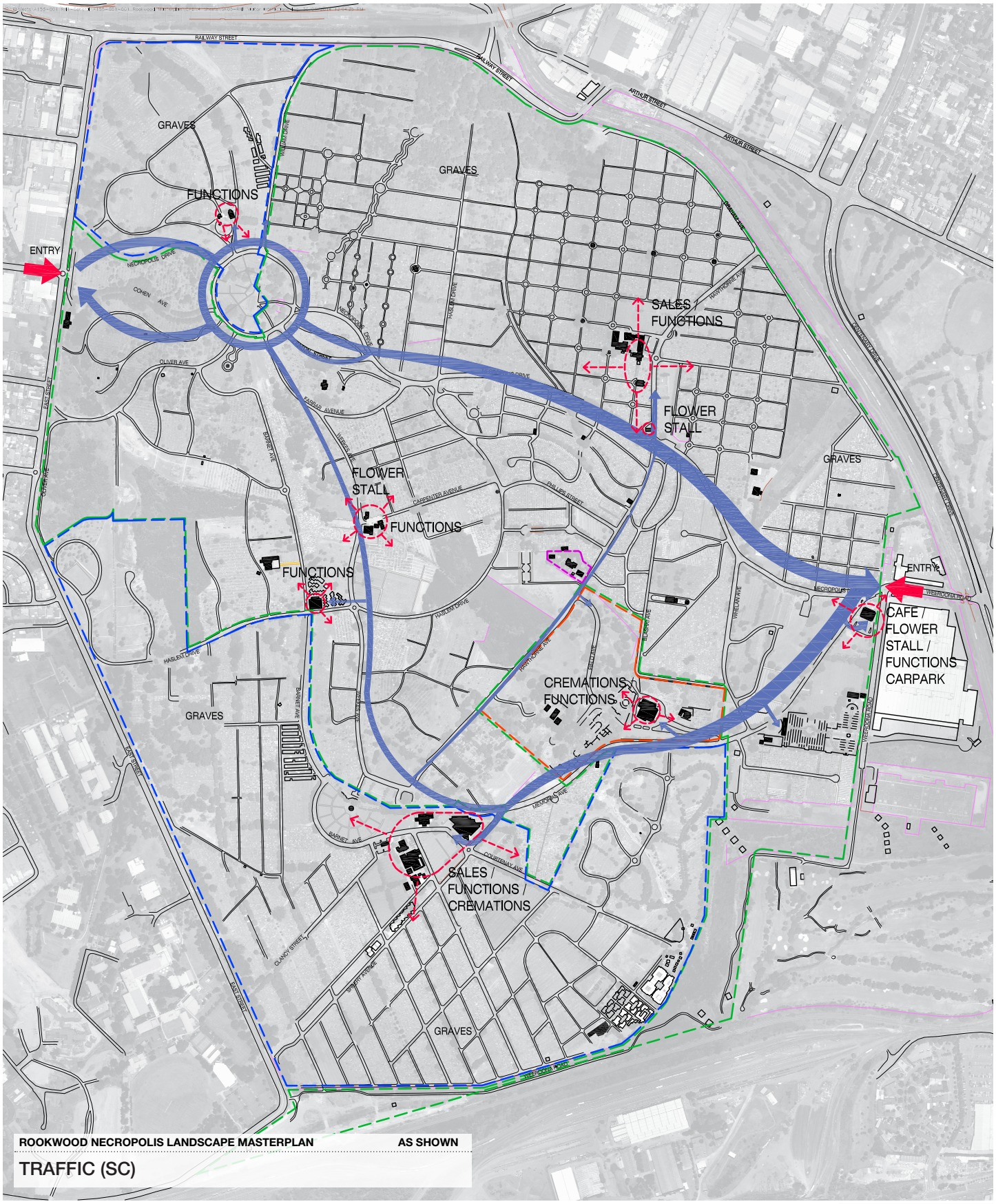
EXISTING PROPOSALS:

Issues

- Redundant buildings due to the amalgamation of the Trusts result in buildings that could be reused or demolished to create space for burials.
- Locations of new buildings needs to consider traffic, logistical and operational issues.
- Facilities and operations should be streamlined and amalgamated where possible to improve efficiencies and maximise burial space.
- Siting of buildings is related to the traffic and congestion issues.
- All segments of visitors should be appropriately catered for, whether they are visiting for mourning, recreation or other purpose.
- Separate administrative facilities in different locations are not ideal from a visitors/users perspective.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency		
Recreational Activities		
Sustainability	Current Invocare Lease locks down the Crematorium site until 2015. Limited "Available Land" suitable for the creation of "hubs". Longer term, create one central hub for both trusts, to create a central place for all visitors and users of the cemetery (subject to traffic study).	Reuse of existing, redundant buildings where possible. Demolition of redundant facilities to create more burial space. Opportunities to: • Create a strong RGCRT administrative hub of new facilities including chapels, condolence lounges, office buildings, etc. as part of the amalgamation of the Trusts. • Consolidate and/or relocate workshops to be positioned strategically such that they are away from administrative hubs and close to new burial grounds. • Create "visitor centre" buildings comprising gift shop/ café / information/ flower shop, etc. New Funeral Director Service Building located strategically to direct external processions away from busy hubs and to provide funeral directors with an efficient service.



SCALE BAR

0 50m 250m
25m 125m

ROADS

- PRIMARY ROADS
- SECONDARY ROADS
- TERTIARY / DIRT ROADS

BOUNDARY

- RGCRT - ROOKWOOD GENERAL CEMETERIES RESERVE TRUST
- CMCT - CATHOLIC METROPOLITAN CEMETERIES TRUST
- UNALLOCATED LAND - RNT
- CROWN LAND RESERVE

GENERAL

- PRIMARY TRIPS
- SECONDARY TRIPS
- PRIMARY DESTINATION
- BUILDINGS

NORTH POINT

ANALYSIS:
TRAFFIC

Site Conditions

A number of traffic reports have been prepared in the past for Rookwood Cemetery. Some are audits prepared for the purpose of developing maintenance plans, and others are strategic reports, identifying road hierarchies or addressing traffic issues.

The "Visitor Interactions" illustration shown adjacent is an approximate representation of the traffic flows through the cemetery, based on 7 Day Average numbers obtained from the Rookwood Road Hierarchy Assessment table in the Rookwood Cemetery Road Hierarchy Report prepared by TAR Technologies Pty Ltd dated August 2010.

The illustration shows a considerably higher usage of the Weeroona Road entry than the East Street entry at an approximately 60/40 ratio.

Traffic monitoring in 2013 indicates:
- An average of 41,800 entries per month (or 1,390/ day) at the East Street entrance and,
- 61,600 entries per month (or 2,050/ day) at the Weeroona Road entrance.

The CMCT is considering a proposal for a new entry gate & statement where East Street & Sheehy Avenue intersect.

Memorial Avenue and Necropolis Drive have the highest traffic, with the traffic reducing considerably west of the CMCT facilities on Weekes Avenue. Hawthorne Avenue also has very low traffic in comparison.

The Rookwood Necropolis Traffic Issues Strathfield Gates report, also prepared by TAR Technologies, dated July 2010 identifies a number of traffic congestion and safety related issues at the Weeroona Road intersection. Congestion issues were identified in both the eastbound and westbound directions, and certain recommendations made to help to alleviate these problems.

These traffic issues are not sustainable in the long-term especially when considering any increase in burial activities based on demographic forecast.

One of the other traffic congestion and safety issues identified in the above report was the number of signs at the intersection of Memorial Avenue and Necropolis Drive just inside the Weeroona Road entry requiring visitors to stop and make a decision.

Apart from general visitor traffic to all parts of the cemetery, the key "hubs" which attract traffic include the Reflections Café, and the business operations of the Rookwood General Cemetery Reserve Trust (RGCRT) and the Catholic Metropolitan Cemeteries Trust (CMCT). The café is located right next to the Weeroona Road entry. The approximate distances between the two gates and the other two hubs above are summarised below:

- Rookwood General Cemetery Reserve Trust (RGCRT)
  - Entry — Distance from Entry
  - Weeroona Road — Approximately 620m
  - East Street — Approximately 1500m
- Catholic Metropolitan Cemeteries Trust (CMCT)
  - Entry — Distance from Entry
  - Weeroona Road — Approximately 1000m
  - East Street — Approximately 1600m

The section of Hawthorne Avenue north of Necropolis Drive gets very congested during periods of services, as there is limited parking available, and exiting traffic from services that are completing conflict with incoming traffic from subsequent services due to the arrangement of the road network.

Unit 24 in the south eastern part of the cemetery has recently been allocated to the Muslims, and the spurt in burials in this section is attracting significant traffic onto Sheehy Avenue, as it is the most direct route to get to Unit 24 from Memorial Avenue. The drawing of additional traffic through an already busy area, being the CMCT hub, has begun to cause congestion during peak times.

It should also be noted that the original alignment of Barnet Avenue has been greatly modified over the years, resulting in a convoluted layout in and out of the CMCT precinct. Its connection to Memorial Dive is not intuitive and unnecessarily complex.

TRAFFIC:

Issues

- Congestion at the Weeroona Road entry, both westbound and eastbound.
- Sustainability of this entry in the future.
- Relative distance of the CMCT business operations from both existing entries.
- Congestion issues on the northern section of Hawthorne Avenue during peak times due to lack of “through” roads.
- Congestion issues on Sheehy Avenue due to the new activity on Unit 24.
- Funeral Directors with services held outside the cemetery currently drag their processions through the existing administrative hubs, clashing with services held on site, and causing congestion issues.
- Large roundabout next to the East Street entry can be confusing.
- Poor connection between Barnet Avenue and Memorial Drive.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency		
Recreational Activities		
Sustainability	Existing traffic light capacity on Homebush Bay Drive unlikely to change. Congestion issues related to Australia Post and Council Depot unlikely to change. Limited space for dedicated parking, due to the need to make land available for burials.	Opportunity to introduce new entry gate at the intersection of East Street and Sheehy Avenue. This should reduce the congestion at the Weeroona Street entry, reduce recent congestion issues along Sheehy Avenue, by providing a direct route to Unit 24 from East Street, and reduce the travel distance from the CMCT hub to an entry to approximately 620m. Potential for multi-story parking in certain areas either below or above ground or both. Potential to simpify roundabout at East Street end by closing Paton Street exit on roundabout. Creation of a Funeral Director Service building at a location such that processions arriving from outside the cemetery can be kept out of the busy spots, thus alleviating congestion in these areas.

St Michael's Chapel

East Street pedestrian entrance

Necropolis Circuit

Weeroona Road entrance

Unit 20B

Crematorium

ANALYSIS:
SIGNAGE

Site Conditions

The general identification signs for each burial sections are consistent. The same can be said of directional and regulatory signs. This gives an impression of consistency when circulating around the Necropolis Circuit. The design is dated and the colours are fading in places.

The Trusts and Lessees have developed their own signage relating to their facilities (buildings mainly). Although the RNT appears to have a signage policy (latest is dated 2002) there is evidence on the ground that it is not as effective as intended. Lessee Invocare appears to use its own signage suite.

The directional signage is too small. Whilst driving, it is not legible enough to be able to make quick decisions especially around the Necropolis Circuit and Weeroona entrance. In addition, funeral directional signs; guiding mourners to a Chapel service from each entrance are lacking. As traffic is an issue on site, this needs to be improved.

Regulatory signage is “wordy” and may not target a multi-cultural, non-English speaking clientele.

Interpretation signage is limited, yet the opportunities for interpretation abound.

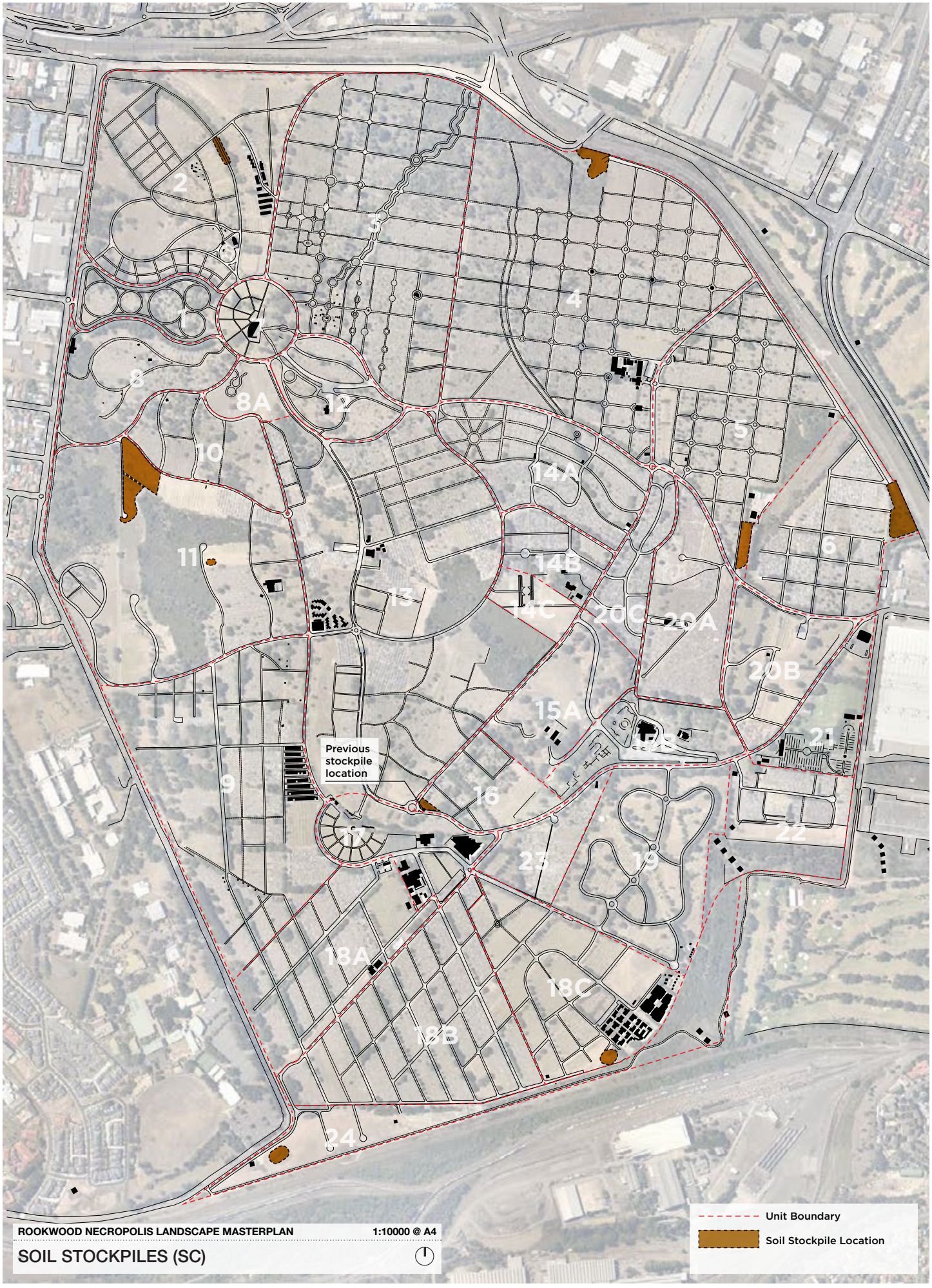
Rookwood Cemetery has not yet kept up with technology advancements in signage which now offers digital technology, and takes advantage of mobile technology. The interactive nature of digital signs may assist with independent way-finding.

Issues

- Directional signage is ineffective.
- Duplication of signs by Trusts or Lessee gives an inconsistent image.
- Signage is dated and non-interactive.
- Regulatory signage needs to be more visual than wordy.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency		• Retain existing information signs for burial sections/denominations • Retain consistency in signage or update all signage suite. • Improve regulatory signs, using universal symbols. • Improve directional signs especially at Necroplis Circuit and at main entrances • Introduce interactive maps at entrances • Introduce digital display at entrances to direct to Chapels and events.
Recreational Activities		
Sustainability		Digital technology alleviates the need for constant information updates and sign replacements



ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN 1:10000 @ A4

SOIL STOCKPILES (SC)

ANALYSIS:
SOIL STOCKPILES

Site Conditions

The process of excavating graves and backfilling them generates surplus fill. It is estimated that approximately 1m^3 of fill is generated for each grave dug.

With an estimated 3000 burial per year, the cemetery generates close to 3000m^3 of surplus soil per year.

CMCT currently disposes of it off site (as Virgin Excavated Natural Material [VENM] class) and is currently building a soil facility in Unit 18C where soils are processed prior to disposal.

Current road works on Sheehy Avenue have also generated temporary stockpiles in view of East Street.

Stockpiles of excavated asphalt are currently located under a significant treed avenue in Unit 2.

Previous arrangements for removal include offering the fill to Macquarie Park Cemetery, for mutual benefit.

RGCRT currently disposes of it on site, in four separate locations. Most are remote, although one is off a Primary road (in Unit 5 off Necropolis Drive and another next to a current burial ground Unit 11).

The last two are visual prominent in the landscape. The main stockpile is located in a flood prone plain.

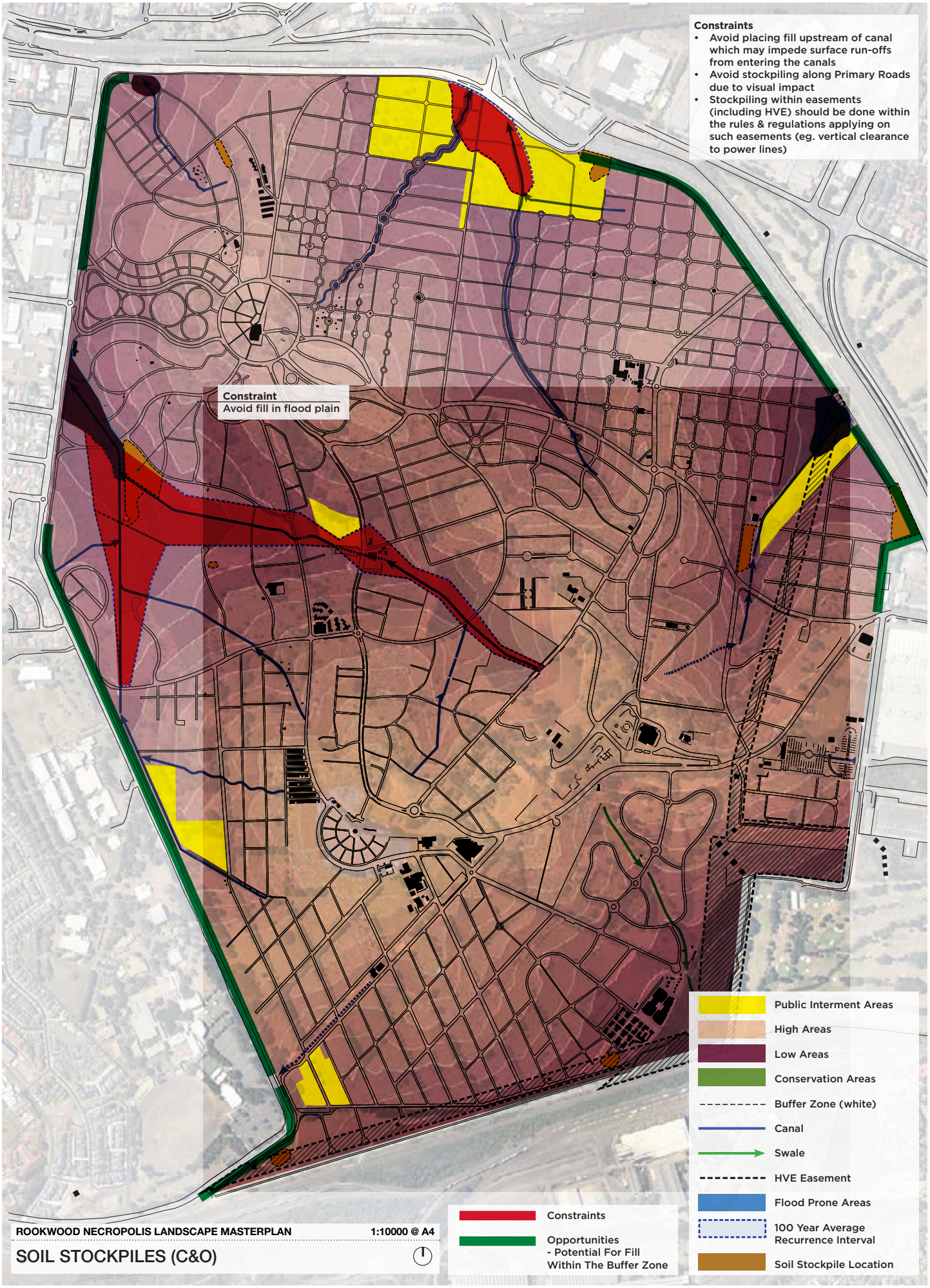
SOIL STOCKPILES:

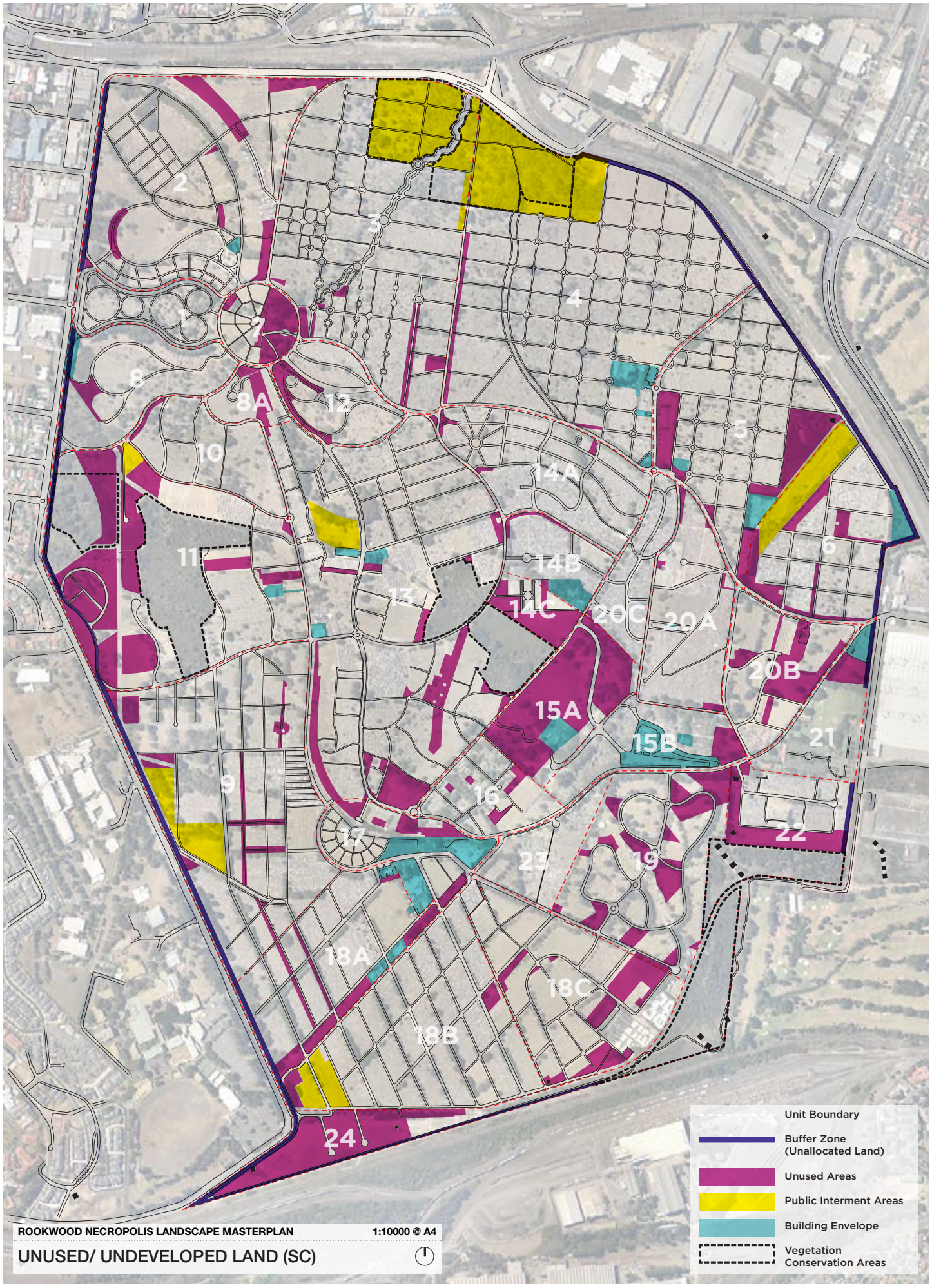
Issues

- Soil stockpiles on Primary roads and in view of public external roads are visually obtrusive and affect site presentation.
- Carting soil off site is costly.
- Large quantities are in need of removal each year.
- Temporary stockpiling is costly as it involves double-handling.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency	Avoid: • Fill in flood plain – may affect flooding on site & downstream and therefore increase cemetery's liability • Placing fill upstream of canal which may impede surface run-offs from entering the canals • Stockpiling along Primary Roads, next to external roads & current burial grounds – conspicuous & suggests neglect Fill/ stockpiling within easements (including HVE) should be done within the rules & regulations applying on such easements (eg. vertical clearance to power lines).	Potential to stockpile away from public eye. Opportunities to stockpile on site on unallocated/unusable land may be possible. Subject to burial legislation changes, soil can be used to fill over Public Interment Areas (long term).
Recreational Activities		
Sustainability	Stockpiling on unused/ undeveloped land: • Takes up valuable burial land • Leads to double-handling if location is only temporary (costly)	Filling over the public areas for renewal when & if legislation returns.


Constraints
• Avoid placing fill upstream of canal which may impede surface run-offs from entering the canals
• Avoid stockpiling along Primary Roads due to visual impact
• Stockpiling within easements (including HVE) should be done within the rules & regulations applying on such easements (eg. vertical clearance to power lines)
Constraint
Avoid fill in flood plain
Public Interment Areas
High Areas
Low Areas
Conservation Areas
Buffer Zone (white)
Canal
Swale
HVE Easement
Flood Prone Areas
100 Year Average Recurrence Interval
Soil Stockpile Location
Constraints
Opportunities
- Potential For Fill Within The Buffer Zone
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN
1:10000 @ A4
SOIL STOCKPILES (C&O)



ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN 1:10000 @ A4

UNUSED/ UNDEVELOPED LAND (SC)

ANALYSIS:

UNUSED/ UNDEVELOPED LAND

Site Conditions

This map has the dual purpose to:

- Calculate the remaining burial yield within the cemetery.
- Highlight land which may have potential for passive recreation purposes.

Based on our assessment from recent high resolution aerial photography, any land appearing to be free of headstones was earmarked as potential burial sites. This was subjected to checking and confirmation by the Trusts (based on the provided records) and confirmed as an audit of unused or undeveloped burial land. This may include:

- Open fields/ land where no burials have taken place
- Building footprints
- Vegetation Conservation areas
- Buffer zones (which are currently unallocated but could change in the future)

It should be noted that some of this land may have already been allocated to specific cultural groups. However, for the purpose of calculating the remaining burial yield, allocation has been deemed irrelevant.

It is recognised that some of this land may be the subject of various constraints some more difficult to overcome than others:

- Significant archaeological sites – As discussed under “Former Buildings”, significant sites such as the mortuary line, stations, and former buildings will limit the ability to bury and be the subject of the strict approval process by Heritage Office NSW.
- Protected vegetation – As discussed under “Ecology”, further removal of protected ecological communities will depend on the process adopted (PMP or Bio-banking) and will be subject to strict approval by OEH.
- Easements (canals, services).
- Buffer zones (along boundaries) – Requires Crown Land legislation changes in order to permit burial.
- Flooding (especially on the western side).
- Building requirements – Although all building sites have been considered as potential burial space with the view to rationalise their footprint wherever possible.

Some of this land will also represent valuable opportunities in terms of passive recreation, a use which potentially competes with the increasing the yield and ultimately extending the life of the cemetery.

It is estimated that 15.7% of the site has not yet been buried into.

Only 63% of the undeveloped land is free of constraints, and is immediately available for either burial or passive recreation.

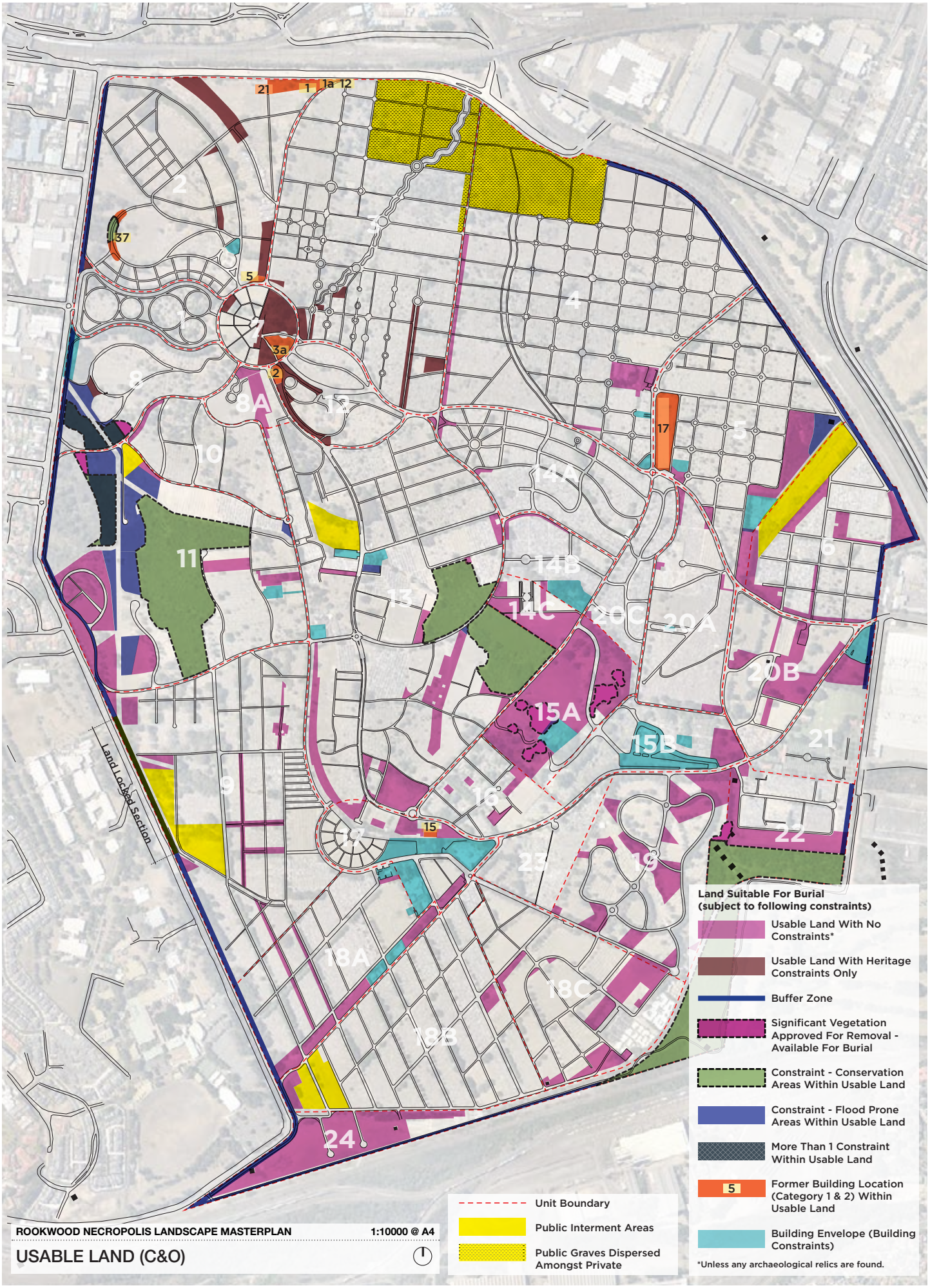
UNUSED/ UNDEVELOPED LAND:

Issues

- The cemetery is running out of burial land; an audit of the unused/undeveloped for burial is required (carried out and as shown on map).
  - A number of constraints will apply to some of this land (ecology, heritage, flooding etc.).
  - Some of this land may be useful for the "good" of Rookwood in facilitating passive recreation and public interest in Rookwood.
- A number of former buildings have been assessed as archaeologically significant.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency		
Recreational Activities	Potential to interpret archaeological footings of structures as part of landscape or building developments. Footprint is unknown and requires further investigation.	Each proposal relating to a site of archaeological significance (Category 1 & 2) will need to be assessed and approved by the Heritage Council.
Sustainability	Public Interment Areas in Unit 3 & 4 (predominantly) planted over and within a Conservation Area. Reuse in long-term will require vegetation removal.	Buffer zones may be suitable for burial (if land is re-allocated to a Trust in the future) under new Crown Land rules.
	"No burial" buffer zone within 3-5m either side of canals. Constraints will apply to the "unused" land with varying degrees of complexity: • Archaeologically significant • Protected vegetation • Flooding • Buffer zones	Re-use of Public Interment Areas is long-term only as subject to change in legislation.
	Category 1 & 2 former structures will impact on and limit the potential to develop the area for interment.	Category 3 former structures do not present a constraints for interment development.
	Sharing of facilities (buildings and workshops) will require Trusts cooperation. There are conflicting pressures between Passive recreation and new burial when allocating unused land to one or the other.	Any area shown as "unused for burial" (pink) has the potential to offer: • Burial space • Temporary and permanent passive recreation • Rationalised building footprints (leading to more land release) • Rationalised workshop footprints (leading to more land release)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15B
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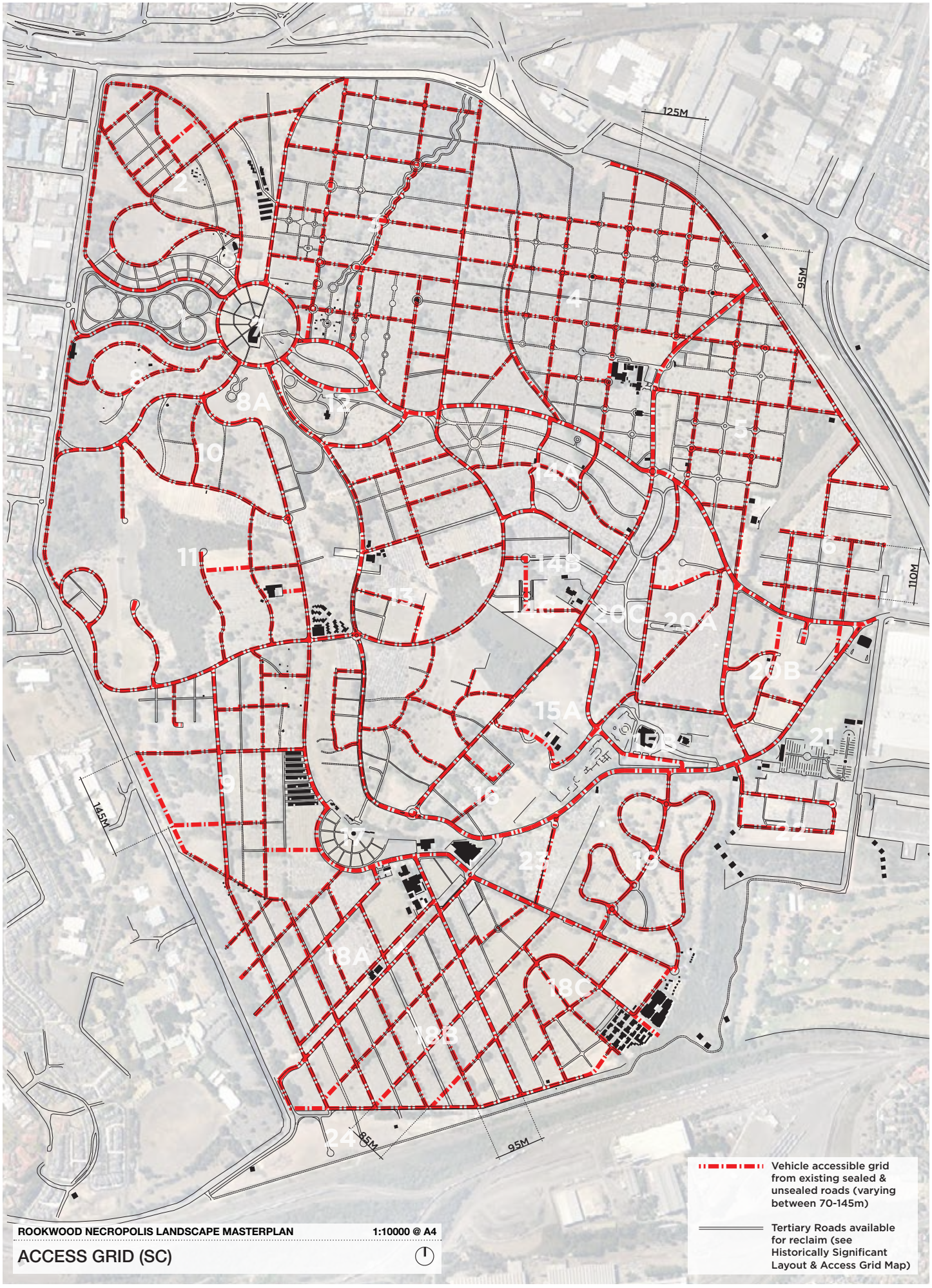
18A
18C
18B
24
Land Locked Section
Land Suitable For Burial
(subject to following constraints)
Usable Land With No Constraints*
Usable Land With Heritage Constraints Only
Buffer Zone
Significant Vegetation Approved For Removal - Available For Burial
Constraint - Conservation Areas Within Usable Land
Constraint - Flood Prone Areas Within Usable Land
More Than 1 Constraint Within Usable Land
5
Former Building Location (Category 1 & 2) Within Usable Land
Building Envelope (Building Constraints)
*Unless any archaeological relics are found.
Unit Boundary
Public Interment Areas
Public Graves Dispersed Amongst Private
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN
1:10000 @ A4
USABLE LAND (C&O)



ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN **1:10000 @ A4**

ACCESS GRID (SC)

ANALYSIS:
ACCESS GRID

Site Conditions

As highlighted in the Plan of Management (2014), sustainable burial practices are being considered to respond to the need to find usable land to bury into, following the assessment that Rookwood is fast running out of burial space.

One approach is the “intensification of use”, where full or part roads can be reclaimed to free up space for new graves.

An assessment of which roads has the potential to be retained or reclaimed was carried out as follows:

- Plotting of Primary, Secondary and Tertiary roads within the cemetery.
- Adoption of a 50m (average) criterion for the maximal walking distance between a road and a grave. This leads to the retention of road grid 100 x 100m (average) which has been highlighted in red.
- Roads within this grid have the potential to be superfluous and therefore eligible for reclaiming. (Uncoloured on the map).

Due to the Heritage sensitivities of the site, the access grid was overlaid with the “Historic Circulation Routes” map to ensure that no historically significant road were taken out in the process.

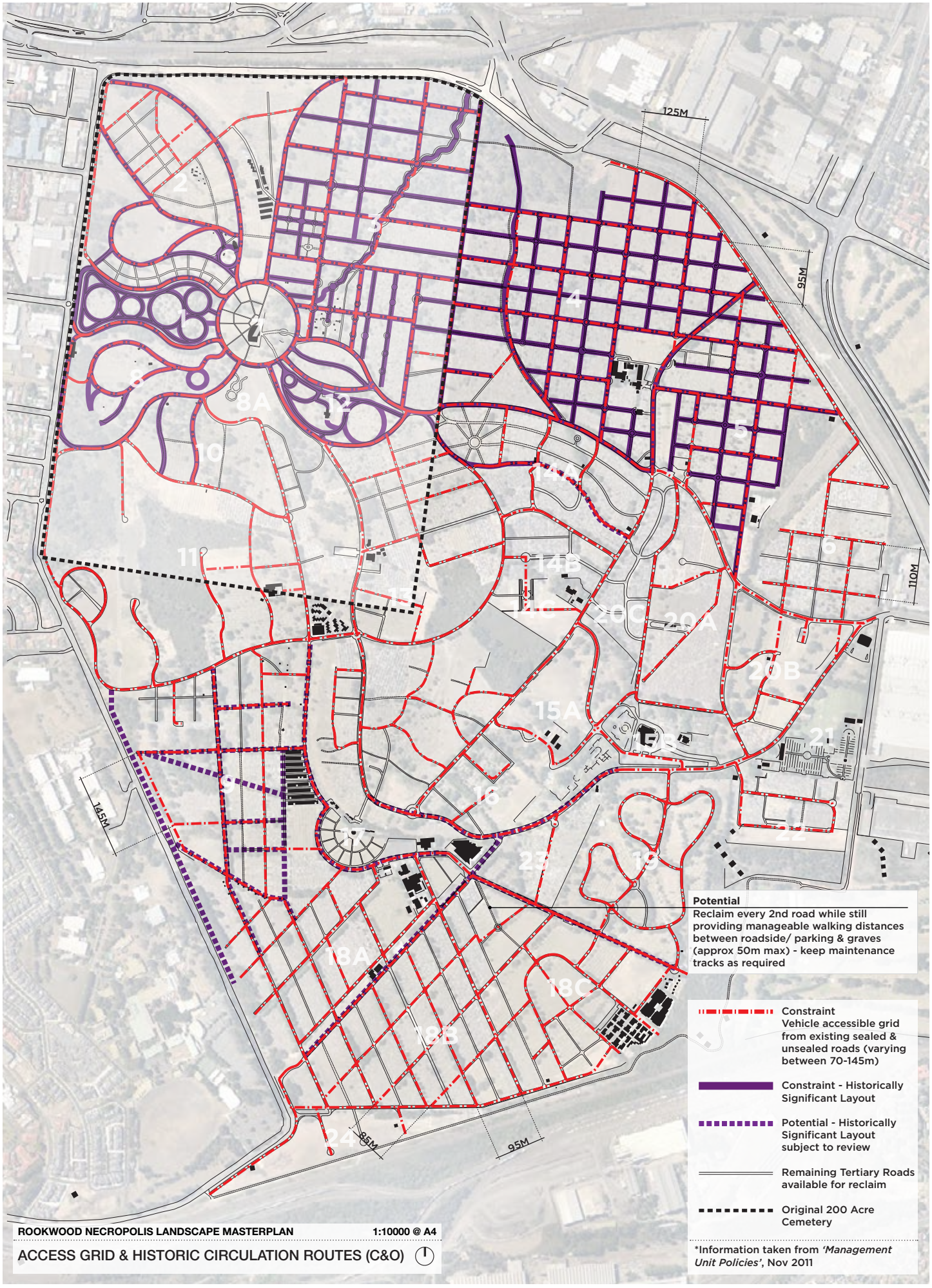
ACCESS GRID:

Issues

- The cemetery needs to maximise its yield as it is running out of burial space.
- Reclaiming full or part roads will release valuable burial land.
- The allocation of lawn or monumental graves within new burial land is the decision of each Trust.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency		
Recreational Activities		
Sustainability	Maintain sealed & unsealed roads at approximately 100m interval for manageable access to graves. Access to graves for maintenance and construction still needs to be provided. Roads deemed as historically significant should not be reclaimed, neither should main access roads.	Reclaim full or part roads will release valuable burial land: • Selected Tertiary road providing manageable walking distances between roadside/ parking & graves (approximately 50m from any road)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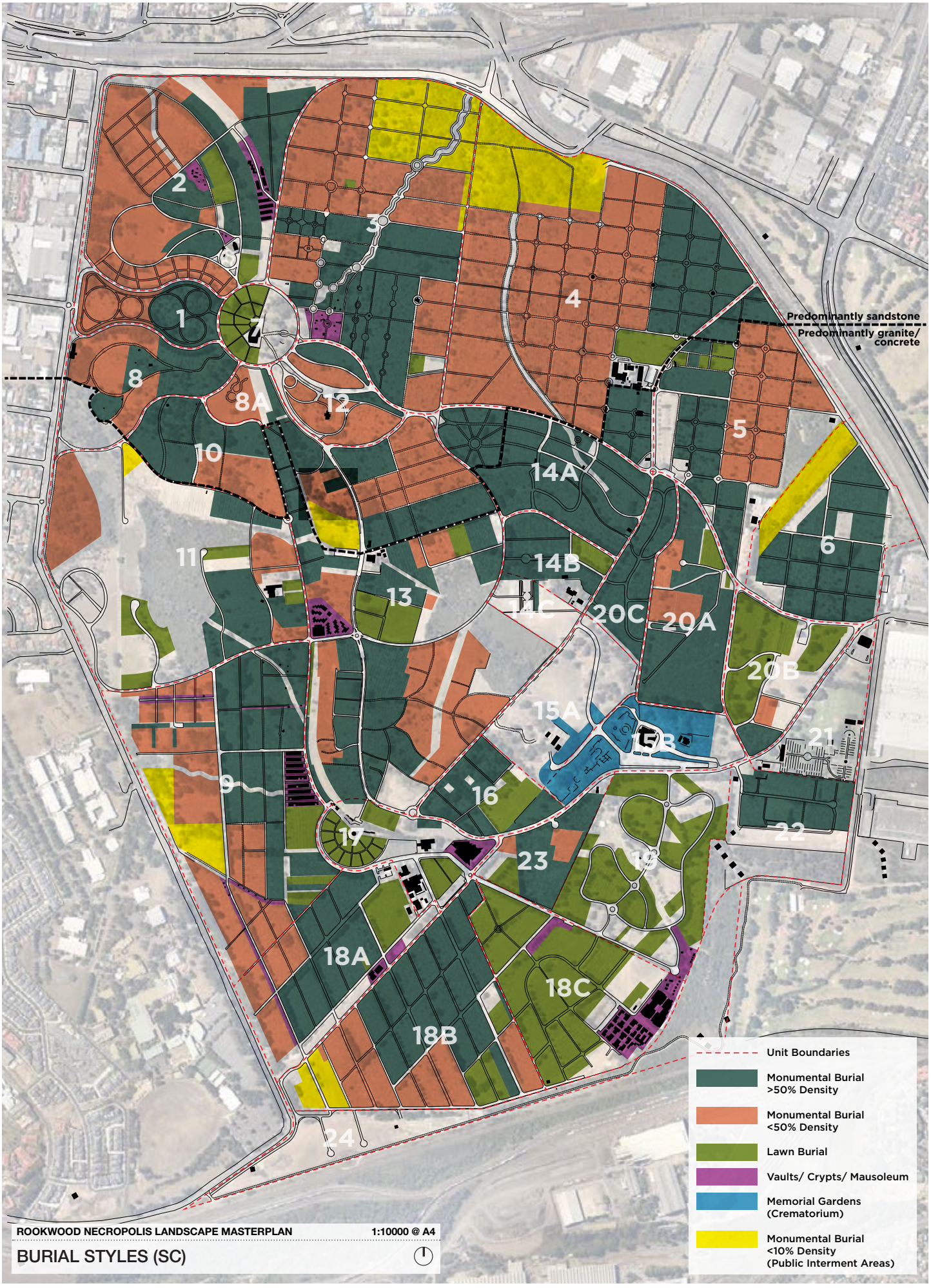
Potential
Reclaim every 2nd road while still providing manageable walking distances between roadside/ parking & graves (approx 50m max) - keep maintenance tracks as required
Constraint
Vehicle accessible grid from existing sealed & unsealed roads (varying between 70-145m)
Constraint - Historically Significant Layout
Potential - Historically Significant Layout subject to review
Remaining Tertiary Roads available for reclaim
Original 200 Acre Cemetery
*Information taken from 'Management Unit Policies', Nov 2011
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN
1:10000 @ A4
ACCESS GRID & HISTORIC CIRCULATION ROUTES (C&O)



ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN 1:10000 @ A4

BURIAL STYLES (SC)

ANALYSIS:

LANDSCAPE CHARACTER & BURIAL STYLES

Site Conditions

The character of the site is largely driven by monuments. There are a number of landscape characters throughout the site, however often difficult to distinguish due to the strong visual impact of the monumentation (headstones and other funerary structures). Rookwood can be summarised as being predominantly Victorian style in the old section, predominantly native in the modern RGCRT areas, and predominantly exotic in the CMCT Units with an emphasis on foliage contrast.

The majority of specimen trees in Rookwood are an important part of these layouts and play a role in beautification and improved amenities. The northern Units (1-5, 7-8 and part of 10, 12-14) are influenced by the Victorian garden style with strong landscape layouts into which burials occur – typical of the style of the era which was preoccupied with beauty as well as function. In contrast, the southern part of the site reflects the shift in cemetery maintenance principles during the 2nd half of the 20th century, which regarded trees to be problematic around graves; rationalising the provision of burial maintenance to be kept to a minimum. This has created a character where monuments are dominant and plantings sparse.

These characters can be built on, hence creating different themes through the site, similar to a garden/ park with different “rooms” and styles. The Victorian style garden plants should be used in the older sections representative of that era and an indicative plant list has been appended for reference. Within the RGCRT areas, there is ample scope to develop multiple themes, some native (more recent areas) and cultural planting (associated with burials as displayed in the Muslim section). The CMCT’s exotic, colourful planting, playing with colour foliage contrast and flowering displays should be continued, whilst avoiding water-dependent species such as tree ferns and azaleas.

Guidelines need to be drawn to guide the various burial intensification processes to ensure the protection of significant landscape/visual fabric of Rookwood, as suggested in a number of previous reports. This will help find new burial spaces and therefore extend the life of the cemetery.

One of these processes is the “Infill” of vacant isolated plots within existing burial areas. The main concern here relates to the visual impact of new graves within established areas, some of which have strong visual character and/ or are historically significant.

LANDSCAPE CHARACTER & BURIAL STYLES:

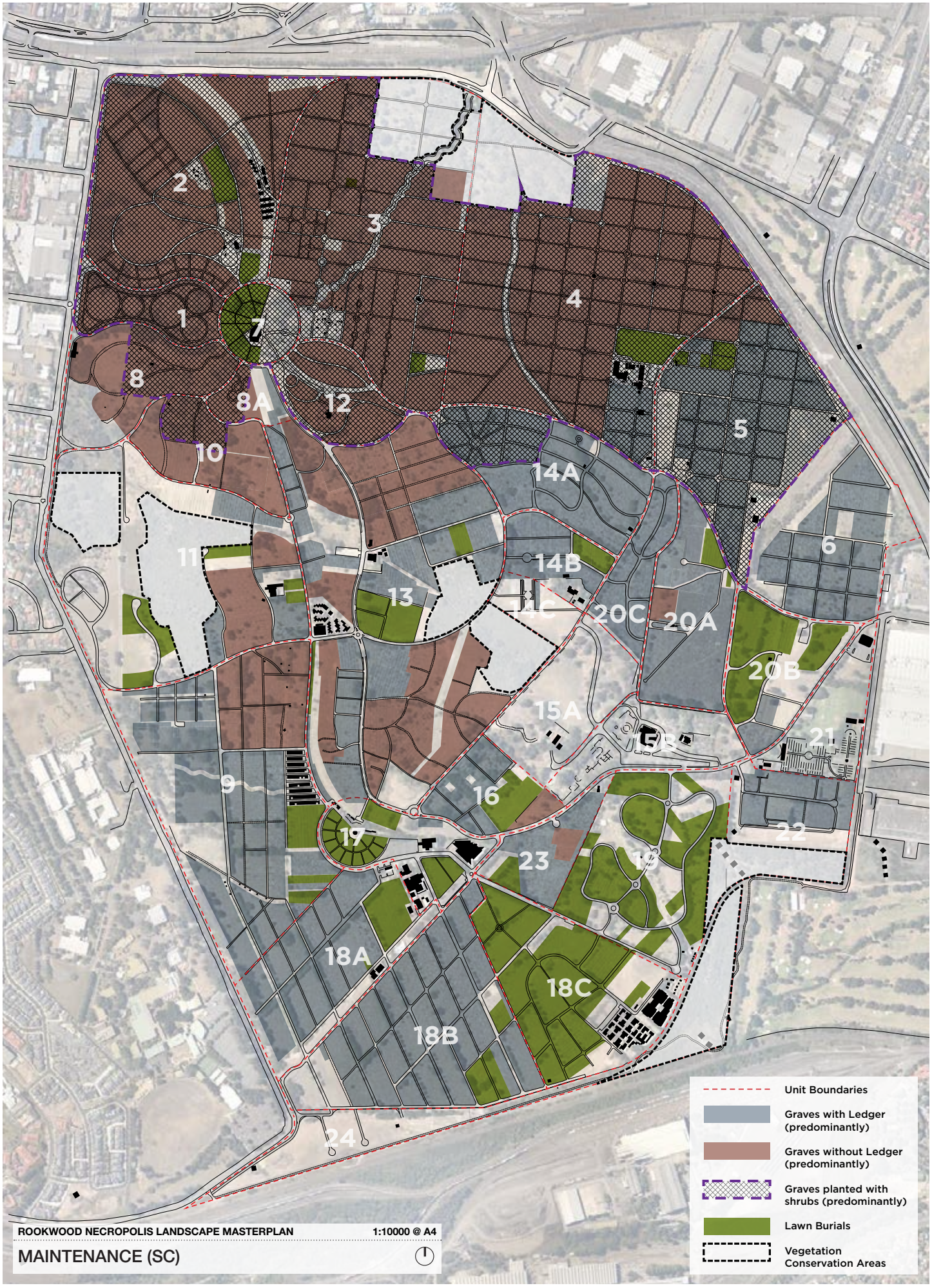
Issues

- The cemetery needs to maximise its yield to provide burial land for as long as possible.
- The areas of potential infill are usually associated with established old monumental areas, where the introduction of new monuments may visually "offend".
- The planting themes are not strong and require more definition throughout Rookwood.
- The northern half of the site has specimen trees, while the southern half is lacking.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency	Avoid planting disparity by using common plants throughout.	Strengthen the existing characters. Develop planting characters pertaining to cultural groups. Develop planting palettes.
Recreational Activities		
Sustainability	Infill potential is an unquantified option and relies on Trusts scrutinising their records for vacant plots.	"Infill" of vacant plots within existing burial areas will assist.
	Isolated infills limit the potential for whole blocks of graves to be renewed/ re-used in the future (not supported by current legislation -subject to future legislation changes).	
	New monuments would visually impact on older areas. Infill in older area may be subject to Heritage consent.	Develop some "infill" guidelines to guide the intensification of older areas.

Retain and strengthen existing planting characters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18A
18C
18B
24
Unit Boundaries
Graves with Ledger (predominantly)
Graves without Ledger (predominantly)
Graves planted with shrubs (predominantly)
Lawn Burials
Vegetation Conservation Areas
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN
1:10000 @ A4
MAINTENANCE (SC)

ANALYSIS:
MAINTENANCE

Site Conditions

When driving around Rookwood Necropolis at various time of the year, it is apparent that the maintenance regime is not uniform.

Maintenance standards vary between Trusts but also between areas.

The collapse of headstones, the weed invasions and the various mowing and herbiciding regimes visually contribute to the impression of Rookwood from a visitor's point of view:

- Monuments: The collapse of monuments occurs in the older parts of the cemetery, in areas buried prior to the introduction of monuments construction Standards. This issue is being dealt with by both Trust and is outside of the scope of this study.
- Weeds: These typically establish between graves and on top of graves without stone ledgers (stone surround only). If not maintained by the Trust, they expose the monuments to damage.
  These weeds are also considered to be a potential threat to the Conservation areas (PMP).
  A number of colourful weeds have established onto graves over the years (whether self-seeded or planted by the families), in particular in the older RGCRT's sections. These are recognisable by the public, and seasonally offer a welcome touch of colour within an otherwise sombre décor. The Coreopsis (yellow-flowering) and the Watsonia (pink-flowering) plants have been the subject of protection for many years. Limited to only when they flower, these weeds add to the aesthetics of the place. The remainder of the year, the Coreopsis plants are not distinguishable from other tall unkept grasses, while the Watsonias turn brown before dying back to nothing over winter (as bulbs typically do).
  The RGCRT's maintenance regime in the older sections consists of brush cutting 3-4 times a year, 6 times a year in high visibility areas.
  The CMCT weeds the older sections by brush cutting every 4 weeks & mowing every 3 weeks. The tops of graves (ledger free) are sprayed 3 times a year.
- Mowing regimes:
  - Monumental areas: It is clear that both Trusts have made the management decision to establish lawn on paths, over unmarked graves and on top of ledger-free graves (where no "protected weeds" are present). This greatly contributes to a "friendly" environment in comparison to numerous older cemeteries who decide to herbicide and use gravel instead, turning their cemetery into hot, mineral and harsh environments. This has great maintenance implications involving wiper snipping and hand mowing due to the intricacy of the shapes and sizes of these areas.
    The areas to be maintained (where the families no longer tends to the graves) are vast and complex maintenance techniques leads to high costs.
  - Lawn sections: Both Trusts use external contractors as well as staff to carry out mowing activities.
    The RGCRT has a mowing regime of every 3 weeks.
    The CMCT has indicated that they mow weekly/ fortnightly depending on the grass mix and season. Most lawns are in the process of being changed to Buffalo which is a more sustainable selection under the current conditions. The lawns are renovated every 10-12 years to repair the ground. Fresh flowers are removed weekly (no plastic flowers are allowed).

MAINTENANCE:

Issues

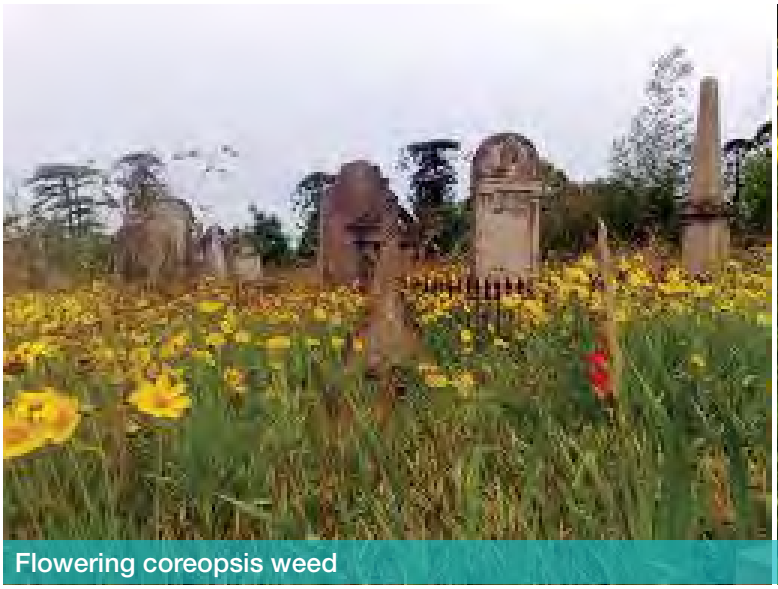
- The maintenance standards within the monumental sections varies greatly.
- Weeds have been allowed to establish in and in between monumental graves.
- Weeds are a threat to the protected areas and potentially increase the maintenance cost of these areas.
- Rare and protected native plants have been allowed to establish on and in between monumental graves.

Constraints & Opportunities

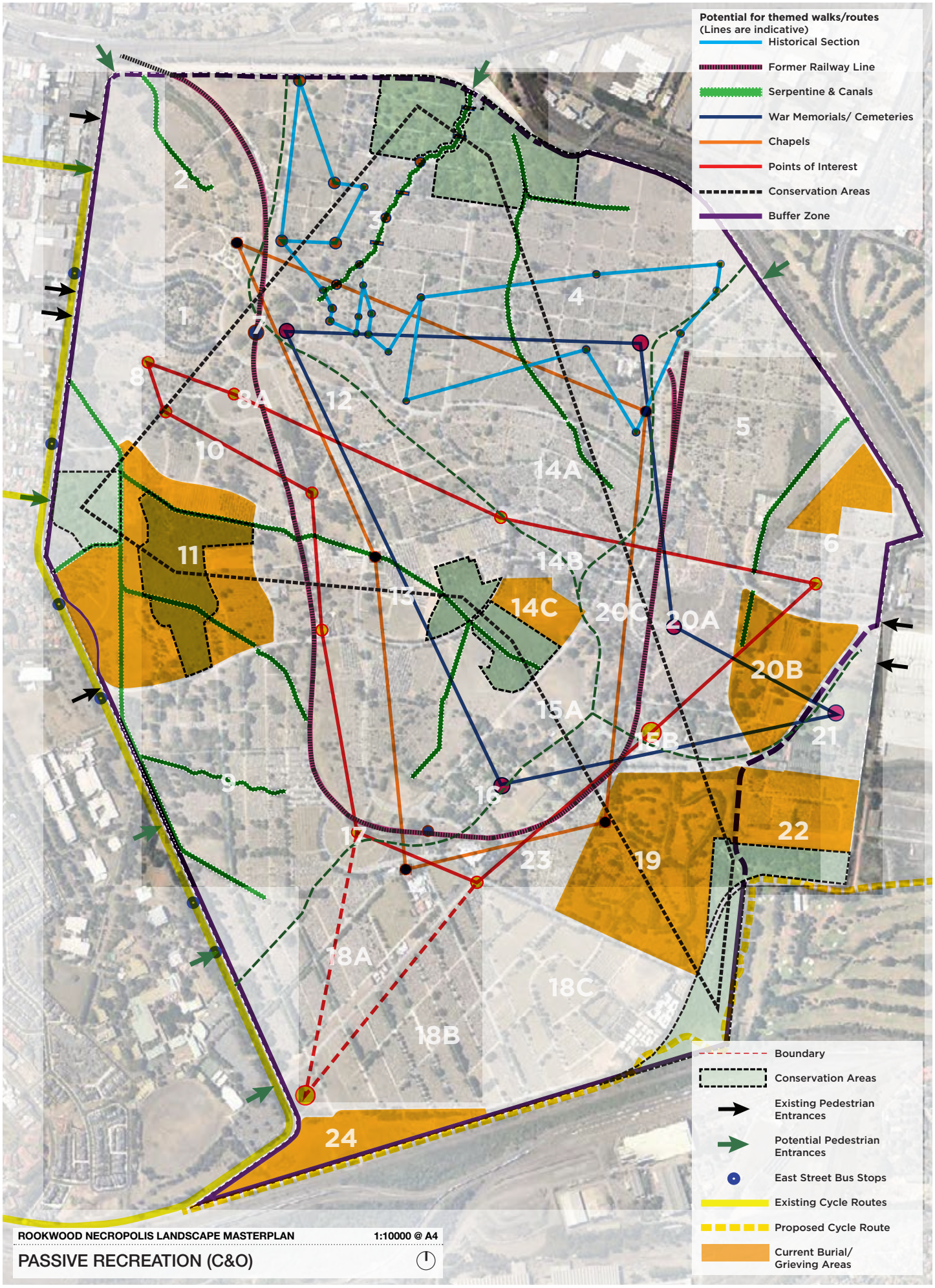
Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency	Inconsistent maintenance regimes in monumental sections leads to a sense of inconsistency throughout the site.	Rookwood Maintenance guidelines would improve visual consistency across the site.
	Herbiciding of graves leads to harsh, bare environment, at odds with beautification aims.	Minimise herbiciding for better environmental outcomes.
	Flowering weeds provide a welcome touch of colour but are very short lived and look messy for the rest of the year.	Provide alternative touch of colour. Planting of ledger-free graves to minimise weed invasion.
	Friends of Rookwood are protective of flowering weeds (Coreposis and Watsonias).	Public consultation may assist in explaining the competing issues and finding a suitable solution.
	Tall, unmown weeds give the appearance of neglect. The area of graves no longer maintained by families is vast and a costly exercise. Weeds propagate into the Conservation areas and increase cost of maintenance of these areas.	
Recreational Activities		
Sustainability	If “protected” by public opinion, the weeds potentially limit re-use in the long-term (subject to legislation changes).	

Neat lawns

Unacceptable weed growth



Flowering coreopsis weed



ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN 1:10000 @ A4

PASSIVE RECREATION (C&O)

ANALYSIS:
PASSIVE RECREATION

Site Conditions

In line with the Strategic Direction #S5 of the Plan of Management (2014), it is important to raise the profile of Rookwood Necropolis as a social, educational and recreational resource.

The development of passive recreational facilities within the site offers the opportunity to promote a “whole of Rookwood” image to the public.

Although opportunities exist within the unallocated and buffer zones, the cooperation of both Trusts is necessary to provide further links within their land.

There are multiple opportunities to interpret and promote significant heritage, cultural and ecological features of the site.

Historical:

- Alignment of the railway corridor and all its stations
- Garden structures within the historic sections
- Serpentines and canals
- Notable people buried within

Cultural:

- War Memorials and Shrines
- Architecturally Significant tombs and monuments
- Chapels
- Outdoor Sculpture exhibitions

Ecological:

- Significant trees/Botanical points of interest
- Conservation areas
- Bird watching

A number of initiatives have already been implemented:

- Yearly temporary sculpture exhibition
- Outdoor movie nights
- Self guided walks (CMCT – Unit 2)
- Guided tours by the Friends of Rookwood (historic section)

PASSIVE RECREATION:

Issues

- Raising the profile of Rookwood is a key objective of the Plan of Management.
- There will be competing forces in the allocation of remaining land for passive recreation use and for burial.
- With increased public recreation use comes increased public liability.

Constraints & Opportunities

Masterplan Objectives	Constraints	Opportunities
Beautification/ Consistency		
Recreational Activities	Although it can be achieved within the realm of each Trust and within unallocated land, cooperation between the Trusts is essential for an improvement to the Rookwood (overall) experience. Accessible only during cemetery opening hours. Higher passive recreation increases: • Pedestrian traffic – separation may need to be provided from current grieving spaces Improved site accessibility potentially increases: • Cyclists – control bike speeds • Dog walkers – impacts on visitor/ grieving experiences and cemetery management • Potential for vandalism, wear & tear • Car commuters • Need for additional carparking The presence of large potential harmful trees (Bunya fruits, limb drops from large trees) in the passive recreation areas will increase the cemetery's liability.	Increasing passive recreation within the cemetery will improve the cemetery's profile. Potential for allocation of land for the interpretation of significant former buildings as part of public recreation spaces. Potential for themed walks/ routes (guided & self-navigated): • Historical Section – pavilions, rest houses, fountains, iron bridges & serpentine • Serpentine & Canals • War Memorials/ Cemeteries – US War Cemetery, Jewish Martyrs Memorial, WW1 Memorial, Sydney War Cemetery, Garden of Remembrance & Chinese War Pavilion • Chapels – St Michael's, Sacred Heart, Outdoor & All Souls • Points of Interest – vaults, shrines, monuments, crematorium • Conservation areas • Buffer zone (predominantly along site periphery)
Sustainability	Burial land is in shortage and burial use will compete with passive recreation in the allocation of unused/undeveloped land.	Proximity to high profile areas may generate more interest and higher prices for interment.

ISSUES PAPER

ISSUES PAPER

Beautification/Consistency

Subject	Issues
Planted Avenues	• Historic and main avenues are incomplete. • Lack of avenues trees means lack of shade for parked cars. • The attack on significant avenues by untreatable disease has a huge visual impact. • Treed avenues assist with way-finding and defining primary and secondary and tertiary roads (together with their road profile). • Some trees used on site are deemed problematic or unsuitable.
Road Treatments	• The Primary roads have a role to play in way-finding. • The majority has been developed as per DEM proposed profile, despite some on-going concerns. • Rookwood's arborist has concerns about the tree selection for these avenues. • The trees compete with existing original avenues. • The verge treatment is maintenance intensive. • There are multiple kerb treatments being implemented as part of the new design which is inconsistent. • The Secondary avenues must be visually different to Primary to improve way-finding.
Primary Roadside Screen Planting	• Some burial areas are visually obtrusive by either being dense, tall or too close to the road. • The planting of verges greatly improves the visual aspect of Primary roads. • The plant selection varies depending on heritage or cultural factors.
Managing Change	• Change will bring opportunities for enhancement of historic character.
Waterways (Canals)	• The brick canals are a liability. • A number of canals are in state of disrepair and are recommended for repairs. • Canals have great appeal from a tourism point of view especially the serpentines.
Water Management	• Surface water does not significantly affect the cemetery operations. • Flooding does not significantly affect the cemetery operations. • Soil filling in flood prone areas has detrimental effect on flooding.
Soil Stockpiles	• Soil stockpiles on primary roads and in view of public external roads are visually obtrusive and affect site presentation. • Carting soil off site is costly. • Large quantities are in need of removal each year.
Topography	• The top of ridges have typically been used for building/landmark positions. • The ridges provide multiple vantage points.
Internal Views	• Views within and beyond Rookwood are an important part of Rookwood's character. • Areas with views are prime burial areas which potentially command higher prices. • Views along the Primary roads as particular important to the experience of visitors and should be enhanced. • Densely monumented burial areas detract from the positive visual experience of Rookwood so do soil stockpiles.

Beautification/ Consistency Issues Table (continued):

External Views	• The site's presentation from the neighbouring public areas is below standard. • Fences are inhospitable. • The public should be enticed to visit and experience Rookwood, with easier access. • Weeroona Road entrance is not commensurate with the significance and size of Rookwood. • Views of extensive burial fields may be offensive to outsiders and could be soften and screened in places. • Buffer zone are not consistent all around the cemetery, potentially showing graves along fence line. • Bushland area gives an impression of untidy and uncared landscape.
Road Hierarchy	• The secondary road treatment needs to be different to the primary road to avoid returning to the original orientation confusion (proposal subject to review). • The Secondary and Tertiary road proposed profile requires modification for Trusts' approval. • Ditto with tertiary roads (proposal subject to review). • The primary road profile is fixed. • The road usage and traffic patterns have changed over the years.
Maintenance	• The lawn sections are well maintained. • The maintenance standards within the monumental sections varies greatly. • Weeds have been allowed to establish in and in between monumental graves. • Rare and protected native plants have been allowed to establish in and in between monumental graves.
Landscape Character & Burial Styles	• The areas of potential infill are usually associated with established old monumental areas, where the introduction of new monuments may visually "offend". • The planting themes are not strong and require more definition throughout Rookwood. • The northern half of the site has specimen trees, while the southern half is lacking.
Signage	• Directional signage is ineffective. • Duplication of signs by Trusts or Lessee gives an inconsistent image. • Signage is dated and non-interactive. • Regulatory signage needs to be more visual than wordy.

Recreational Activities

Subject	**Issues**
European Heritage	• All of Rookwood (except for Unit 24) is subject to Heritage Protection.
Aboriginal Heritage	• Part of Unit 24 requires Aboriginal archaeological Investigations prior to development. • Any scarred or carved trees would require protection.

Recreational Activities Issues Table (continued):

Former Railway Line	• The mortuary line and all its stations are significant to the history of Rookwood. • Some parts are listed as archeologically significant and therefore under protection. • Their interpretation will enhance the public's experience of Rookwood.
Former Buildings/ Unused Land	• A number of former buildings have been assessed as archaeologically significant.
Landmarks	• All landmarks represent a part of Rookwood's history and as such, are points of interest for visitors. • Landmark assist with way-finding and enhance views. • The northern part of the site is rich in landmark specimen trees whilst the southern end lacks them.
Context	• Pedestrian and vehicular entrances are essential part of the cemetery's operations and presentation/approachability.
Passive Recreation	• Raising the profile of Rookwood is a key objective of the Plan of Management. • With increased public recreation use comes increased responsibilities.

Sustainability

Subject	**Issues**
Historic Circulation Routes	• Historic circulation routes are recognised (by others) as significant due to their setting and fabric still being present in the landscape. • Historic circulation routes have been assumed to be linked to the evidence of original brick kerbs and channel, street trees and elements otherwise expected to have been present in the original design.
Road Treatments	• Parking on grassed verges increases maintenance requirements and can detract visually when damage occurs. • Relaying all roads for aesthetic or way-finding purposes is not warranted. • Relaying roads to improve drainage and minimise maintenance may be required in places.
Context	• Good connections by roads, public transport and green corridors are important to the sustainability of the cemetery.

Managing Change	• Areas have been assessed (by others) and categorised as having a range of the ability to absorb change
	  • Unable to absorb change
	  • Able to absorb change within existing grid
	  • Able to absorb change
	which is not an appropriate way to categorise possible change.
	• Areas have been assessed (by others) and categorised by phases of historical development
	  • Phase 1: 1865 - 1888
	  • Phase 2: 1889 - 1919
	  • Phase 3: 1920 - 1945
	  • Phase 4 1946 - present

Sustainability Issues Table (continued):

Managing Change (continued)	• The evolution of burials for different religions and community groups has resulted in a unique patchwork character. • Change is possible and can be managed if respecting the unique character patchwork of Rookwood.
Access Grid	• The cemetery needs to maximise its yield as it is running out of burial space. • Reclaiming full or part roads will release valuable burial land. • The allocation of lawn or monumental graves within new burial land is the decision of each Trust.
Unused/ Undeveloped Land	• The cemetery is running out of burial land; an audit of the unused/ undeveloped for burial is required. • A number of former buildings have been assessed as archaeologically significant.
Landscape Character & Burial Styles	• The cemetery needs to maximise its yield to provide burial land for as long as possible.
Former Buildings	• Category 1 and 2 former structures are highly significant. • Category 3 former structures are deemed non-significant.
Former Buildings/ Unused Land	• A number of former buildings have been assessed as archaeologically significant.
Ecology	• The site holds 20.3Ha of Conservation areas which are the subject of a PMP. • Pockets of endangered vegetation (other than Conservation areas) are also present on site. • New specimens of threatened species found (6 plants). • The Bio-banking process may offer alternative options for land release. • The cost of management of these areas is not subsidised and needs to be financed by the cemetery.
Trust & Unit Boundaries	• The land is divided into land allocated to Trusts (for their use), Crematorium and memorial garden purposes, and Common areas (unallocated). • Buffer zones are inconsistent.
Services	• All services are in easements (currently being surveyed and recorded) and are subject to various restrictions.
Waterways (Canals)	• The cracks and collapses within these canals are seen to contribute to flooding and waterlogging. • The brick canals are a liability. • Canals form part of service easements, unusable for burials.
Water Management	• Groundwater affects burial potential in places.
Stockpile	• Temporary stockpiling is costly as it involves double-handling.
Topography	• The top of ridges is currently sought after for burials. • The low points on site can be wet and boggy.
Maintenance	• The interpretation will enhance the public's experience of Rookwood.
Passive Recreation	• There will be competing forces in the allocation of remaining land for passive recreation use and for burial.

Sustainability Issues Table (continued):

Buildings	• Redundant buildings due to the amalgamation of the Trusts result in buildings that could be reused or demolished to create space for burials. • Locations of new buildings needs to consider traffic, logistical and operational issues. • Facilities and operations should be streamlined and amalgamated where possible to improve efficiencies and maximise burial space. • Siting of buildings is related to the traffic and congestion issues. • All segments of visitors should be appropriately catered for, whether they are visiting for mourning, recreation or other purpose.
Traffic	• Congestion at the Weeroona Road entry, both westbound and eastbound. • Sustainability of this entry in the future. • Relative distance of the CMCT business operations from both existing entries. • Congestion issues on the northern section of Hawthorne Avenue during peak times due to lack of “through” roads. • Congestion issues on Sheehy Avenue due to the new activity on Unit 24. • Funeral Directors with services held outside the cemetery currently drag their processions through the existing administrative hubs, clashing with services held on site, and causing congestion issues. • Large roundabout next to the East Street entry can be confusing.

OVERALL PHILOSOPHY/ VISION

OVERALL PHILOSOPHY/ VISION

BACKGROUND

In December 2009, representatives from all of the Rookwood's management organisations met to discuss the Vision for Rookwood.

They recognised that by the year 2060 the cemetery is likely to be buried out. It was also noted that a number of factors will affect this date and may bring it forward considerably:

- Population growth (more people to cater for within the catchment)
- Demographics (ageing population and proportion of religious groups which request single depth graves)
- Trends in disposition of the dead (percentage of cremation versus burial, new methods?)
- Legislation (allowing renewal, limited tenure and other forms of re-use)

Similarly the look of the cemetery will be affected by:

- Climate change
- Increasing cost of compliance
- And most of the factors affecting the "closing" date (above)

Their Vision is captured below (Plan of Management, 2014),

> *"That the cemeteries within Rookwood Necropolis be managed as attractive and sustainable resources for disposition of the dead and promoted to families and communities within Sydney and related communities as the preferred destination of the deceased.*
>
> *Whilst promoting the Necropolis as a cemetery continues to be the primary purpose, the Necropolis lands and management will also provide for:*
>
> - *Conservation, interpretation and presentation of important and representative samples of the built and natural environment.*
> - *Conservation of threatened species in a manner consistent with sustainability of the cemeteries.*
> - *Public access, including appropriate passive recreational use.*
> - *The principles of sustainable land-use management."*

VISION STATEMENT

The Landscape Masterplan's Vision directly responds to the key elements highlighted above, and will sit under the endorsed Plan of Management's Vision.

It is in support of the PoM's statement that *"the cemeteries within Rookwood Necropolis be managed as attractive and sustainable resources for disposition of the dead"*, with particular interest in the following three aims articulated in the Masterplan's brief:

- Beautifying and providing for visual consistencies throughout the site.
- Promoting recreational activities within.

And last but not least,

- Extending the life of the cemetery.

The Landscape Masterplan needs a clear and concise Vision which will help guide its development and management well into the future, past the scope of a typical Masterplan. It can be encapsulated by the following statement:

> *"Rookwood will remain a cemetery for as long as possible, as an example of sustainable management. If and when the time of the last interment comes, the cemetery will be left to the community as a park and public facility of high quality."*

ACHIEVING THE VISION

In direct response to the Plan of Management (2014), Rookwood Necropolis will provide:

Conservation, interpretation and presentation of important and representative samples of the built and natural environment (POM).

- A world leading example, not just by its size but its diversity of landscape, cultural and built elements and how it manages them all.
- Where all 80+ cultures are respectfully catered and maintained.
- Where art abounds (sculpture exhibitions).
- Where buildings of heritage significance are properly maintained and showcased.
- Where new buildings and structures are architecturally vibrant and sympathetic to their site context.
- Where significant heritage elements are reinterpreted and showcased appropriately.
- Where its park-like setting is the best of its kind and the pride of the industry.

A green haven for the public and mourners to enjoy.

- Where the landscape dominates.
- Where the landscape is varied, yet unified by a common theme.
- A botanical resource (arboretum of rare trees and plants).
- Where passive and grieving activities can coexist respectfully.
- Where passive recreation, reminiscent of Victorian times, can capture all that Rookwood has to offer.

Conservation of threatened species in a manner consistent with sustainability of the cemeteries (POM).

- A protective yet interactive environment for some ecology to flourish.
- Where sustainable pockets can survive as useful habitats and samples of threatened ecosystems.
- Promoted as an educational resource for the public to enjoy.
- Preferably located on previously buried land or, if not possible,
- Where Natural and Woodland interment may occur.

Public access, including appropriate passive recreational use (POM).

- A tourism landmark.
- Promoted as a tourism destination (as Pere Lachaise in Paris).
- Where self-guided tours abound, generating some income for the cemetery.
- Offering unique experiences such as museums, viewing platforms, weekend entertainment and seasonal events, all with the potential for income generation.
- Where stunning contemporary architecture meets old and draws crowds.

The principles of sustainable land-use management (POM).

- A sustainable burial ground for many generations to come.
- Where intensification is sensitively controlled.
- Where new methods are tested.
- Where the potential for new legislation can be demonstrated.
- Where new legislation is first introduced.

(Image coutesy of SAG & Friends of Rookwood)

MASTERPLAN PROPOSALS

MASTERPLAN PROPOSALS

GENERAL

This Landscape Masterplan should be seen as a management plan with particular interest in landscape related issues. It takes the Rookwood Necropolis Plan of Management 2014 to the next level of detail with specific and practical recommendations and guidelines.

It is not a typical masterplan, in the sense that it does not provide a "pretty picture" with design solutions. It aims to structure all opportunities within the site into an easy-to-use document.

The Landscape Masterplan aims to provide initiatives which respond to both the vision and the principles setout in the Plan of Management:

- A vision which is based on what the cemetery may look like and may offer the community once the last interment has taken place,
- A set of Strategic Directions (SD 1-5) and Principles (P1-18 – as identified in the Management Unit Policies document).

Of prime importance to the report is the need to respond to the main objectives of the Landscape Masterplan, as set out in the brief, whilst also responding to the Plan of Management's principles and strategic directions:

OBJECTIVE 1: BEAUTIFICATION/CONSISTENCY Recommendations 1 to 86

SD 2	**Protect Rookwood's heritage and conserve its environment**
P1	Maintain Visual corridor
P2	Maintain Historic Circulation Routes including setting and material fabric
P3	Maintain landscape pattern of areas within State Heritage Register (SHR)
P4	Maintain representation of cemetery and landscape design including influences of significant people
P5	Maintain heritage monuments, features, landmarks of artistic, creative and technical value including its setting
P6	Interpret significant heritage features and/or heritage items no longer present
P7	Implement and reinforce established street hierarchy – Primary, Secondary and Tertiary
P8	Maintain significant trees/ vegetation/ botanical items of rarity in accordance with results of the Significant Tree Register (to be completed)
P9	Maintain historic serpentine and canals
P10	Provide special consideration to High points and ridgelines: visually prominent areas
P14	Maintain all above ground structures for maintenance of safety, visual and heritage values
SD 5	**Raise the profile of Rookwood as resource for the whole of Sydney**
P17	Adopt and expand on design guidelines for promotion of "whole of Rookwood" image
P18	Identify profile initiatives (as well as passive recreational opportunities)

OBJECTIVE 2: INCREASED RECREATIONAL ACTIVITIES — Recommendations 87 to 112

SD 1	**Adopt sustainable management practices**
P14C	Improve traffic circulation now and in the future
SD 2	**Protect Rookwood's heritage and conserve its environment**
P4	Maintain representation of cemetery and landscape design including influences of significant people
P5	Maintain heritage monuments, features, landmarks of artistic, creative and technical value including its setting
P6	Interpret significant heritage features and/or heritage items no longer present
P8	Maintain significant trees/vegetation/botanical items of rarity in accordance with results of the Significant Tree Register (to be completed)
P9	Maintain historic serpentine and canals
SD 5	**Raise the profile of Rookwood as resource for the whole of Sydney**
P15	Improve resources
P16	Expand on existing interpretation initiatives
P17	Adopt and expand on design guidelines for promotion of "whole of Rookwood" image
P18	Identify (profile initiatives as well as) passive recreational opportunities

OBJECTIVE 3: SUSTAINABILITY (YIELD & EFFICIENCIES) — Recommendations 113 to 186

SD 1	**Adopt sustainable management practices**
P12	Identify areas suitable for renewable tenure within Units
P13	Identify opportunities for development and additional burial space whilst maintaining Rookwood wide values (heritage, social, visual, vegetation)
P14	Maintain all above ground structures for maintenance of safety, visual and heritage values
P14A	Identify opportunities for soil stockpile on site
P14B	Identify opportunities for WSUD on site and flood mitigation
P14C	Improve traffic circulation for now and in the future
SD 2	**Protect Rookwood's heritage and conserve its environment**
P2	Maintain Historic Circulation Routes including setting and material fabric
P3	Maintain landscape pattern of areas within State Heritage Register (SHR)
P6	Interpret significant heritage features and/or heritage items no longer present
P8	Maintain significant trees/vegetation/botanical items of rarity in accordance with results of the Significant Tree Register (to be completed)
P9	Maintain historic serpentine and canals
SD 4	**Respect cultural diversity and equitable allocation of resources**
P11	Maintain representative examples of social/religious group burial practices-areas identified in social significance study (to be completed)

It should be noted that the recommendations within this report are directed at improving Rookwood as a "whole" with no preference given to either of the Trusts. It is therefore likely that some of the recommendations may or may not coincide with the Trusts' individual objectives to date.

Furthermore, approval of recommendations for the "whole" of Rookwood will require bilateral agreement. This may not be achievable across the board, however some consensus is required together with a commitment to adhere.

RESPONDING TO THE NEED FOR BEAUTIFICATION/ CONSISTENCY

The aesthetics of the site have been compromised over the years due to multiple management techniques adopted by up to 7 Trusts, with little coordination of standards.

With the rationalisation of the Governance structure into only 2 Trusts in 2012 comes opportunities to discuss common objectives and management techniques.

“Beautification” combined with “increased recreational activities” will ensure that Rookwood Necropolis continues to provide useful open space in perpetuity to the various communities and cultural groups of Sydney. The mutual benefits the two objectives provide each other will ensure a sustainable future. Otherwise, the cemetery runs the risk of slowly growing inwardly and becoming the point of interest of only a few historian enthusiasts. The aim is to supplement the Perpetual Care Fund by creating long term interest and activities within the site after the last burial has taken place.

Burial sales in the cemetery industry are subject to competition. Appearances play a significant role. Rookwood needs to improve its image and maintenance standards in order to become a leader in the field and retain its reputation as a caring environment for grieving families.

VIEWS

The importance of views internally and externally are well documented.

The internal views provide a welcome variety of short, medium and long views beneficial to the visual experience of the site. This is particularly important when considering what the cemetery may look like once the last interment has taken place and what legacy is left to future generations.

Of particular importance are the views beyond the site to recognisable landmarks, such as the city and Sydney Olympic park, which provide the public with well-known and valued sight-lines.

Similarly the first impressions of the site are of prime importance. The buffer zone if planted or opening onto lawn views, but more importantly, if free of graves would provide a better presentation to the site, especially on East and Railway Street.

Recommendations

1. *Maintain significant views beyond the site (refer to Internal Views & Topography Analysis Map – pages 56 & 54).*
2. *Maintain a variety of views within and into site on public interface (short, medium and long views)*
3. *Use landmarks as focal points for way-finding, ensure views onto them are not obscured during future developments and plantings.*
4. *Avoid burying into the buffer zone.*

CIRCULATION

ROADS

The concept of defining typical profiles for Primary, Secondary and Tertiary roads for the purpose of assisting with way-finding within Rookwood Necropolis is sound.

This process has already been started by others and should be continued. It reinforces the differences amongst the hierarchy giving more clarity to what is a complex road network on the site.

Primary

The reconstruction of the Primary roads will be completed by 2019. The chosen profile has its challenges, some of which can be improved whilst others have to be accepted as they are and managed in future years.

It was noted that there are up to 6 kerb treatments within the completed sections. A more consistent kerb treatment would be preferable, with differences in the heritage areas where the original brick kerb and channel still exists.

The Primary road profile recommends the creation of a new avenue in a different alignment to the original one. New trees are planted within the road – in between car bays (refer to Tree Management – page 147). This ultimately leads to the removal of the original avenue as the two compete for light, space and nutrients. This practice may have been deemed suitable for the Primary roads, which had limited existing established avenues. However, this practice is not recommended for the Secondary and Tertiary roads which often exhibit established treed avenues.

As demonstrated in the Primary Roads Planting (refer to Planted Avenues Map – page 77), the new tree avenue competes with the existing one and struggles to grow in places. This competition will only cease once the original trees are removed. Removal of established treed avenues is not supported in the context of Rookwood for heritage and aesthetic reasons. Although the practice potentially provides additional graves along the main avenues, intensification of burial should be explored elsewhere where the visual impact can be minimised.

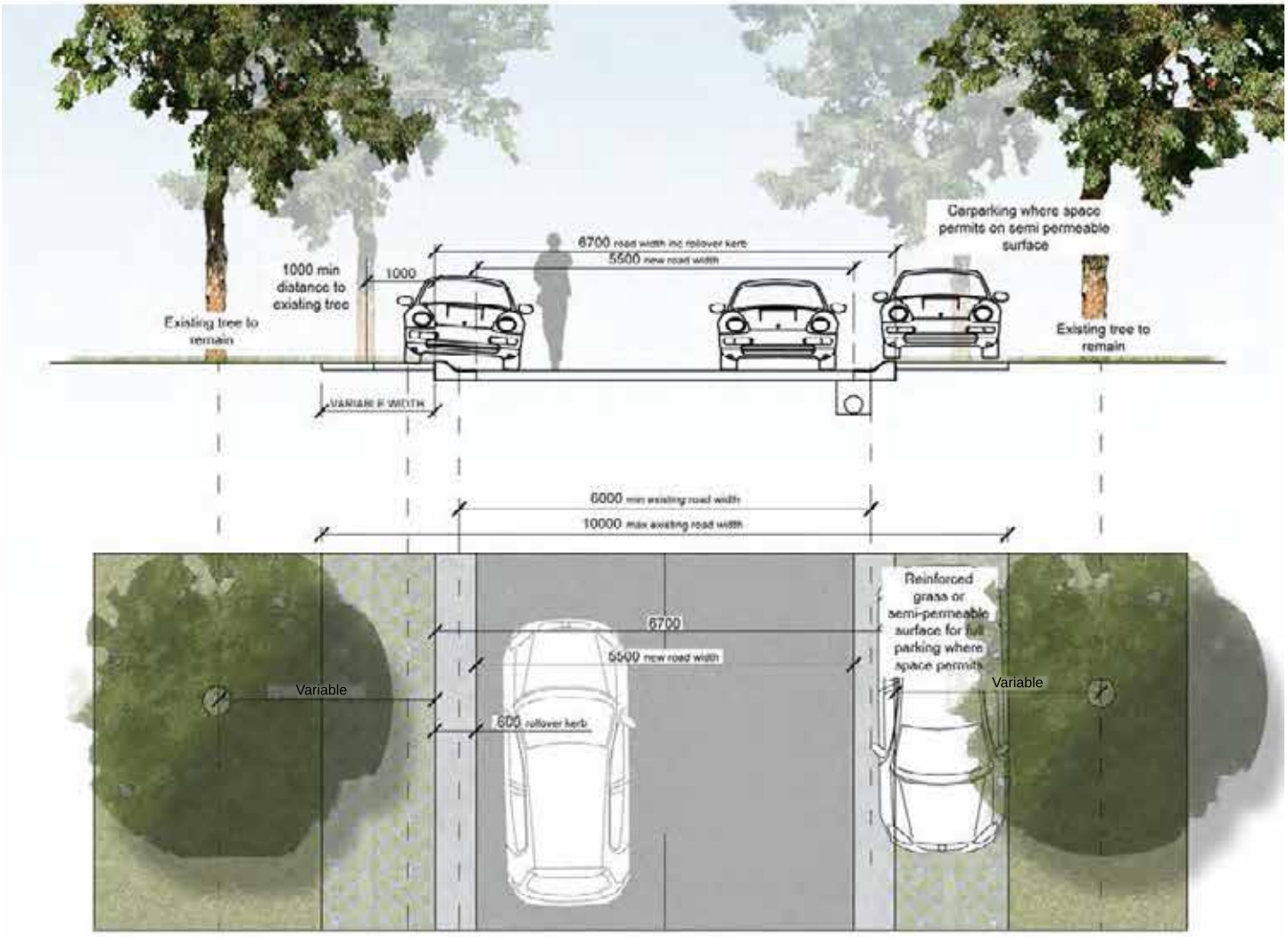
Necropolis Circuit is difficult to navigate with 6 equally prominent roads that radiate from it. Its wide radius does not read as a roundabout adding to the confusion. A simplification together with better signage would be beneficial to give visitors some “decision-time” whilst travelling. This could be achieved by downgrading a number of roads linked to the Circuit.

Recommendations

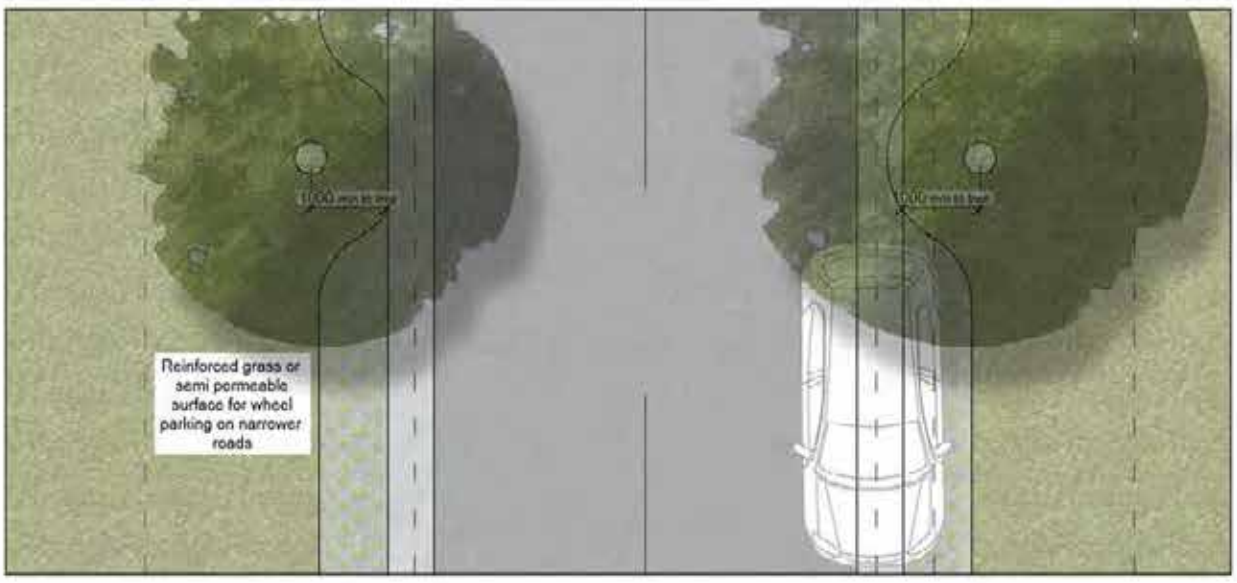
5. *Retain original brick edges and kerb and channel where present*
6. *Ensure consistency of treatment of edging on all Primary roads*
7. *Enhance Primary road (all on ridgelines) as part of the visual experience of Rookwood, by adding roadside planting (refer Vegetation recommendations below).*
8. *Consider downgrading Paton Avenue to Secondary road, to simplify the Circuit, as traffic conditions have changed*
9. *Consider downgrading William Drive for the same reasons.*

Secondary

The vast majority of Secondary roads are currently adorned with established treed avenues in good health. Secondary roads are also main feeders to burial sites and not necessarily adjacent to currently active burial areas. This may change with the introduction of re-use in future years. As there are no localised carparks throughout the cemetery and the generally practice is to park on the side of the roads, the Secondary roads should provide for carparking on both sides, where possible.



OPTION 1 - SCENARIO FOR WIDEST ROAD
(existing trees max distance apart)



OPTION 2 - SCENARIO FOR NARROWEST ROAD
(existing trees min distance apart)

SECONDARY ROAD PROFILE

Furthermore, as visitation increases with the promotion of recreational activities, ample parking should be provided within the site to minimise the competition with funeral parking requirements.

Paton Street which is currently classified as a Primary road has been deemed suitable for downgrade to Secondary (Road Hierachy C&O Map – page 69). If and when due for repairs, the Secondary road profile should apply for its reconstruction. It is particularly important to differentiate its profile at the Necropolis Circuit end to ensure a clearer definition of the roads radiating from the Circuit in an attempt to make decision making easier whilst travelling along it.

The CMCT has proposed to redirect Barnet Avenue to connect directly the junction of Weekes Avenue and Memorial Drive at the existing roundabout. The purpose of this redirection is to provide a more direct route into the CMCT administrative hub, and to provide for a better layout of facilities within the hub. The proposal will result in improved way finding to the CMCT hub and reduced traffic congestion in this area, and is therefore aligned with the strategic objectives.

Any new Secondary road profile should follow the following principles:

- Be flexible to cater for various width.
- Retain existing treed avenues.
- Have a roll-over profile to cater for parking.
- Parking should occur on consolidated grassed verges to avoid on-going tree and grass damage.
- Avoid concrete grass reinforcing as it heats up and is uncomfortable for foot traffic.
- Avoid off-road path system which is land consuming and unnecessary.

The following profiles are recommended:

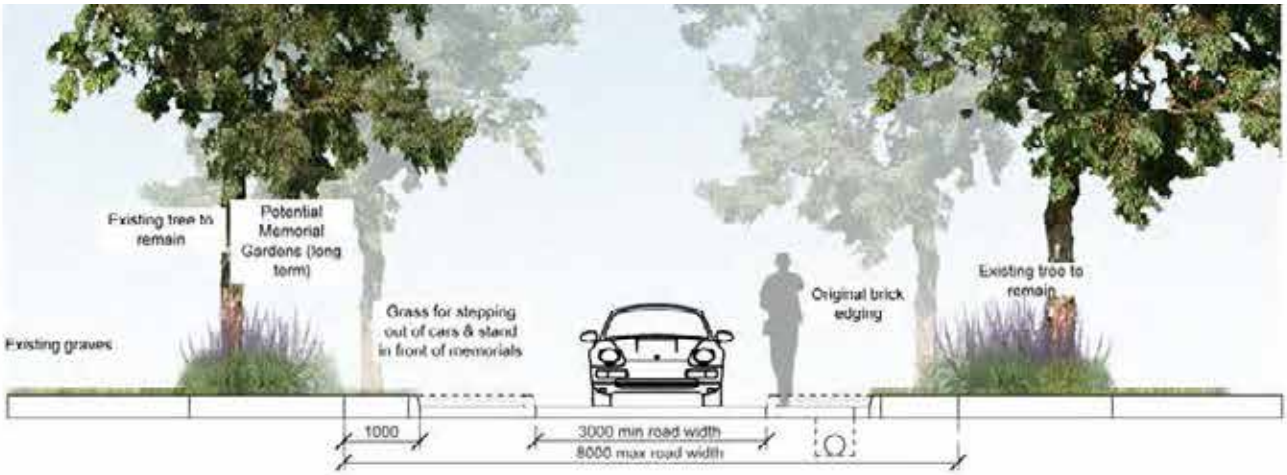
- 6.5m wide roads (eg. Barnet Avenue, Sheehy Avenue, Phillips Street):
  - Retain any treed avenue where and as is.
  - Raise parking strip for wheel parking only,with rollover kerb and different material (grass-rings or permeable paving material) away from established trees.
  - Modify kerb and channel and upgrade stormwater drains were necessary.
- 8.5m+ wide roads (Courtenay Avenue, Haslem Drive, Hawthorne Avenue):
  - Retain any treed avenue where and as is.
  - Raise parking strip for full car width, with rollover kerb and different material (grass-rings or permeable paving material).
  - Modify kerb and channel and upgrade stormwater drains were necessary.
- Redundant Roads (William Drive, Haslem Drive (north), Hawthorne Avenue (east)).

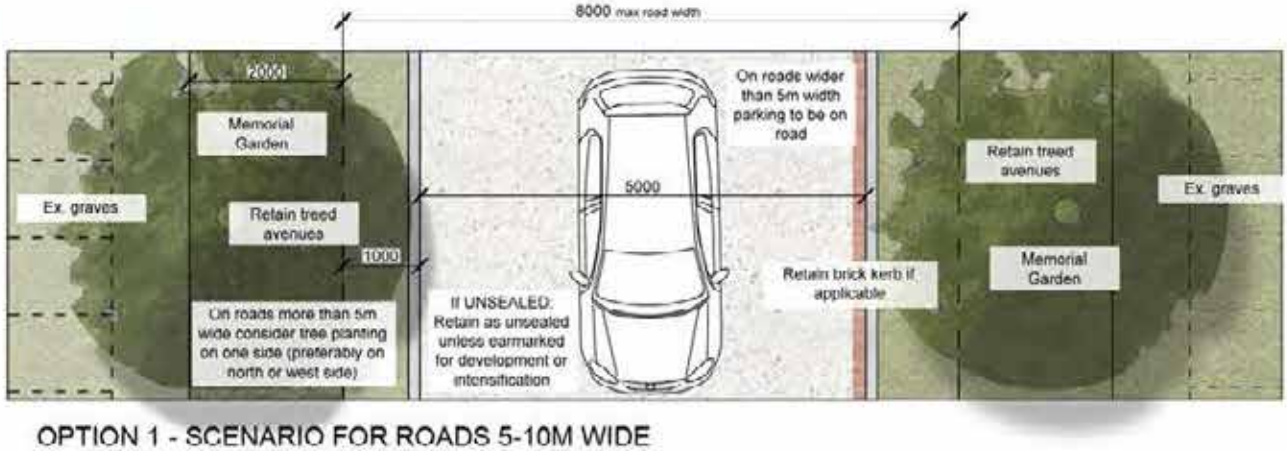
  A number of wide historic routes have become redundant. They no longer lead anywhere due to the removal of original entry points (over the railway line and off Railway Street). As the burial areas they used to service have reached their capacity, the traffic movement and parking demands on these very wide roads have dramatically reduced (subject to the approval of the relevant Heritage authorities).

  - Retain treed avenue where and as is.
  - Retain any brick edging, kerb and channel details.
  - Intensify interment within road profile and verge (refer to Case Studies – page 215).

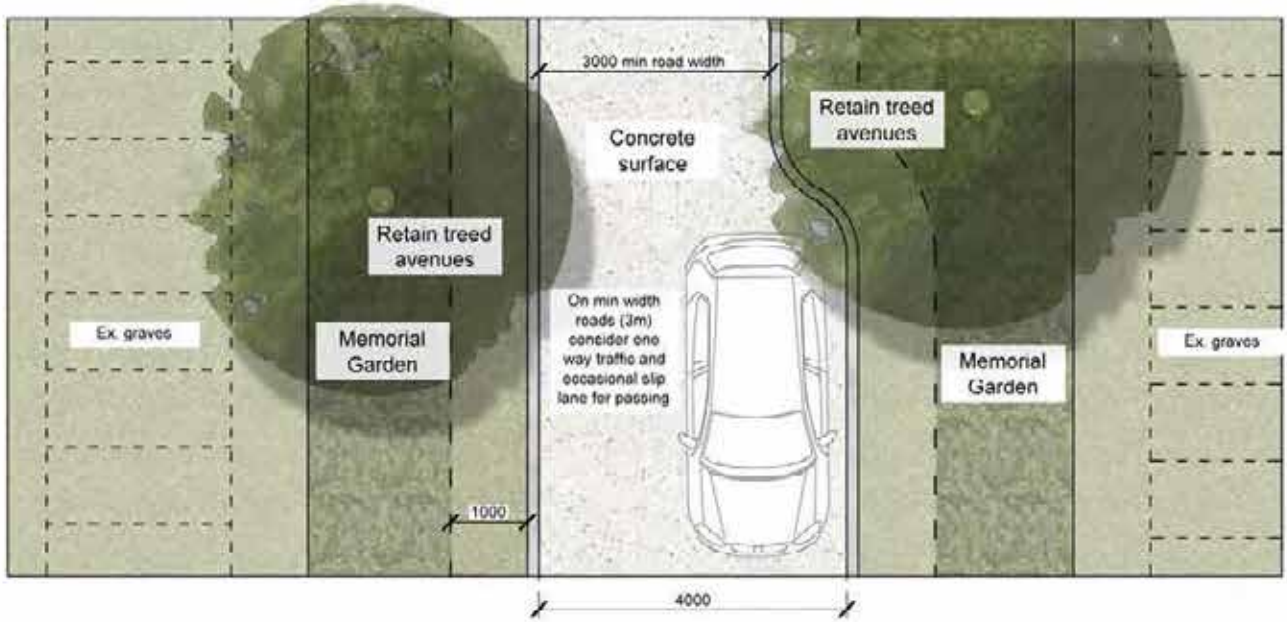
Recommendations

10. *Consider a revised Secondary road profiles based on the above principles.*
11. *Ensure consistency of treatment of edging on all Secondary roads allowing for 2 alternatives: one in heritage area where brick details are still present, and another in all other areas.*
12. *Retain original brick edges where present.*
13. *Downgrade/narrow redundant Secondary roads: William Drive, Haslem Avenue (north), Hawthorne Avenue's east end (refer to Case Studies - page 215).*





OPTION 1 - SCENARIO FOR ROADS 5-10M WIDE



OPTION 2 - SCENARIO FOR ROADS 3-5M WIDE

TERTIARY ROAD PROFILE

14. *Consider downgrading Blashki Avenue and part of Farrar Avenue to Tertiary, due to the close proximity of another Secondary road.*
15. *Connect Barnet Avenue to Hawthorne Avenue as part of the CMCT administrative hub development.*

Tertiary

The Tertiary roads also vary significantly throughout the site both in width, materials and planting practices rendering difficult the design of one single profile.

They bring mourners closer to the burial areas and as such, should be able to accommodate some parking without blocking traffic. This will not be possible in roads narrower than 5m.

The introduction of one-way traffic in some selected narrow roads as well as during funerals would assist traffic management. As one-way traffic can be difficult to manage in cemeteries, slip-lanes should be considered to allow for cars to pass each other where space permits.

Tertiary roads are also expected to accommodate for pedestrian traffic in addition to parked cars.

It is not practical nor economical to re-design all Tertiary roads within the site. A change of road profile is only warranted should the road fail (for drainage reasons or otherwise) or when the area has reached full capacity with very little visitation occurring. At that point the road verges can be adapted to receive memorial gardens. However, it is always expected that Tertiary roads will be required to provide vehicular access and access to interments. It is therefore important that the roads retain a minimal width of 5m or 3m + slip-lane.

A number of Secondary roads which are close to other Secondary roads have been deemed suitable for downgrade to Tertiary (refer to Road Hierarchy – page 67). If and when due for repairs, the Tertiary road profile should apply for their reconstruction. These roads are:

- Part of Farrar Avenue (between Necropolis and Memorial Drive)
- Blashki Avenue

It is important that the Tertiary road profile differ from that of Secondary road for legibility. This can be achieved with road material and kerb design. The following profiles are recommended:

- 8.5m-6m wide road – sealed
  - Narrow to 5m minimum.
  - Consider concrete for surfacing.
  - Provide standard kerb profile.
  - Introduce tree planting on one side if space permits.
  - Retain treed avenue if present as and where is.

- 6m wide and less – sealed
  - Narrow to 5m minimum or consider one way traffic with occasional slip-lanes (+arrow painted at each end).
  - Consider concrete for surfacing.
  - Provide standard kerb profile.
  - Introduce planting on one side if space permits.
  - Retain treed avenue if present as and where is.

- 6m-4m wide and unsealed
  - Introduce tree planting on one side if space permits
  - Retain treed avenue as and where is.
  - Retain as unsealed but consolidate with stabilised crushed rock if earmarked for development or intensification.

Recommendations

16. Consider a revised Tertiary road profiles based on the above principles.

17. Implement Tertiary road profiles.

18. Retain original brick edges where present.

ENTRANCES

The current entrances are the main gateways into the site and as such should help define the standing and importance of Rookwood Necropolis. The first impression of the site should be that of significance, grandeur, efficiency and high standards. Congested entrances and exits also have the potential to drastically tarnish the presentation and reputation of a cemetery.

East Street

Currently only one entrance has been the subject of a considered design with the view to improve traffic flows and presentation. All current and future additional entry points should be the subject of similar improvements.

Weeroona Road

The Weeroona Road entrance is the main entry point yet is inconspicuous and subdued. The current proposal, although in keeping with East Street entrance, does not reflect the importance of the site and does not appear to make a significant statement. A re-design is warranted.

Sheehy Avenue

The CMCT has proposed to construct a new entry into the cemetery at the southern end of Sheehy Avenue to provide better and more direct access to the CMCT facilities.

The proposal would provide additional capacity of entry into and exit out of the cemetery, and will likely have a significant impact on reducing the strain on the existing entry points, particularly the Weeroona Street entry. Refer also to the section in this report on Traffic for further discussion. As the proposal would reduce congestion and improve accessibility into deep areas of the cemetery, it is aligned with the strategic objectives.

An entrance at the end of Sheehy Avenue entrance is a logical addition to the site which struggles with traffic and way-finding issues. With the development of Unit 24 and the growing of the western suburbs, a new entrance in the south west corner would be beneficial to the general circulation within the site (traffic issues discussed below).

When compared with other cemeteries of similar size or turn-over the following statistics are worthy of consideration:

	Size	Entries/ exits	Burials/ year	Cremations/ year	Chapel services/ year
Rookwood Necropolis*	288Ha	2	3,000	2,700	1665 (Invocare) 950 (CMCT) Not Available (RGCRT)
Springvale Botanical Cemetery (Vic)	168Ha (3/5 of RN)	5 (4 permanent, 1 for special events only)	2,184	6,697	8,917
Fawkner Crematorium & Memorial Park (Vic)	113Ha (2/5 of RN)	6	2,500	3,100	2,300

* Based on 2013 data

By having 3 entries, Rookwood Necropolis will still under-catering compared to others.

The style of each entrance may be different, reflecting the different period in time during which they were built. However, to instil a sense of belonging and a consistent "Rookwood" look, similarities may be drawn between them, either in terms of materials or colours.

Recommendations

19. *Improve visual appearance of main entrance (Weeroona Road).*
20. *Consider re-design of current Weeroona entrance proposals.*
21. *Open new entrance on East Street for Catholic and Muslim section to alleviate current congestions at Weeroona entrance.*

VEHICULAR TRAFFIC

Traffic around the site can be difficult during peak hours, funeral times and commemorative days. It is important to spread the traffic across the site in terms of timing and location.

Although time coordination of large influx into and out of the site between the Trusts is theoretically possible, it is unlikely as both will endeavour to maximise the use of their own facilities.

It is therefore more likely that traffic can be somewhat alleviated by the spreading of the events to several entry points. Funeral directors may be amenable to enter at different points and it is conceivable that this could be coordinated on a common database accessible by both Trusts.

Keeping funeral traffic simple and taking it away from congested entrances will also assist in spreading the load. The building proposal has taken this into consideration by defining a clear central meeting point for funeral processions and a separate main road "branch" for each Trust, minimising the potential for clashes and overlap between Trusts' operations, located on Hawthorne Avenue. The proposal will redirect a significant amount of traffic away from the RGCRT and CMCT hubs onto Hawthorne Avenue, and hence consideration should be given to upgrading Hawthorne Avenue to a Primary road.

An additional entry point for the Catholic section and the Muslim section should be considered as the Muslim procession presently have a convoluted access route to their new ground (first burial in 2014), one which traverses Catholics grounds and has the potential to impede their operations.

In terms of traffic, we recommend a logical and simple solution, one where each entrance has a clear path to each Trust from:

- Weeroona Road/ Centenary Drive: left to Catholics, right to General.
- East Street: left to General, continue around the roundabout and then right to the Catholics.
- Sheehy Avenue: straight to Catholics and right to General (New Muslim/ Jewish section).

A traffic study exploring the implications of an additional entry point on East Street may be beneficial in confirming the need for an extra entrance but also to assist in its layout development as it is potentially close to an existing bend.

Recommendations

22. *Consider coordinating entry usage between Trusts (common database).*
23. *Open new entrance on East Street for Catholic and Muslim section to alleviate current congestions at Weeroona entrance.*
24. *If deemed necessary, commission a traffic study to define the benefits of an additional entrance.*
25. *Upgrade Sheehy Avenue to Primary road when new entry point is implemented.*
26. *Upgrade Hawthorne Avenue to Primary road.*

Original gardenesque layouts

Original gardenesque layouts

PEDESTRIAN

With regards to funeral and visitor pedestrian traffic, it is expected that it will continue along the roads.

The introduction of "off-road" path systems for the use of mourners (as suggested in the current Secondary road profile) is difficult to retrofit, onerous and space consuming and therefore not recommended.

The provision of a network of pedestrian path designed for visitors and general public to appreciate the beauty of Rookwood away and between burial areas is extensively discussed in the "Responding To The Need For Increased Recreational Activities", Pedestrians (page 167).

HERITAGE

LAYOUT

The significance of Rookwood's layout and features (past and present) are well documented. The original plans from C. Moore, S. Pearce and J. Haiden featured unique roundabouts, garden structures and sculptures. Together with the remnant of former buildings they offer a wealth of opportunities for visitors to immerse themselves in Rookwood's history and beauty.

Some structures are in need of repairs, some former buildings in need of unearthing and interpretation, some plantings in need of rejuvenation. Any improvements to these items would assist in beautifying the cemetery.

The cost of maintenance for these significant items is an on-going concern. The introduction of memorialisation is one additional option for raising the necessary funds, over and above seeking grants from heritage organisations and authorities (refer to "Responding To The Need For Sustainability" – Intensification, Former Buildings – page 185).

Recommendations

28. *Restore original gardenesque layouts where lost or damaged, with plantings similar to originals (subject to further research).*
29. *Restore remaining garden features as per S.Lavelle's recommendations (1996 report).*
30. *Consider interments within, subject to approval from heritage authorities to raise fund for repairs.*

RAILWAY

The railway line is a fascinating part of the cemetery's operation. Its alignment is still discernable in places.

There are multiple opportunities throughout the site to interpret its lost presence. With minimal expense both financially and spatially, a large portion of its original alignment can be reinstated using paving patterns on a new path. A corridor of approximately 6m is required to provide a path, tree planting and buffer zones against burial areas.

This will add interest and improve the aesthetic of the site, with careful design, tree planting and respite areas.

Recommendations

31. *Refer to Interpretation Railway Line – page 243 for details.*

CANALS

The early planning for the cemetery recognised the site's valleys for drainage and placed canals along these inverse. Combined with Victorian period landscape design traditions, these utilitarian structures became garden features with ornamental planting, sculptures and bridges.

The northern Serpentine was restored in 2002 and provide a great example of the canals' potential for recreation, education and beautification. It is unfortunately out of the way and somewhat hidden from view. Making canals easier to find is an important part of promoting Rookwood and is discussed in the relevant chapter (refer to Waterways – page 45).

Planted Canals

Example of unwanted visual clash between new and old sections (Boroondara General Cemetery, Victoria)

A number of other canals are in a state of disrepair, cracking and collapsing. In addition to appearing unsightly, they do not drain efficiently and create further problems. Their maintenance is sporadic and often retain debris and litter within.

The treatment of the canals buffers varies and could be consolidated across the site for consistency.

There is a public liability issue arising from public access as some canals are deep and potentially dangerous whether full or empty. For this reason, the buffer zone (3m on both sides at present) should be planted to clearly indicate that access is not encouraged.

All crossings and bridges should be suitably equipped with barriers.

Recommendations

32. Repair canals as per canal strategy with priority to leaking ones.

33. Regularly remove debris from canals especially palm fronds.

34. Regularly clean out stormwater outlets on boundary lines.

35. Plant buffer zones, avoiding larger trees which will impact on structural integrity.

36. Restore other serpentine and ornamental basins in Unit 9.

37. Restore planting along historic brick canals.

MONUMENTATION (HEADSTONES)

The monumentation styles, density and state of disrepair greatly contribute to the visual amenity of the cemetery.

Although the styles are dictated by the families and the density dictated by the need to rationalise land use, the repair works can be somewhat controlled by the Trust. The worst cases occur in the older sections where the families no longer visit and tend to graves, leaving the cemetery with the costs of repairs or restoration.

Although outside the scope of this masterplan, it is an important consideration when presenting a “well-cared-for’ image to the public. Planning for headstone conservation and stabilisation should take into account public safety and the need to prevent accelerated decay if they do fall over and/or break. Prioritisation of headstone conservation projects should consider the condition/deterioration, stability, heritage/architectural/historic value and degree of risk if not conserved.

Where possible, it may be possible to prioritise works close to visible boundaries and main internal roads. (Prioritisation of monuments is likely to be based on safety first).

The visual appeal of the site is also severely affected by insufficient weed management within monumented sections. This also contributes to a sense of inconsistency throughout the site as the different Trusts have ranging maintenance regime and standards. The subject is discussed further under “Maintenance”.

Due to the number of Trusts which used to manage the site (up to 7) and the multitude of cultural and religious groups represented on site (approx.. 80), the monumentation on site is varied and often disparate. It is further exacerbated by the fact that Rookwood operates as denominational cemetery allocating land to each group (as opposed to non-denominational which does not segregate). As one groups runs out of land it is relocated elsewhere where space permits and without consideration to the overall aesthetics. This has created a patchwork of styles, materials and colours, some which clash with one another (eg. small lawn patches amongst monumental sections, modern crypts next to old sections). It is important in future planning to try to limit further disparity by grouping compatible styles together where possible. Screen planting should be considered in areas where this is not possible.

The visual amenity of the site is also a main consideration when implementing intensification of burials within established burial areas. It is essential that new memorialisation does not clash visually with the “old”. For this reason, the development of guidelines for managing change of any “infills” is deemed important and is covered within the scope of this report.

Recommendations

38. *Adopt and Implement consistent monument conservation guidelines for Rookwood as a whole.*
39. *Implement prior to monument collapse to ensure cemetery presentation and sense of care is in line with public's expectations.*
40. *Adopt and implement common landscape maintenance guidelines for Rookwood.*
41. *Avoid visual clash between monument styles.*
42. *From an aesthetic point of view, where possible, prioritise repair works close to visible boundaries and main internal roads.*
43. *Provide screen planting to soften the transition between styles and cultural groups.*

VEGETATION

GREENING COMMITMENT

The vegetation on site is one of the main appeals of Rookwood. Whether consciously or not, visitors appreciate the benefits a planted environment has to offer:

- The pacifying green tones.
- The cleaner air (release of oxygen from plants during the day).
- The shade and cooling effects of planted surfaces and trees.
- The wildlife it hosts.

This environment cannot thrive nor survive without a management plan of its own. As all living things, vegetation has a finite life and benefits from caring conditions.

In the same way that some Trusts have historically committed to:

- Increase the lawn cover on their site whilst reducing the herbiciding of graves,
- Limit gravel use between graves, and
- Increase their ornamental planting.

Rookwood needs to commit to a greening of its grounds to a level it is comfortable to maintain in the long-term.

The setting of goals and principles would facilitate the management of these landscape as well as provide a more unified and consistent image for the cemetery. This would involve getting an agreement on the following:

- Lawn: Extent and specie selection.
- Ground covers: Extent and plant list.
- Shrubs on roadside: Extent and plant list.
- Shrubs on graves: Rules for permissibility.
- Trees in avenues: Extent and plant list.
- Specimen Trees: Extent and plant list.

LANDSCAPE MANAGEMENT

It is therefore important to set landscape management guidelines for the whole of the site which considers the requirement of both Trusts and establishes a mutually agreed approach.

The process to be followed is as follows:

- Establish aims and objectives for landscape management of lawn, ground covers and shrubs and trees.
- Develop a landscape resource inventory.
- Develop landscape maintenance standards.
- Develop landscape maintenance specifications.
- Implement and review regularly.

The management of lawns and shrubs can be dealt with as part of the Maintenance Guidelines. The management of the Protected Vegetation is being dealt with as part of the PMP. The management of trees is a specialist skill with public liability implications and needs to be handled by a professional arborist.

TREE MANAGEMENT

A number of tree reports and discussions with Rookwood's main arborist have highlighted the need for a Tree Management Strategy and a Significant Tree Register.

A number of very large and/or rare trees exist on site. The variety of species and their strategic positioning greatly contributes to the beauty of the site.

It is essential that all significant trees and botanical items of rarity are recorded. Some trees are significant because of their age, location or specie.

Cemeteries are often a repository for unique and rare trees: in this case it is likely that the site hosts rare trees selected by C. Moore, former director of the Royal Botanical Gardens.

Cemeteries also allow trees to grow to their full potential without competition for space or nutrients, left alone and shielded from on-going development for generations. The large Araucarias and Eucalyptus on site are testament to this.

In contrast to the old areas, the southern end of the site is devoid of specimen trees and in areas, lacks vegetation. The character of its burial areas is predominantly mineral and built up. This is the result of changes in the cemetery management in the mid-20th century, which typically regarded land to be solely used for burial with minimal or no maintenance. The results are often harsh, hot and exposed mourning grounds.

It is possible to reverse the trend by introducing more vegetation throughout to soften the visual impact. This should be done in a limited but effective manner to minimise maintenance costs and loss of burial land.

All trees accessible by the public carry a public liability. This extends to staff working on site. It is therefore important that all trees be recorded and assessed for on-going management, repairs and replacements. This will provide some cost efficiencies and avoid the ad-hoc decision making in times of crisis.

The following information needs to be recorded:

- Tree number
- Botanical and common name
- Size (height and width)
- Location (GPS coordinates)
- Proximity to services and buildings
- Overall tree condition
- Tree significance (cultural – size – rarity)
- Specific problem
- Management actions required
- Estimated time required to complete action
- Last date of last works carried out/inspected
- Estimated date for replacement

The careful selection of future trees is paramount to their sustainability and to the ability of the Trusts to meet the maintenance obligations. It is therefore essential that the arborists entrusted with the trees' long-term care have an input in the selection process. This will be more –cost effective in the long-term. For example:

- Trees such Bunya Pines which now line the boundaries have giant cones (up to 6kg) which can drop from 20-30m high. They are dangerous . Yearly de-fruiting is required to minimise any liability especially as a pedestrian path is proposed within the buffer zones where these have been planted.
- Some tree species may cause road damage especially when planted within the road (Primary roads). Although removal of the chosen specie is not practical, an alternative selection may be warranted for the

Significant trees throughout burial areas

Significant Canary Island Palms

remainder of the Primary road upgrade.

Recommendations

44. *Develop guidelines for lawn and shrubs with agreed maintenance standards and plant lists.*
45. *Develop a Tree Management Strategy including new planting, replacements and on-going management. Appoint a reputable arborist for the task.*
46. *Develop a Significant Tree Register as part of the Tree Management Strategy.*
47. *Involve arborist in all major tree selection processes.*
48. *Carry out yearly removal of fruits on Bunya pines adjacent to paths.*
49. *Consider the sale of Bunya Pine's fruits which are delicacies.*
50. *Introduce specimen trees (rare species) in selected locations in southern portion of site as part of a tree replacement program or in location unsuitable for burial to soften the heavily monumented sections.*

LANDSCAPE CHARACTER

There are a number of landscape characters throughout the site, however often difficult to read due to the strong visual impact of the monumentation (headstones and other funerary structures).

It can be summarised as being predominantly Victorian style in the old section, predominantly native in the modern RGCRT areas and predominantly exotic in the CMCT units with an emphasis on foliage contrast.

These characters can be built on, hence creating different themes through the site, similar to a garden/ park with different "rooms" and styles.

The Victorian style garden plants should be used in the older sections representative of that era and an indicative plant list has been appended for reference.

The CMCT exotic, colourful planting, playing with colour foliage contrast and flowering displays should be continued, whilst avoiding water-dependent species such as tree ferns and azaleas for example.

Within the RGCRT areas there is ample scope to develop multiple themes, some native (more recent areas) and cultural planting (associated with burials as displayed in the Muslim section). However, in all cases, it is important to maintain the following broad principles for the sake of consistency and long-term sustainability (refer to Landscape Management Guidelines – page 252):

- Use drought tolerant plants.
- Use long lasting plants (longer life span).
- Use plants which hold their shape without regular pruning.
- Avoid multiplicity of themes and limit them to one per unit.

This implies creating a palette of plants for different zones.

Recommendations

51. *Develop different planting themes based on the character of the area whilst maintaining a cohesive Primary and Secondary road identity.*
52. *Refer to Planting guidelines (implementation chapter).*
53. *Refer to Victorian Garden/cemetery plant list (Appendix 06: Plant Lists – page 361).*

Planted avenues at Pere Lachaise, France

Existing avenues at Rookwood Cemetery

PLANTED AVENUES

The planting of avenues undoubtedly contributes to a better presentation of the cemetery. They provide a protective tunnel of green, with shade for parked cars. They also assist with way-finding, making the cemetery experience more pleasant.

The reconstruction and planting of all Primary roads is well under way.

As previously mentioned, the vast majority of Secondary roads are currently adorned with established tree avenues in good health. These should be retained and completed with matching species. On the other hand, this is not generally the case for Tertiary roads. Most are bare, with the exception of the catholic section. Looking at the photographic records from 1930-40, it appears that the practice often was to plant trees on one side only. However, it would be impractical to re-establish avenues on all Tertiary roads even if only on one side due to the cost of implementation but also because of the added liability and long-term maintenance it entails.

Tree planting should be aimed at providing comfort to mourners by offering shade and shelter during their visit. It is therefore more useful in the current and future development areas and should be assessed on an individual basis, depending on existing conditions, space available etc..

Avenue trees deemed problematic may be replaced with a more suitable species, if less than 10 years old. Trees older than 10 years should be retained and managed. This would apply to the *E. microcorys* on Primary road's, to the Lagerstroemias on Sheehy's Avenue's, all identified as potentially out of proportion with their setting.

The Ficus trees East of Hawthorne road have also been deemed as problematic. However, the original "one-of-its-kind" avenue should be restored within a new road profile (as suggested in "Responding To The Need For Sustainability", Road Reclaim – page 187).

The replacement of trees along historic avenues is more complex as heritage considerations play an important role. If at all possible historic trees should be replaced with the same specie unless an incurable disease has struck them (ie. Palms, Elms). In this case a disease resistant cultivar of the same specie should be used (refer to Centennial Park, Sydney). If that is not available, a new specie may have to be used.

In the case of Canary Palm trees a number of historically significant avenues have been the subject of a fungus attack in Sydney. To minimise the visual and historical impact on site, the short term solution is to replace them with healthy specimen (for the next 5-10 years) whilst waiting a cure. The site has ample supply of individual replacement trees to maintain the main avenues. Palms have the advantage of being easily transplantable, which is not the case for other large trees. If no solution has been found in the next 5 years or when the supply of healthy palms runs out, alternative but similar diseased-resistant species should be sought.

To avoid the spread of disease, a rapid response is required to contain the diseased trees and its growing medium and guidelines exists which the arborist is familiar with. As highlighted by the disease outbreak on Canary Palms, entire populations of trees can be affected or wiped out with enormous visual consequences. Monocultures are logically more at risk.

For these reasons, the palette of trees used on site should be widened to minimise the impact of any future outbreak. This does not suggest using a variety of trees within one avenue, but a wider variety of trees on sections of avenues across the site.

Recommendations

54. Replace diseased historical Palm Trees with healthy ones until solution is found for the disease.

55. Manage diseased trees and material in accordance with NSW government's guidelines.

56. Replace Lagerstroemias in Sheehy Avenue with larger specie and space them out 15m minimum.

57. Replace young E. microcorys on Primary roads with alternative specie.

58. Restore Ficus avenue on Hawthorne Avenue (east).

Existing roundabout at Rookwood

Beautification potential with sculptures

59. *Investigate potential for alternative tree species for the remainder of the Primary roads. Discuss with arborist.*
60. *Complete the Secondary road avenue plantings where space permits.*
61. *Complete planting of Tertiary which exhibit existing avenue trees.*
62. *Implement planting on selected Tertiary road, on one side, preferably on north or west side, as space permits.*
63. *Vary the choice of avenue trees across the site, for more visual interest, diversity and better protection against the impact of disease.*

ROADSIDE PLANTING

It is evident when circulating through the cemetery for the first time that the burial fields have a visual impact on the experience. In places, where burials and monuments have been allowed to come close to the roadside, the visual impact and potential for monument damage are much greater. It also contributes to the visual inconsistencies across the site."

It is preferable to have a consistent 3-4m wide verges on all Primary roads to allow for a buffer zone, with planting and space for some trees to grow.

Some of the existing roadside planting along the Primary roads already achieves some welcome screening for the more obtrusive monuments from the road whilst providing privacy for mourners.

This practice should be encouraged and trialled on the main roads, with a potential expansion into Secondary roads, depending on costs and feedback.

The planting of verges may differ in character throughout the site but in general should be:

- Consistent with the planting theme for that area (exotic, native, heritage).
- Display some common recognisable species to ensure some visual consistency across the site.
- Be self-sustainable (beyond the establishment phase).
- Be low maintenance.
- Be limited to 1.5m in height.

The planting should occur in the designated road verge if such a verge exist.

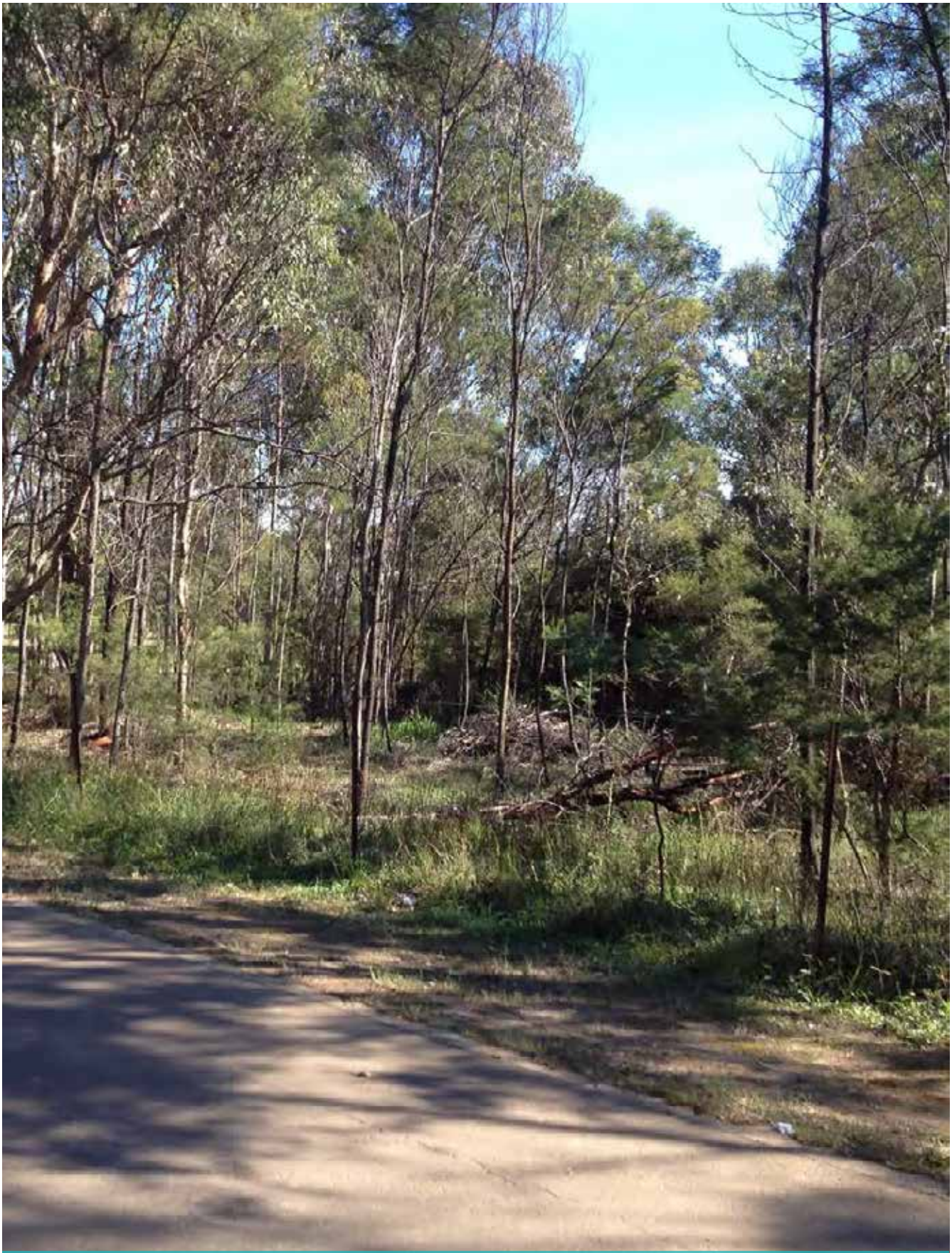
Screening should not act as a solid barrier to the burial areas. Occasional views and entry points are warranted. Views onto lawn graves are welcome.

The planting of and around roundabouts presents another opportunity for beautification, as demonstrated at the intersection of Hawthorne Avenue and Necropolis Drive. There are also opportunities to incorporate permanent (or temporary sculptures in the center of roundabouts. These could generate some income for the Cemetery (refer to Cemetery Tourism section - page 165)

Planting should remain low to respect sight lines and road safety principles.

Recommendations

64. *Implement consistent landscape treatment along Primary roads which screens visually obtrusive monumental areas as part of the beautification of the site.*
65. *Consider extending to Secondary roads where possible.*
66. *Keep views onto lawn sections.*
67. *Implement beautification planting on and around roundabouts and incorporating sculptures where possible.*



Conservation Area Unit 11 - Poor fencing, untidy appearance and lack of information

PERIMETER PLANTING

The presentation of the cemetery from East and Railway Street is below standard. This is due to the uninviting fencing design and the lack of landscaping around the perimeter (refer to Fencing – page 157).

The introduction of a single row of Bunya Pines along the cemetery's boundary has helped to define and soften the cemetery's boundary. This should be supplemented with:

- Additional shrub planting to help render a more "cared-for" and dignified image, assuming that maintenance can be sustained. Planting does not need to be solid all along and could be limited to selected monumental sections. Short, medium and long views into the cemetery should be maintained to provide interest and encourage visitors to enter.
- A mulched, weed and rubbish-free strip under the trees is recommended.

Assistance from Council should be sought for an improved maintenance of the external grassed verge with an emphasis on regular rubbish collection.

Recommendations

68. Implement screen planting in selected areas along the boundaries visible by the public.

69. Discuss external maintenance with Council in the view to seek an improvement to the present standards.

CONSERVATION AREAS

The Conservation areas are not visually appealing. To the untrained eye, these fenced off areas appear clumsily cordoned and untidy. The areas which appeal the most to the public do not belong to a threatened species, Lemon scented gum (northern cluster), nor are they endemic to NSW. In contrast, the threatened Melaleuca 'Tea-trees' in Areas 7, 8, 27, 28 appear scruffy and neglected with piles of dead branches visible from the public interface. These piles may have an ecological purpose (eg. habitat for invertebrates) and, if so, should be labelled accordingly.

The beauty within these Conservation areas is often not visual but lies within their significance and ecology. In order to appreciate them interpretation and promotion/education are required.

Recommendations

70. Tidy up perimeter of Conservation areas by removing superfluous debris and improving fencing detail.

71. Provide interpretation material for justification of vegetation 's presentation if needed.

BUILDINGS

The buildings and structures at Rookwood Cemetery currently display a wide range of architectural styles and heritage values, ranging from Exceptional to Intrusive, as referred to in Howard Heritage Consultancy's "Report on Buildings and Structures at Rookwood Necropolis" dated January 2011.

Considering a common architectural language across all new buildings and structures will contribute considerably to the beautification of the cemetery. The preparation of and adherence to architectural guidelines which provide design benchmarks, and guidance on appearance, aesthetic, scale and materiality would enable the built environment within the cemetery to evolve with time into a more consistent and visually appealing landscape.

Recommendations

72. Develop an Architectural Guidelines document as described above.

Example of fencing (Springvale Botanical Cemetery, Victoria)

Example of fencing (Bunurong Memorial Park, Victoria)

FENCING

As previously mentioned in Perimeter Planting (page 155), the presentation of the cemetery is below standard. The fencing design is currently a galvanised chain mesh with 3 strands of barbed wire on top. It is considered to be a visual deterrent to enter the site, and is unwelcoming to visitors.

Ideally the entire boundary fence should be replaced with a more inviting one. The priority is to replace areas where the boundary opens onto "public" spaces, whilst the rest of the fencing could remain as is (chain-mesh with barbed wire) until funding becomes available.

As part of Rookwood's improved image, the public interface of Rookwood along East and Railway Street is in urgent need of improvement. It represents approximately 3km of frontage of the 7.5km perimeter boundary. An alternative fence design should be considered and meet the following principles:

- Using recessive colours (dark grey or black) to blend into the landscape and match existing colours
- 2m high to maintain security outside of opening hours
- Inviting – avoiding spear ends, barbed wire or broken glass
- Low maintenance
- Using durable materials
- Low to medium capital cost, to stand the test of time whilst being affordable.

The fence recently installed along Unit 20B's Memorial Avenue is at odd with the rest of the cemetery as it is the only example of such practice in the cemetery. Fencing is not necessary along burial sections.

Recommendations

73. *Replace all fencing along public frontage with public-friendly fence.*
74. *Consider an incremental implementation coordinated with Rookwood's beautification and implementation of a pedestrian path of the buffer zones (refer to "Responding To The Need For Increased Recreational Activities"* – page 165*).*
75. *Remove the fence on Memorial Avenue along Unit 20B.*

Example of directional signage (Altona Memorial Park, Victoria)

Example of directional signage (Lilydale Memorial Park, Victoria)

SIGNAGE

Rookwood needs a "corporate" image with standard signage across the board. When visitors enter the site and circulate through they should be met with clear, consistent and informative signage. Although the current signage system is reasonably consistent, it is failing to be effective for way-findings.

The signage would ideally be updated and contemporarised to reflect Rookwood's positioning as a leader in the industry. Should a complete update of the suite of sign be considered too costly, the signage update should at least consider the following:

- Entry statement (part of the corporate image)
- Directions to:
  - Chapels (digital and updated twice daily)
  - Offices (larger, clear signs to RCGRT, CMCT, Crematorium and Australian War Graves)
- Identification:
  - Overall site maps (touch screen maps near each entrance).
  - Search screens (at each office, identifying name of all deceased).
  - Interpretation signs (refer to Interpretation Chapter – page 171).
- Regulations: Rights and regulations

The principles underpinning the signage strategy should be:

- Striking an appropriate balance between prominence and unobtrusiveness.
- Striking an appropriate balance between oversupply and insufficiency (less is more works best).
- Present a contemporary image.
- Respond to circulation, passive use, funeral traffic, safety, heritage and other relevant factors, to promote way-finding, identify destinations and promote confidence in users.
- Consider the use of universal symbols and digital technology.
- Located consistently (angling and distance form kerbs).
- Take account of maintenance implications such as mowing around signs, repairing, replacing and updating.

Recommendations

76. *Consider an update of the signage suite.*
77. *Improve directional signs.*
78. *Simplify regulatory signs using universal symbols where possible.*
79. *Expand the use of interpretation signs.*
80. *Integrate any self-guided walks in new signage strategy.*

Highgate Cemetery, London

Boroondara Cemetery, Victoria

LANDSCAPE MAINTENANCE

As previously mentioned in “Monumentation” (page 145), the visual appeal of the site is severely affected by insufficient weed management within monumented section. This contributes to a sense of inconsistency throughout the site as different Trusts have varying maintenance regime and standards. It also gives the impression that the cemetery in uncared for in places.

Rookwood is not alone in the search for a suitable and affordable maintenance regimes and standards. The same problem occurs in all cemeteries nearing capacity, or where older areas are no longer cared for by the families (typically after 3 generations or 75 years). However Rookwood has not reached its full capacity and for as long as it operates, its presentation should be that of a well-cared for and dignified environment.

The level of tidiness is a subjective notion and may also depend on available funds. However the cemetery should appear “maintained” in some way, exhibiting explanatory signage where the level of tidiness is below public’s expectations. For example, native grasses can only be mown once or twice a year or they will not survive in the long-term. This may appear untidy to the untrained eye but it is directly related to their life-cycle which can be easily explained to be appreciated.

More often than not the overgrown look can be an excuse for the lack of maintenance which eventually creates its own problems:

- Damaging vegetation: A famous example of “managed neglect” is Highgate Cemetery in London. The lack of maintenance has turned it into an uncontrolled woodland which destroys significant monuments. Their yearly budget, time and Friends of the Cemetery Group’s contributions are almost exclusively spent on tree removal and costly infrastructure and monument restoration.
- Restrictive vegetation: As native threatened species establish, they limit the use of virgin land (Conservation areas at Rookwood) and the potential re-use of existing graves in the long-term. Taking the example of City of London Cemetery, graves older than 100 years have been earmarked for re-use under new legislation responding to a dire shortage of burial land in the city. Lift and deepen and re-allocation to a new family is now in place. Had protected vegetation been allowed to establish on a grave this process could not occur. The same issue would apply to any renewal process of public interment areas.

Although a more “relaxed” and romantic look may be acceptable once the cemetery is full, it should be controlled during the cemetery’s operating years. This report will demonstrate that there are is still some potential for burial (small pockets, infill and revoking) as well as ash interments in the older sections, making it paramount to improve the standard in the older, currently more neglected, parts of the cemetery.

The “flowering weeds” such as Coreopsis and Watsonias in Units 3 to 5 for example provide a seasonal and welcome splash of colour, albeit for a very short time. The rest of the year they give an “unkept” look to the areas in which they grow. As weeds, they are highly opportunistic and pioneer plants which establish and spread easily. A compromise should be sought to ensure a colourful solution can be provided planting other more controllable species or ensuring that the weeds are pruned back after flowering as soon as their life-cycle permits.

A number of endangered species have also established amongst graves (*A. pubescens* and some unidentified Orchids), none of which have been mapped. It is thought that these occurrences are limited and it is therefore conceivable that a different regime could be applied to these graves once their locations have been documented. The relocation or isolated protection of significant vegetation from grave tops should be considered wherever possible. This would provide a more “cared for” look to the old sections whilst limiting the establishment of future plants due to the regular slashing which would take place.

It should be noted that any *A. pubescens* which damages a grave can be removed under the PMP’s conditions.

In all cases, maintenance is more of an issue within the monuments with no ledgers, predominantly in the older sections (refer to Maintenance – page 113), where weeds have established on the soil surface. Both Trusts rely on herbicide treatment to control weeds and although they have both tried to reduce their use, they should continue to reduce chemical usage for the sake of the environment and staff.

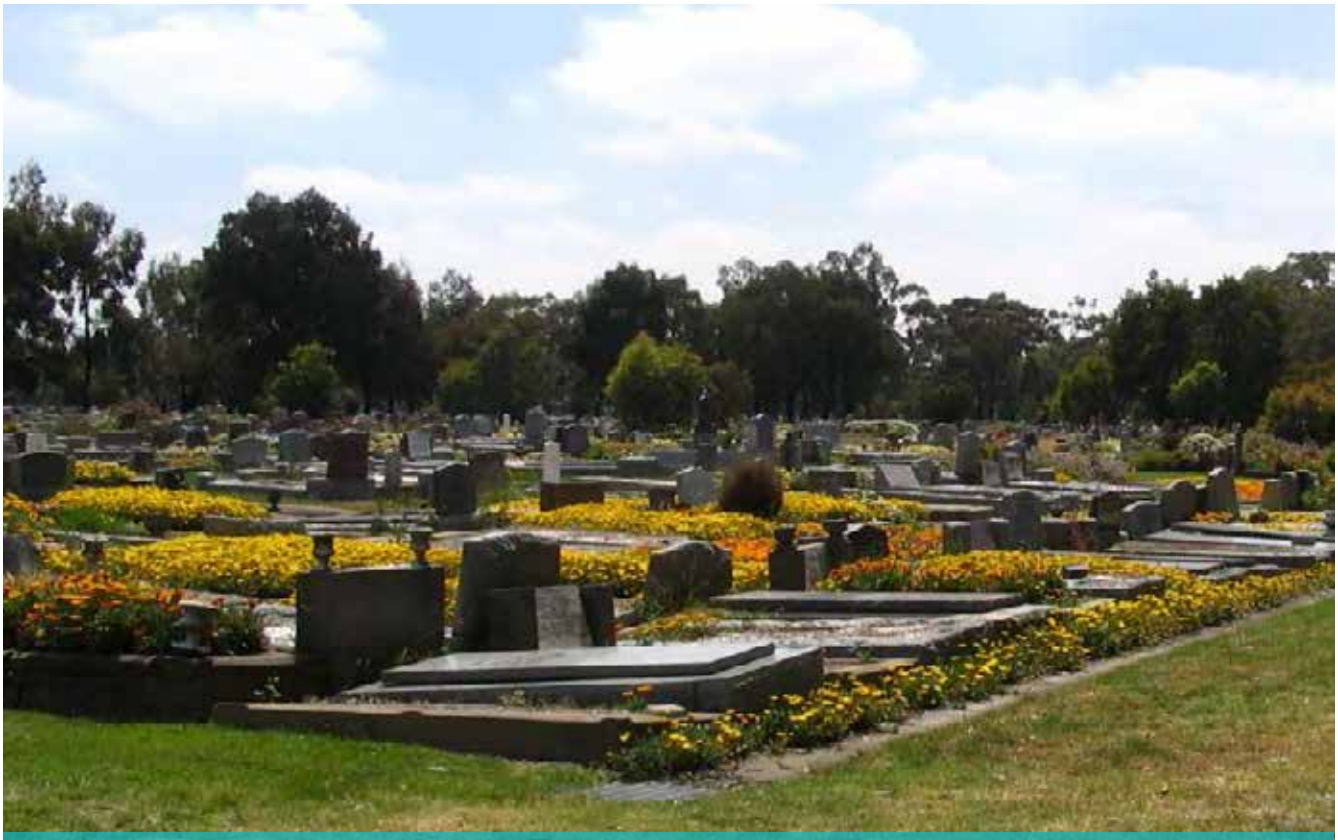
Fawkner Cemetery in Victoria has established a planting program on their old graves, establishing non-invasive ground-covers with long flowering credentials. This has dramatically transformed the sections, created a highly ornamental look (out of a problematic area) and greatly limited weed establishment and therefore chemical herbicide reliance.

Gazanias (clumping form) were selected as they do not spread and therefore require less maintenance to keep path free and any inscriptions visible. It is also non-invasive and does not readily spread by seeds.

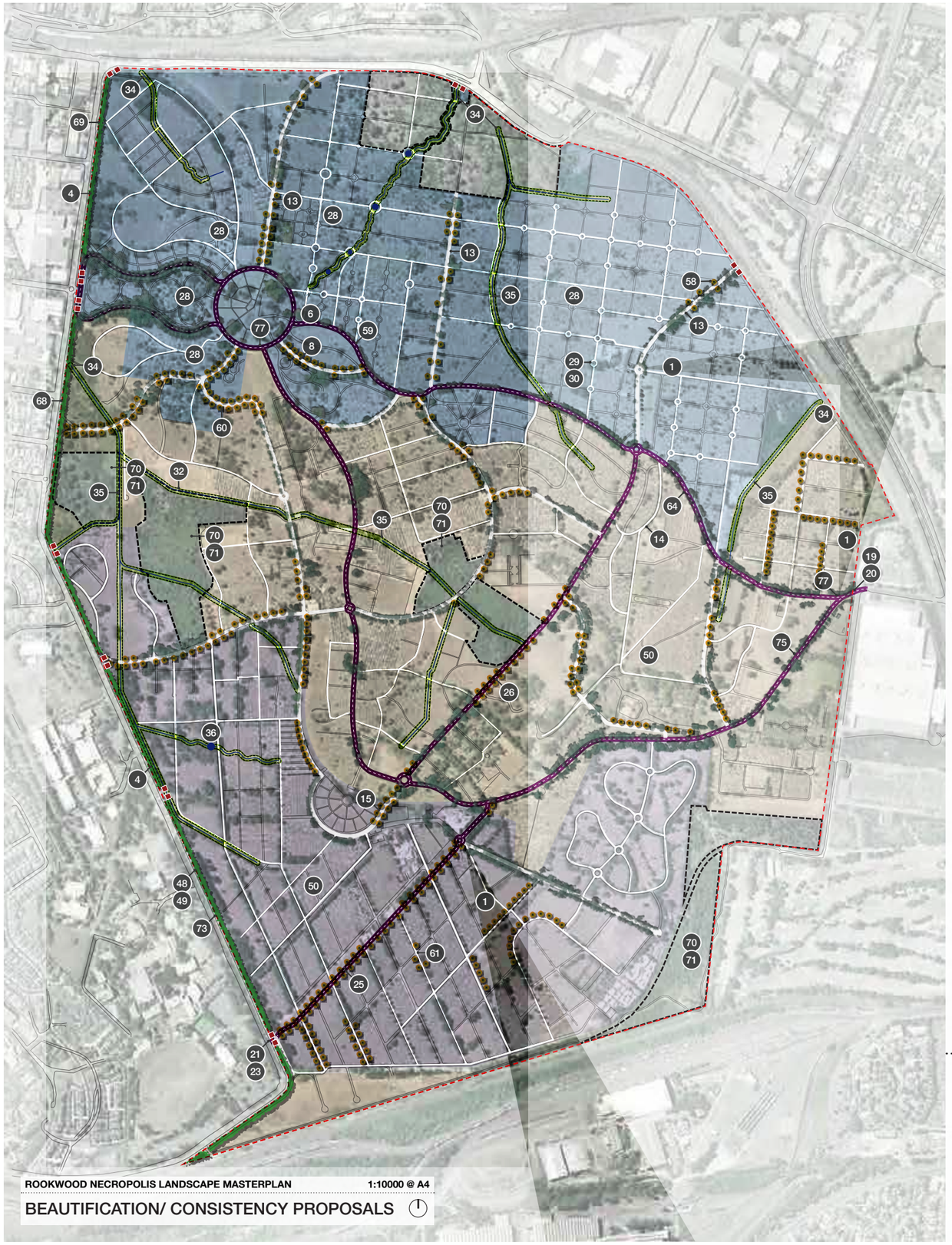
A similar solution would work for Rookwood. Trials using clumping Gazanias or any other plants with similar properties, should be established across the site. These could be grown internally or with the help of volunteers.

Recommendations

81. *Develop landscape maintenance guidelines for the whole of Rookwood (as a common ground between the 2 Trusts) to avoid disparity in presentation.*
82. *Improve maintenance standard to present a "managed" look, free of unsightly weeds.*
83. *Negotiate with stakeholders for a compromise in the management of "flowering weeds".*
84. *Investigate relocation or isolated protection of significant native vegetation from grave tops wherever possible.*
85. *Implement planting of non-invasive groundcovers on all graves with no ledgers.*
86. *Consider using community groups for the growing and planting of groundcovers.*



Fawkner Cemetery, Victoria



Summarised Recommendations

Views

1. Maintain significant views beyond the site.
2. Maintain a variety of views within.
3. Use landmarks as focal points.
4. Avoid burying into the buffer zone.

Circulation

5. Retain original brick edges and kerb and channel.
6. Ensure consistency of treatment of edging.
7. Enhance Primary road with roadside planting.
8. Downgrade Paton Avenue to Secondary road.
9. Downgrade redundant road William Drive.
10. Adopt revised Secondary road profiles and implement.
11. Ensure consistency of edge treatment allowing for 2 alternatives (heritage area and other).
12. Retain original brick edges on secondary roads where present
13. Downgrade other narrow redundant Secondary roads: Haslem Avenue, North, Hawthorne Avenue's east end (refer to case studies).
14. Downgrade Blashki Avenue and part of Farrar Avenue to Tertiary.
15. Connect Barnet Avenue to Hawthorne Avenue.
16. Adopt revised Tertiary road profiles.
17. Implement Tertiary road profiles.
18. Retain original brick edges on tertiary roads where present.
19. Improve visual appearance of main entrance (Weeroona).
20. Consider re-design of current Weeroona entrance proposals
21. Open new entrance on East Street.
22. Coordinate entry usage between Trusts (common database).
24. If deemed necessary, commission a traffic study for additional entrance.
25. Upgrade Sheehy Avenue to Primary road.
26. Upgrade Hawthorne Avenue to Primary Road.

Heritage

28. Restore original gardenesque layouts where lost or damaged.
29. Restore remaining garden features.
30. Inter within to raise fund for repairs.
31. Interpret railway line.
32. Repair canals with priority to leaking ones
33. Regularly remove debris from canals.
34. Regularly clean out stormwater outlets.
35. Plant canal buffer zones.
36. Restore other serpentine and ornamental basins in Unit 9
37. Restore planting along historic brick canals.
38. Adopt and Implement consistent monument conservation guidelines.
39. Implement prior to monument collapse.
40. Adopt and implement common landscape maintenance guidelines.
41. Avoid visual clash between monument styles.
42. From an aesthetic point of view, where possible, prioritise repair works close to visible boundaries and main internal roads.
43. Provide screen planting between styles and cultural groups.

Vegetation

44. Develop Management Guidelines for lawn and shrubs.
45. Develop a Tree Management Strategy.
46. Develop a Significant Tree Register.
47. Involve arborist in all major tree selection processes
48. Carry out yearly removal of fruits on Bunya pines.
49. Consider the sale of Bunya Pine's fruits.
50. Introduce specimen trees (rare species) in southern portion of site.
51. Develop different planting themes .
52. Refer to Planting guidelines (implementation chapter)
53. Refer to Victorian Garden/cemetery plant list.
54. Replace diseased historical Palm Trees with healthy ones.
55. Manage diseased trees and soil material.
56. Replace Lagerstroemias in Sheehy Avenue.
57. Replace young E. microcorys on Primary roads with alternative specie
58. Restore Ficus avenue on Hawthorne Av (East)
59. Consider alternative tree species for the remainder of the Primary roads.
60. Complete the Secondary road avenue plantings.
61. Complete existing avenue planting on Tertiary roads.
62. Add planting on selected Tertiary road, on one side.
63. Vary the choice of avenue trees across the site.
64. Implement consistent landscape treatment along Primary roads.
65. Extending to Secondary roads where possible.
66. Keep views onto lawn sections.
67. Beautify roundabouts.
68. Implement screen planting along public interface.
69. Improve Maintenance outside site (Council).
70. Improve fencing and remove debris in Conservation Areas.
71. Provide interpretation to Conservation areas.

Buildings

72. Develop an Architectural Guidelines document as described above.

Fencing

73. Replace all fencing along public frontage.
74. Implement incrementally with pedestrian path.
75. Remove the fence on Memorial Av, along Unit 20B.

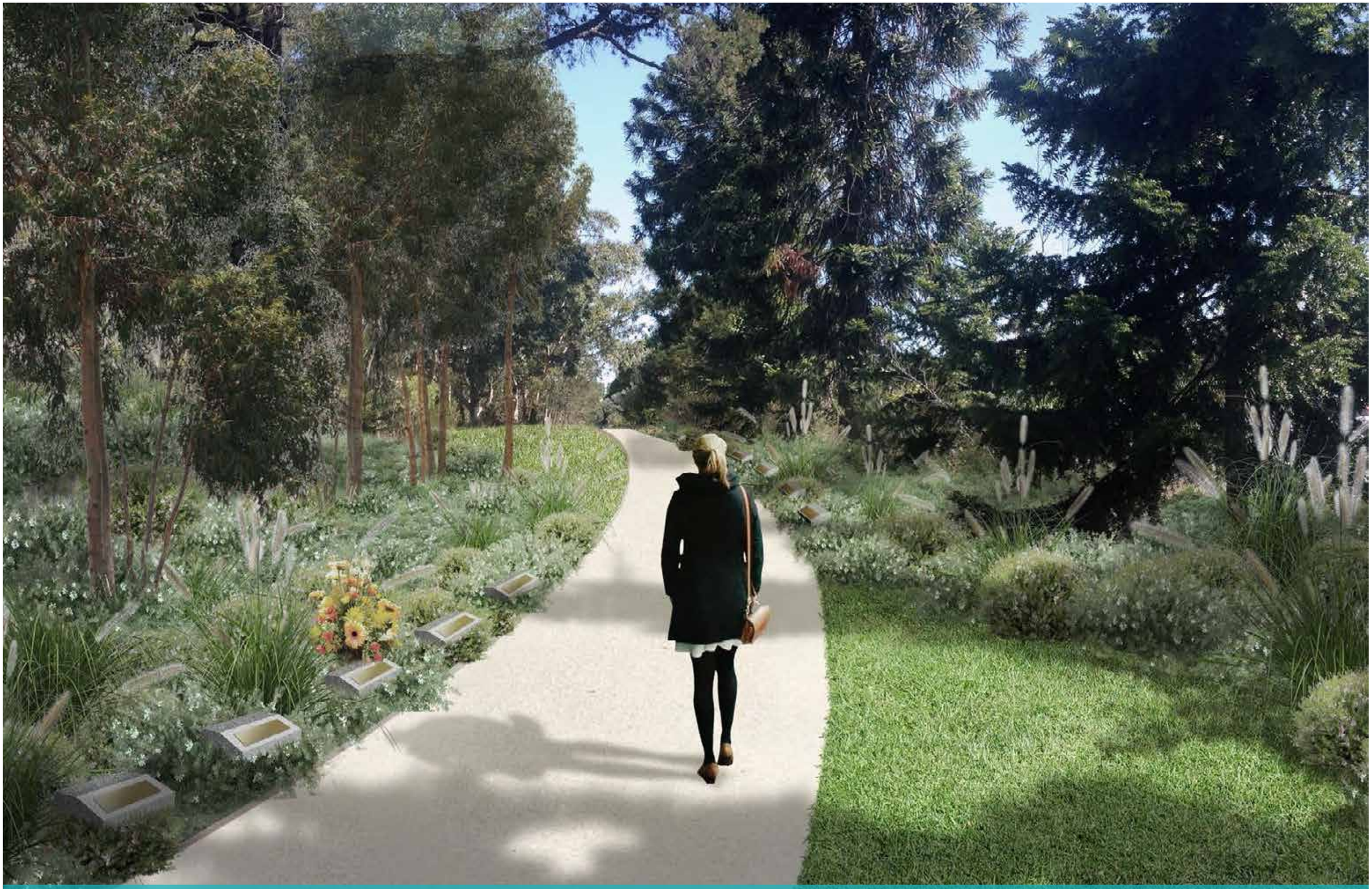
Signage

76. Consider an update of the signage suite
77. Improve directional signs.
78. Simplify regulatory signs using universal symbols where possible.
79. Expand the use of interpretation signs
80. Integrate any self-guided walks in new signage strategy

Maintenance

81. Develop landscape maintenance guidelines for the whole of Rookwood.
82. Improve maintenance standard.
83. Negotiate a compromise in the management of "flowering weeds".
84. Investigate relocation of isolated protection of significant native vegetation from grave tops wherever possible.
85. Implement planting of non-invasive groundcovers on all graves with no ledgers.
86. Use community groups for the growing and planting of groundcovers

- Unit Boundary
- Conservation Area Boundary
- 1 Recommendation Numbers
- Entrances
- Cultural Planting
- Native Planting
- Exotic Planting
- Primary Roads
- Secondary Roads
- Tertiary Roads
- Proposed Avenue Planting
- 10m Buffer Screen Planting
- Canal
- Canal 3m Buffer



Potential for path in buffer zones.

RESPONDING TO THE NEED FOR INCREASED RECREATIONAL ACTIVITIES

As aptly said by Ken Worpole of the Commission for Architectural and the Built Environment (UK), "Urban burial grounds in the 19th Century were originally envisaged as public open space, and were professionally designed to be attractive places to visit in their own right. Today, many cemeteries are neglected, with little to attract anyone apart from those visiting specific burial plots. This lack of design, planning and ambition means that the potential health and environmental benefits of cemeteries are not being realised".

The Plan of Management recognises in its Strategic Directions (SD5) that Rookwood has a "significant social, educational and recreational" role to play. It needs to "commit resources to a unified program to promote Rookwood as a place of passive recreation and educational value".

Rookwood is situated on Crown Land and is operated as a public facility. In order to sustain the significance of the place, it is essential that public awareness and public support are maintained and increased over time. As the Cemetery nears its burial capacity it will be important for the Cemetery Managers to have recourse to other forms of income and other forms of activity that can facilitate the long term obligation to maintain and conserve the place.

Rookwood Cemetery, the oldest and largest public cemetery in New South Wales, has been a major focus for burials in the Sydney region for almost 150 years. As such it contains the graves of many well known and/or significant personalities in the history of Australia, NSW and Metropolitan Sydney. Rookwood Cemetery is a rare and important demonstration of the multi-cultural evolution of Australian society since the mid 19th century. Public recognition of the heritage significance of Rookwood has been enshrined in a combination of State and Local Government Heritage Listings and strong interest from historians and genealogists.

Increasing recreational activities and interpreting/presenting the significance of the place to visitors are important ways to ensure that Rookwood remains viable and relevant to future generations. The most successful public programmes for any historic cemetery, including Rookwood, are likely to be based on assisting visitors to locate and appreciate specific aspects of the cemetery that are of greatest interest to the general public.

Interpretation, Presentation and Visitor Programmes can generate a number of positive outcomes for Rookwood including raising the public profile of Rookwood, expanding the public perception of the place from cemetery to attractive historic landscape, expanding the visitor base and public support, improving the potential for Rookwood to be more highly valued as a burial location, improving surveillance through greater activation, iIncreasing revenue from food and beverage plus souvenir sales, and building its profile to extend public engagement after burial activities are completed.

CEMETERY TOURISM

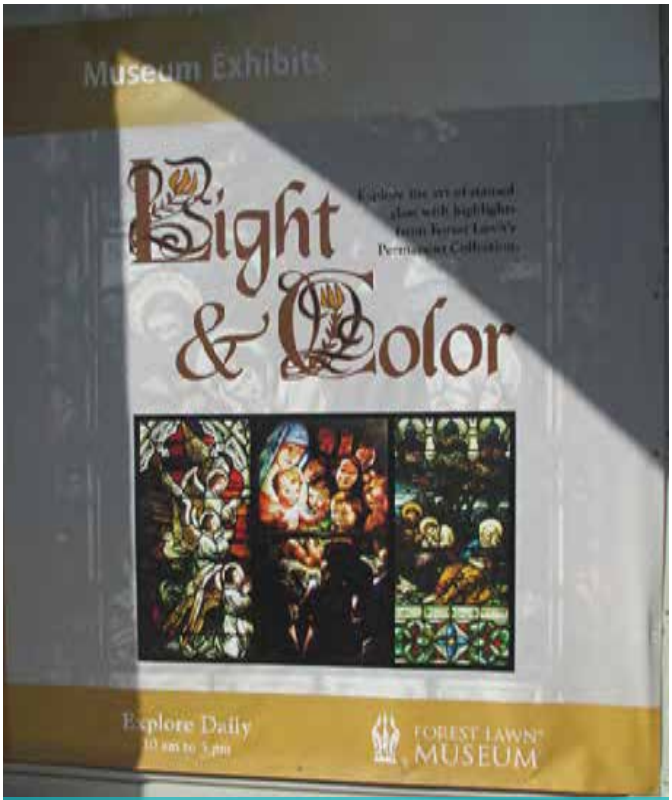
A number of major historic cemeteries around the world attract large numbers of visitors particularly those interested in commemorating the life and work of particular personalities, or those who are just curious about the famous or infamous. In Australia, the depth of this public interest in historic personalities is best demonstrated by the success of the National Portrait Gallery in Canberra, including the themed merchandise sold in the Gallery Shop.

Rookwood currently has a variety of public visitation programmes and facilities that complement its fundamental roles of burial and commemoration. These include themed guided tours by the "Friends of Rookwood", self guided tours using brochures and signage that identifies the various religious sections of the Cemetery as a whole, annual Rookwood Cemetery Sculpture Walk Festival, material on the web sites of the Cemetery Management Trusts and Interpretive and way-finding signage panels at intervals throughout the Cemetery

In addition to those who visit Rookwood for burials, cremations and commemoration, key cemetery visitor market segments include visitors looking for famous people, historians and history buffs, mourners, friends and family making return visits to a previously unknown burial landscape, cultural and religious groups celebrating community leaders, special memorials, festivals and events, repeat visitors from themed tours, the local catchment for passive recreation.

Potential visitor attractions at Rookwood include the burial places of famous people, an attractive, varied and

Re-use of redundant buildings - Art Gallery at Forest Lawn Cemetery, USA



Temporary exhibition at the art gallery at Forest Lawn Cemetery, USA

intriguing historic funerary cultural landscape with conserved and well presented features, themed walking tours, both guided and informal, annual or periodic cultural style events, such as the current Sculpture Festival, heritage interpretation programmes, passive recreation, structured cycleways, unstructured walking trails, quality merchandise related to famous people for sale in a Visitors' Centre and education activities for all ages.

Based on the experience of other Cemeteries in Australia such as West Terrace in Adelaide, there is potential to increase the range of public visitation activities and facilities over time.

Given that it is highly unlikely that Rookwood will ever be able, or want, to charge for simple visitor access to the Cemetery, income generation from activities for which a charge is reasonable and practical can increasingly be a useful source of income either for the service provider. It is essential however, to avoid future, unanticipated, land use conflicts between public recreation and burial capacity. Passive recreation activities or festival style events may become so popular over time that public pressure could call for the land to be quarantined from burial use.

The long term success of tourism and visitor activity relies on Rookwood being presented as a well managed, conserved and maintained historic funerary cultural landscape. It is essential that the proposed maintenance and beautification programmes proposed in the LMP are undertaken and continue to underpin the growing public awareness and respect for Rookwood that will be generated over time.

Recommendations:

(These recommendations reinforce the recommendations made elsewhere in the report and have therefore not been numbered)

- *Expand and/or develop additional Visitor Centre/Café, possibly associated with a condolence or functional building complex and near Mortuary Station No.1.*
- *Reuse redundant buildings for cultural purposes as 1st preference before building new facilities, subject to their location and been appropriate for their purpose*
- *Introduce high quality merchandise for sale, based on the public interest in historic burials such as monologues, reproductions or recordings of the works of famous authors, artists, musicians, composers, business people, politicians, entertainers, explorers, adventurers etc.*
- *Upgrade historic shelter sheds*
- *Develop or upgraded public toilets at intervals across the landscape*
- *Improve way finding signage*
- *Improve interpretive signage related to specific religious or historic community precincts*
- *Enhance web site searching to identify famous peoples' graves*
- *Develop additional themed walking routes and circuits*
- *Implement cooperative programmes with Commonwealth War Graves Commission*
- *Develop elevated walkways/boardwalks associated with special aspects of the Cemetery (eg. elevated boardwalk, boardwalks through ecology areas, viewing tower)*
- *Interpret railway line corridor and features with combination of overhead walkways and ground level walking paths/themed route to minimise impact on burial land.*
- *Enhance organised parking and vehicle circulation routes to avoid visitor traffic congestion*
- *Continue active traffic management in busy periods*

CIRCULATION

PEDESTRIANS/ CYCLISTS

Pedestrians and cyclists entering the site are currently limited to 3 entry points from East Street (some more than 800m apart) and one entry at Weeroona Road.

As Rookwood promotes itself as a passive recreation provider, it will need to provide for accessibility from neighbouring areas, connecting to existing cycle paths and public transport.

An additional pedestrian entry point should be considered at the traffic light, intersection of Railway Street and Church Street as it is a "high-exposure" point and coincides with the end of the restored Serpentine canals (with potential parallel parking on the road to cater for pedestrians).

Encourage pedestrian interaction along canals

More entry points are required along the main public interface to the site along East Street. Locations should be directly linked to bus stops and connections to the CBD and railway station.

The historical connection to the east side, via the end of Hawthorne Avenue and over the railway line, should be reinstated if possible, as it provides an important link to suburb of Strathfield and its open space network, via the public Golf Course Range (Hudson Park) and the Bay to Bay cycle path.

The proposed cycle path on the south of the site is recommended outside the fence to provide 24 hour access. Its alignment within Lot 7053 should coincide with the existing tracks as much as possible to avoid any damage to the protected vegetation (coordination with Council required).

In all cases, signage should be made clear and concise to guide visitors through a complex network of roads and paths.

BUS

In order to service the whole of Rookwood and , in particular, the areas of current burials, a review of the bus route within the cemetery need to be undertaken. A “figure-8” bus route (refer to Context Analysis Map (C&O) – page 21) would service the site better. The bus route should be reviewed and adjusted to respond to burial and visitation patterns on a regular basis (every 10 years minimum).

BUFFER ZONES

The buffer zones are earmarked as “common property” under the Crown Land’s Act and as such are not allocated to any Trust and cannot be buried into. It is conceivable that the Act may be amended to allow burial in the future. However, as discussed in “Water Management”, under world’s Best Practices, “contaminated” groundwater in burial grounds should be controlled and be kept away from boundaries, for health reasons. It is therefore recommended to avoid burials in the buffer zones and use this land for recreational purposes and/or the internment of cremated remains.

Recommendations

87. *Consider pedestrian entrance off Railway Street at traffic light, with potential parallel parking on roadside (subject to Council’s approval and cooperation).*
88. *Realign pedestrian entrances where needed (refer to Recreational Proposals Map – page 175).*
89. *Avoid burying in buffer zones.*
90. *Develop pedestrian network in buffers and throughout the site for public use.*
91. *Incorporate pedestrian paths in the vicinity of canals and encourage pedestrian interaction.*
92. *Re-instate connection to Strathfield over railway line and into public golf course.*
93. *Provide pedestrian access at the new Sheehy Avenue entrance.*
94. *Consider pedestrian entrance opposite the University at existing pedestrian crossing if Sheehy Avenue does not go ahead.*
95. *Fine-tune bus route to provide more equitable servicing of the site.*
96. *Provide consistent signage at all entrances.*

PARKING

A detailed assessment of the current adequacy and future requirements for car parking provision is beyond the scope of this report.

It is generally accepted that parking in cemeteries for internment and visitation can be catered for along the road shoulders. Additionally, dedicated car parks are required close to buildings such as chapels and condolence lounges providing facilities for functions.

Boardwalk protecting vunerable vegetation

Each "hub" of facilities should be designed to include sufficient and dedicated car parking spaces in order to provide comfortable walking distances to the facilities and prevent traffic congestion. Where feasible, consideration may be given to constructing multi-level car parks, either in the basement, above ground, or a combination of both, to reduce the pressure on land for burials.

Recommendations

97. *Provide adequate, dedicated parking around all new administrative and public facilities such as chapels, condolence rooms, offices, etc..*
98. *Consider multi-level parking structures in the administrative hubs.*
99. *Interpret railway line with overhead walkway (refer to photomontage - page 194)*

ECOLOGY

The Conservation areas are not visually appealing yet they are significant and worthy of recognition. In order to appreciate them interpretation signage is required for promotion and education purposes.

It is recommended that the best way to appreciate these areas is to experience them; walking through on (controlled) paths or boardwalks. It is conceivable that boardwalks could be built over significant low vegetation, meandering through trees and shrubs. In areas where vegetation is lacking, poor or patchy (as seen on aerial photography), a path could meander with limited impact.

Any perceived impact should be negotiated as part of the PMP or be considered as part of a Bio-banking arrangement, if the former is too rigid. Any increase in weed invasion can be dealt with as part of the on-going compulsory weed management program which is already in place as part of the PMP.

The potential for memorialisation along the path and on the elevated boardwalk is also discussed further into the report (refer to "Responding To The Need For Sustainability" – page 177) which will assist with the project funding.

Recommendations

100. *Negotiate paths and boardwalks into Conservation areas. If not negotiable under the PMP, consider Bio-banking option (refer to Appendix 02: Flora and Fauna Constraints Assessment).*

INTERPRETATION

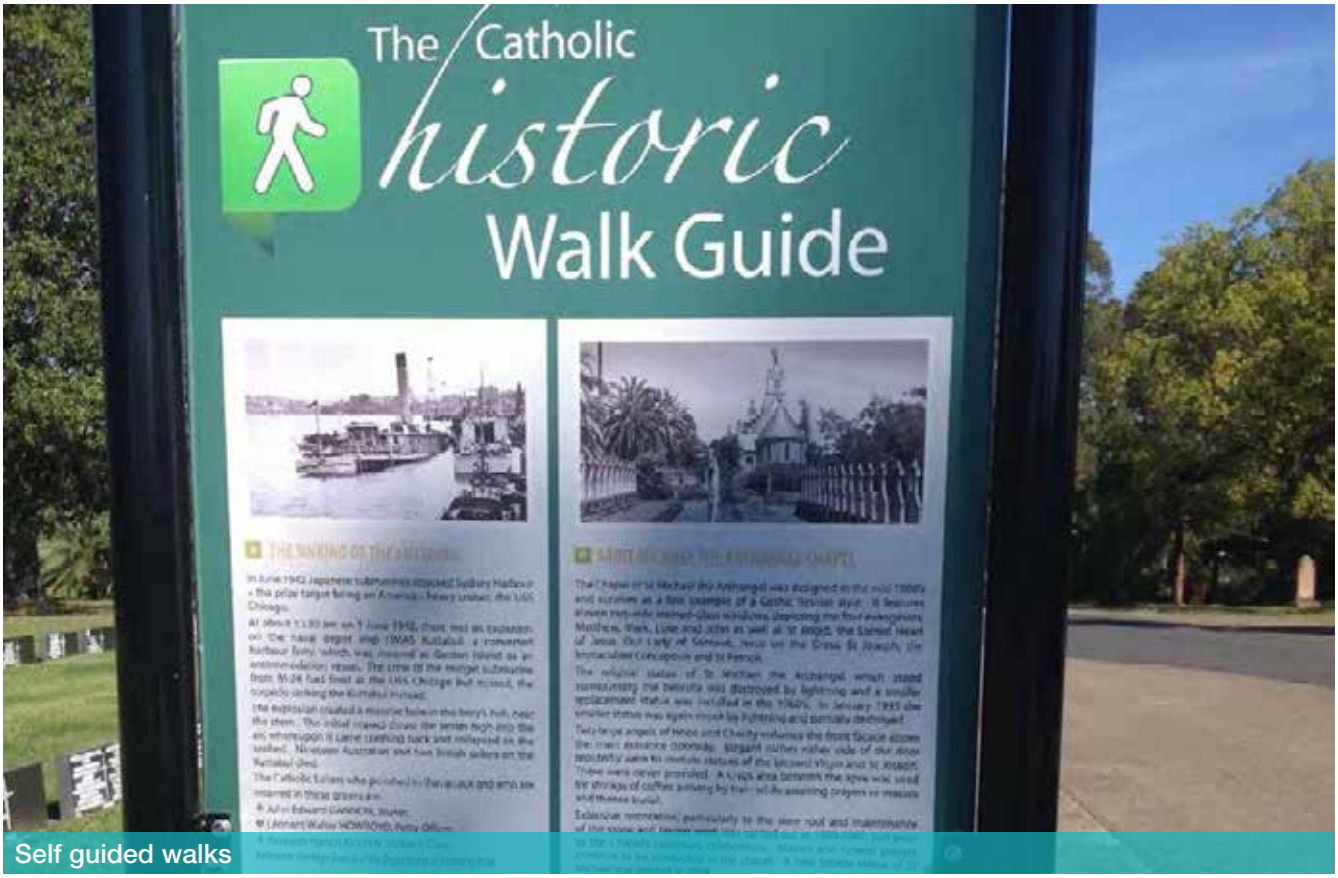
The site is the source of a wealth of knowledge worthy of interpretation, to be shared with the wider public, starting from its history, architectural elements, vegetation and cultural significance. This pool of information will draw visitors to return multiple times due to the volume and range of both topic and content.

The information needs to be disseminated using a range of mediums due to the wide age bracket which will be attracted to the site, from young students to retirees. The technology they will be familiar with will vary greatly. For apt users the future is in mobile technology (QR codes and 'apps'). Distribution of information using printed brochures and physical signage may also be required to cater for the older generations which may not have the relevant technology or for those who may not be actively seeking it.

FORMER RAILWAY

As mentioned in the Analysis, the history of Rookwood is strongly linked to its former railway line.

The interpretation of the railway works best if done in its entirety (rather than just one small section where convenient) and as such, will require the relinquishing of some burial land to passive recreation by both Trusts. Although buried over in sections, many opportunities exist to restore its alignment in the form of a pedestrian path (where undeveloped land is still available) and (where buried over) with elevated boardwalks and/or painted line which can guide pedestrians back onto roads and guide them to the next available interpreted section.



Self guided walks

Signage for famous graves

A 6m-wide path may be sufficient to provide a path and associated landscape (refer to Case Studies – page 215). This limits the "non-burial" land usage to a minimum as it represents only 2.5% of the remaining land available for burial, making it more palatable for the Trusts to consider.

The detailing of these paths would include:

- Physical representation: by unearthing tracks where still present or simply aligning a path with its former position where possible.
- Graphical representation: by incorporating paving patterns and details as clues of past history when no remnants remain.
- Respite, in the form of seating and shading.

The potential for memorialisation along the path and on the elevated boardwalk is also discussed further into the report (refer to "Responding To The Need for Sustainability" – page 177) which will explore ways that may assist with the project funding.

Recommendations

101. Interpret the railway line as a pedestrian path within the "usable" undeveloped land.

102. Provide tree planting for shade and seating for respite together with interpretation along the walk, where possible.

103. Re-use rail tracks where still present, if possible.

104. Link the various interpreted portions with colour coded line painted on the roads to help define the entire walk.

FORMER STRUCTURES & BUILDINGS

When deemed significant (ie. Category 1 and selected Category 2 former structures), former structures can also be interpreted by unearthing foundations where still present and incorporating them within paved areas used for respite.

Recommendations

105. Interpret Category 1 former buildings as part of burial development, with associated respite areas.

106. Interpret selected Category 2 former buildings as part of burial development, with associated respite areas.

ECOLOGY

The Conservation areas should be accompanied signage (and mobile technology) offering explanations on their significance and management to compensate for their limited accessibility and visual appeal. Preferably, the Conservation areas should form part of the pedestrian network so that the public can appreciate the significance of these areas by experiencing direct contact.

Recommendations

107. Provide some interpretation for all Conservation areas.

SELF-GUIDED WALKS

The Plan of Management has highlighted to plight of the Friends of Rookwood and their fear for the future as their volunteer base diminishes. Their work in organising guided tours, spreading information and fundraising has been invaluable. It is important to recognise that increasing the public interest in Rookwood will generate some additional work which must not rest solely on the shoulders of the Friends' group. Alternative measures should be considered such as self-guided walks and dedicated staffed shops.

As discussed in the Analysis section, there is a significant potential for self-guided walks, including topics such as:

- Famous people
- Former and current heritage structures
- Landscape design history
- Former railway line and stations
- Serpentine and canals
- War memorials and cemeteries
- Chapels and Shrines
- Landmarks
- Botanical (ie. specimen and rare trees, heritage roses)
- Conservation/ ecology
- Permanent/ temporary sculptures

The advantage of Rookwood is that it will appeal to a wide range of demographics and will require multiple visits to scratch the surface of the information available for exploration. The implementation of these walks can be staged, promoted heavily by press releases, creating a slow momentum of interest in the site.

Self-guided walks have been trialled by the Adelaide Cemeteries Authority (SA) and have been found very popular as it allows people to spontaneously enjoy the site without prior preparation and arrangements.

Recommendations

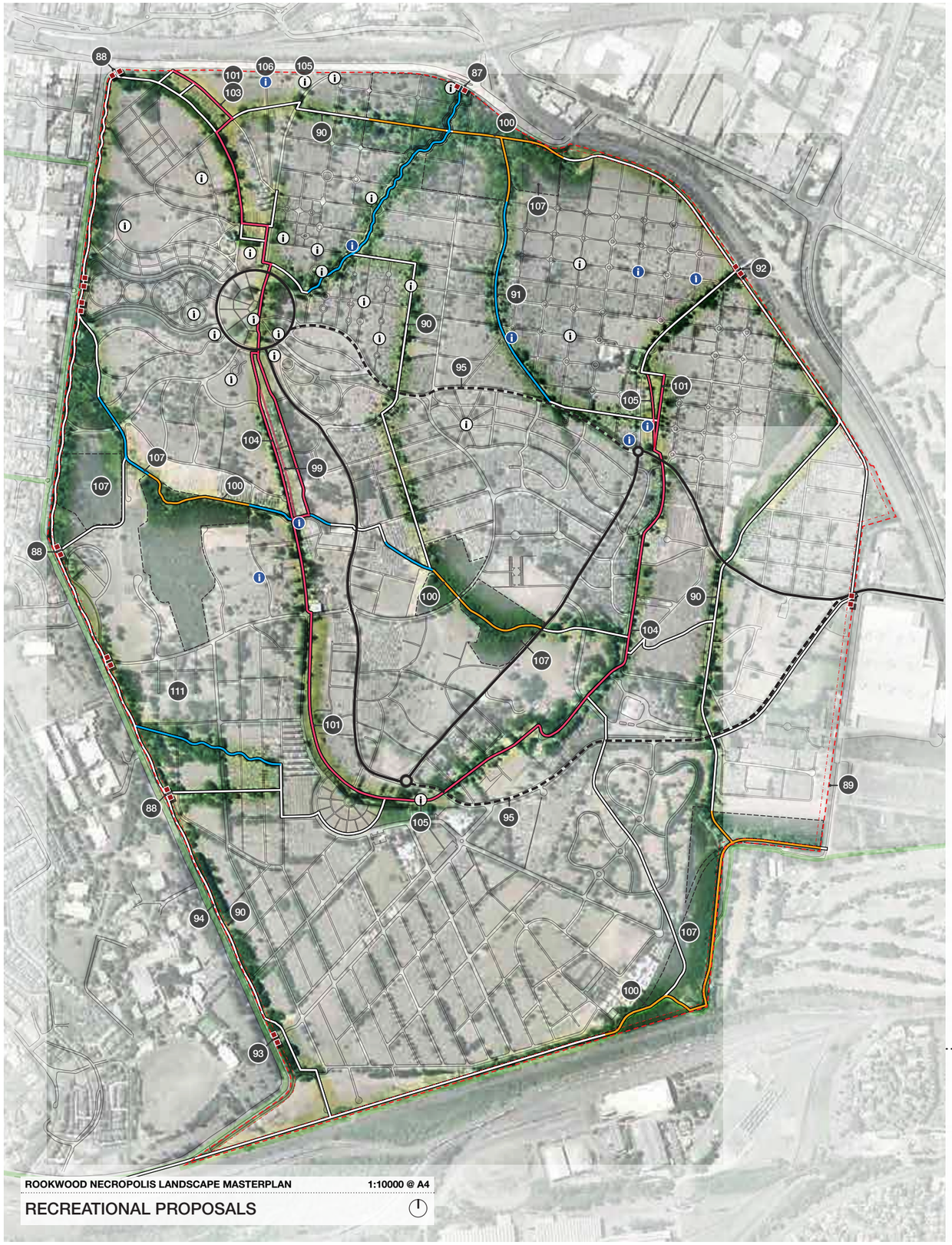
108. Develop self-guided walks relating to botanical, historical, cultural, architectural, sculptural themes

109. Integrate any self-guided walks in new signage strategy

110. Provide interpretation for all points of interest (ecological, historical and cultural)

111. Investigate presence of Aboriginal scarred and carved tree in Unit 9 and interpret any findings.

112. Consider paths and boardwalks in Conservation areas and interpretation of the vegetation within.



Summarised Recommendations

Cemetery Tourism

The Cemetery Tourism recommendations reinforce the recommendations made elsewhere in the report and have therefore not been numbered.

- Expand and/or develop additional Visitor Centre/Café, possibly associated with a condolence or functional building complex and near Mortuary Station No.1.
- Reuse redundant buildings for cultural purposes as 1st preference before building new facilities, subject to their location and been appropriate for their purpose
- Introduce high quality merchandise for sale, based on the public interest in historic burials such as monologues, reproductions or recordings of the works of famous authors, artists, musicians, composers, business people, politicians, entertainers, explorers, adventurers etc.
- Upgrade historic shelter sheds
- Develop or upgraded public toilets at intervals across the landscape
- Improve way finding signage
- Improve interpretive signage related to specific religious or historic community precincts
- Enhance web site searching to identify famous peoples' graves
- Develop additional themed walking routes and circuits
- Implement cooperative programmes with Commonwealth War Graves Commission
- Develop elevated walkways/boardwalks associated with special aspects of the Cemetery (eg. elevated boardwalk, boardwalks through ecology areas, viewing tower)
- Interpret railway line corridor and features with combination of overhead walkways and ground level walking paths/themed route to minimise impact on burial land.
- Enhance organised parking and vehicle circulation routes to avoid visitor traffic congestion
- Continue active traffic management in busy periods

Circulation

87. Consider pedestrian entrance off Railway Street at traffic light, with potential parallel parking on roadside (subject to Council's approval and cooperation).
88. Realign pedestrian entrances where needed (refer map).
89. Avoid burying in buffer zones.
90. Develop pedestrian network in buffers and throughout the site for public use
91. Incorporate pedestrian paths in the vicinity of canals and encourage pedestrian interaction.
92. Re-instate connection to Strathfield over railway line and into public golf course
93. Provide pedestrian access at the new Sheehy Avenue entrance.
94. Consider pedestrian entrance opposite the University at existing pedestrian crossing if Sheehy Avenue does not go ahead.
95. Fine-tune bus route to provide more equitable servicing of the site
96. Provide consistent signage at all entrances.
97. Provide adequate, dedicated parking around all new administrative and public facilities such as chapels, condolence rooms, offices, etc.
98. Consider multi-level parking structures in the administrative hubs.
99. Interpret railway line with overhead walkway.

Ecology

100. Negotiate paths and boardwalks into Conservation Areas. If not negotiable under the PMP, consider Bio-banking option (refer to Biosis report)

Interpretation

101. Interpret the railway line as a pedestrian path within the "usable" undeveloped land.
102. Provide tree planting for shade and seating for respite together with interpretation along the walk, where possible.
103. Re-use rail tracks where still present, if possible.
104. Link the various interpreted portions with colour coded line painted on the roads to help define the entire walk.
105. Interpret Category 1 former buildings as part of burial development, with associated respite areas
106. Interpret selected Category 2 former buildings as part of burial development, with associated respite areas
107. Provide some interpretation for all Conservation areas.
108. Develop self-guided walks relating to botanical, historical, cultural, architectural, sculptural themes
109. Integrate any self-guided walks in new signage strategy
110. Provide interpretation for all points of interest (ecological, historical and cultural)
111. Investigate presence of Aboriginal scarred and carved tree in Unit 9 and interpret any findings.
112. Consider paths and boardwalks in Conservation areas and interpretation of the vegetation within.

- Unit Boundary
- Conservation Area Boundary
- 1 Recommendation Numbers
- Pedestrian Entrances
- Category 1 Former Buildings
- Category 2 Former Buildings
- Existing Bus Route
- Proposed Bus Route
- Proposed Pedestrian Path
- Proposed Railway Pedestrian Path
- Proposed Eco Boardwalk Pedestrian Path
- Proposed Canal Pedestrian Path
- Existing Cycle Routes

RESPONDING TO THE NEED FOR SUSTAINABILITY

As mentioned in the Plan of Management (PoM), “a central issue for the long-term management of the Rookwood Necropolis is the demand for burial places and the ability to meet this demand”.

Although an audit of remaining burial land was not available at the time of the formulation of the PoM, the various Trusts estimated burial at Rookwood may run out around 2026. An audit has since been carried out as part of this study (see summary table page 192) to ascertain the current yield.

Sustainable burial practices will also need to be introduced to supplement the above and will come in the form of intensification of use in new and old areas, as well as potential re-use schemes, some of which may not yet be allowed under current legislation. The exploration of overseas and other potential change to the legislation are important in understanding how these may affect the life the cemetery and will be briefly addressed within this part of the report.

Once all burial has been exhausted on site, the cemetery will continue to function as a crematorium and memorialisation will need to be catered for on-site. Some of this potential will be explored herein. However, this plan will not attempt at highlighting all the locations but provide principles which each Trust may apply to their own section.

All of these measures will ensure the long-term sustainability of the cemetery.

Sustainability also extends to the adoption of environmentally sustainable work practices applying the 3R’s (Reduce, Re-use and Recycle) to more aspects of outdoor management.

USABLE LAND

An audit was carried out, with the assistance of both Trusts, as part of this study. The task consisted in documenting all land not yet used for burial and analysing the various levels of constraints imposed on them (refer to Usable Land C&O Map – page 103).

This identified patches of land immediately available for burial whilst others had various levels of constraints (eg. flood, ecology, legislation) which may or may not possible to overcome.

It also identified Public areas which may be usable in the future should the legislation for renewal return. It is important to note that the public area to the north of the site appears to be a random mix of public and private graves, and lies within a Conservation Area. This will be an important consideration when discussing the possible removal of Protected Vegetation which covers it as the value of removal may be limited to the re-use of isolated graves and will depend on the quality of the cemetery’s record to identify their exact location.

The Land Analysis identified that the buffer zones may, on day and subject to changes to the Crown Land Act for Rookwood) be available for burial. However we do not recommend burial in this area on the basic that it does not comply with guidelines for cemetery groundwater (refer to page 10 in Appendix 03: Surface Water Report) and is more valuable for presentation and recreational use.

In summary, the Usable Land analysis led to the following estimates:

- Immediately available 246,500m^2*
- With flood constraints 32,220m^2
- With ecology constraints 133,297m^2
- Buffer zones with legislation constraints 30,000m^2
- Public burials with legislation constraints 118,000m^2
- Public burials with legislation and burial constraints (Northern cluster) 75,800m^2

*excluding crematorium land

Where the canals are leaking and contributing to the high water table, the repairs and installation of weepholes together with additional drainage to allow the groundwater to seep out may render suitable areas not previously able to be buried into.

Should a retarding basin be required on site and should the groundwater still render the land unsuitable for burial, the lower, southern end of Unit 8 may be a logical location (subject to Auburn Council's flood study review) (refer to Water Management – page 49).

Whilst the removal of flooding constraints may be possible, the removal of ecological constraints will be both onerous and difficult. The options are discussed in more detail below and in the Ecology Report by Biosis (Appendix 02: Flora and Fauna Constraints Assessment).

Recommendations

113. Bury and/ or allocate land immediately available (no constraints).

114. Start investigations on groundwater and flood mitigation to release land subject to water constraints.

a. Implement stormwater recommendations for surface run-off collection, lowering of groundwater table and capture of contaminated groundwater.

b. Respect a 3-5m clearance for burials from canals and swales due to groundwater contamination.

c. Monitor areas of perched water table and investigate possible remedies.

d. Install weepholes in area of raised groundwater table.

115. Based on groundwater advice, do not bury within 10m of the boundaries.

116. Based on groundwater advice, do not bury within 3m of canals.

117. Potential for retarding basin in Unit south, if deemed necessary for flood control.

VEGETATION CONSERVATION AREAS

Not forgetting that the primary purpose of the cemetery is that of burial provider, the Conservation areas offer great opportunities for Woodland burials or ash interment (subject to OEH's approval). This would generate some income on an otherwise unusable parcel of land. The footprint of cremated remains is small and would have limited impact on the vegetation if sensitively introduced. Burial may not be acceptable due to the equipment and trampling required during the process.

Furthermore, as discussed earlier, accessibility of these areas (even if limited) would benefit the public and increase their appreciation of it. The addition of small path and boardwalks (least invasive and damaging to the vegetation) would provide interment opportunities and should be encouraged.

A comprehensive ecological constraints report has been prepared by Biosis P/L as part of this consultancy which aims at summarising all issues currently experienced at the cemetery with regards to the ecology, ie. bushland areas and threatened species in general (refer to Appendix 02: Flora and Fauna Constraints Assessment).

The main aim of the report is to establish if any options are available to the cemetery management to release more land and/ or better utilise the protected vegetation/ Conservation areas.

The key findings which came out of the assessments by Biosis P/L and discussions with DEM and UBM (who have advised and managed of the threatened species over last decade) are:

- The PMP allows for the removal of threatened vegetation outside of the Protected Conservation areas. These can be removed as long as the PMP is current and are thought to re-enter the "pool" of vegetation to be protected when the PMP expires. The PMP's status is unclear as recent comments received from DEH has deemed it perpetual. It has been assumed as current and able to be reviewed periodically until otherwise informed. The removal of vegetation after the PMP has expired is punishable by law.
- The Cumberland Plain Woodland in mown settings can be removed as part of the PMP. However, some large specimen trees are worthy or retention within these clumps even though the entire patches are earmarked for possible removal. Memorial gardens development would offer some income generation whilst preserving these

trees.

- In principle, when the PMP expires, it is understood that all remaining significant vegetation may be re-negotiated for either full or partial removal. The level of difficulty, the time and expenses in doing so will vary depending the level of removal sought.
- The Cumberland Plain Woodland (CPW) vegetation (north cluster) is of low to good quality and easier to remove than others on site. However it sits over an area previously buried out, comprising a random mix of public and private graves, making it difficult to re-use and unsuitable for new burial. The recent assessment by Biosis indicates that the vegetation on the western edge of this cluster is not significant, opening up the potential for further discussion with EOH with regards to the boundary alignment.
- The Cooks River Castlereagh Ironbark (CRCI) vegetation is in moderate to good condition which will make its removal more difficult.
- Out of the 4 clusters of Cooks River Castlereagh Ironbark vegetation, the Central and Southern clusters contain the most threatened species making their removal all the more difficult.
- Area 18 is almost all buried out but for a small path on the north –east corner. The recent assessment by Biosis indicates that the vegetation on that corner is not significant, opening up the potential for further discussion with EOH with regards to the boundary alignment.
- Areas 7, 8, 27,28 contain the least threatened species which makes it a good candidate for removal.
- According to DEM, negotiations to date have not been looked upon favourably for the creation of paths or boardwalk within all Conservation areas, claiming additional weed invasion and loss of vegetation.
- If and when the PMP no longer permits either interments within or removal of vegetation for the purpose of burial, Bio-banking may be suitable option for land release.
- A number of Bio-banking scenarios are possible and would need to be further explored at the time (refer to three possible scenarios explored on page 18 in Appendix 02: Flora and Fauna Constraints Assessment).
- The most beneficial option would be as a variation of Scenario 3, with the removal of Areas 7, 27 & 28 (3Ha) in return for in perpetuity care of the remaining areas. However it would not offer an income potential as it "balances out" and provides no credits for sale.

Bio-banking may also allow for the release of land at Rookwood if other vegetation of the same EEC could be locked in perpetuity on another Crown site.

In summary, a variety of options are available, depending on the philosophical stand , the commitment and budget Rookwood may wish to invest in the exercise.

Recommendations

118. Clarify the PMP's terms and conditions as soon as possible, in particular its possible perpetuity status.

119. Whilst PMP is still current, remove all vegetation allowed for removal under PMP.

120. Keep key specimen trees in all areas of mown CRCI & CP woodlands.

121. Negotiate amendments to PMP based on latest assessment of non-significant vegetation within the Conservation areas surveys and release for burial.

122. Negotiate introducing paths or boardwalks within the Conservation areas. Memorialise along paths and within boardwalks.

123. Consider the removal of CRCI in priority to CPW as only they offer the potential for burial land release.

124. Consider Bio-banking as part of negotiations into the release of more land:

a. Removal of areas 7, 27 and 28 , with no credits left and therefore no income potential.

b. Removal of 7 and 28, with credits for sale and income potential.

125. Consider Bio-banking of vegetation on other Crown sites in lieu of release of land within Rookwood.

a. Any CRCI clusters for others on Crown Land if they exist.

b. CPW Northern Cluster for CPW on Crown Land if they exist.

125A. Consider appointing an ecologist fully versed with legislation and OEH negotiations to undertake future negotiations on PMP or biobanking.

Elephant House

Lattice Rest House

HISTORICAL STRUCTURES & ARCHAEOLOGICAL REMAINS

The land audit has identified areas currently unused for burial but where archaeological remains may be present and require further identification and investigation (refer to Former Buildings – page 41). Category 1 & 2 buildings will require investigations whilst Category 3 may be removed and returned to burial land.

The footprint of such structures has not yet been identified so an estimation of available land for burial is not yet possible. Depending on their significance, an interpretation and display of remnants may be required and could form part of paved or respite area.

It is conceivable that memorial gardens (ash interments) and some burial may still be possible within these areas in a sensitively integrated design (subject to Heritage Office's approval).

Historical structures such as the Elephant House and various shelters in the older Anglican sections have the potential to be used for interment, hence generating some income for their ongoing care and restoration. A similar precedent exists at St Kilda Cemetery in Victoria. A Vault was created under the floor of an old Heritage Victoria classified pavilion. Like in the churches and cathedrals of Europe, the ledger is flush with the ground and offers a 'pride of place' within the cemetery which attracted significant gazetted price (approximately $168,00 in 2008) (refer to Case Studies: ACCA Article "The Power of One" - page 251).

Recommendations

126. Conduct further archaeological investigations to determine extent and form of Category 1 & 2 Former Buildings:

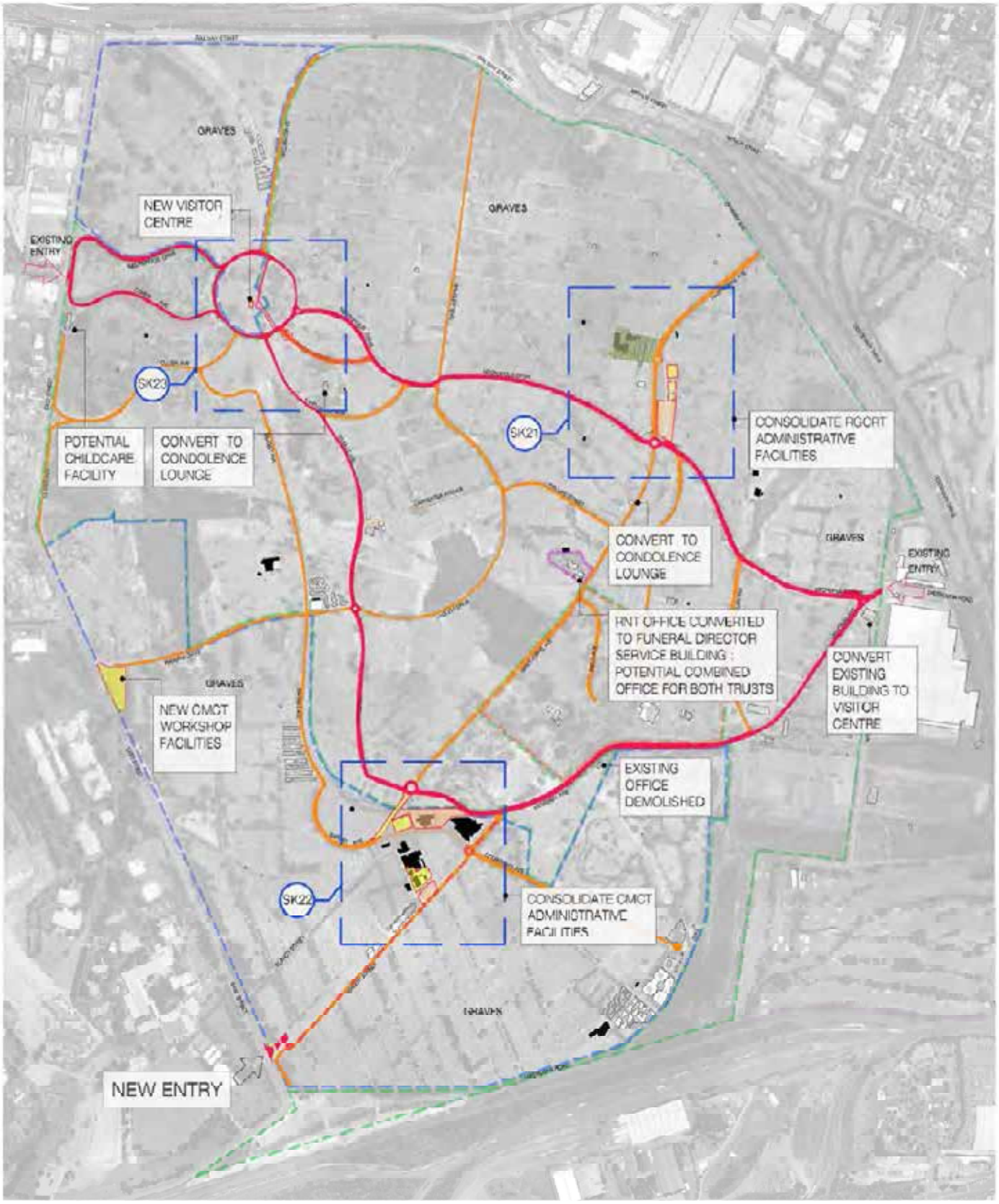
a. Develop individual designs for approval.

b. Incorporate interments (ash interments or burials) wherever possible.

c. Utilised floor space within Historical Structures as part of adaptive re-use (subject to Heritage approval

127. Remove Category 3 structures and use land for burial.

Example of adaptive reuse of a historical shelter (St Kilda Cemetery, Victoria)



SCALE BAR

ROADS
- PRIMARY ROADS
- SECONDARY ROADS
- TERTIARY / DIRT ROADS

BOUNDARY
- RGCRT - ROOKWOOD GENERAL CEMETERIES RESERVE TRUST
- CMCT - CATHOLIC METROPOLITAN CEMETERIES TRUST
- UNALLOCATED LAND - RNT
- CROWN LAND RESERVE

GENERAL
- PROPOSED
- CAR PARKING
- CONVERT TO BURIAL LAND
- BUILDINGS

NORTH POINT

ROOKWOOD NECROPOLIS TRUST MASTERPLAN **PROPOSED - BUILDINGS LOCATION PLAN**

DRAWING NO: SK20

IGNITE

RATIONALISATION OF BUILDINGS & FACILITIES

As described in the analysis section, due to the amalgamation of a number of trusts into the RGCRT, opportunities now exist to consolidate various facilities into a more streamlined operation, some of which are already being implemented. In addition to this, there are also opportunities to improve existing operations and logistics, reduce congestion, and increase recreational activity and general attractiveness of the cemetery.

For the purpose of assessing suitable sites for different facilities, buildings were generally grouped as follows:

- Administrative Facilities: This group includes administrative functions, sales offices, and facilities for functions relating to internments such as chapels and condolence rooms.
- Workshop Facilities: This group includes work sheds, storage sheds, work compounds, and the like.
- Public Facilities: This group includes facilities for the general public including cafes, gift shops, information centres, etc..

Various parcels of available land were considered in proposing locations for new facilities (refer to Appendix 04: Architectural Drawings (SK08-10)).

The key criteria which were applied in this assessment included:

- Administrative Facilities:
  - Need to be on or directly accessed from Primary roads, for ease of navigation.
  - Should be visually accessible for intuitive way finding.
  - Where possible, facilities should be amalgamated for increased efficiency.
  - Siting and access should address traffic congestion issues.
- Workshop Facilities:
  - Should be located away from the administrative hubs to reduce interference of noise, dust, etc..
  - Should be away from Primary roads to minimise negative visual impact.
  - Should be close to and provide sufficient coverage for the current burial grounds.
  - Where possible, facilities should be amalgamated for increased efficiency.
- Public Facilities:
  - Could be on Primary or Secondary roads.
  - Should be visually accessible for intuitive way finding.
  - Visitor centres should be located close to the entries.
  - Siting and access should address traffic congestion issues.

Recommendations

128. Convert the RNT office building into a Funeral Director Service Building. This is estimated to draw approximately 50% of total traffic away from the administrative hubs, thereby dramatically reducing congestion at these places. (refer to Appendix 04: Architectural Drawings (SK20))

129. Consolidate the RGCRT and RNT administrative facilities into a hub located along the northern section of Hawthorne Avenue. The facilities could include an office building, café, condolence lounge, chapel, etc.. The new facilities and car parking should reinterpret the dead end railway sidings, preserving their heritage value. (refer to Appendix 04: Architectural Drawings (SK21))

130. Demolish the Anglican Workshops to release land for premium burials.

131. Improve the functionality of the CMCT administrative hub by providing direct access to it from Memorial/ Weekes Avenues. Redirect Barnet Avenue to meet the roundabout on Memorial/ Weekes Avenues. Consolidate the car parking and facilities (office, condolence lounges, etc.) in this area. (refer to Appendix 04: Architectural Drawings (SK22))

132. Demolish the redundant Muslim Office to create space for new burials.

133. Relocate the CMCT Workshops to the end of Haslem Drive.

134. Convert the Reflections Café into a Visitor Centre to include an information centre, gift shop, café, toilets, etc..

135. Construct new Visitor Centre in the centre of the large roundabout at the existing East Street entry (Necropolis Circuit). This building should reinterpret the old Mortuary Receiving Station, preserving its heritage value. This location could also provide parking for tourist buses along the road.

Intensification potential:

Along undeveloped sections of former railway

Along edges of roads

Along redundant roads

Where archaelogical relics remain

To be avoided:

Clashing styles

136. Consider reducing remote toilet blocks once the administrative hubs and visitor centres have been implemented, if the existing toilet blocks are found to have little or no visitation.

136A. Longer term, create one central hub for both Trusts to create a central place for all visitors and users of the cemetery (subject to traffic study).

BURIAL INTENSIFICATION

Once all unencumbered land has been used and all avenues to remove constraints over remaining encumbered land have been explored, the next step to extend the life of the cemetery will be burial intensification.

The intensification process is aimed at maximising the use of the remaining and previously used burial land. The following factors have a significant impact on the yield of a parcel of land:

- The **size** of a burial plot, the width of concrete beams and paths separating the plots.
- The burial **space efficiencies** (in-ground (1-3 deep) or above ground, multi-storey structures).
- The **orientation** of the graves (in square pattern, on diagonal, along curved lines), a square pattern being the most efficient.
- Availability of vacant graves (**infill**) and unused burial rights (**revoking**).
- **Rationalisation** of roads as traffic changes and areas fill up.
- **Legislation changes** and improvements towards a more sustainable land-use.

SIZE

The standard burial plot size in the older section was based on the 3'x8' model. Newer plots are generally 1m wide and 2.4m long. Concrete beams vary between 350mm wide for lawn plaques to 1m wide for back to back headstones.

As sizes vary from state to state, it is conceivable that efficiencies may still be found in beams and path width. Advances in machinery has led to more compact equipment. It is worth noting that the difference between a 350mm and 1m wide beam for example translates into 320 graves per hectare, which is significant.

Plot size however is unlikely to change greatly. NSW already has one of the smallest plot size within Australia, with Victoria and Tasmania using a 1.2x2.4m format. However, by way of example, graves in Europe are often 2x1m which is significantly shorter. On the other hand, recent industry discussions on sizes have indicated a trend towards enlarging plot size to cope with the obesity epidemic.

Recommendations

137. Review plot size, beam and path sizes to find more efficiencies.

BURIAL TYPE/ SPACE EFFICIENCIES

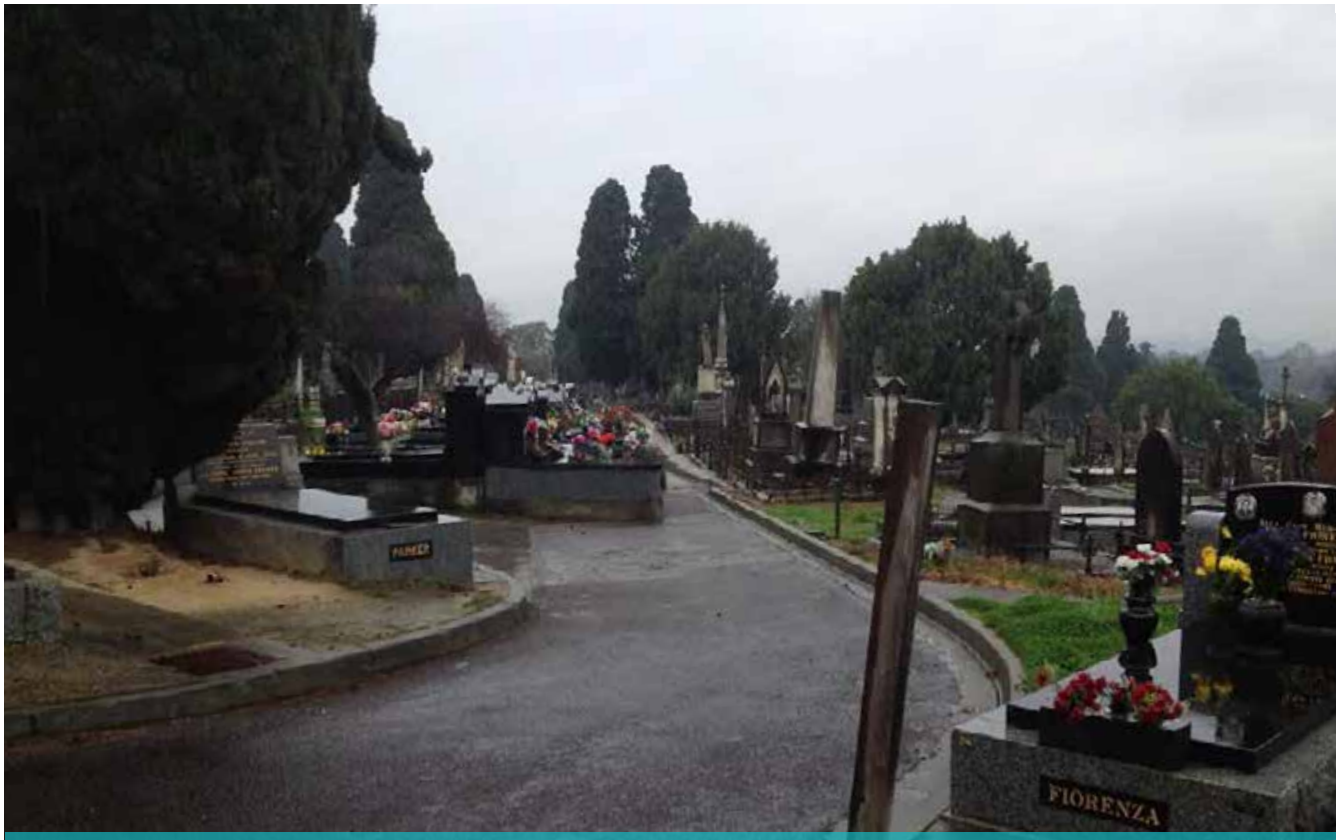
The type of grave offered whether in ground (1 to 3 deep) or above ground largely depends on market demand and religious beliefs. Although mausolea and crypts are more efficient by their multi-story layout, they appeal to limited ethnic groups which may have already been catered for.

The depth of graves also depends on religious affiliation some requesting single depth. It appears that the Muslim community has accepted double depth burial which will potentially double the life span of the new Muslim section.

Further work may be required to encourage all to use double or triple depth grave plots for efficiencies. This is not likely to occur in the short term, a critical period for Rookwood, and is therefore unlikely to have an impact of the yield of the cemetery.

Recommendations

138. Encourage double and triple depth burial where possible.



Road infill regrets (Boroondara Cemetery, Victoria)

Regrettable road infill (Boroondara Cemetery, Victoria)

ORIENTATION

The land still available for burial within the cemetery consists mostly of pockets constrained between existing burial sections. From an aesthetic point of view, a continuation of surrounding types, alignment and layout are preferable. Generally, the most space consuming layout is curvilinear and should be discouraged when running out of space. As there are no examples of such style within Rookwood, it should not be introduced at this point.

Recommendations

139. Avoid curvilinear grave layout. Retain straight lines.

140. Continue with adjacent monumental style (lawn/ monumental) to minimise visual clutter.

ROAD RECLAIM (PARTIAL OR FULL)

Road reclaim is an obvious and common way to intensify burial within a cemetery. As burial areas fill up, the need to access to graves diminishes and eventually becomes limited to genealogy research and rare visits. The roads are seldom used yet take up valuable burial land. The wider roads may be narrowed whilst the narrower roads may be reclaimed in full.

However, it is commonly regretted as it damages:

- Visual amenities: Grave alignments may be different for efficiencies, new materials clash with old.
- Layout and heritage fabric of the cemetery: the original layout is lost or difficult to interpret.

City of London is an example where the lack of burial space, unaddressed by legislation, has put extreme pressures on management which has allowed burial within major thoroughfares to only regret it within a few years once realising its visual impact. This should be avoided at all costs.

In a place like Rookwood, where the visual significance has been well documented, it is essential to recognise the importance of the current layout by:

- Minimising the road reclaiming so not to dramatically affect the heritage fabric.
- Limit the full road reclaim to Tertiary roads only.
- Maintaining a visual representation of the original alignment, retaining avenues and an access path so the circulation routes are still visible.
- Control the monumentation style to ensure it is visually unobtrusive or matching the surrounding graves (subject to Heritage approval in SHR).

The potential for road reclaim is directly linked to the character of an area and its historical significance (refer to Managing Change Analysis Map – page 30). A number of case studies were therefore selected to represent a typical scenario for adaptive re-use for each situation:

- Within SHR (CMCT) - St Michaels Chapel
  - Significant layout, strong historic character.
  - Where some roads may be narrowed, ash interments placed in ornamental gardens where compatible with original layout and historic and new trees memorialised.
  - (Refer to Case study – Page 218 to 223)
- Within SHR (CMCT & RGCRT) - William Drive
  - Significant redundant road, boundary between two units of different characters.
  - Where some roads may be narrowed, memorial gardens inserted in road verges and trees memorialised.
  - (Refer to Case study – Page 224 to 229)
- Outside SHR area - but within significant layout (RGCRT) - Unit 4
  - Strong grid layout of historical significance, canal edge.
  - Where memorial gardens are established within original garden layout and along canals.
  - (Refer to Case study – Page 230 to 235)
- Outside SHR area - but within non-significant layout (RGCRT) - Unit 6
  - General road reclaim
  - Where grave instensification takes place within the road.

· (Refer to Case study – Page 236 to 241)

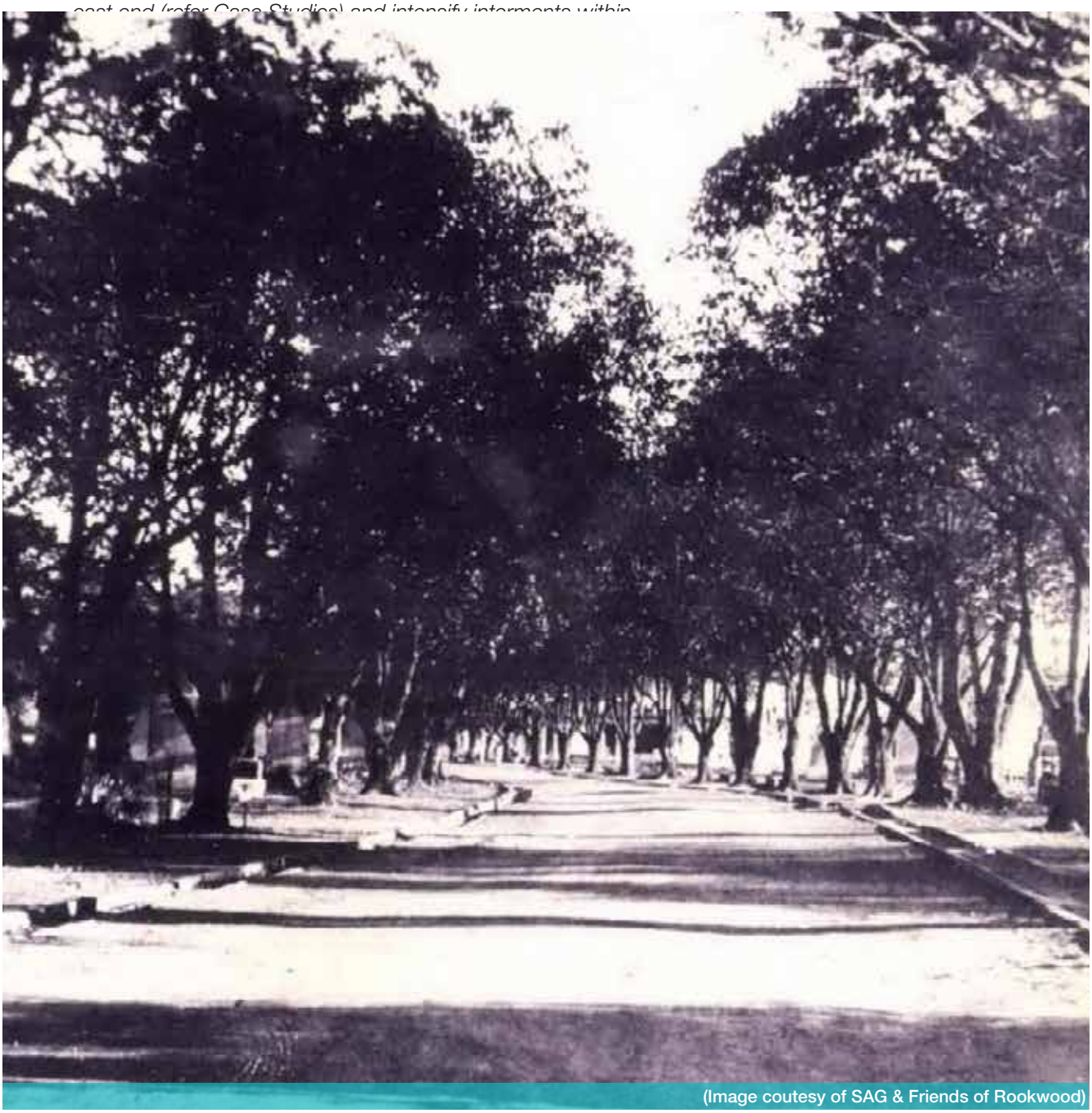
Each Case Study defines the set of principles which underpin the proposals. These principles can then be applied to other areas which match the above criteria (refer to Case Studies – page 215). The extent to which each Case Study applies is shown on Case Studies Map (page 216).

Recommendations

141. Reclaim Tertiary roads for burial where shown.

142. Downgrade Secondary road which are obsolete and introduce interment within original road footprint (Blashki Avenue).

143. Downgrade/ narrow redundant Secondary road William Drive, Haslem Avenue (north), Hawthorne Avenue's east end (refer Case Studies) and intensify interments within



(Image coutesy of SAG & Friends of Rookwood)

INFILL/ REVOKING

As is often the case, isolated plots may have missed out on a sale and may remain vacant without a burial licence having been sold/issued. These graves have been referred to as “Infills”.

Similarly, graves and burial rights may have been sold but not utilised. These have been referred to as “revoked” graves. In 2011 Cemetery Legislation changed to reduce the minimum period required before an unused burial rights can be revoked to 50 years.

Assessing the potential within each Trust is a tedious and onerous task, which requires checking through cemetery records. It is not expected to represent a large volume of plots and is not a priority at the moment whilst burials are still available elsewhere. It is also thought that the public may not find appeal in an isolated location within an old section. However as shown overseas where legislation has not kept up with demand and burial shortage has been critical, management has had no other choice but to explore such options and the public has been more accepting of what is on offer for the privilege of burial in their chosen cemetery.

It is important to plan for this eventuality, as it is not a case of “if” but “when” it happens. The development of guidelines for managing change for the control of the visual appearance of both infill and revoking options is the first step in preparing for this eventuality.

Recommendations

144. Trusts to identify potential for revoking of burial right (after 50 years of non-use) and infill.

145. Refer to managing change guidelines for infill and revoking.

PUBLIC GRAVES

Each Trust has specific areas allocated for the purpose of burial of the destitute and bury to different depths. Regardless of the number of bodies allocated to one grave, it is conceivable that no all have been used to full capacity. Again, assessing the potential within each Trust is a tedious and onerous task, which requires checking through cemetery records. It does not represent a significant portion of the yearly demand and is therefore unlikely to have a significant impact of the yield of the cemetery.

Recommendations

146. Identify potential for additional burial within public sections and utilise accordingly.

(LIMITED) RENEWABLE TENURE

The only sustainable option available to Rookwood is the newly introduced (limited) renewable tenure, however it only applies to new burial grounds, something in which Rookwood is poor. It is also voluntary and its level of uptake has not been tested. It may be 50% as a good case scenario and 0% as a worst case scenario. Time only will tell.

At the end of any chosen term, the grave would be vacated for a new family using the process of “lift and deepen”, where the remains are exhumed, placed in a box and buried deeper in the grave.

Should tenure uptake be 50% of the current available unencumbered land, this would represent 36,000 burial potential or 12 number of years at the current burial rate. Out of this number, some may not renew after 25 years thus offering some graves for resale.

Although the legislation does not stipulate it, it is important to recognise that:

- Isolated graves choosing this option render the process difficult to administer in the long-term. To ensure that (limited) renewable tenure is viable in the long term, an area should be dedicated for this purpose.
- Lawn graves are also easier to resale than one with an existing monument.

There is an opportunity to provide above-average presentation in these areas, with screen planting, landscaping and respite facilities to compensate for the short term use. On-going income potential will assist the funding of high quality grounds and facilitate its marketing.

Recommendations

147. Identify areas suitable for (limited) renewable tenure and utilise exclusively for this purpose.

148. Offer lawn graves in these areas in preference to monumental graves.

a. Provide above-average/high end presentation to facilitate marketing.

b. Minimise memorialisation to facilitate re-use.

FUTURE RE-USE POTENTIAL

The burial options available under the current legislation do very little for the long-term sustainability of Rookwood:

- Limited renewable tenure only applies to new graves which Rookwood has very little of.
- The re-use of public interment (paupers) areas is no longer available and has not had a chance to be implemented in the short period during which it was permissible.

Any other form of reuse is not presently allowed.

It is proposed to explore what other significant re-use techniques are available overseas in country which are experiencing critical shortage of burial land, so that Rookwood can benefit from their hindsight.

Any re-use method would need to be assessed or modified to ensure a respect of the heritage value of the site and record of previous owners.

SHORTENING OF PERPETUITY PERIOD

It is now rare in Europe that perpetuity is offered due to land shortage. It may be labelled as such but equates to 75 or 100 years only.

This allows for a reuse every 78-103 years taking into consideration that a period of advertising (2 years) and implementation (1 year) are required before a grave can be re-offered.

In order to be useful to Rookwood, it would need to be applied retrospectively as Rookwood is unable to wait for 75 years before a grave can be re-used, unless it is closed to burial for period of time. Should the number of reclaimed graves match the number of graves in demand each year, the cemetery is potentially self sustaining.

The re-use of older sections is often met with resistance from Heritage groups as it is seen to modify the visual amenity of the site and may result in loss of information and social mapping. A number of methods have been trailed successfully overseas and may be worthy of consideration at Rookwood. They either aim to respectfully re-use the original monuments or creating a visual record of existing conditions for future generations to enjoy.

- *City of London Cemetery – Selective Monument Re-use*
  In 2007 the London Authority modified its legislation to allow “lift and deepen”, the removal of perpetuity and the replacement with 100 year licences. This has permitted a cycle of re-use which has been so popular, they are back in the news for running out again.
  The renewal process is sensitive to heritage issues and consists of the following steps:
  - After 75 years of non-use, the cemetery starts a process to reclaim the grave (last interment 75 years or 3 generations ago).
  - Advertising for 2 years on site, ads in the two City of London papers and writing to the families.
  - If no replies, cemetery reclaims the grave.
  - All reclaimed graves are assessed by heritage architect for significance.
  - If not significant, dangerous or in poor state, monument is removed.

- If significant with legible inscriptions, headstone will be re-used and turned around. New family uses the new face for inscriptions.
- If significant but illegible, headstone is sandblasted and re-used.
- A process of “lift and deepen” follows.

- *Pere Lachaise, Paris- Monument Re-use*
  Opened in 1804, the cemetery provided perpetuity until 2003, when new legislation was introduced to offer 10, 30, 50 years and perpetuity as long as graves are maintained.
  It is renowned all over the world for its superb monuments and the famous people buried within. The entire cemetery is classified as “historical monument”, which limits its ability to remove any monuments within.
  - As all graves are considered private property, maintenance is the responsibility of the family.
  - If not maintained, the cemetery can reclaim the grave after a period of advertising (3 years).
  - Each monument earmarked for reclaim is assessed by the chief heritage architect of Paris.
  - If deemed significant, it is classified “untouchable” and cannot be reclaimed for burial. It can be used as a columbarium. The cemetery uses trade schools and receives some Heritage budget from City of Paris for restoration.
  - If not significant, the monument can be reclaimed and on-sold to unrelated families. The monument is retained for re-use.
  - Previous remains are exhumed and placed in ossuary (may use cremation in the future as ossuary is nearly full)
  - The new family engraves its name on the monument.
  - The maintenance of old monuments is effectively funded by new families, by columbaria sales or external funding.

- *Ashford Cemetery, California, USA – 3D Modelling*
  In this particular case, the Historical Society has applied for funding for a project which aims to document gravestones in the town’s 20 cemeteries and possibly to create a three-dimensional replica of the cemetery and stones, a kind of virtual tour that could be accessed online by genealogists and historical researchers. It is conceivable that this technique could be used to record sections earmarked for re-use and create a complete record of monuments and their inscriptions. This method would create a social map (as referred to in the Plan of Management) whilst enabling sustainable burial services.

By allowing the shortening of the perpetual term and the re-use of monuments if the family is no longer connected nor maintaining it, the re-use of monuments, in some form or another, would theoretically apply to all graves. The sustainability of this option is based on whether the current yearly demand is greater or smaller than the number of graves released each year.

RENEWAL

The renewal legislation which was introduced in 2012 and withdrawn in late 2013 allowed the re-use of public graves, assuming no disturbance to existing remains. The land could be re-used by either building over or filling with soil to enabling another layer of burial over the top.

The new graves could be sold as private graves or reused as public graves. As new areas, these would be subject to (limited) renewable tenure in a 25 year increment with a maximum of 99 years.

It is not possible at this stage to estimate the level of uptake for tenure on private graves, the length of the tenure which may be most popular, nor the cultural and religious groups which may be enticed. The continuation of use as public graves also depends on demand and is a decision for each Trust.

It is unclear if the new legislation allows for “lift and deepen” of the public graves as not rights of burials were issued.

The ability to fill and re-use over the public area may be limited by the presence of significant or threatened vegetation. It is therefore important to keep this mind and adjust any maintenance regime until the legislation returns.

Recommendation:

149. Continue to lobby for more sustainable burial practices.

150. Investigate if "lift and deepen" is allowed for public graves under new legislation.

151. Identify suitable areas should renewal legislation return.

152. Ensure that further protected vegetation does not establish on public areas which would jeopardise potential for re-use.

153. Ensure that no further native vegetation establishes on private graves which will limit re-use potential in the future.

STRATEGY SUMMARY

	Description	**Timing**	**Surface Available (Ha)**	**Yield (Nº)**	**Refer To**
Intensification				Assumes 2,500 graves/ Ha 3,000 gr/yr	
Undeveloped Land Audit	Land able to be developed (constraints free)	Immediate use	24.65	61,625 = 20.5 yr	Usable Land Map (page 103)
	If limited tenure chosen	Dependent on uptake	Not available		
	Land subject to archaeological constraints	Subject to Archaeological investigations & Heritage Office consent	Not available		Usable Land Map & Former Railway Map (C&O) (page 103 & 37)
	Land subject to ecological constraints	Subject to OEH consent	13.33	33,300 = 11.1 yr	Ecology Map (page 80) & Ecology Report (Appendix 02)
Road Reclaim	Superfluous Tertiary roads	Immediate	8.61	21,500 = 7.1 yr	Proposal Map (Responding to Sustainability) (page 205)
		Subject to Heritage Office's approval in SHR	Not available		Case Study, St Michaels (page 219)
			Included in Road Reclaim		Case Study, Unit 6 (page 237)
			Not available		Case Study, Unit 4 (page 231)
	Narrow redundant roads	Subject to Heritage Office's consent		750 = 0.25 yr	Case Study, William Drive (page 225)

	Description	Timing	Surface Available (Ha)	Yield	Refer To
Revoke Unused Burial Licences	Reclaim burial sites purchased but unused in 50 years	Check records		Unknown	Managing Change Guidelines (page 213)
	If limited tenure applied	Await 25 to 99 years?		As above multiplied by re-use factor	Managing Change Guidelines (page 213)
Infill	Use individual/ isolated plots not yet sold	Check records		Unknown	Managing Change Guidelines (page 213)
	If limited tenure applied	Await 25 to 99 years?		As above multiplied by re-use factor	Managing Change Guidelines (page 213)
Historical Buildings	Subject to Heritage office's approval	Variable	Not available	Unknown	Case Study Article "Power of One" (page 248)
Re-use of Existing Sites					
Lift & Deepen On Existing	Re-use of Public areas	Subject to approval?	4.22	10,500 = 3.5 yr	Land Use Map p103
	Re-use of private perpetuity graves	Not allowed. Subject to legislative changes			
	Re-use of private limited tenure graves	Await 25 to 99 years?			
Renewal Scheme	Re-use of Public areas	No longer available Subject to legislative changes	4.22	10,500 = 3.5 yr	Land Use Map p103
	If perpetuity chosen- re-use once only	As above			
	If limited tenure chosen- perpetual re-use	As above			

CREMATED REMAINS/ MEMORIAL GARDENS INTENSIFICATION

Once Rookwood has carried out its last interment, it may continue to operate as a Crematorium and Memorial Garden for many years. The site has two crematoria which do not operate at capacity yet.

Units 15A & B have been earmarked for memorial gardens and still contains ample land for the interment of cremated remains. Invocare has estimated that it will provide for current memorialisation styles for another 50 years or more. Nevertheless, it is important to plan for an efficient use of the Crematorium land as well as identify areas throughout the site which may be better utilised for this purpose.

Bricks from canal

Possible pedestrian bridge for interpretation over existing graves in Unit 13 - (Artist Impression)

It is interesting to note that memorialisation is following an "Individualistic" style with larger personalised plots, a definite departure from niche walls and group memorials. This is more land-consuming but as all trends, it may change in the future.

This move away from niche walls has also eroded the character of the garden which offered walls "rooms" and strong geometry. Any future designs within the Crematorium land should be in keeping with the original character, using hedges in lieu of walls and strong visual links between rooms, wherever possible (refer to Rookwood Visual Significance Study DEM - 2010).

In general the scope for memorialisation of cremated remains is endless. Many under-utilised corners can be used for this purpose and would be too numerous to identify and list.

Due to the visual significance of the site and similarly to burials, the potential for intensification of cremated remains has been dealt with in relation to the site's ability to absorb change.

The potential for adaptive re-use has been explored through case studies within each character area:

- Within SHR (CMCT) - St Michaels Chapel
  - Significant layout, strong historic character.
  - Where some roads may be narrowed, ash interments placed in ornamental gardens where compatible with original layout and historic and new trees memorialised.
  - (Refer to Case study – Page 218 to 223)
- Within SHR (CMCT & RGCRT) - William Drive
  - Significant redundant road, boundary between two units of different characters.
  - Where some roads may be narrowed, memorial gardens inserted in road verges and trees memorialised.
  - (Refer to Case study – Page 224 to 229)
- Outside SHR area - but within significant layout (RGCRT) - Unit 4
  - Strong grid layout of historical significance, canal edge.
  - Where memorial gardens are established within original garden layout and along canals.
  - (Refer to Case study – Page 230 to 235)

As each Case Study defines the set of principles which underpin the proposals, these principles can then be applied to other areas which match the above criteria (refer to Case Studies - page 215).

Preliminary discussions with the Heritage Office of NSW have indicated that the introduction of interments within all areas of Rookwood (including areas deemed unable to absorb change) would be acceptable if dealt with sensitively and if demonstrating a Heritage benefit such as restoration or reinstatement of past plantings. This would require additional research in the layout and plantings conducted by the original designers of Rookwood.

Recommendations

154. Investigate further potential for memorial gardens within the older areas (refer to Case Studies and associated map – page 216).

155. Restore original gardenesque layouts where lost in older areas adapting them for memorial gardens where possible.

a. Ensure original character of "walled gardens" is retained within Unit 15A

CANALS

The canals offer great opportunities for memorialisation. The buffer zones (3m) on either side can be planted and all edges offered as memorial gardens for cremated remains. The canals within the SHR area may require a different treatment.

The following principles should apply:

- The canals should be renovated /restored, if required, prior to establishing memorial gardens
- The plaques should be small not to over-power the landscape setting (which is also part of the public passive recreation network) (sizes 80x150mm approximately).

- The plaques should be installed on a base of similar material to that of the canal (grey stone adjacent to concrete canals and brick base next to historic brick canals). Bricks can be made to order to suit small plaque dimensions.
- The planting style may be adapted to suit the products on sale, however a planting theme should remain for the whole length of the canals within each Trust's section.

Both edges are potentially suitable for memorialisation and in the case of the serpentine, all four edges may be suitable. This represents over 7000 linear metres of memorialisation edge.

Recommendations

156. Implement a progressive canal repair program linked to progressive landscaping and memorialisation of the canals' edges.

157. Consider some agreed principles for the landscaping and memorialisation of the canals to ensure a consistent image and neat appearance throughout the site.

GENERAL LANDSCAPING

As part of the beautification of the cemetery a number of garden beds may be established. Each one represents an opportunity for memorialisation which should be encouraged as it promotes an efficient use of land and creative solutions to intensification and will ensure the long term viability of the cemetery:

- Along the Primary roads.
- Separating burial sections (for sensitivities and privacy).
- Along the boundary paths, within the buffer zones.
- At key interpretation nodes (Mortuary stations, former buildings).
- Along the railway interpretation paths.
- Within boardwalks (elevated over burials or within the Conservation areas.

Recommendations

158. Consider all garden beds within the site as potential memorial gardens.

159. Memorialise within the buffer zones.

160. Memorialise within the interpretative layout of the railway line and selected former buildings.

161. Consider memorialised boardwalks (elevated railway, ecology areas).

TREES

Potentially every tree can be memorialised, whether part of an avenue or not, assuming it is safe to stand beside it. One major exception is the Primary roads which now have trees within the road verge and are not safe to access.

As highlighted previously a number of significant trees exist, particularly in the northern, older part of the site and require on-going maintenance. These trees, whether specimens or part of an historic avenue, may need surgery work or removal or replacement, all of which are costly. The cost of their on-going preservation and the restoration of key avenues can be partly funded by the memorialisation and the steady stream of income this provides.

It is in the interest of the cemetery that these visual elements are retained and in the interest of the managers that these trees generate some income.

Recommendations

162. Memorialise trees on Secondary and Tertiary roads.

163. Memorialise historic and significant trees as part of their long term management.

PET MEMORIALS

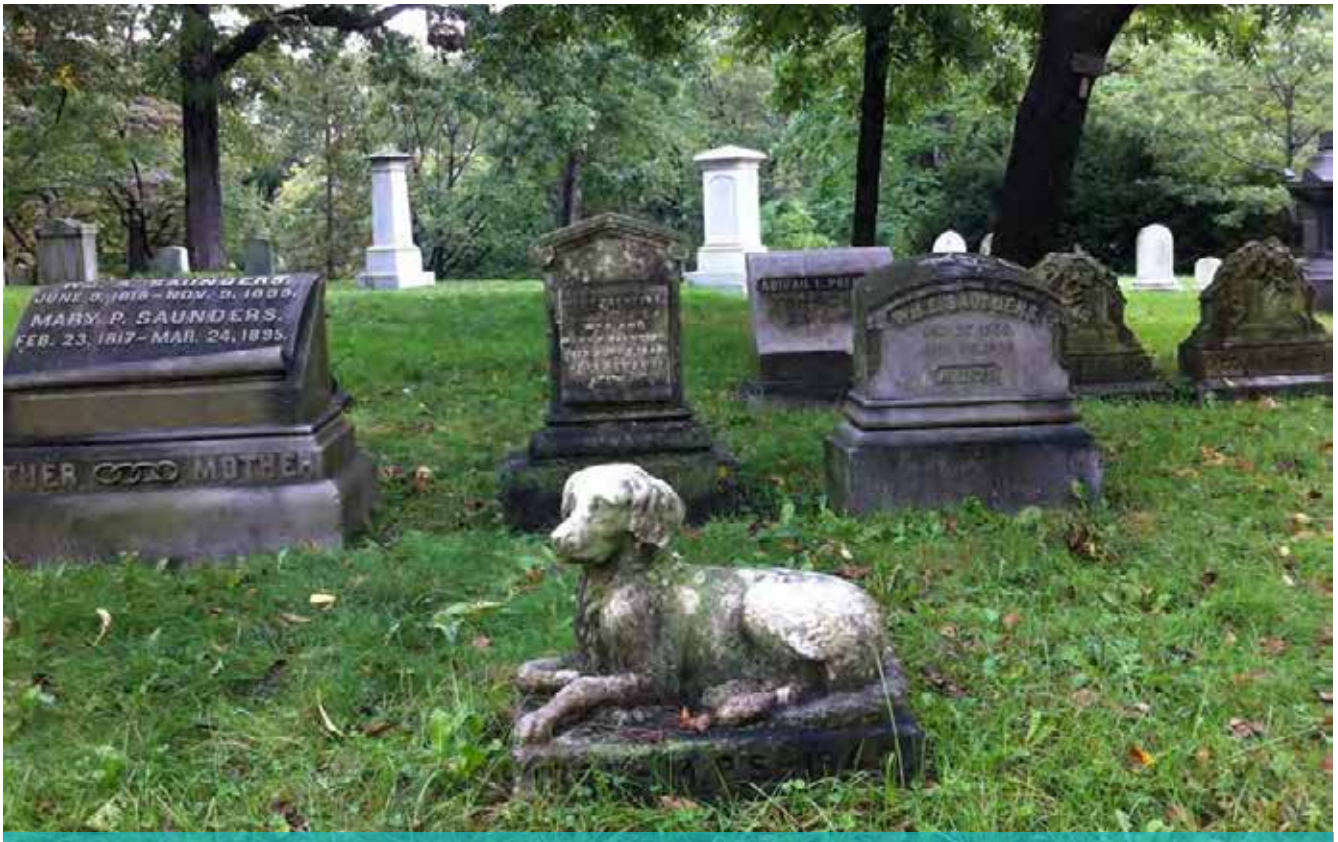
Although impermissible under current legislation, the concept of providing memorialisation for pets may be worthy of investigation.

The concept of a pet cemetery is not suggested as it would compete for land otherwise needed for humans. However, the potential for pet cremated remains to be interred within their owners graves or within a specific area within the cemetery would be possible. In particular, the path meandering within the buffer zones along the boundaries would provide an ideal location, compatible with recreation pursuits, yet away from grieving areas.

Recommendations

164. Consider the buffer zone as pet cemetery (cremated remains only) (subject to legislation changes).

165. Consider interment of pet within owners graves as additional source of income (subject to legislation changes).



Pet memorial at Auburn Cemetery, Cambridge

ENVIRONMENTALLY SUSTAINABLE WORK PRACTICES

As eluded to in the Plan of Management, “the preparation of an Environmental Management Plan for Rookwood will assist in a consistent approach to sustainable uses of resources and protection of the environment in a way that also addresses the challenges created by climate change”.

The aims are to:

- Minimise the environmental impact of the cemetery’s operations by reducing energy use, greenhouse gas emissions, water consumption and waste generation.
- Use resources efficiently so they can be reused or recycled to limit the depletion of the stock of natural resources, as well as to limit the harm to the environment.

Of particular interest to the landscape amenities will be the application of the 3 R’s (Reduce, Reuse, Recycle) to the topics of, to name of few:

- Water Management
- Soil disposal off site
- Composting
- Monumentation
- Preparing for climate change

WATER MANAGEMENT

A thorough assessment of the stormwater constraints and opportunities was undertaken by Engeny P/L, with their full report appended as part of this report (refer to Appendix 03: Surface Water Report). In summary:

- Storm Events: Water run-offs after storm events generally do not affect the cemetery's visual experience. Drainage is generally catered for on the roads and rain water does not stay long enough to be an issue.
- Flooding: Similarly, in the event of a flood, water has usually drained away within a few hours. The velocity of the water is generally low and therefore does not cause damage to graves.
  The basin within Unit 8 has been flagged as flood prone and suitable for retarding basin in prior report and Council is currently reviewing its flood modelling. Should a retardation basin be deemed beneficial to all parties, Unit 8 will be the only possible location. If not, burial in this area would provide significant potential and both Biosis and Engeny's reports recommend possible steps to permit burial as this area is subject to both vegetation and groundwater constraints.
- Groundwater: Is an issue in the Mary McKillop area (CMCT – Unit 11), the Greek Orthodox area (RGCRT – Unit 10 & 11) and at the corner of Sheehy and Courtenay Avenues (CMCT – Unit 23) where the high water table present a constraint to burial. The report offers detailed recommendations for the monitoring and lowering of the perched water tables which will result in improved conditions, suitable for burial. Importantly, groundwater is to be treated as contaminated water, kept way from the stormwater canals and, if captured, directed to the sewerage lines.
- WSUD: The impact of pollutants captured on site onto the receiving waterways is minimal as the amount of impervious surfaces is low compared to vegetated surfaces (grass). Therefore the need to implement Water Sensitive Urban Design (WSUD) is low as pollutant reduction is its primary purpose.
  Any WSUD treatment measures such as wetland, rainwaters or bio-filters are usually space consuming and would compete with burial for land. It would also require the alteration of historic canals to extract the water for treatment.
- Irrigation: As per the principles of Sustainable Environmental practices, irrigation should be kept to a minimum. In the face of changing climate, where water availability will vary throughout the year, it is important not to rely on irrigation for the on-going survival of the landscape. It should be relied on during the establishment periods and during unexpected periods of weather variations. In general:
  - Reduce water requirement: Use plants suitable for the conditions. A wide range of plants are commercially available, able to be sourced from numerous nurseries. Research well before implementing so that the right plant is selected. Limit irrigation to establishment periods and periods of extreme weather conditions.
  - Reuse water: Water tanks and water cells below infrastructures can be used to capture stormwater for reuse on the landscape.
  - Recycle water: portable treatment plants for grey and black water are commercially viable for re-use onto garden beds.

Reuse and recycling can be costly as they often require retrofitting and modification to existing infrastructure. Minimisation of water usage is by far the more cost effective to deal with this diminishing resource.

Recommendations

166. Implement stormwater recommendations for surface run-off collection, lowering of groundwater table and capture of contaminated groundwater.

167. If measures are insufficient to permit burial in lowest areas, and if retarding basin is warranted on site, investigate basin in Unit 8.

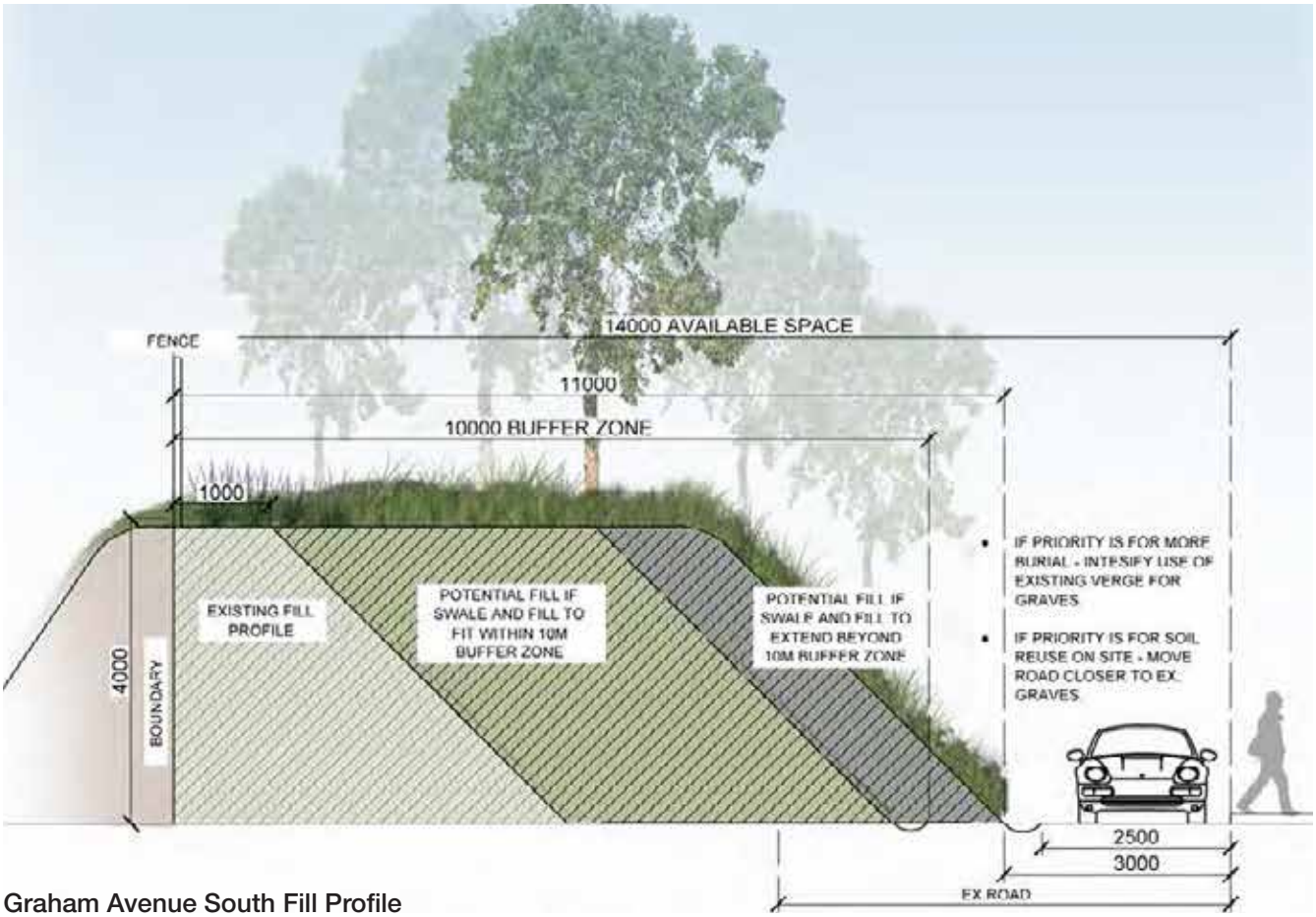
168. Keep burials away from canals (3-5m minimum).

169. Keep burials away from boundaries (10m minimum).

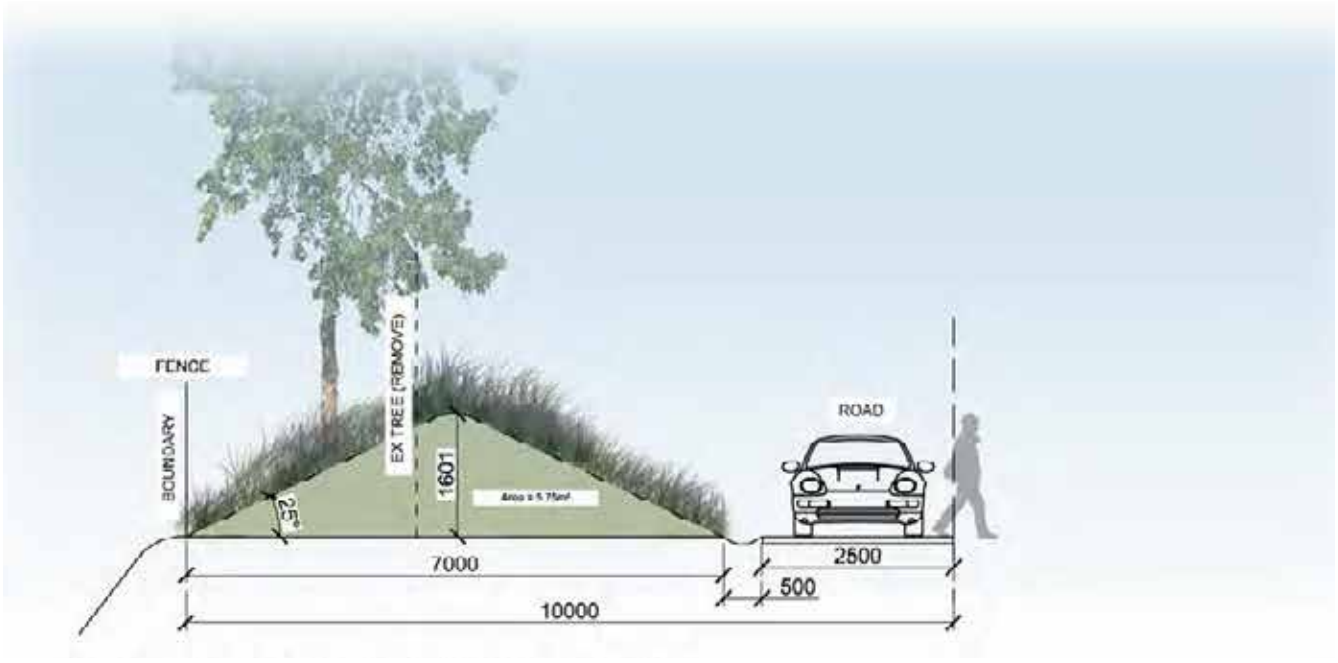
170. Refer to full report for details (Appendix 03: Surface Water Report).

171. Reduce irrigation requirements by careful plant selection.

172. Consider re-use and recycling to top-up any temporary additional water requirements.



Graham Avenue South Fill Profile



Graham Avenue North Fill Profile

SOIL STOCKPILES & DISPOSAL

The process of excavating graves and backfilling them generates surplus fill. It is estimated that approximately 1m^3 of fill is generated for each grave dug. With an estimated 3000 burial per year, the two Trusts generate close to 3000m^3 of surplus soil per year.

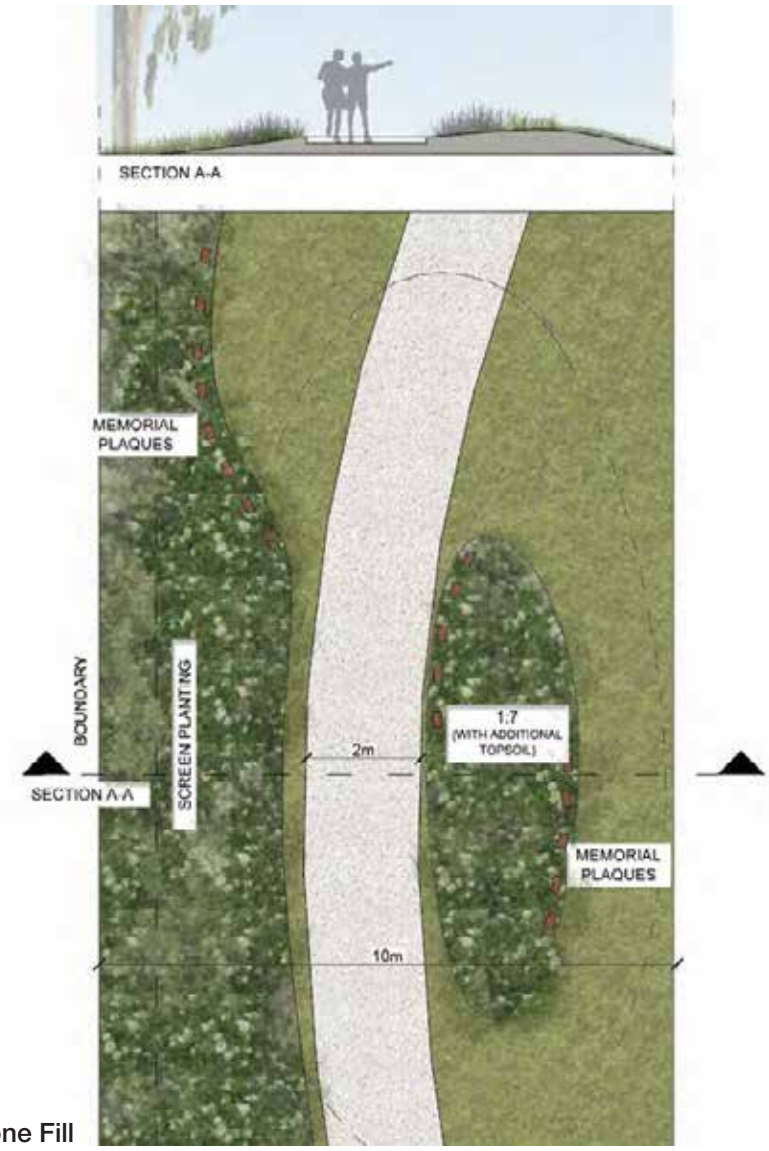
Disposal off-site is costly even under the current VENM classification. Should the requirements change to a stricter classification, the cost could increase by 10 folds. It is therefore important to prepare for this eventuality whilst attempting to reduce current costs by identifying any potential for re-use on site.

Due to their unsightliness and the truck traffic associated with it, soil stockpiling should occur away from Primary roads.

It is thought that the buffer zones may be suitable locations for mounding:

- East Street: The buffer zone is 10m wide and runs the entire length of East Street. Beside a short portion in Unit 8 and 11 where fill is prohibited for drainage reasons, the remaining areas can be filled over (assumed 300mm deep). The regrading would incorporate small mounds beside a meandering path, as part of the beautification and promotion of recreational activities on site. It could be incrementally implemented with the fence reconstruction). The proposal below identifies some 8,300m^3 potential for re-use.
- Graham Avenue: On the north side, the buffer zone is also 10m wide including a 5m wide access road, the railway cutting embankment is lower, and some Bunya pines have already been planted. On the southern portion the road is outside of the buffer zone, the railway cutting embankment is higher and steeper, the boundary fence is located on top of the embankment which is sparsely planted with native saplings. The proposals (refer Sustainability Proposals map – page 205) have identified some 10,000m^3 potential for soil re-use by extending the embankment over the current road, leaving a 2.5m wide road with a 0.5m swale for drainage. The existing ramped mound at the most southerner tip of Graham Avenue may offer some further potential for filling. RNT has indicated that the re-shaping of the railway embankment and the relocation of the fence on its crest have been earmarked for implementation. As the area has not yet been buried into, a rationalisation of the fill is urgently required to ascertain the potential for land release and spoil disposal.

Selected undeveloped areas may also be suitable for additional minor filling provided this does not impede on other constraints (drainage, ecology etc.).



Buffer Zone Fill

Recommendations

173. Avoid stockpile in flood prone areas as it increases the potential for flooding downstream and therefore the cemetery's liability.

174. Keep temporary stockpiles away from Primary roads.

175. Avoid filling upstream of canals where it may impede surface run-offs from entering the canals.

176. Reuse spoil on site wherever possible to limit costs.

177. Utilise buffer zones for fill and re-landscaping, as part of the rationalisation of roads.

a. Fill over the Western buffer zone, create mounds where permissible as part of the beautification of the cemetery.

b. Narrow Graham Avenue (north) and mound along the fence. Remove Bunya Pines where necessary.

c. Narrow Graham Avenue (south) and extend the existing embankment.

COMPOSTING

The constant influx of fresh flowers together with the regular production of grass clippings, collection of leaves and other green waste suggests that a composting program would be beneficial, if not already in place. This would achieve:

- A reduction of the waste volume carted away from site.
- The re-use and recycling of the material on site.
- An Improvement of soils' health.

Whilst the material generated from cemetery's maintenance can be stored at the depots, the collection of fresh flowers requires a dual rubbish bin system, where green waste is separated for general rubbish. The green waste bins are collected by the cemetery's staff and composted on site for re-use on the landscape as required.

This practice has been common in many European cemeteries for a number of years. Its introduction at Rookwood will be made easier by the fact that all households in Sydney are already familiar with the practice.

Recommendations

178. Establish a two-bin system for green-waste collection.

179. Consider composting on-site for re-use on landscape.

MONUMENTATION

The practice of sourcing non-renewable natural stone for headstone is not sustainable. The footprint of such practices is large especially when considering that most stone is imported from India or China.

There is an opportunity for Rookwood to lead the way by exploring the following:

- Minimising natural stone use and offering alternatives (glass, reconstituted recycled materials)
- Encourage lawn graves over monumental graves. (Lawn graves all have the best potential for renewal and are therefore more sustainable as well as no requiring headstone)
- Explore new technologies as alternative memorialisation (for example QR codes to minimise the need for inscriptions, hence reducing the size of the headstone, hologram technology).

Recommendations

180. Encourage lawn graves as a sustainable form of burial

181. Investigate avenues to minimise the use of non-renewable headstone materials.

CLIMATE CHANGE

According to the NSW's Department of Environment and Climate Change, the climate change predictions for the Sydney region are for:

- A hotter climate: Days are projected to be hotter over all seasons, with the greatest warming in winter and spring (2 to 3°C). Nights are also projected to be warmer, particularly in spring (2 to 3°C).
- Increased rainfall in summer: Summer rainfall is projected to increase across the region by 20-50%, with a smaller increase in spring. Winter rainfall is projected to decrease.
- Drier conditions in winter and spring: Higher temperatures and changes to evaporation are likely to create slightly drier conditions in winter and spring.
- Increase in fire weather: The frequency of very high or extreme fire-risk days is predicted to increase across NSW. Increases in temperature, evaporation and high fire-risk days are likely to influence fire frequency and intensity across the region. The fire season is likely to be extended as a result of warmer temperatures. More fire is likely to impact on air quality, by increasing the levels of fine particles.

These are likely to have an impact on Rookwood's landscape and should be integrated into the long-term landscape management of the Necropolis.

Changes in Temperatures & Rainfall

The rise in temperatures combined with more storm events will lead to:

- An increase in plant growth for the plants which will tolerate these new conditions:
  Maintenance requirements will change, lawn will require mowing for longer periods and more often which will put pressure on existing schedules. More staff may be required to produce the same standard of maintenance. Similarly tree growth will occur at a faster pace and impact on the frequency of pruning and other activities.
- The disappearance of species which will not tolerate these new conditions:
  Ecosystems are likely to be affected, including the two Endangered Ecological Communities present on site. Further advice from ecologists and more research on the subject is required to fully understand if and how these communities may be affected.
  With regards to introduced plantings, the Necropolis should consider observing the impact on avenue plantings as their demise will significantly impact the visual amenities of the site. These changes are expected to occur slowly and when a pattern of declining health has been observed, a tree replacement strategy should be implemented. With regards to planting, most shrubs are likely to need replacement prior to a significant change in climate conditions.
  However, in anticipation, and to avoid a drastic visual change in plantings, new plantings should aim to respond to a drier and warmer winter as well as a more humid summer. New plantings should include plants which can naturally survive in today's conditions whilst tolerating the above changes.
  To minimise the impact of more extreme weather patterns (wetter, yet drier depending on the time of the year), the cemetery should consider the installation of rain water cells under roads or water tanks to assist with irrigation in the peak of the dry season.
- Potential for more disease outbreaks:
  The more humid conditions are likely to be more conducive to fungus and virus growth. It is likely that a number of plants will be affected by disease for which a cure is not available. The subject was discussed earlier (refer to Beautification/ Consistency, Vegetation – page 146). In general the use of a wider range of plant is recommended to reduce the impact of disease on the plant population as monocultures are weaker ecosystems where disease can spread quickly.

Fire

Bushfire risk will increase. Rookwood may be affected by bushfires within or in the vicinity of the cemetery (which may spread to the site). The latter is unlikely as the site is not bordered by bushland.

In anticipation of bushfire occurring within the site the following should be considered:

- Preventative measures:
  - Preparing the bushland for a reduced risk of fire (seek advice from ecologist).
  - Avoid funerals during fire danger days.
  - Re-schedule funerals to cooler days.
  - Evacuation procedures in place including defining multiple exit points.
- Management during:
  - Enact evacuation procedures.
- Post fire:
  - Restore fire damage.

Recommendations

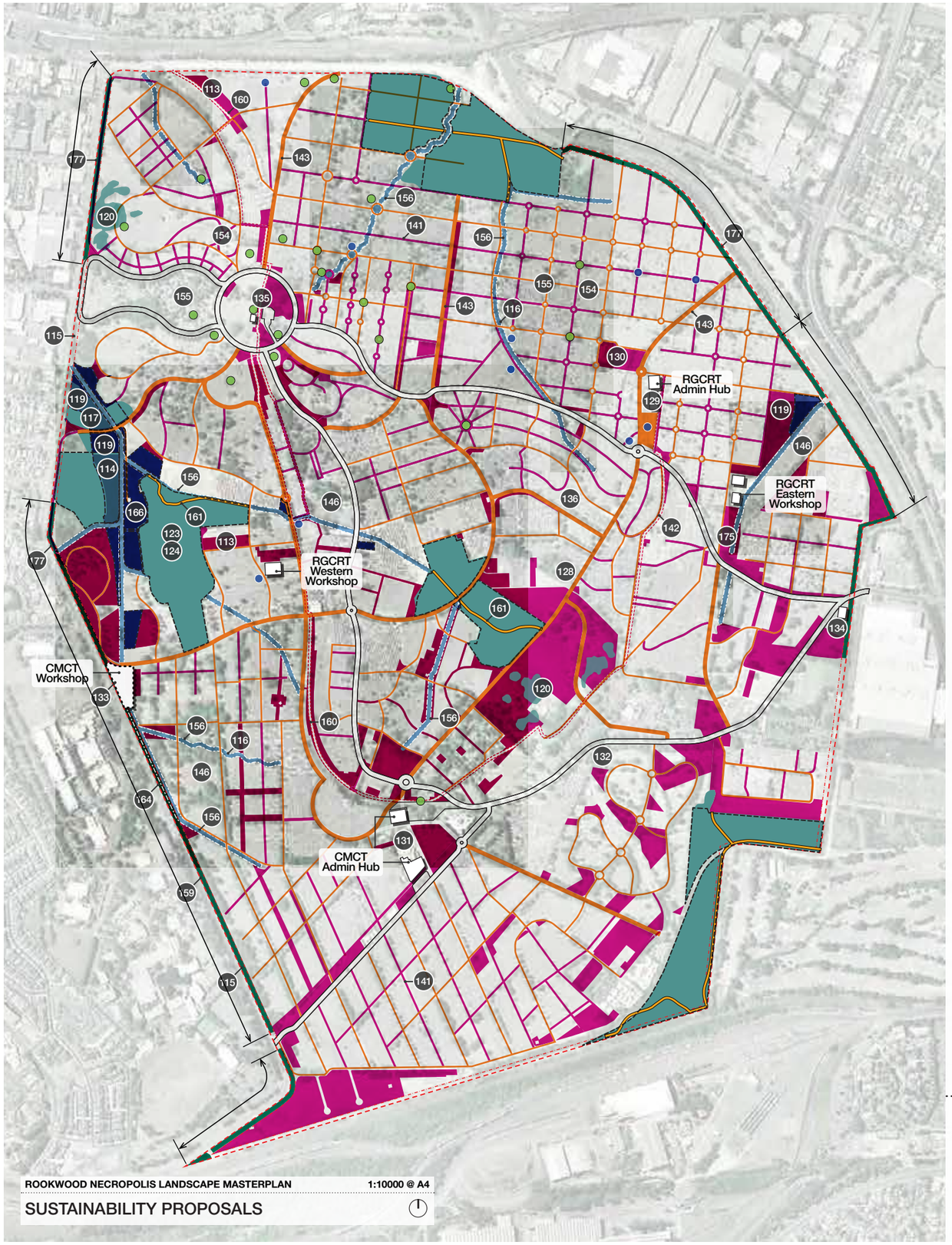
182. Prepare for climate change by undertaking detailed predictive study.

183. Instigate or update fire evacuation procedures.

184. Investigate preventative measure for Conservation areas.

185. Use a range of tree avenue species to minimise the impact of disease.

186. Start using plants which are suitable for the forecasted climate conditions.



Useable land

113. Bury and/or allocate land immediately available.
114. Start investigations on groundwater and flood mitigation:
    a. Implement stormwater recommendations
    b. Respect a 3-5m clearance for burials from canals and swales
    c. Monitor areas of perched water table and investigate possible remedies
    d. Install weepholes in area of raised groundwater table
115. Do not bury within 10m of the boundaries.
116. Do not bury within 3m of canals.
117. Potential for retarding basin in Unit south, if deemed necessary.

Conservation Areas

118. Clarify PMP's possible "perpetual "terms ASAP.
119. Whilst PMP is still current, remove all vegetation allowed for removal under PMP.
120. Keep key specimen trees in all areas of mown CRCI & CP woodlands.
121. Negotiate amendments to PMP based on latest assessment of non-significant vegetation within the Conservation areas surveys and release for burial
122. Negotiate paths or boardwalks within the conservation areas and memorialise.
123. Consider the removal of CRCI in priority to CPW.
124. Consider bio-banking as part of negotiations into the release of more land
    a. Removal of areas 7, 27 and 28 or 7, 28.
125. Consider bio-banking of vegetation on other Crown sites in lieu of release of land within Rookwood.
125A. Consider appointing an ecologist fully versed with legislation and OEH negotiations to undertake future negotiations on PMP or biobanking.

Historical structures and Archaeological remains

126. Conduct further archaeological investigations to Category 1 & 2 former buildings
    a. Develop individual designs for approval.
    b. Incorporate interments.
    c. Memorialise or inter in floors.
127. Remove Category 3 structures and use land for burial.

Rationalisation of Buildings and Facilities

128. Convert the RNT office building into a Funeral Director Service Building.
129. Consolidate the RGCT and RNT administrative facilities into a hub.
130. Demolish the Anglican Workshops.
131. Improve the functionality of the CMCT administrative hub with direct access from Primary road. Redirect Barnet Avenue to meet the roundabout.
132. Demolish the redundant Muslim Office.
133. Relocate the CMCT Workshops to the end of Haslem Drive.
134. Convert the Reflections Café into a Visitor Centre.
135. Construct new Visitor Centre over Mortuary 1 station site.
136. Reduce remote toilet blocks numbers.
136A. Longer term, create one central hub for both Trusts to create a central place for all visitors and users of the cemetery (subject to traffic study).

Burial Intensification

137. Review plot size, beam and path sizes.
138. Encourage double and triple depth burial.
139. Avoid curvilinear grave layout.
140. Match adjacent monumental style (lawn/monumental).
141. Reclaim Tertiary roads for burial where shown
142. Downgrade Blashki Av and introduce interment.
143. Downgrade/narrow redundant Secondary road William Drive, Haslem Avenue, North, Hawthorne Avenue's east end (refer Case studies) and intensify interments within.
144. Identify potential for revoking of burial right and infill.
145. Refer to managing change guidelines for infill and revoking
146. Identify potential for additional burial within public sections.
147. Identify areas suitable for (limited) renewable tenure.
148. Offer lawn graves in these areas in preference to Monumental graves.
    a. Provide above-average/high end presentation to facilitate marketing.
    b. Minimise memorialisation to facilitate re-use.
149. Continue to lobby for more sustainable burial practices.
150. Investigate if Lift and deepen is allowed for public graves.
151. Identify suitable areas should renewal legislation return.
152. Ensure that further protected vegetation does not establish on public areas.
153. Ensure that no further native vegetation establishes on private graves .

Cremated remains/Memorial Gardens Intensification

154. Investigate further potential for memorial gardens within the older areas (refer to Case studies and scoping map).
155. Restore original gardenesque layouts incorporating memorial gardens.
    a. Ensure original character of "walled gardens" is retained within Unit 15A.
156. Implement a progressive canal repair program linked to progressive landscaping and memorialisation of the canals' edges.
157. Consider some agreed principles for the landscaping and memorialisation of the canals.
158. Consider all garden beds within the site as potential memorial gardens.
159. Memorialise within the buffer zones
160. Memorialise within the interpretative layout of the railway line and selected former buildings.
161. Consider memorialised boardwalks (elevated railway, ecology areas).
162. Memorialise trees on Secondary and Tertiary roads.
163. Memorialise historic and significant trees .
164. Consider the buffer zone as pet memorial cemetery.
165. Consider interment of pet within owners graves.

Environmentally Sustainable work practices

166. Implement stormwater recommendations .
167. If retarding basin is warranted on site, investigate basin in Unit 8.
168. Keep burials away from canals (3-5m min)
169. Keep burials away from boundaries (10m min.)
170. Refer to full appended report for details
171. Reduce irrigation requirements by careful plant selection.
172. Consider water re-use and recycling .
173. Avoid stockpile in flood prone areas.
174. Keep temporary stockpiles away from Primary roads.
175. Avoid filling upstream of canals.
176. Reuse spoil on site wherever possible.
177. Utilise buffer zones for fill and re-landscaping,
    a. Fill over the Western buffer zone,
    b. Narrow Graham Avenue (north)
    c. Narrow Graham Avenue (south) and extend the existing embankment.
178. Establish a two-bin system for green-waste collection.
179. Consider composting on –site for re-use on landscape.
180. Encourage lawn graves as a sustainable form of burial
181. Minimise the use of non-renewable headstone materials.
182. Prepare for climate change
183. Instigate or update fire evacuation procedures
184. Investigate preventative fire measure for Conservation Areas.
185. Use a range of tree avenue species to minimise the impact of disease.
186. Use plants which are suitable for the forecasted climate conditions

Site Boundary
Conservation Area Boundary
1 Recommendation Numbers
Usable Land
Flood Prone Areas
Significant Vegetation
10m Buffer Line
10m Buffer Area
Canal Interment
Canal 5m Buffer Area
Category 1 Former Buildings
Category 2 Former Buildings
Existing Buildings
Proposed Building Area
Roads
Pedestrian Boardwalk
Former Railway

IMPLEMENTATION STRATEGY

IMPLEMENTATION STRATEGY

GENERAL

The implementation of the masterplan will take many years.

As some of the capital works program is subject to approval process (OEH [Heritage and ecology branches for example]) or dependent on further investigations and reports, the works program will span over a long period of time.

DESIGN IMPLEMENTATION PROCESS

A number of design disciplines will be required over the next few years to further design, document and administer the various contracts. The design process will follow these logical steps:

- Further reports/Investigations
- Detailed concept based on the masterplan principles.
- Approval from relevant authorities (Council, OEH...)
- Design development and Documentation
- Tendering
- Contract Administration

STAGING

The implementation of the recommendations will also need to be staged.

For the purpose of setting priorities, the following have been assumed that the three objectives of the masterplan, although equal in importance, carry different levels of urgency. For example:

1. Sustainability (in particular extending the life of the cemetery) is of prime importance
2. Beautification is an important factor for sales and marketing
3. Increased recreational use is less important as it does not relate to the core business (burial provision) but has the potential to bring welcome income as the cemetery fills up.

A simple ranking of short, medium and long term implementation has been suggested:

SHORT TERM: (to be carried out in the first 1-5 years)

- For projects/recommendations which are likely to have a significant and immediate positive impact on the cemetery and its operations.
- For projects /recommendations which involve further studies and negotiations to ensure the timely delivery of subsequent tasks.

MEDIUM TERM: (to be carried out in the next 5-15 years)

- For projects which release land for burials, following the confirmation that current available land will run out after 25 years.

LONG TERM: (to be carried out in the next 15 + years)

- For projects which aim at improving the viability of Rookwood in the long-term but are not essential to the burial provision.

PROGRAM

BEAUTIFICATION

SHORT TERM

- Completion of Primary road treatment, downgrade and upgrade of roads, improved and new entrances, coordination of funeral traffic
  - All will contribute to the presentation of Rookwood and improve traffic within, leading to a better impression of the cemetery overall.
- Guidelines for Monument Conservation, Landscape maintenance, Tree Management Strategy, Significant Tree Register
  - Agree on common guidelines and objectives. Develop existing guidelines to ensure a consistent approach and improvement in staBeautificationndards.
- Conservation Study for historic significant landscapes,
  - This work will enable a better understanding of the significant landscape and form the basis for the preparation of plans for adaptive use in these areas.
- Reinforcement of planting theme, introduction of collection trees in the newer areas, completion of avenue plantings and primary roadside planting, ground cover planting on old graves.
  - A stronger landscape theme and consistent avenue planting will greatly benefit the cemetery with minimal outlay.
- Perimeter fence upgrade, pedestrian entry realignments, perimeter planting and soil disposal
  - These tasks will be integrated and incremental. They are likely to spill over into Medium term.
- Removal of fencing on Memorial avenue (Unit 20B)
  - Remove and coordinate with primary roadside planting
- Upgrade of directional signage
  - Signage contributes to poor way-finding and is in urgent need of improvement

MEDIUM TERM

- Restoration of remaining garden structures
  - This needs to be combined with interment provision within the structures to help with restoration costs. Approval from Heritage Office will be required.
- Planting of Canal buffers
  - Following the necessary repairs the beautification of the canals will prepare garden beds which can be used for ash interments. Memorialisation will assist with the cost of beautification
- Restoration of Serpentine/basin in Unit 9
  - Refer to above comments
- Complete Secondary Avenue plantings
  - Any avenues with inconsistent planting or missing trees should be completed to improve the presentation of the thoroughfares.
- Complete Tertiary Avenue planting
  - Refer to above comments
- Continue with perimeter planting and fence upgrade
- Conservation Areas' fencing and interpretation
  - Following the confirmation of the final extent of the PMP areas (or Bio-Banking areas) which are to be kept in perpetuity, fencing should occur. Interpretation may start before if funds permit.
- Completion of signage upgrade
  - This would include the introduction of digital welcome signs, etc..
- Continue with planting of ground-covers on old graves

LONG TERM

- Downgrade William Dr, Haslem Av (North) and Hawthorne Av (East)
  - Although the roads may provide additional burial spaces in the long-term, the beautification of these roads can start ahead of this process. Complete avenue trees, road edge plantings, tree works and road re-surfacing. The roads within the SHR area will require approval from Heritage Ofice.

ON GOING/WHEN REQUIRED

- Implementation of Secondary and Tertiary road profiles
  - This is dependent on timing of road and/or stormwater failure
- Removal of debris from canals and outlets
  - This should be undertaken at least yearly and after major storm events (wind and rain)
- Provision of planting between clashing cultural/monumental styles.
  - As areas develop and cultural clashes become evident, implement planting as and where required.

RECREATIONAL USE

SHORT TERM

- Negotiation on improved bus network
  - As this affects the accessibility of graves by visitors and mourners, it should be undertaken early to ensure full benefits during the remaining “burial” years.

MEDIUM TERM

- Implementation of public paths in buffer zones and railway alignment
  - This can be implemented as part of or following the perimeter and fence upgrade depending on available funds
- Completion of interpretation signage
  - This includes interpretation material to ecology areas, railway items and any areas of interest within the cemetery, together with the production of self-guided walks (brochures and QR technology)

LONG TERM

- Reinstatement of pedestrian link over railway
  - Although a precedent exists (removed a few years ago only), this will require approval of the Rail Authority and is expected to be subject to lengthy negotiations.
- Complete pedestrian path network internally

SUSTAINABILITY

SHORT TERM

- Restoration of historic layout and downgrade of redundant roads with integration of interments
  - Commence on plan preparation to start the process of approval which may take several years.
- Repairs on leaking canals
  - Fix as a matter of priority as it impacts on groundwater and ability to bury in certain areas
- Further archaeological investigations on key Cat.1 and 2 sites
  - This will determine the potential for interpretation and interment within. The process should be started early as it may be lengthy.
- Further investigations in groundwater and flood mitigation
  - Monitoring and improvements should be carried out now to enable future burials. Flood mitigation is linked to Council’s findings and subject to potentially lengthy negotiations.
- Review of PMP, clarify perpetuity requirements, remove all vegetation allowed, thin out CRCI and CPW in lawn.
  - Appoint experienced ecologist for negotiation tasks.
- Ensure no further vegetation establishes outside of PMP’s conservation areas (on-going)
  - This will avoid further loss of burial land
- Review of burial efficiencies, clarification of lift and deepen on public, Identify areas for renewable (limited) tenure.
- Memorialise all secondary and tertiary avenue trees
  - This will ensure long-term management of these trees.
- Review irrigation needs for ornamental plantings
  - Aim at reducing the reliance on water, modify plantings to suit site conditions and climate forecasts.

- Removal of stockpiles close to Primary roads
- Implementation of composting program
  - Establish a 2-bin program and recycling facilities
- Conversion of RNT Office into Funeral Director Service Building
  - As this is expected to significantly reduce local congestion issues, this project is recommended to be delivered as soon as the RNT operation has been relocated and its existing office made redundant.
  - Agreement on funding contribution and project delivery would be required between the trusts for implementing this project.
- Consolidation of RGCRT and RNT facilities into Administrative Hub along the northern section of Hawthorne Avenue
  - With the recent merger of trusts into the RGCRT, it would appear that now is a good time to implement this project and further streamline the RGCRT operations. Completing this project also allows other related projects to proceed.
- Relocation of CMCT workshops to Haslem Drive
  - This project is a priority for the CMCT due to interference of maintenance operations with cemetery visitors and mourners.
- New Entry at the South-Western end of Sheehy Avenue
  - This project is expected to have a significant positive impact on a number of traffic issues and is recommended for early implementation.
- Consolidation of CMCT Administrative Hub and Redirection of Barnet Avenue
  - The redirection of Barnet Avenue would be best delivered around the same time as the new entry to minimise the negative impact of change on visitors of the cemetery. The delivery of this project requires agreement between the trusts on reallocation of land between the trusts, in order to provide sufficient parking for the hub.

MEDIUM TERM

- Release of more land using Bio-Banking, Paths within Conservation Areas
  - It is expected that the PMP will not allow further removal but Bio-Banking could. Engage Ecologist for negotiations
- Interpretation of selected Cat 1 & 2 sites
  - Based on the outcome of the archaeological studies, prepare designs for approval for the interpretation of and interments within these sites.
- Reclaim tertiary roads, investigate potential for infill/revoking/public areas intensification
  - In preparation for burial land running out, start the process to ensure timely release of land or graves.
- Continuation of canal repairs and beautification planting
  - In preparation for ash interments.
- Continuation of memorialisation of of Secondary and Tertiary avenue trees.
- Demolition of Anglican Workshops
  - The exact timing of this project should be at the discretion of the RGCRT and driven by their commercial requirements.
- Demolition of the Muslim Office
  - The exact timing of this project should be at the discretion of the RGCRT and driven by their commercial requirements.
- Conversion of Reflections Café into Visitor Centre
  - It is recommended that this project is delivered as soon as the new RGCRT hub is complete, as the Reflections Café would not be needed as a Condolence Lounge any further. The implementation of this project would require agreement between the trusts on funding arrangements and project delivery.
- New Visitor Centre near the East Street Entry
  - The implementation of this project should be delayed until such time that the Visitor Centre at the Reflections Café location has been proven to be successful. If required, a short term facility may be designed and constructed as a trial. Parking for tour buses should be considered at this time.
- Reduction of Toilet Blocks
  - The implementation of this project would be at the discretion of the trusts based on their observations of patronage and condition of the toilet blocks within their units.

LONG TERM

- Continuation of Tertiary road reclaim
- Preparations for climate change
- Amalgamation of the administrative components of both Trusts into one location (to be brought forward if and when further amalgamation of Trusts occurs).
    - The implementation of this project should drive benefits for both trusts through the potential sharing of reception and certain administrative functions and is likely to provide a better experience for visitors and users of the cemetery.

ON GOING/WHEN REQUIRED

- Lobbying for legislation change for more sustainable burial practices and pet cemetery.
- Keep native vegetation out of public, renewal and private graves
- Memorialise all trees
- Investigation of alternative materials for headstones

MANAGING CHANGE GUIDELINES

Rookwood's Variable Character Precincts

The Archaeological Appraisal by Siobhan Lavelle identified four major phases of historical development at Rookwood:

PHASE 1: 1865-1888

- Initial Establishment of the 200 acre Necropolis
- Distinctive differences between the fluid cultural landscape characters of early Catholic, Wesleyan, Presbyterian, Jewish and Independent sections, with the rigid grid of the Anglican section
- Different religious areas generally separated by roadways

PHASE 2: 1889-1919

- Extension of the Necropolis to approximately its current boundaries
- Further development of the rail line
- Phase closes at end of WW1
- Burials generally extend eastwards, repeating the dominant grid pattern of the Anglican section and the fluid character of the sections south of Necropolis Drive

PHASE 3: 1920 – 1945

- A period of consolidation and change
- Introduction of the Crematorium reduces intensity of demand for burials
- Progressive opening of burial areas south of Necropolis Drive ridgeline

PHASE 4: 1946 – PRESENT

- Post war closure and dismantling of rail line
- War graves and Garden of Remembrance
- New denominations and burial requirements
- Burial areas extend to the southern sections of the available land
- Disposal of surplus assets

The long evolution of burials for different religious and community groups has resulted in Rookwood having a unique patchwork character of closely spaced but often distinctly different burial landscapes. With the general exception of the historic Management Units 1, 2, 3, 8 and 12, the majority of the MUs with 19th or early 20th century burials also have pockets of mid to late 20th century burial landscapes.

The primary character features of the historic Management Units include major historic chapels and flamboyant monuments or headstones, fluid, gardenesque pathway layouts or rigid axial grids, attractive small funerary buildings and shelters, majority of burial features comprise sandstone, marble or granite, an emphasis on dramatic plantings at axial nodes complemented with secondary planting, roadways and pathways, historic stormwater drainage channels and planted avenues. In general cultural features and landscape features tend to blend into a dynamic and complementary presentation. Unfortunately, the older graves are often in the most worn and weathered condition, with some loss of the physical clarity of early pathways and planning layouts.

The 20th century burial areas, that generally extend south of Necropolis Drive, have the most varied character derived from the number of religious communities and from different burial techniques over time. Principal characteristics include remnant historic Railway alignment, random planning layouts with fluid and grid-like sub-precincts of varying character, broader range of materials, design and scale, scattering of lawn cemetery style precincts, major features such as 1930s Crematorium, Holocaust Memorial, Crown of Thorns and Commonwealth War Graves, modern Chapels, administration and service buildings, a predominance of natural landscaping.

Principles for Enhancement of Historic Character

- Conserve headstones and monumentation, including stabilisation and re-erection of fallen elements
- Conserve and upgrade historic chapels and other funerary buildings
- Maintain, upgrade and possibly recapture early pathway and road layouts within historic precincts
- Maintain and recapture major site features such as Serpentine, bridge and channels
- Maintain and replace as necessary major trees and planting patterns
- Maintain general mowing regimes
- Replace weeds on graves with suitable new species

Principles for scattered infill development within historic precincts

- Retain existing character and gradually manage subtle change
- Avoid reproductions of surrounding monuments in terms of scale, materials, design, flamboyance or grandeur
- Preference for low key infills with simple plaques on beams
- Add new family names to existing monumentation, subject to Heritage Division Approval in SHR area

Principles for Continuing Burials within predominantly 20th century precincts

- Retain and extend individual character of precincts for contemporary monumentation
- Reflect adjoining materials, scale, design, layout, density and religious identity

Principles for Adaptive Re-use of Archaeological Sites

- If there are surface relics visible, consider adding site elements to interpret or enhance as part of the new burial locations
- If there are no surface relics, review documentary evidence, prepare and lodge Excavation Permit with NSW Heritage Division for prior permission to disturb relics as part of new burial locations
- Undertake required high quality archaeological investigations of any archaeological site identified for re-use or new burials
- Formulate a case outlining the heritage benefits arising from potentially adding new burials below or memorialisation associated with conservation and upgrade of existing funerary buildings and other features
- Build a case around long term sustainability of the Necropolis' heritage values
- Develop a programme for updated interpretation signage for progressive implementation across Necropolis

CASE STUDIES

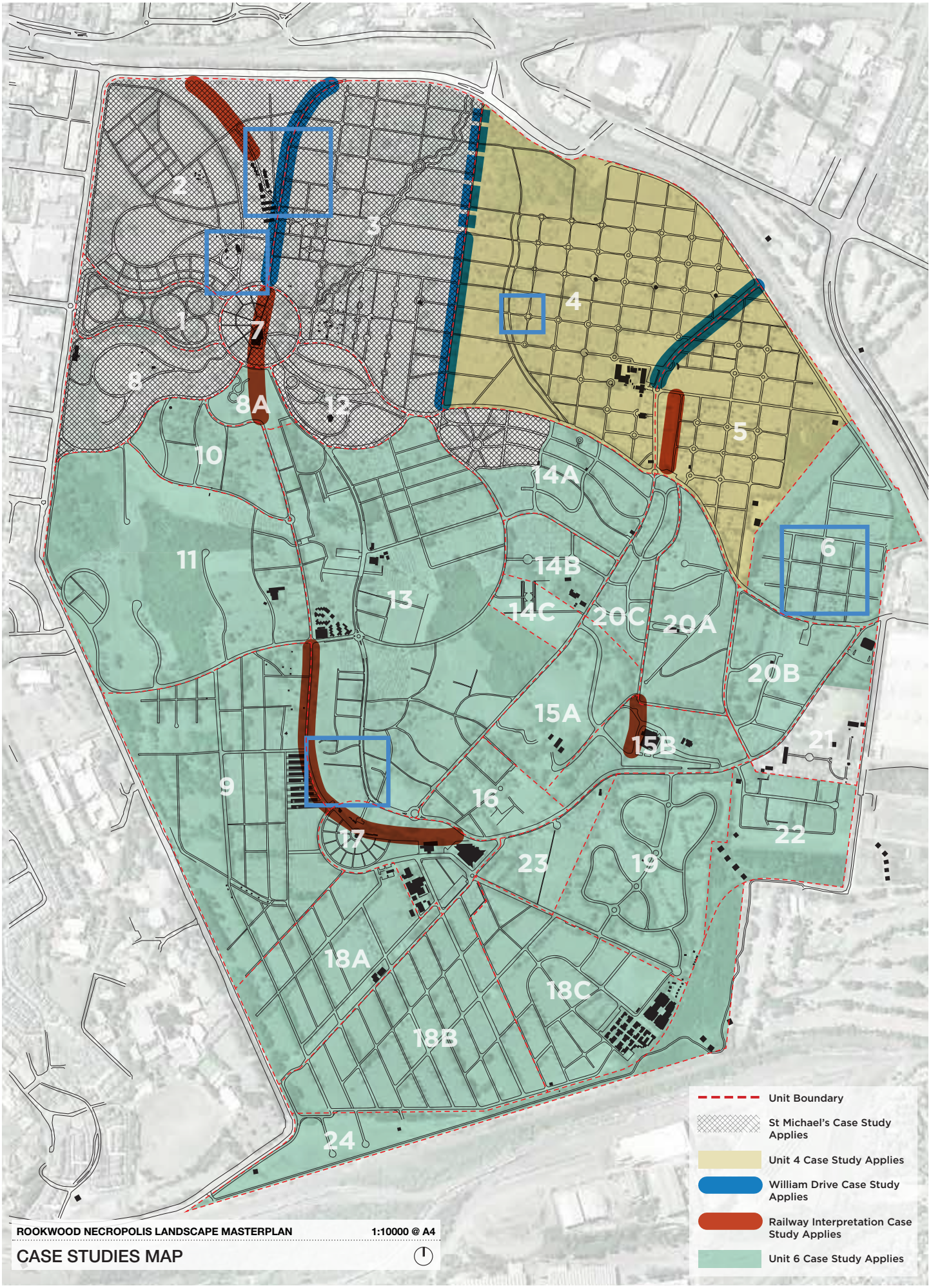
The following Case Studies provide ideas to guide the intensification of burials and memorialisation in areas of the Cemetery that were historically unused for this purpose. Such areas include:

- Along the edges of roads and access paths where the established burials are set back, often by several metres
- Within the original width of redundant or underused roads and pathways
- Areas previously occupied by buildings that have since been demolished but where archaeological relics may remain in-situ
- Within and immediately surrounding the small visitor pavilions or landmark trees located on major visual axes throughout sections of the cemetery.
- Along undeveloped sections of the historic alignment of the former railway, including the locations of former stations or marshalling areas
- Areas with strongly defined but quite distinctive visual characters on either side of a road or accessway, which is a strong feature of the historic patchwork that defines Rookwood

All of the case studies are designed to maintain the well established visual character of the surrounding landscape, within the varied patchwork of the Management Units and their sub-precincts. Individual case studies provide design guidance that can be applied across other areas of the cemetery with similar visual character or intensification opportunities

Some of the case studies examine the potential for new burials in the State Heritage Registered section of Rookwood (refer to Case Studies Map - page 216) while the majority are located within the remaining areas that are heritage listed by Auburn Council. One of the key aims of intensifying burials and memorialisation is to extend the operational life of Rookwood as one of the leading cemeteries in NSW. From a heritage perspective, the additional income earned from intensification can provide funds for the enhancement of the highly regarded historical burial landscapes that contribute so much to Rookwood's important status.

Strong historic characters of Rookwood (Images coutesy of SAG & Friends of Rookwood)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Unit Boundary
St Michael's Case Study Applies
Unit 4 Case Study Applies
William Drive Case Study Applies
Railway Interpretation Case Study Applies
Unit 6 Case Study Applies
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN
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CASE STUDIES MAP

When considering intensification of interments within the cultural landscapes of Rookwood, it is important to explore

- The redundant spaces within the cemetery
- Their location, era and character
- The principles which may regulate any proposed changes

The following case studies aim to categorise the potential areas where change may occur and set some guidelines to facilitate the approval process with the relevant authorities.. This will enable a smooth and expedient transition into implementation.

Due to the visual significance of the site, the potential for intensification of burials and cremated remains has been dealt with in relation to the site's character and historical significance.

Within SHR (CMCT) - St Michaels Chapel

- Significant layout, strong historic character.
  Where some roads may be narrowed, ash interments placed in ornamental gardens where compatible with original layout and historic and new trees memorialised.
- (Refer to Case study – Page 218 to 223)

Within SHR (CMCT & RGCRT) - William Drive

- Significant redundant road, boundary between two units of different characters.
  Where some roads may be narrowed, memorial gardens inserted in road verges and trees memorialised.
- (Refer to Case study – Page 224 to 229)

Outside SHR area - but within significant layout (RGCRT) - Unit 4

- Strong grid layout of historical significance, canal edge.
  Where memorial gardens are established within original garden layout and along canals.
- (Refer to Case study – Page 230 to 235)

Outside SHR area - but within non-significant layout (RGCRT) - Unit 6

- General road reclaim
  Where grave instensification takes place within the road.
- (Refer to Case study – Page 236 to 241)

Railway Line Interpretation - Unit 13

- Archaeological remnant of historical significance
  Where memorial gardens are established alongside the main path where space and use permit and where trees are memorialised .
- (Refer to Case study – Page 242 to 247)

Garden Structures Adaptive Re-use

- Example from St Kilda Cemetery (VIC)
  Where a shelter under Heritage protection was retrofitted with vaults/graves
- (Refer to Case study – Page 248 to 249)

As each case study defines the set of principles which underpin the proposals. These principles can then be applied to other areas which match the above criteria. (Refer to Map)

St Michaels Chapel (Image coutesy of SAG & Friends of Rookwood)

St Michaels Chapel in 1937 (Image coutesy of SAG & Friends of Rookwood)

CASE STUDIES

ST MICHAELS CHAPEL

INTENSIFICATION - SHR - CMCT

Character:

- Historic Funerary Landscape within State Registered listed area.
- In the vicinity of a major historic chapel and some burial monuments
- Existing Road layout reflects historical layout with low key modern overlay

The majority of the circulation routes carry only limited and sporadic traffic as the area is only utilised for limited religious burials.

The roads are wide, sometimes exhibit brick edging and have inconsistent treed avenues.

The original layout has been lost over the last few decades with crypts and graves being developed in isolated pockets. In places the original flow of traffic and alignments of roads have been interrupted by monument infills, different alignments and sometimes clashing styles.

This has contributed to a patchy, inconsistent appearance leading to a general loss of visual amenities.

Many original specimen trees are still present and worthy of retention and on-going preservation.

Selected avenues have a strong presence and provide impressive “tunnels” of green.

Proposal:

- Assess roads with the view to set a hierarchy (main and secondary)
- Keep main roads for 2 way traffic, conserve brick edges and tree alignment where applicable.
- Narrow road surface to 4m wide
- Establish garden beds between road edge and brick edge and memorialise.
- Complete avenue trees
- Memorialise all trees
- Where road verge (outside of brick edges) is wide, intensify with lawn burial (memorialisation to be advised) by:
  - Extending existing rows to the edge
  - Create clumps of graves between trees where possible (Subject to arborist approval)
- Burial memorialisation should be consistent with existing adjacent conditions:
  - Plaques where lawn exists (preferred)
  - Monuments of similar styles and materials

Benefits:

- Heritage:
  - Preservation of visual significance
  - Enhancement of significant layout
  - On-going preservation of significant trees
  - Enhancement of historical burial cultural landscape
  - Retention of historic road layout
- Interment:
  - Additional memorialisation and burial positions
  - On-going income provision
  - Rationalisation of unused spaces
  - Sustainable funding for tree preservation and restoration

Applicable to:

Unit 1, 2, 3, 7, 8, 8A, Part of 10, 12, Part of 14A,

CASE STUDIES

Consent process:

For State Heritage Listed area:

All works associated with alterations and additions to road layouts, walls, garden beds and memorials require approval by NSW Heritage Council.

- Seek advice from Heritage Consultant and/or Landscape Architect
- Undertake initial consultation with Heritage Council representative to discuss and refine design ideas
- Prepare final drawings of the proposed works and a brief Statement of Heritage Impact
- Consult with Heritage Council, prepare and submit s60 Application
- Development Application to Auburn Council will be required for works other than burials

For areas of the Cemetery that are not within the SHR boundary:

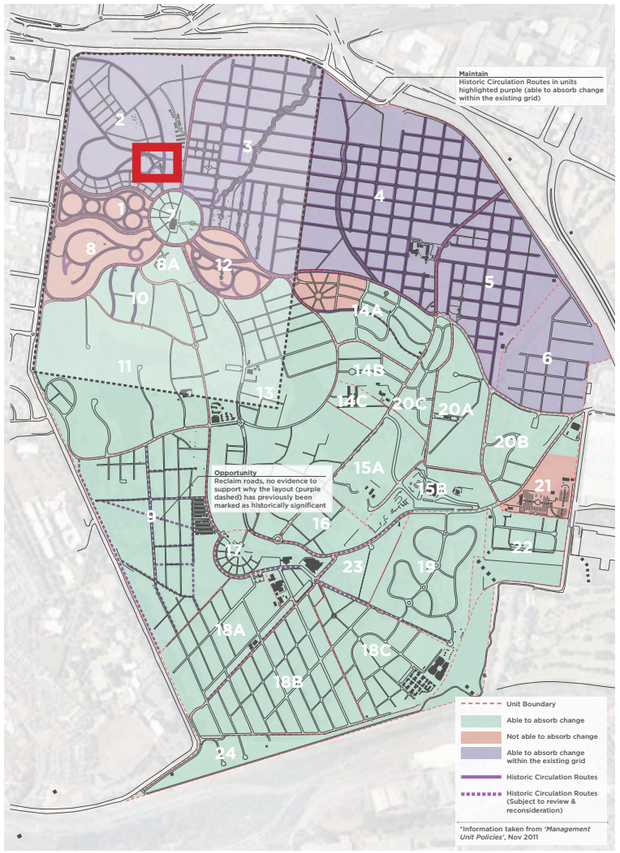
- Check with Auburn Council if DA is needed. Usually not required for burial intensification as formation of graves is exempt development but may be needed for new walls or structures, alterations to paved roads
  - Seek advice from Heritage Consultant and/or Landscape Architect
  - Prepare final drawings of the proposed works and a brief Statement of Heritage Impact
  - Submit Development Application











Florence Jaquet
Landscape Architect

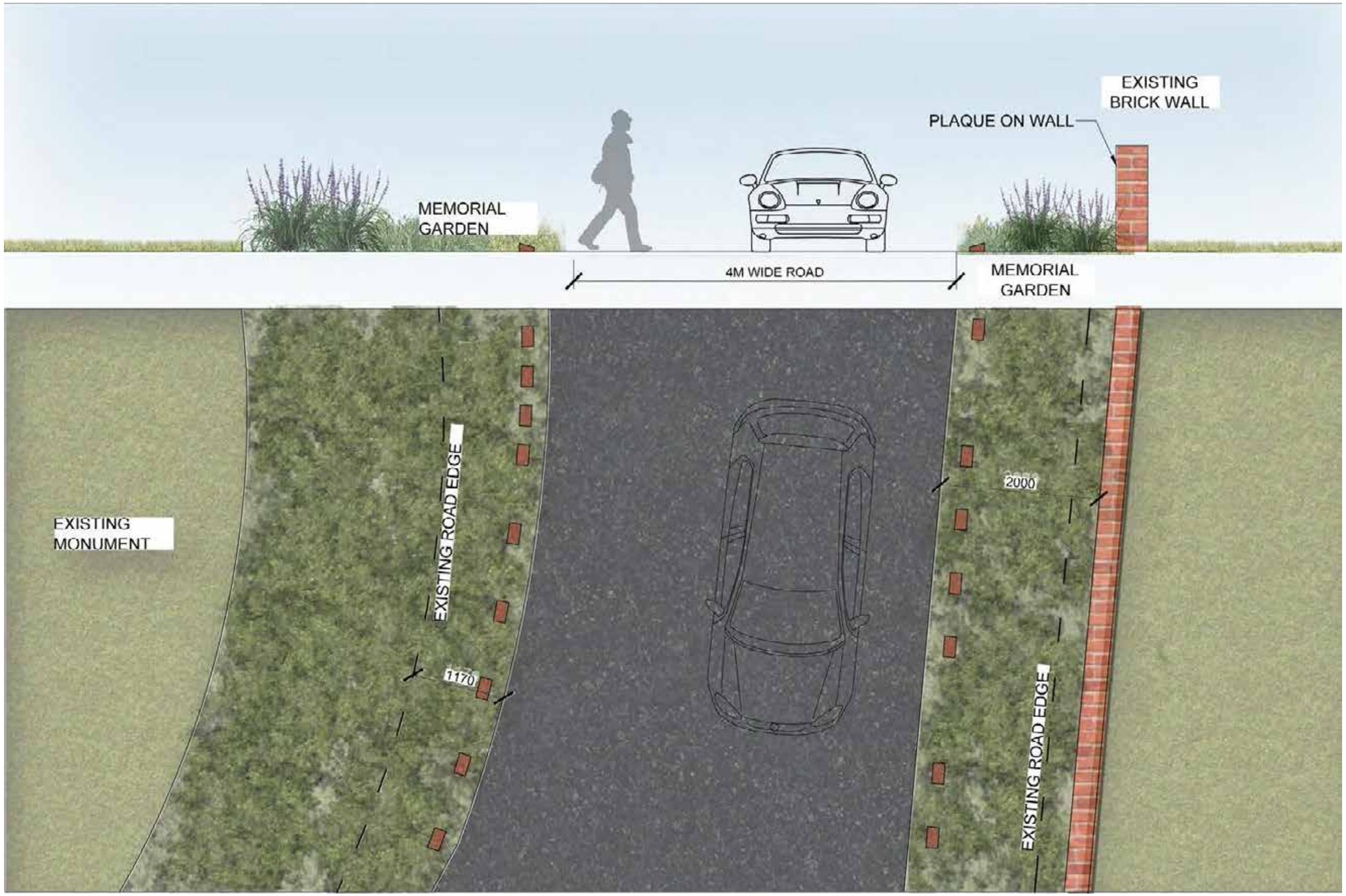
ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN

CASE STUDIES

TITLE: St Michael Chapel Case Study

DRAWN BY: PC

8 Rowell Ave
Camberwell 3124
f: 03 9882 2442
ph: 0419 983 641



Florence Jaquet
Landscape Architect

ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN

CASE STUDIES

TITLE: St Michael Chapel Case Study - Enlargement
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DRAWN BY: PC

8 Rowell Ave
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CASE STUDIES

WILLIAM DRIVE

INTENSIFICATION - SHR - CMCT & RCGRT
REDUNDANT ROAD

Character: Historic Management Unit

- Historic Funerary Landscape within State Registered listed area.
- In the vicinity of some burial monuments
- Existing Road layout reflects historical layout with low key modern overlay
- Historic canal edges
- Road alignment marks the boundary between two very different historic funerary landscapes, each of which needs to be protected

A number of wide historic routes have become redundant. They no longer lead anywhere due to the removal of original entry points (over the railway line and off Railway Street). As the burial areas they used to service have reached their capacity, the traffic movement and parking demands on these very wide roads have dramatically reduced. These roads should be retained but can be better utilised, with interment intensification, whilst respecting their streetscape, original layout and kerbing details, subject to the approval of the relevant Heritage authorities.

Proposal:

- Ensure that the existing, distinctive burial landscape character on each side of the road is respected
- Keep brick edges as and where they occur
- Retain trees and all of heritage fabric)
- Complete avenue (set minimum planting distance to avoid over planting)
- Narrow road surface to 5m (2-way- road)
- Establish grass verge where possible
- Establish understorey planting where lawn is not possible
- Introduce lawn grave in grass verge or memorial garden in planted verge
- Protect with bollards or raise kerb
- Keep memorialisation inconspicuous (plaque only) in road
- Extend burial outside of road profile (up to brick edge)
- No burial within canopies of existing trees.
- Memorialise all trees.
- Burial memorialisation should be consistent with existing adjacent conditions:
  - Plaques where lawn exists (preferred)
  - Monuments of similar styles and materials

Benefits:

- Heritage:
  - Preservation of visual significance
  - Enhancement of significant layout
  - of significant avenue
  - Enhancement of historical burial cultural landscape
- Interment:
  - Additional memorialisation and burial positions
  - On-going income provision
  - Rationalisation of unused spaces
  - Sustainable funding for tree preservation and restoration

Applicable to:

William Drive, Haslem Drive North, Hawthorne Avenue East (past RGCRT's office)

CASE STUDIES

Consent process:

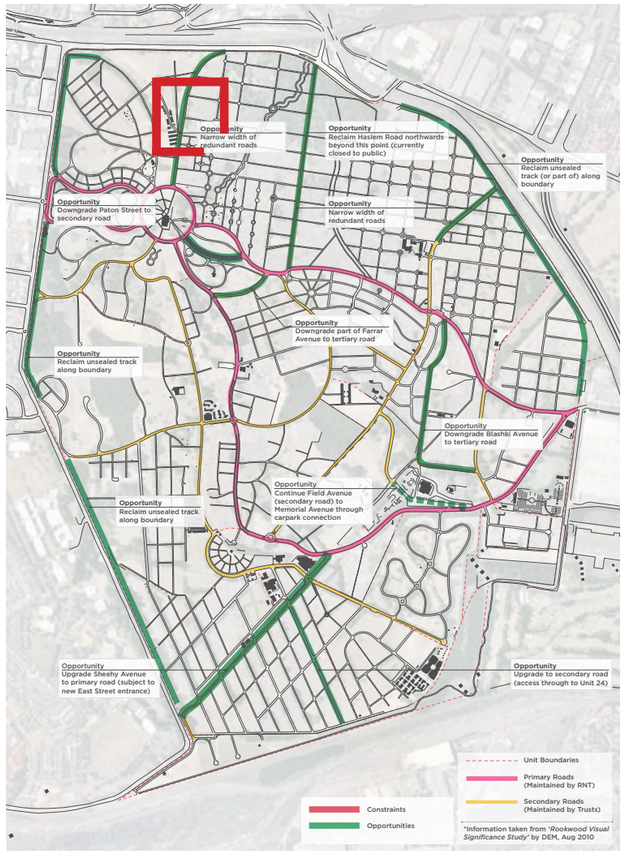
For State Heritage Listed area:

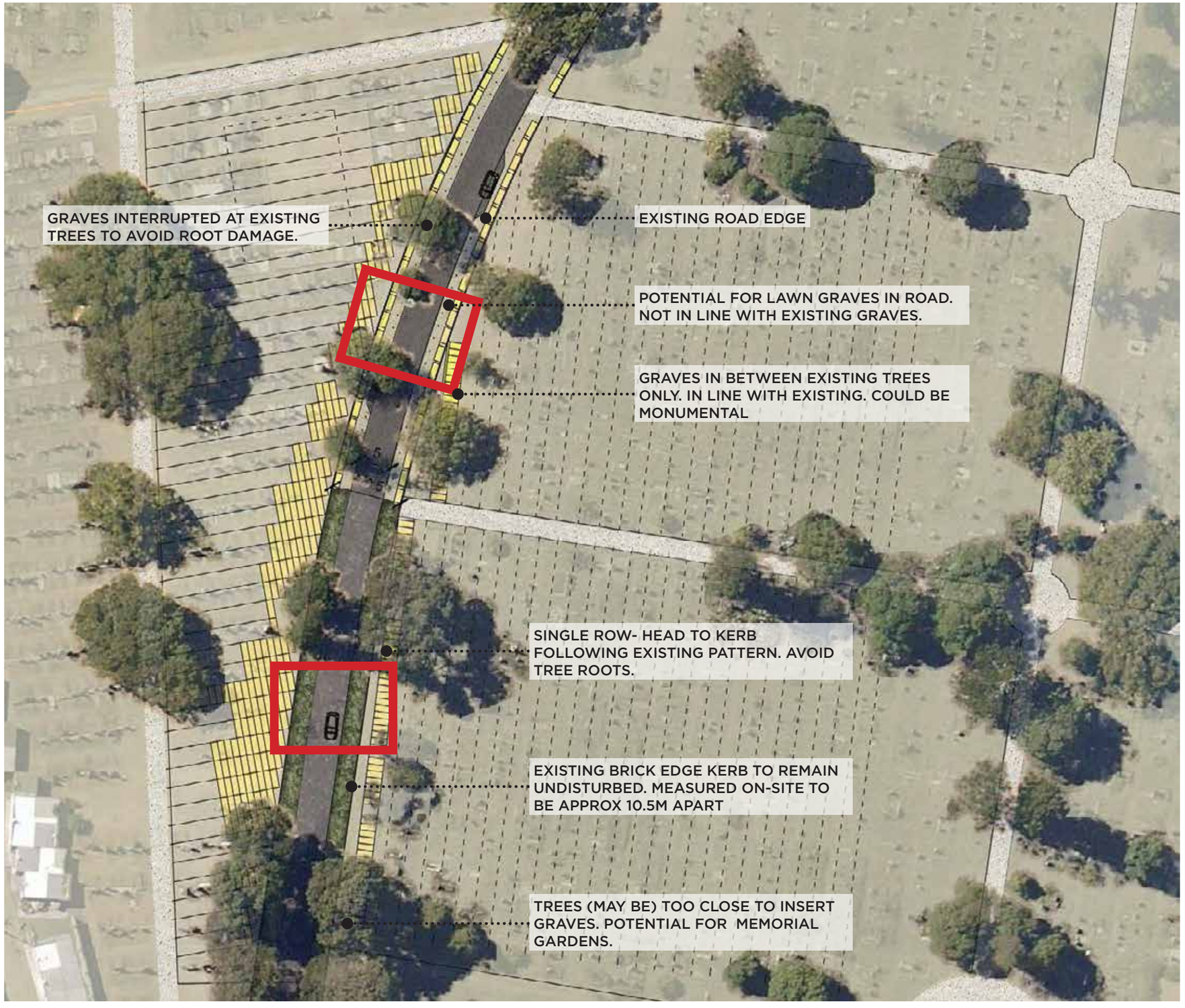
All works associated with alterations and additions to road layouts, walls, garden beds and memorials require approval by NSW Heritage Council.

- Seek advice from Heritage Consultant and/or Landscape Architect
- Undertake initial consultation with Heritage Council representative to discuss and refine design ideas
- Prepare final drawings of the proposed works and a brief Statement of Heritage Impact
- Consult with Heritage Council, prepare and submit s60 Application
- Development Application to Auburn Council will be required for works other than burials

For areas of the Cemetery that are not within the SHR boundary:

- Check with Auburn Council if DA is needed. Usually not required for burial intensification as formation of graves is exempt development but may be needed for new walls or structures, alterations to paved roads
  - Seek advice from Heritage Consultant and/or Landscape Architect
  - Prepare final drawings of the proposed works and a brief Statement of Heritage Impact
  - Submit Development Application





Florence Jaquet
Landscape Architect

ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN

CASE STUDIES

TITLE: William Drive Case Study

DRAWN BY: PC

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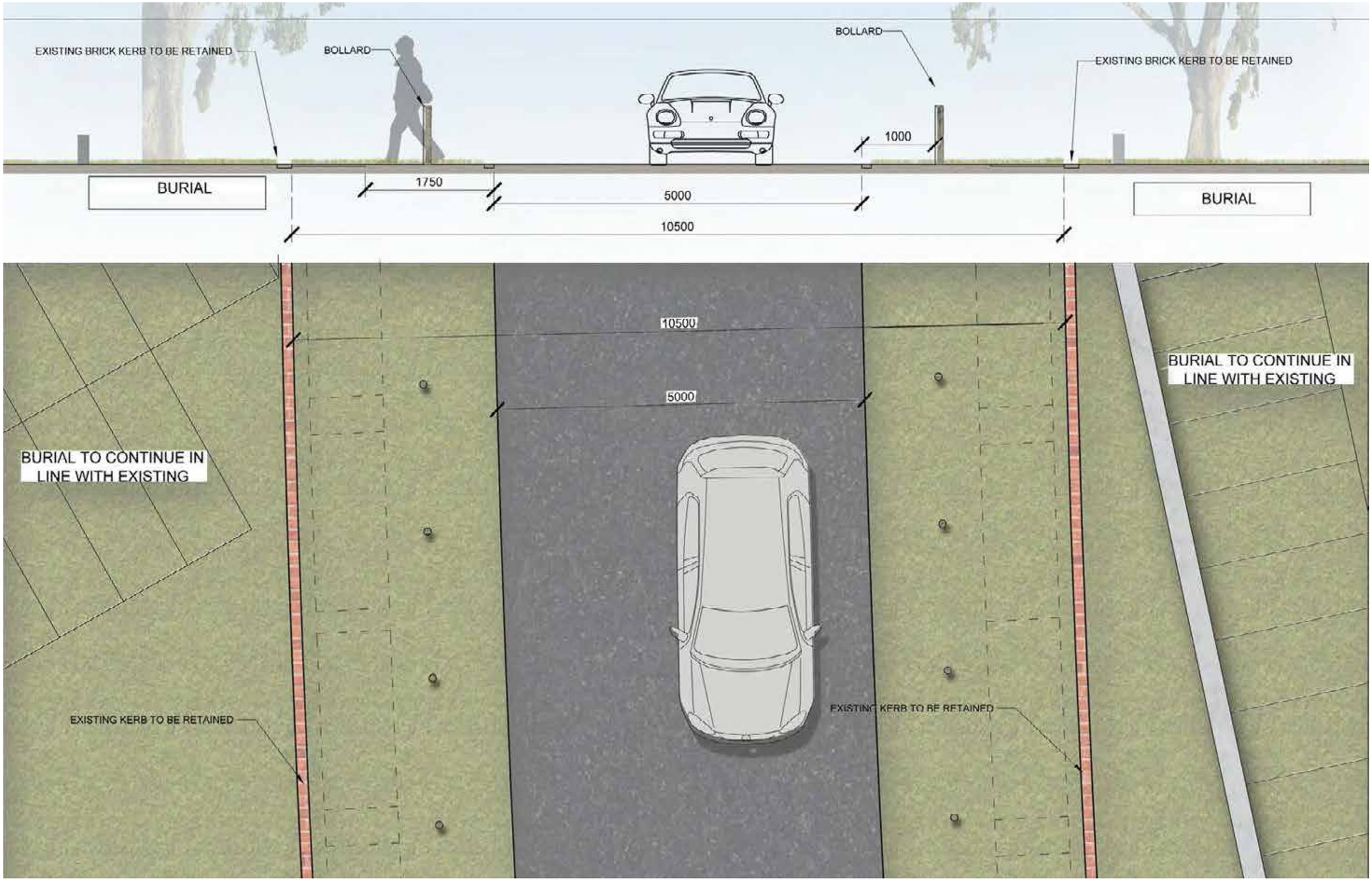
f: 03 9882 2442
ph: 0419 983 641



Florence Jaquet
Landscape Architect

ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN

CASE STUDIES

TITLE: William Drive Case Study - Enlargement 01
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Camberwell 3124
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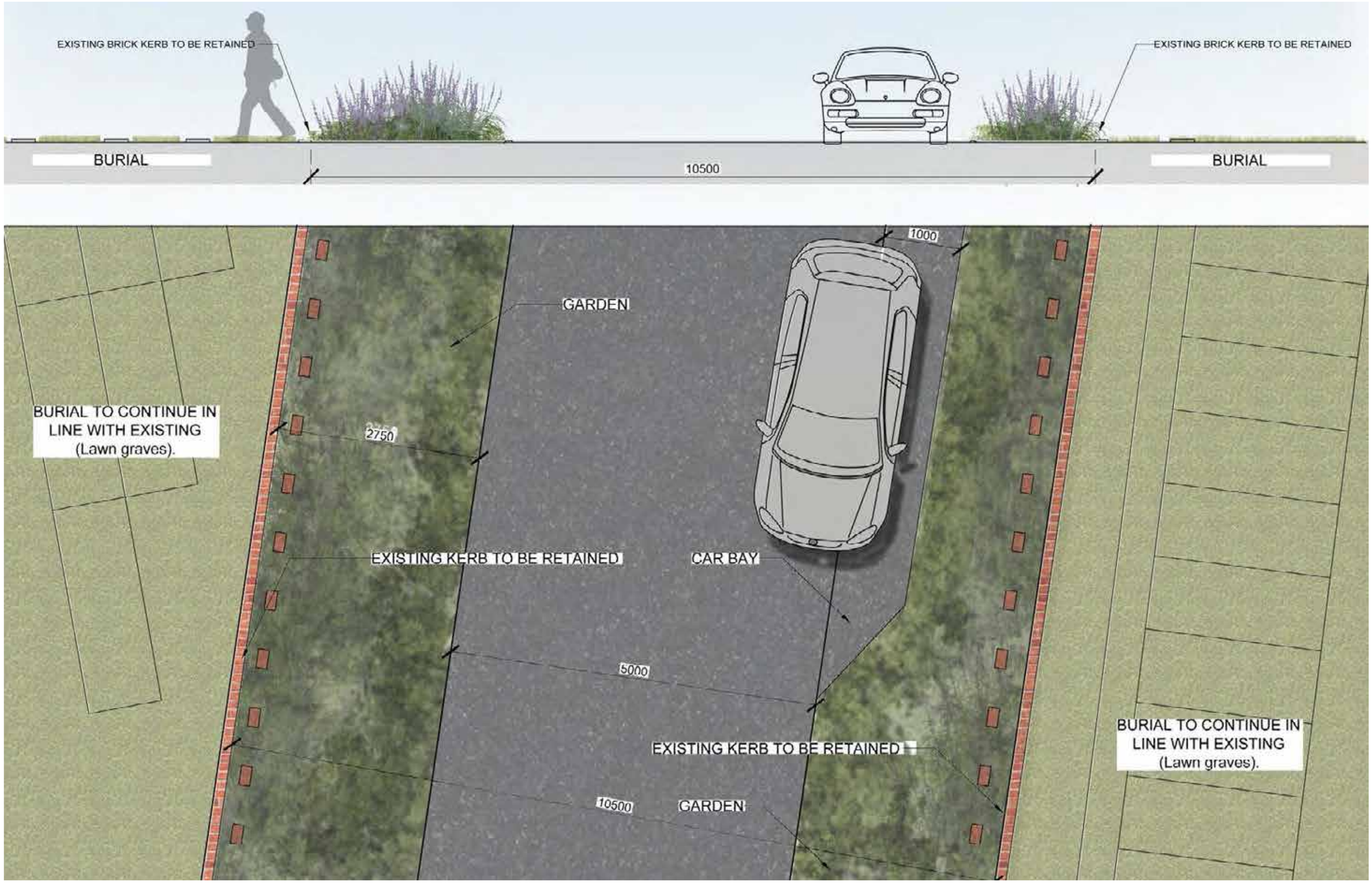

Florence Jaquet
Landscape Architect

ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN

CASE STUDIES

TITLE: William Drive Case Study - Enlargement 02
1:50 @ A3
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CASE STUDIES
UNIT 4

INTENSIFICATION - OUTSIDE OF SHR - RCGRT

Character:

- Historic Funerary Landscape outside State Registered listed area.
- In the vicinity of some burial monuments
- Existing Axial Road and pedestrian layout reflects historical layout with low key modern overlay
- Historic canal edges

The layout of Unit can be attributed almost exclusively (with the exception of recent changes around the RGCRT's office) to J.H .Maiden and dates from the late 1800's-early 1900's.

It offers a strong grid pattern interrupted by circular nodes still typical of Victorian Garden. These roads should be retained but can be better utilised, with interment intensification, whilst respecting their streetscape, original layout and kerbing details, subject to the approval of the relevant Heritage authorities.

The canal (which dated from 1899 is flanked by 2 access tracks. Although one track is desirable for maintenance access (canal and general operations), the other track can be converted to interment.

The width of the maintenance track can also be rationalised and combined with a scenic pedestrian track. This pedestrian thoroughfare would provide welcome sightseeing opportunities in an area otherwise forgotten.

Proposal:

- Keep brick edges as and where they occur
- Retain trees and all of heritage fabric)
- Upgrade road material to stabilised crushed rock in anticipation for increased traffic.
- Complete avenue (set minimum planting distance to avoid over planting)
- Narrow road surface to 3m (one-way-traffic)
- Use one access track as pedestrian path
- Extend burial up to the canal's buffer zone (3m off canal), allowing for 1m path in front of graves.
- Introduce lawn grave in grass verge or memorial garden in planted verge
- No burial within canopies of existing trees.
- Memorialise all trees
- Provide memorialisation along canal garden bed on both sides.
- Memorialise around nodes' feature trees and on nodes' outside perimeter
- Burial memorialisation should be consistent with existing adjacent conditions:
  - Plaques where lawn exists (preferred)
  - Monuments of similar styles and materials

Benefits:

- Heritage:
  - Preservation of visual significance
  - Enhancement of significant layout
  - Enhancement of historical burial cultural landscape
- Interment:
  - Additional memorialisation and burial positions
  - Rationalisation of unused spaces
  - On-going income provision
  - Sustainable funding for tree preservation and restoration

Applicable to:

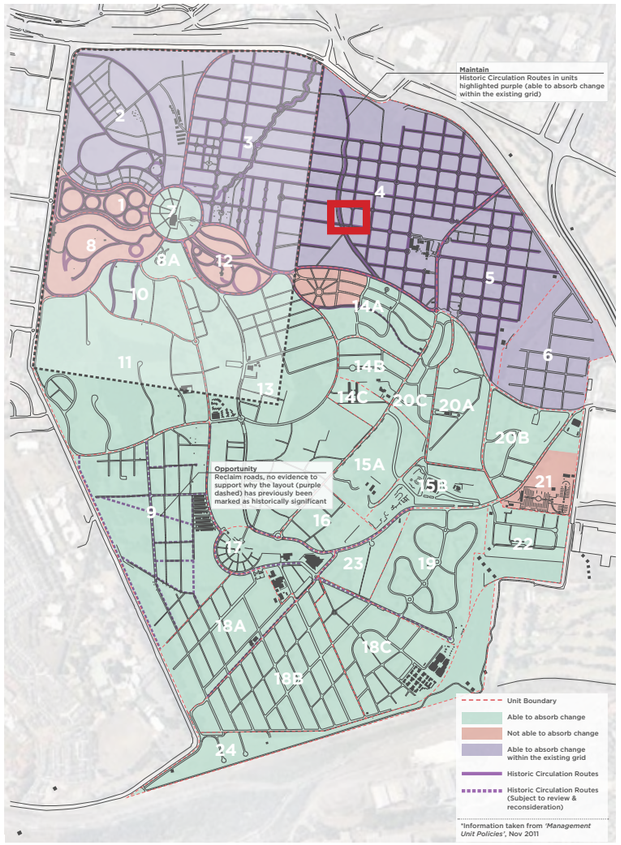
Unit 4, 5 and historic canal edges.

CASE STUDIES

Consent process:

For areas of the Cemetery that are not within the SHR boundary:

- Check with Auburn Council if DA is needed. Usually not required for burial intensification as formation of graves is exempt development but may be needed for new walls or structures, alterations to paved roads
  - Seek advice from Heritage Consultant and/or Landscape Architect
  - Prepare final drawings of the proposed works and a brief Statement of Heritage Impact
  - Submit Development Application



Florence Jaquet
Landscape Architect

ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN

CASE STUDIES

TITLE: Unit 4 Case Study

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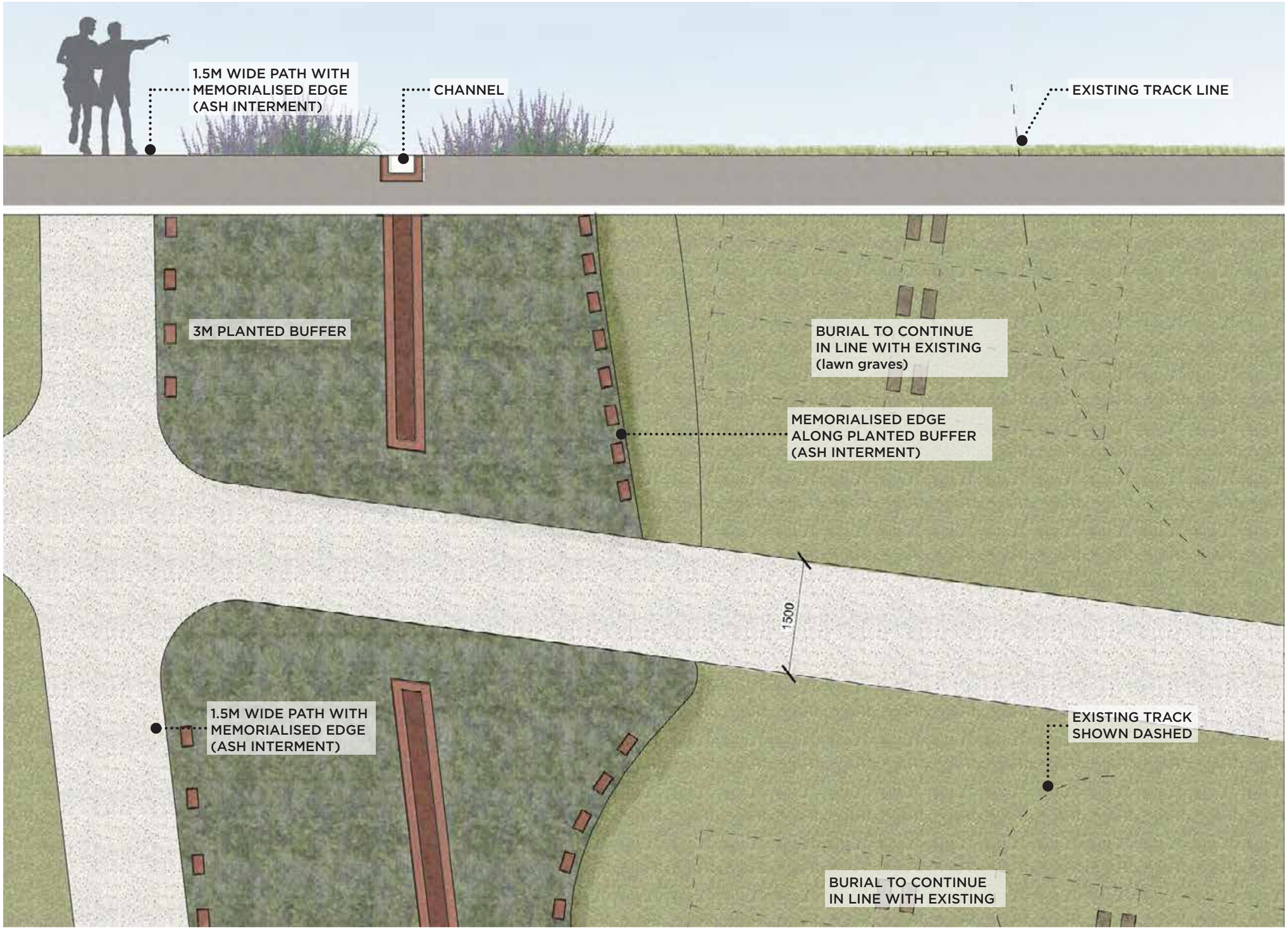

Florence Jaquet
Landscape Architect

ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN

CASE STUDIES

TITLE: Unit 4 Case Study Enlargement

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CASE STUDIES
UNIT 6

INTENSIFICATION - OUTSIDE OF SHR - RCGRT
ROAD RECLAIM

Character:

- 20th Century Management Unit
- Non-Significant road layout
- Modern, layered funerary cultural landscape

The layout of Unit is a logical extension of Unit 5's grid layout without the heritage detailing of the earlier layouts (no historic kerbs, nodes or original surfaces)

The road grid is less than 100m x 100m and is therefore over supplied with roads. By removing every second road, the walking distance to any grave is still less than the accepted 50m.

The grid layout should be retained but can be better utilised, with interment intensification, whilst respecting their streetscape, original layout and kerbing details. By narrowing the road to a path width, access for maintenance and visitor is still maintained and the original layout remains legible.

Proposal:

- Retain treed avenues.
- Remove road surfacing and backfill.
- Establish path for pedestrian and operational access, at grave level (no kerb)
- Extend rows in line with existing orientation
- Match monumentation style (monumental to monumental , lawn to lawn)

Benefits:

- Heritage:
  - Preservation of original layout
  - Preservation and Restoration of original treed avenues
  - Enhancement of burial cultural landscape
- Interment:
  - Additional memorialisation and burial positions
  - Rationalisation of unused spaces
  - On-going income provision
  - Sustainable funding for tree preservation and restoration

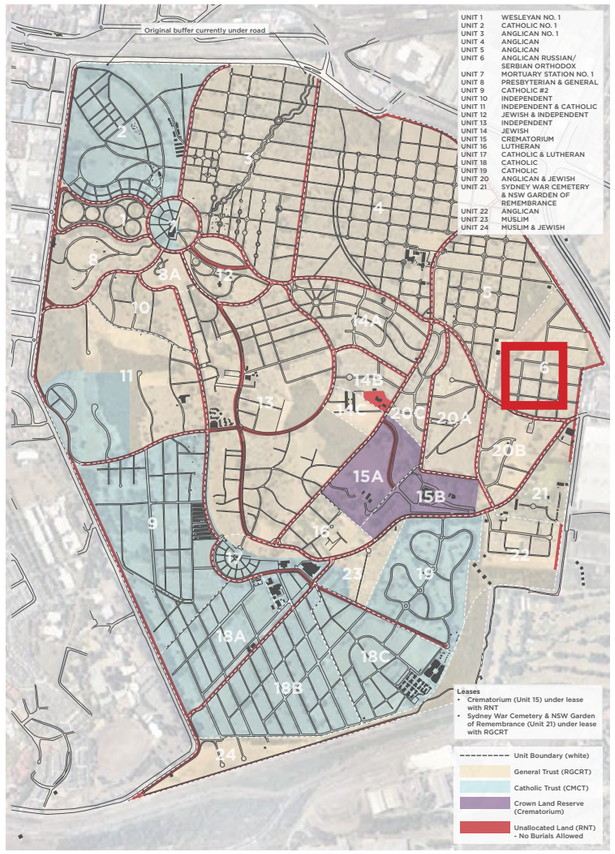
Applicable to:

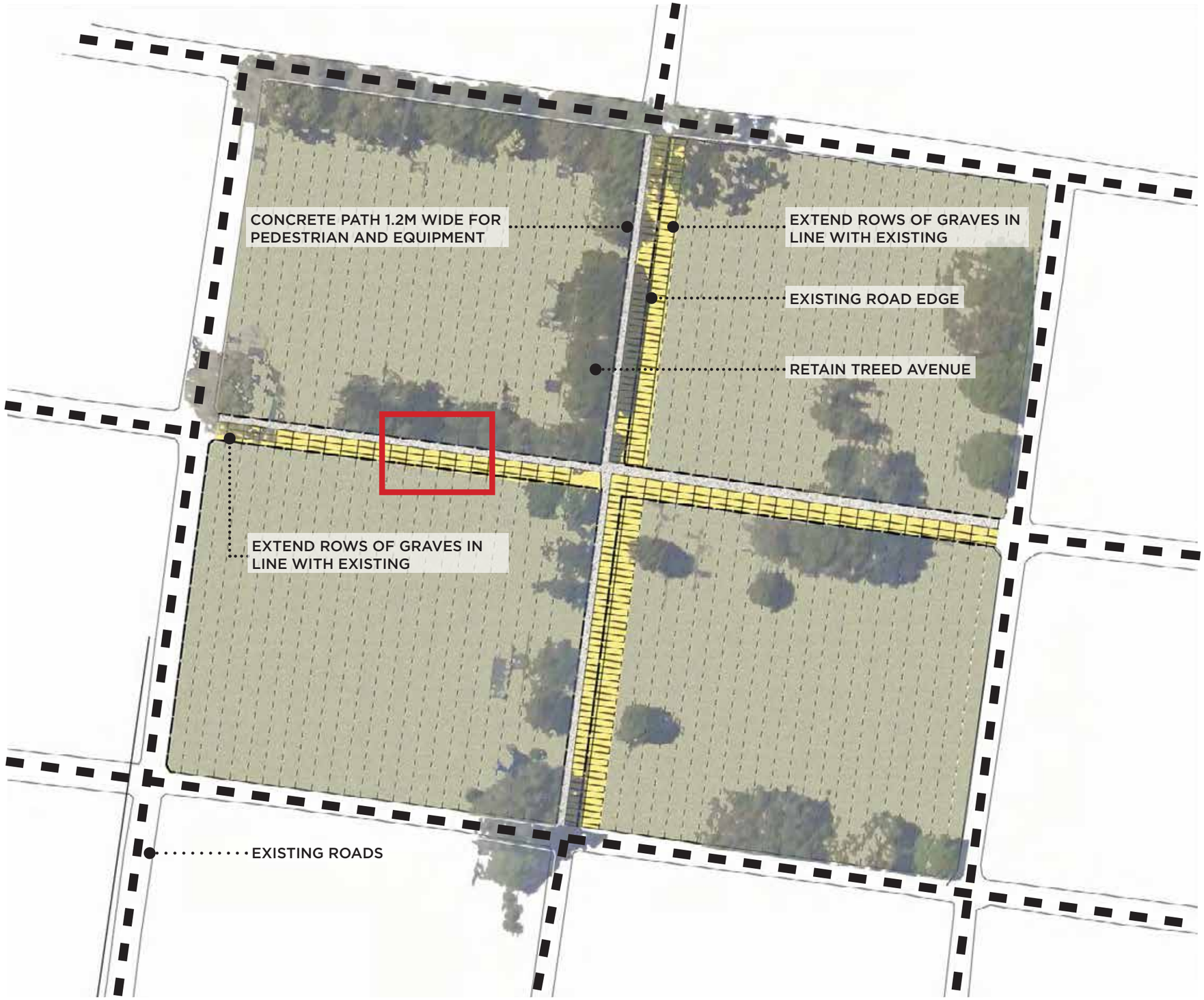
Unit 6, 9, Part of 10, 11 ,13, 14 (except part of 14A), 15-24, but excluding 21

Consent process:

For areas of the Cemetery that are not within the SHR boundary:

- Check with Auburn Council if DA is needed. Usually not required for burial intensification as formation of graves is exempt development but may be needed for new walls or structures, alterations to paved roads
  - Seek advice from Heritage Consultant and/or Landscape Architect
  - Prepare final drawings of the proposed works and a brief Statement of Heritage Impact
  - Submit Development Application





Florence Jaquet
Landscape Architect

ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN

CASE STUDIES

TITLE: Unit 6 Access Grid Case Study

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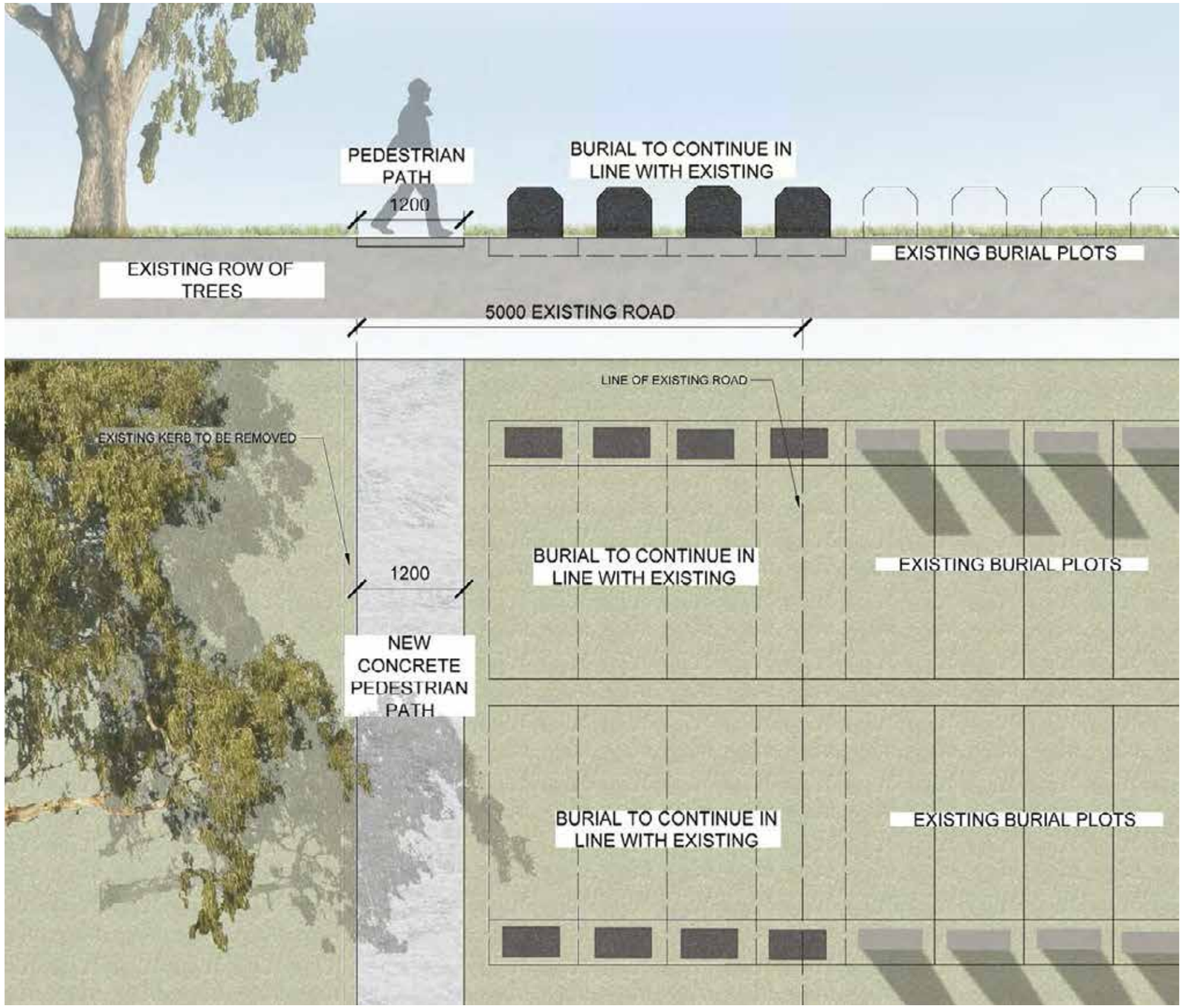

Florence Jaquet
Landscape Architect

ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN

CASE STUDIES

TITLE: Unit 6 Case Study - Enlargement

1:50 @ A3
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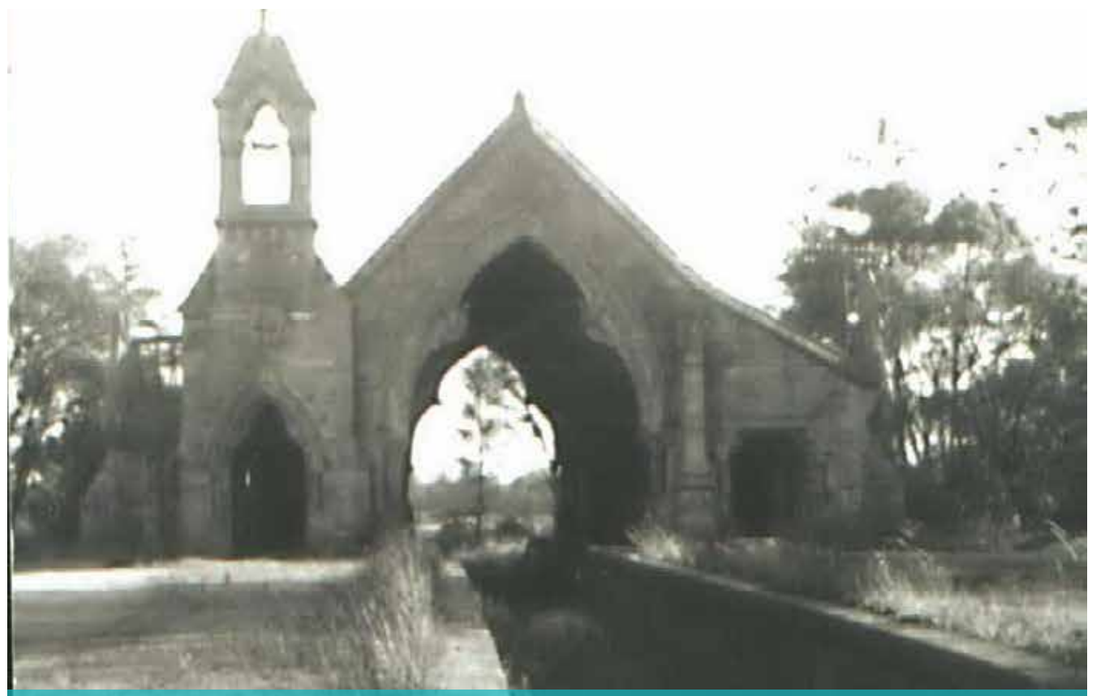
Mortuary Station 1 (Image coutesy of SAG & Friends of Rookwood)



Mortuary Station 1 (Image coutesy of SAG & Friends of Rookwood)

CASE STUDIES

RAILWAY INTERPRETATION

Unit 13

Character:

- Spatial axis and Archaeological remnants of historically significant item

Most of the railway alignment is presently illegible yet it forms an intergral part of Rookwood's history. Most of the original alignment is now buried over, however some sections remain unused to date. It is important to bring back to the surface portions of this history wherever possible with interpretive designs within the landscape.

This will require relinquishing some burial land for the purpose of recreational activities for the wider community.

Proposal:

- Minimise path/railway interpretation footprint.
- Maximise burial in the vicinity
- Memorialise key areas along the way
- Introduce 2m wide path = 2m planted or grassed strip on both sides (6m overall)
- Plant row of tree for shade
- Provide respite every 200-300metres
- Provide interpretation signs in key areas
- Interpret railway using paving and planting patterns .

Benefits:

- Heritage:
  - Interpretation of archaeological items of high significance
  - Enhancement of burial cultural landscape
- Interment:
  - Additional memorialisation and burial positions
  - On-going income provision
  - Sustainable funding for on-going maintenance

Applicable to:

Selected portions of original railway alignment (refer Former Railway Line Map (C&O) - page 37)

Consent process:

For State Heritage Listed area:

All works associated with alterations and additions to road layouts, walls, garden beds and memorials require approval by NSW Heritage Council.

- Seek advice from Heritage Consultant and/or Landscape Architect
- Undertake initial consultation with Heritage Council representative to discuss and refine design ideas
- Prepare final drawings of the proposed works and a brief Statement of Heritage Impact
- Consult with Heritage Council, prepare and submit s60 Application
- Development Application to Auburn Council will be required for works other than burials

For areas of the Cemetery that are not within the SHR boundary:

- Check with Auburn Council if DA is needed. Usually not required for burial intensification as formation of graves is exempt development but may be needed for new walls or structures, alterations to paved roads
  - Seek advice from Heritage Consultant and/or Landscape Architect
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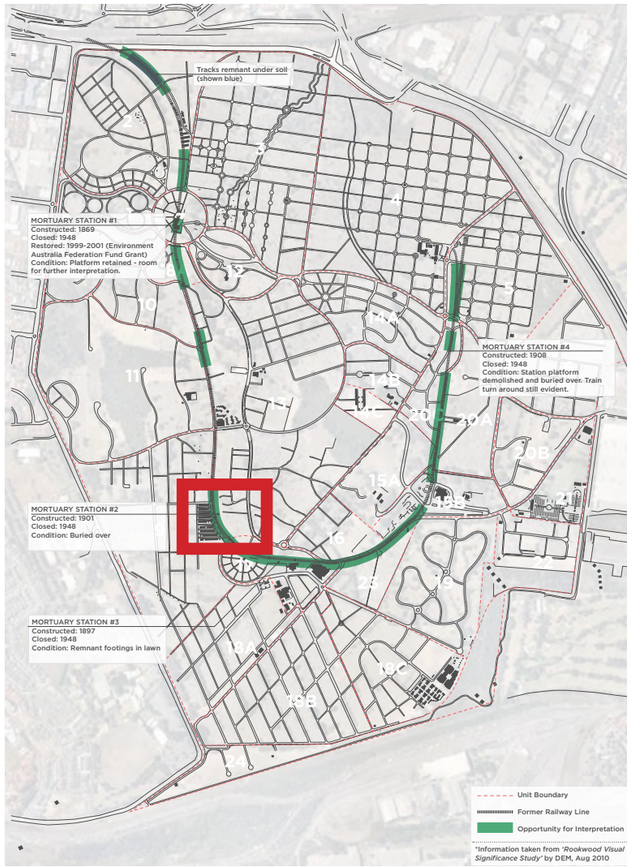

Florence Jaquet
Landscape Architect

ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN

CASE STUDIES

TITLE: Unit 13 Railway Interpretation Case Study

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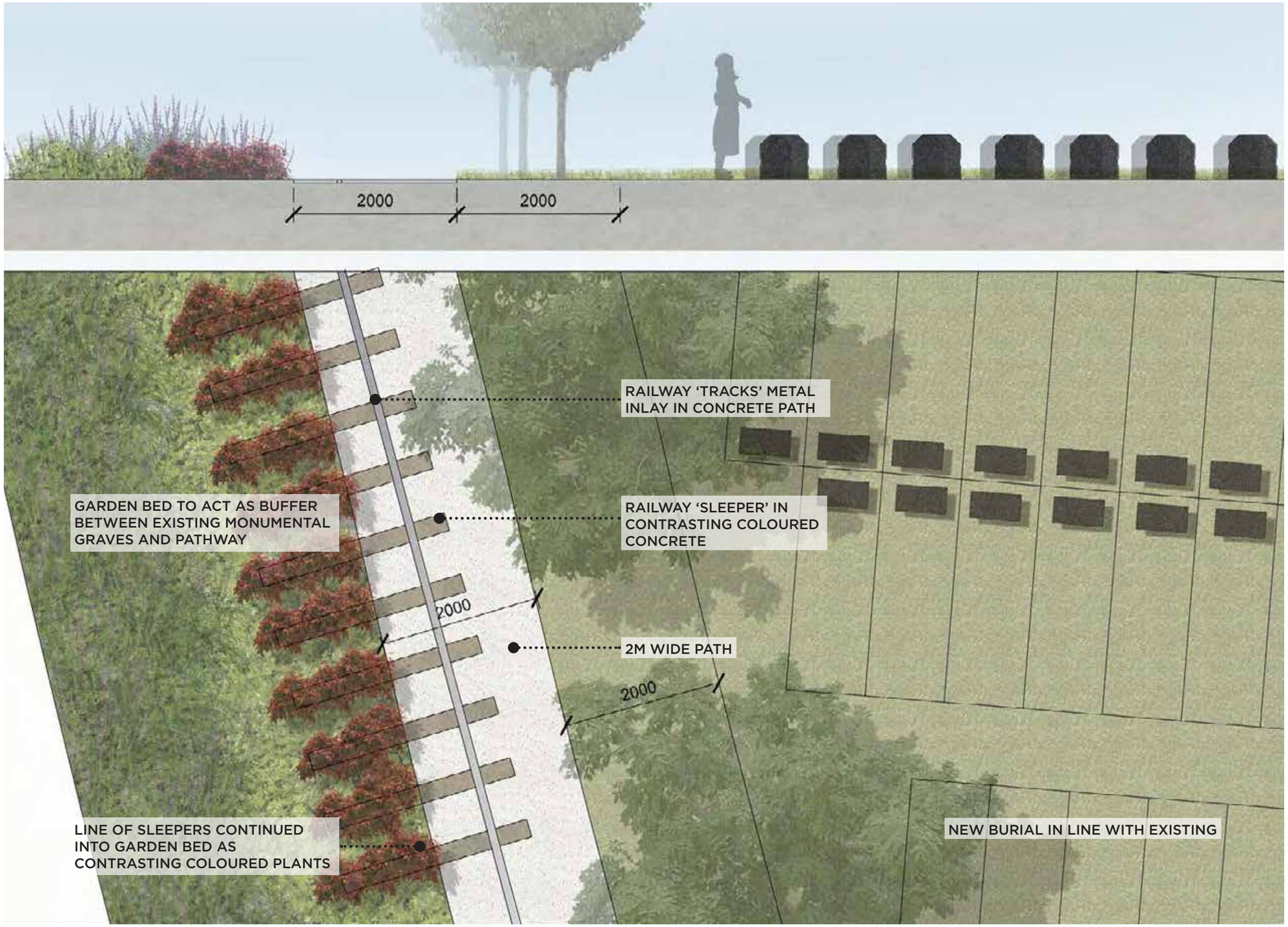

Florence Jaquet
Landscape Architect

ROOKWOOD NECROPOLIS LANDSCAPE MASTERPLAN

CASE STUDIES

TITLE: Unit 13 Railway Interpretation Case Study - Enlargement
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Lattice Rest House (Image coutesy of SAG & Friends of Rookwood)

The Power of One

Contributed by Russ Allison, CEO
Springvale Botanical Cemetery
Springvale Botanical Cemetery also manages St Kilda, Dandenong and Melbourne cemeteries

One never ceases to be amazed by the clients we serve. Their needs and at times their preparedness to make significant outlays to satisfy them, serve time and time again to encourage us to offer a range of products to cater for a variety of tastes, incomes and preferences.

A clear example of this marketing philosophy is readily found in St Kilda Cemetery in Melbourne. Amongst the thirty-four graves released for sale at this closed cemetery, in October 2007, was one most unusual vault.

It was created under the floor, inside an old Heritage Victoria classified pavilion within the cemetery at the suggestion of John Hawker (a 'Friend of St Kilda' and a Heritage Victoria staff member).

Like those in the cathedrals of Europe, this vault has a ledger flush with the floor which forms part of the pavilion floor. The vault provides for two interments. Its gazetted price of approximately $168,000 reflected the following:

- vault construction and pavilion restoration costs;
- special nature and positioning within a closed cemetery;
- the fact that St Kilda had been cross subsidised by Springvale Botanical Cemetery since 1968;
- need to build St Kilda's future preservation fund.

Its sale in February to a family who became aware of its existence and selected it after reading the cemetery brochure truly reflected the power of one:

- unusual but good idea;
- creative implementation;
- quality brochure;
- team of proactive staff;
- family who wanted something special;
- trust and management team that is prepared to do something different.

One thing you can be sure of is that if you do what you have always done, you will do what you always do.

Below: photos of the unusual vault at St Kilda Cemetery

CASE STUDIES

GARDEN STRUCTURE ADAPTIVE RE-USE

INTESIFICATION
EXAMPLE FROM ST KILDA CEMETERY (VIC)

Character:

- Shelter under Heritage overlay, retrofitted for interments
- Remnants of important funerary cultural landscape features

The site is host to a number of historic shelters, some already renovated, some in need of repairs and all in need of on-going preservation. The adaptive re-use of these structures will ensure that the public can appreciate them in close encounters and continue to enjoy them for generations to come.

The issue of funding restoration works for items which do not directly generate income for a cemetery is often raised as a main stumbling block.

The St Kilda experience provides an interesting and successful precedent.

Proposal:

- Utilise space below floor for burial (concrete lined) or urn placement.
- Restore or put aside generated fund for on-going preservation of the historic structure.

Benefits:

- Heritage:
  - Conservation and enhancement of significant structures
  - Enhancement of burial cultural landscape
  - Adaptive re-use for continued public enjoyment
- Interment:
  - Additional memorialisation and burial positions
  - Rationalisation of unused spaces
  - On-going income provision
  - Sustainable funding for preservation and restoration

Applicable to:

Shelter and garden structures throughout. Some disused buildings may also be candidates.

Consent process:

For State Heritage Listed area:

All works associated with alterations and additions to road layouts, walls, garden beds and memorials require approval by NSW Heritage Council.

- Seek advice from Heritage Consultant and/or Landscape Architect
- Undertake initial consultation with Heritage Council representative to discuss and refine design ideas
- Prepare final drawings of the proposed works and a brief Statement of Heritage Impact
- Consult with Heritage Council, prepare and submit s60 Application
- Development Application to Auburn Council will be required for works other than burials

For areas of the Cemetery that are not within the SHR boundary:

- Check with Auburn Council if DA is needed. Usually not required for burial intensification as formation of graves is exempt development but may be needed for new walls or structures, alterations to paved roads
  - Seek advice from Heritage Consultant and/or Landscape Architect
  - Prepare final drawings of the proposed works and a brief Statement of Heritage Impact
  - Submit Development Application

LANDSCAPE MANAGEMENT GUIDELINES

INTRODUCTION

The visual amenities of Rookwood rely heavily on its landscape. As Rookwood commits to a beautification program and implements consistency throughout its site, regardless of ownership (Trusts), the development of Landscape Guidelines will guide these changes.

The following chapters describe the subjects which should be considered as part of a Landscape Management Agreement:

- Objectives of the guidelines: What are we trying to achieve? (the "WHY")
- Inventory of the landscape: what is there to manage and where is it? (The "WHAT and WHERE")
- Maintenance standards: how is each going to be managed? (The "HOW")

OBJECTIVES

OVERALL GOAL

In recognition of Rookwood's landscape significance, the overall goal for landscaping in Rookwood is:

To ensure that, consistent with a commitment to achieve a sustainable environment, high quality landscape development, enhancement and protection are pursued as an integral part of Rookwood's on-going development.

OBJECTIVES

High quality landscape development, enhancement and protection shall be designed and established within the framework of the above goal, and so as to achieve the following aims:

- Achieve integration of buildings and infrastructure with the natural and cultural landscape features to create a unified and visually appealing design:
  - Careful attention should be given to the protection and enhancement of the essential landscape elements of Rookwood. For example, the unified streetscapes, verge treatment, street tree planting, shrub planting, lawn care, street furniture, signage etc…
- Achieve , through creation of aesthetically pleasing landscape environments, increased visitors enjoyment and greater sense of care for the deceased in Rookwood's care:
  - The provision of high quality landscaped spaces projects a caring attitude towards mourners, provides a better experience for visitors and motivate people to recreate within Rookwood.
- Achieve desirable environments through microclimate modification, air quality improvement and noise attenuation.
  - The landscape has the ability to achieve beneficial modifications of microclimate (shade, cooling moisture), higher air quality through filtering and oxygen production and attenuation of noise (hedges)
- Achieve ecological benefits including improved wildlife habitat and enhanced bio-diversity in the Conservation Zones.
  - The sustainability of the isolated pockets of protected vegetation depends on their on-going and careful management.
- Achieve heritage benefits through protection of landscapes of recognised special significance.
  - The significant trees, plants and layouts which adorn the site provide a unique setting which should be preserved whilst offering potential for future sensitive development.
- Contribute to the economic viability of Rookwood as a cemetery of choice for the local community of Sydney and as a tourism destination
  - The presentation and landscape efforts are recognised as having an impact on Rookwood for setting it is a place of choice with a difference. Its significance and the quality of its heritage and features have the potential to set it as a major tourist attraction.
- Minimise energy consumption and carbon dioxide production.
  - Research indicates that well designed tree plantings can reduce the cost of heating and cooling of buildings. Plants though their photosynthesis are also able to absorb carbon dioxide and therefore reduce the site's carbon footprint.

- Contribute to cost efficient urban stormwater systems and improved stormwater quality.
  - Carefully designed and well managed planting can reduce erosion, reduce stormwater impact on infrastructure and improve stormwater quality down stream
- Minimise on-going maintenance cost whilst maximising the quality of the experience.
  - Carefully selected plants with minimal irrigation requirements, hence suited to the site conditions play an important part in minimising costs together with quality and well-thought out designs. Areas which return less income may need to be of lesser costs than those which can generate on-going income, although cross-subsidisation is possible. Marketing of run-down areas may also require a larger capital injection and improved presentation in order to make them palatable and enjoyable.
- Provide a diversity of landscape experiences whilst reinforcing the existing character of the various units.
  - Rookwood has many landscapes to offer from historic to cultural to manicured and planting themes in selected areas which should be extended and reinforced

INVENTORY

In order to manage the landscape, it is important to treat it a resource and create an inventory of what needs to be maintained.

The role of the inventory is to provide information on what needs to be managed, how much of it and where it is found:

- Its location
- Its nature (turf, shrubs, trees, grassland, bushland)
- Its significance (Cultural landscape, rare, old…)

These three factors will influence the type, level and cost of maintenance.

Of particular importance and urgency is a Significant Tree Register for all the specimen trees generally located in the historic (northern) section of the site, remnant of original plantings by known designers.

Similarly, all trees on site are of potential value and/or liability and should be closely recorded to facilitate their management and diminish the liability exposure of the various Trusts.

The following information should be recorded as a minimum:

- Trunk diameter, height and crow condition
- Likely longevity on this site
- Landscape visual values
- Recreational amenities values
- Ecological values (habitat, plant community)
- Cultural values
- Retention value (High, Medium or Low)
- Development action (no building within X metres, no trenching within dripline)
- Management action (recommended work)

This task is much specialised and should be undertaken by a qualified arborists. This above list should be regarded as a starting point, modified by the arborist as they see fit to facilitate the management.

LAWNS

Lawns are important in the presentation of Rookwood and may be located:

- In lawn burial sections
- In between graves in old sections
- On road verges
- In undeveloped areas

Selection	Lawn should be:
	Selected from warmer climate species for minimal maintenance requirements
Location	
In lawn burial sections	Uniform, using the same specie within a lawn patch.
	High maintenance level, weed-free and fertilised
	Surviving without irrigation
	Evenly graded so to drain without ponding
	Avoid under trees and in heavy shade where excessive competition for water and light exists
In between graves in old sections	Even on paths to avoid tripping
	Low maintenance, slow growth
On road verges	High maintenance, especially if avenue trees are memorialised.
	Consolidated with plastic rings where parking is expected to occur.
In undeveloped areas	Low maintenance, neat in appearance
	Potentially used for special events.
	Regularly mown to avoid native vegetation establishment
Mulch	
	Use decomposed granite or ground-cover/shrubs where other permeable materials ,where lawn cannot be established due to competition for light or water
	Provide metal edging to mulch
	Avoid using granite mulch near paving (due to slippery effect) or on sloping ground (erosion)

SHRUBS

Shrub garden beds are important in the presentation of Rookwood and may be located:

- At entry points as a statement
- Along the frontages for screening and beautification
- At roundabouts for beautification
- Around buildings for presentation
- Between burial sections for screening and beautification
- Along the Primary roads for screening and beautification
- In memorial gardens for beautification of interment areas

- In historic areas remnant from the original layout
- On graves as part of cultural practices or remnant from the past or established from lack of maintenance
- On embankments for erosion control

Selection	**Shrubs should be:**
	Selected from a master/common list for consistency (refer to attached)
Location	
Entry points	Showy, with all-year interest as a group
	Maintained to a higher level (Pruning , fertilising)
Frontages	Screening, with all-year interest, low-maintenance not relying on irrigation system
	Planted away from the edge of the path, when bordered by a path (buffer zones)
	Varied in sizes, allowing for views in in places
	Planted to avoid hiding places for undesirables.
Roundabouts	Providing all-year interest
	Selected for their low growing habits, to allow sightlines for vehicular traffic and minimise pruning requirements
	Low maintenance , not relying on irrigation systems
Building surrounds	Be planted with a clearance equal to their mature dripline against walls.
	Be kept away from eaves and overhangs where rain water does not reach
Primary roads and burial sections	Maximum 1.5m high, providing all year interest, neat and dense without regular pruning
	Intermittent allowing views onto borrowed landscapes such as lawns and garden beds
Memorial gardens	Be highly maintained
	Showy, with all year-interest, dense and neat without excessive pruning
	May require irrigation if sustainable
Historic areas	Maintained with care if of historic significance (ie. Heritage roses)
	Be selected from approved plant list and planted in a fashion similar to the original (assuming info is available)
	Be low maintenance
Graves	Be removed if damaging graves or expected to damage when fully grown
	Survive with no maintenance
Embankments	Be effective for erosion control
	Planted in erosion control material when slope is steeper than 1(V):3(H)
Edging	
	Use galvanised metal edging for longevity in high maintenance areas
	Use spade edging in low maintenance area .
	Use brick edging in historic areas in pattern consistent with original edgings

Mulch	
	Use in areas with flatter than 1(V):3(H)
	Avoid in areas which can be washed away or blown away
	Use at 75mm min. depth in shredded wood chips maximum 75mm in size
	Use only composted material if generated from on-site tree felling.
	River pebbles should be minimised (non-renewable resource) and be limited to creek settings.
In all cases	
	Replaced if dead or dying
	Growing in a weed free environment

TREES

Trees are important in the presentation of Rookwood and may be located:

- Along avenues (Primary , Secondary and some Tertiary)
- As specimen trees in the historic sections
- As specimen trees in new areas, completing a botanical collection
- As memorialised trees (encompassing all of the above)

Selection	**Trees should be:**
	Selected from the recommended list (attached)
	Selected to suit the situation (root space, head space and moisture available)- Involving the arborist in the decision making
	For Primary road Select trees with limited root system yet sufficient canopy to create “green tunnel “
	For Secondary road, select trees to match existing or in scale with available verge if nothing exists.
	For Tertiary, select trees in scale with available verge. Complete existing avenues or plant on one side only (north or west).
Location	
Avenue trees	6m max. tall under overhead powerlines
	Check height restrictions under HV powerlines
	Outside of traffic sightlines at intersections
	1m min. from kerbs, path and driveways
Specimen trees in historic areas	
	Recorded in Significant Tree Register with full description of significance, and measurements,
	be managed accordingly
	be reviewed periodically
Specimen trees in newer areas	
	Recorded in Tree register/Management Plan and managed according to its recommendations

New specimen trees	
	Selected from approved list for its botanical interest (coordination between Trust advantageous)
	Planted where space permits allowing it to grown to its mature size without damage to infrastructure
	Low fruiting with no dripping sap over paths, in carparks and around pedestrian areas.
	Add to tree Register
Edging	
	Provided with root barrier where necessary to protect road infrastructure
	Use galvanised metal edging around new trees for longevity in high maintenance areas
	Use spade edging in low maintenance areas .
Mulch	
	Provided with a mulched ring, where mulch is kept away from trunks
	Use at 75mm min. depth in shredded wood chips maximum 75mm in size
	Use only composted material if generated from on-site tree felling.
Verges	
	Protected from compaction with plastic grass rings or other permeable material where parking is likely to occur off-road
In general	Avoid level changes near established trees
	Avoid trenching near established trees
	Avoid drainage changes
	Avoid compaction around trees
	Avoid chemical leaks
	Avoid physical injury
	In case of any of these above occurrence, refer to the Tree Management Strategy.

ECOLOGICAL AREAS (COMPLETE WITH ECOLOGIST)

	Areas should be:
Location	
Protected/Conservation areas	As defined in the Property Management Plan (PMP)
Grassland	Weed-free
	Supplying seeds to seed bank
	Relocated to suitable site when public area due for renewal
Isolated threatened species	Identified and physically protected
Fencing	As per standard detail.

MAINTENANCE STANDARDS

The maintenance standards are expected to vary depending on the location, nature and age of the landscape.

In establishing the standards which are right for Rookwood, it is important to consider the following criteria:

- **The innate characteristics of the landscape in question:**
  - High-end burial zones and memorial gardens will require more maintenance than areas which no longer generate income and are away from public eyes.
  - Some areas of the cemetery are formal and almost urban (lawn graves, memorial gardens historic gardens, streetscape), whilst others some are more informal (screening, bushland and boundary planting). All areas should be maintained albeit at a different level.
- **Level of usage:**
  - The greater the use, the greater the wear and the maintenance requirements to keep it a set standard
- **The proximity of the user and the perception of what the landscape should be:**
  - If the landscape is seen from afar and rarely visited , it may be warranted to apply a lower maintenance regime. However, if the expectations of the public is for it to be maintained as part of the perpetual care, a burial area will be better maintained than a bushland area.
- **The maturity of the landscape:**
  - Young and ageing plants will require more maintenance that established ones.
- **The designer's vision of what the landscape was meant to be :**
  - Although this be lost for most of the more recent designs and plantings, any historically significant landscapes, through a conservation analysis, will establish was is significant and what is not (Intactness, excellence of type, rarity, association with a significant building, reflecting a particular period, association with significant personality or notable designer)
  - The Conservation Analysis process is outside of this scope and should be undertaken separately to inform these guidelines.

LAWN	
Location	
In lawn burial sections	Mown regularly to achieve a maximum height of 50mm between mowing
	Scarified every 5 years
	Levelled once a year min. to avoid subsidence
	Stripped and redone when thatching reaches 80mm above original levels
	Fertilised once a year
In between graves in old sections	Mown regularly to achieve a maximum height of 100mm between mowing
	Avoid herbiciding strip around graves
On road verges	Mown regularly to achieve a maximum height of 50mm between mowing
	Fertilised once a year
In undeveloped areas	Slashed regularly to achieve a maximum height of 150mm between mowing
	If used for special events, treat as per lawn burial
Mulch	Top up decomposed granite where subsidence is higher than 20mm in high exposure areas
	Check edging yearly and fix any tripping edge

SHRUBS	
Location	
Entry points	Keep weed free.
	Replace dead plants immediately
	Fertilise twice yearly
	Top up yearly on garden beds
Frontages	As above
Roundabouts	As above
Building surrounds	As above
Primary roads and burial sections	As above
Memorial gardens	As above
Historic areas	Refer to Conservation Analysis and Plan
On Graves	Review yearly for damage to graves
Embankments	Herbicide twice yearly when established
	Replace dead plants immediately
Edging	Check edging yearly and fix any tripping edge

TREES	
Location	
Avenue trees	Check for root damage yearly and carry remedial works if required
	Check for structural damage yearly (or as per recommendations of the Tree Management Strategy)
Specimen trees in historic areas	Refer to Tree Management Strategy
Specimen trees in newer areas	As above
New specimen trees	As above
Edging	
	Check edging yearly and fix any tripping edge
Mulch	
	Top up twice yearly around trees
Verges	
	Check Grass-rings yearly for movement and fix any tripping edges.

ECOLOGY	
Protected/Conservation areas	As per PMP or any other documents which guides its management
Grassland	Slashed yearly or as per ecologist advice
	If relocation required, strip topsoil and respread in new location.
Isolated Threatened species	Define location and protect
	No herbiciding in vicinity

IMPLEMENTATION AND REVIEW

These guidelines should be regarded as setting a minimal requirement onto which to build and onto which negotiation can be based in order to reach bi-lateral support.

Once a Landscape Management Agreement has been reached and endorsed by all parties, it should implemented to ensure a consistent presentation standard for the “whole of Rookwood”. It should be regularly reviewed and adjusted as needed.

PLANT LISTS

In order to create a more consistent landscape appearance in Rookwood cemetery, it is important that plant lists be drawn to guide the selection process, restrict the variety of plants used, give a sense of commonality which will strengthen the current planting characters.

These should be used by the relevant Trusts staff and supplied to various consultants involved in landscape development works.

These lists are guidelines only and not prescriptive. They aim at creating a formal data base for a set of commonly used plants on site. These lists should be reviewed regularly to add high performance plants and remove problematic ones.

The following plant lists are appended and should be used as follows:

	LIST	**To be used for**	**Refer to**
A	Recommended trees for Primary Roads, Secondary and tertiary roads	For avenues	Appendix 05: Plant List A
B	Recommended trees for specimen trees	For specimen trees within the landscape	Appendix 05: Plant List B
C	Recommended plant list for 19th Century landscapes	For SHR and older sections Plants noted with * should also be added to Trusts Planting list for the sake of visual consistency	Appendix 05: Plant List C
D	Recommended plant list for CMCT	To be drawn by CMCT building upon existing chosen character and incorporating plants from above list C	-
E	Recommended plant list for RGCRT	To be drawn by RGCRT building upon existing chosen character and incorporating plants from above list C	-

ARCHITECTURAL MANAGEMENT GUIDELINES

INTRODUCTION

As noted in the introduction of this report, the key objectives for the masterplan are for:

- The beautification of the whole site
- An increased sense of cohesion and consistency throughout the site.
- An increased interaction with the wider public (other than mourners)
- Lengthening of the life of the cemetery

Given these objectives, and that the intention is for the Rookwood Masterplan to act as a role model for other cemeteries, it is vital to establish general principles to guide all aspects of future development in the cemetery.

In the absence of any process or guidelines, there is risk that buildings and structures may be constructed without due consideration being given to the overall masterplan, thereby resulting in lack of consistency and a poor outcome generally for the cemetery. A clear process requiring dialog between the trusts also creates the potential for shared facilities and streamlined operations, resulting in mutually beneficial outcomes.

Accordingly, the following sections have been produced:

REVIEW PROCESS FOR NEW DEVELOPMENT PROJECTS

This section sets out a review process that each of the three trusts, namely the RNT, RGCRT, and CMCT should follow for all proposed non-grave development projects prior to their implementation. This process is designed to be largely self-regulated, in order to minimise red-tape, but does require each trust to issue a notification of its proposals to each of the other two trusts. In this way, all proposed projects may proceed unless an objection is raised by any of the Trusts.

DESIGN GUIDELINES FOR PROPOSED DEVELOPMENTS

The Design Guidelines sets out a number of principles that should be taken into account in the design of all new buildings and structures. The guidelines have been designed to be “descriptive” rather than “prescriptive” so as not to stifle creativity or limit design possibilities. The intention of the guidelines is not to dictate the actual architectural style, but to establish “good-practice” principles, which if applied on all new projects, will result in consistency of design across the cemetery.

DESIGN CHECKLIST FOR PROPOSED DEVELOPMENTS

The Checklist is designed as a simple form which can used by each trust as part of the Review Process to check that they have considered all aspects of the Design Guidelines prior to notifying the other trusts of their proposals.

REVIEW PROCESS FOR NEW DEVELOPMENT PROJECTS

STEP 1 - PROJECT NEED AND FUNCTION

Any trust proposing a project should submit a proposal to the other two trusts, outlining the need for the project, its function and proposed location. The proposed location must be aligned with the agreed proposals contained with the Landscape Masterplan.

The trusts should discuss the proposal and any concerns raised at the RNT meetings, and reach an agreement on whether the project should proceed, be reconsidered, or not proceed at all.

In the event of a disagreement between the trusts, the Dispute Resolution Process should be followed.

STEP 2 – PROJECT DESIGN REVIEW

The proponent should engage its consultants to develop the concept design and on completion, submit its concept design together with a completed Design Checklist for Proposed Developments to the other trusts for endorsement.

The concept design submitted must be detailed enough to demonstrate compliance with all items in the checklist, and as a general guide should include the following drawings:

- Site location plan
- Existing plan (minimum 1:200 scale)
- Proposed plan (minimum 1:200 scale)
- Proposed section, elevations, and / or 3D Illustrations.

If any trust has any concerns or objections with the proposal, it must formally notify the proponent immediately with a copy of the notification provided to the RNT for information. The concerns should be addressed at the next RNT meetings with a view to resolving the issues raised. In the event of a disagreement between the trusts, the Dispute Resolution Process should be followed.

If no notification is received by the proponent within 2 calendar weeks or other mutually agreed time period of submitting the design for review, then it may be assumed that there are “no objections”, and the proponent may implement the proposed project.

DISPUTE RESOLUTION PROCESS

It is in everyone’s interests that the trusts make every effort to resolve their differences at the RNT meetings. The Landscape Masterplan should be used as the reference document in guiding these discussions, as all projects must comply with the intent of the proposals contained within this document.

Negotiation

If a dispute arises, a written notification should be delivered to the trust in question, with a written copy to the third trust. Within 10 days of serving this notice, a representative from each of the three trusts must meet and endeavour, in good faith, to resolve the dispute.

If the dispute is not resolved within 10 days of the representatives meeting, then the matter should be referred to the RNT for mediation.

Mediation

As the overarching trust, the RNT should facilitate the process of mediation and organise for a nominee of the Minister to be appointed.

Mediation should be conducted in accordance with the Australian Commercial Disputes Centre Guidelines for Commercial Mediation which are operating at the time that the matter is referred for mediation.

DESIGN GUIDELINES FOR PROPOSED DEVELOPMENTS

The following design guidelines set out key principles that should be followed for all new development projects in Rookwood Cemetery.

In the event of any conflict between these guidelines and Auburn Council's Local Environment Plan (LEP) or Development Control Plan (DCP), the LEP and DCP shall take precedence.

Every building or non-grave structure in the cemetery must be designed by a suitably qualified and professional architect or designer with relevant experience in the design of similar buildings or structures.

LOCATION

Buildings should be located in accordance with the general "siting criteria" shown on the Site Analysis illustrations contained within this report in relation to buildings. These key principles are summarised below.

Administrative Buildings

(includes offices, chapels, condolence lounges, mausolea, crematoria, etc).

- Located on primary roads for ease of access.
- Visually accessible for intuitive way finding.
- Far enough away from main entries so as not to create congestion issues at entry points and should be confirmed by a comprehensive traffic study.
- Close enough to main entries so that they can be easily found.
- Combined with other similar facilities where possible to maximise efficiency of operations.

Workshop Facilities

(includes sheds, storage areas, soil containers, facilities for "ground" staff, etc)

- Located away from administrative buildings due to noise and dust issues.
- Located away from primary roads due to visual impact and traffic interference.
- Close to current and future burial areas.
- Combined with other similar facilities where possible to maximise efficiency of operations.

Public Facilities

(includes coffee shops, visitor centres, gift shops, museums, etc)

- Located on primary roads for ease of access.
- Visually accessible for intuitive way finding.
- Close to main entries so that they can be easily found.
- Combined with other similar facilities where appropriate to maximise efficiency of operations.

SITE CONTEXT

Building proposals should be sensitive of their surroundings, of appropriate scale and fitting within the overall site context. In particular, the following principles are important:

Visual Impact

- Buildings should not obstruct views from key vantage points such as primary and secondary roads onto pristine parts of the cemetery.
- Buildings must not have a negative visual impact on their immediate surroundings. For example:
  - Buildings to be used by the public should look open, inviting and interesting.
  - Workshop facilities and the like should be screened off for noise, security and dust, and use landscaping extensively to create a visual buffer.

Heritage and Conservation

Part of Rookwood Cemetery is listed on the NSW State Heritage Register. Additionally, the entire cemetery is listed as a Local Heritage Item in the Auburn LEP 2000 and the Auburn LEP 2010. It is therefore important that all proposals consider their heritage impact on the local area and the site overall.

The document entitled "Report on Buildings and Structures at Rookwood Necropolis" dated January 2011 prepared by Howard Heritage Consultancy should be used as a guide to determine the required design response for any proposals that affect existing buildings.

Auburn Council requires that a Heritage Impact Statement be submitted with every Development Application for projects within Rookwood Cemetery. Such statements should be prepared by suitable qualified, experienced and competent heritage consultants.

SCALE

The scale of all buildings and structures should be constrained by any/all relevant constraints specified in the current LEP and DCP. In general, the scale of proposed buildings should be appropriate to its function and site context.

PARKING

It is generally accepted that people visiting the cemetery for an interment or for visiting a loved one will generally park along the internal roads. However, any new building which will generate additional traffic needs to have sufficient, off-street parking. This may be combined with existing or new parking provided for other facilities. The proponent may need to engage a traffic consultant to confirm the adequacy of parking proposed.

It should be noted that disabled parking places must be provided for all developments in accordance with the current regulations and Australian Standards with regard to disabled parking.

GENERAL DESIGN CHARACTERISTICS

As it is vital to support creativity which brings vibrancy to the design of buildings, it is not possible to prescribe a specific architectural aesthetic to be applied to all projects. However, the following points should be used as guiding principles:

- All buildings should be of a high architectural quality and construction standard, aim for design excellence and enhance the cemetery overall.
- A "domestic" style of design and construction is not considered appropriate for the cemetery.
- As Rookwood is foremost a cemetery for the interment of the dead, all buildings related to interments (such as Chapels, Mausolea, etc) should be designed to evoke a sense of spirituality. This may be achieved by incorporating religious and or cultural qualities, or by using forms which represent a contemporary interpretation of a spiritual quality.
- Building facades designed to face the public should be clean and uncluttered.
- Buildings used for interment should use materials which are highly durable and require minimal maintenance.
- Building entrances should be visually distinct, easily identifiable, and be designed as part of the building form.
- Building entrances should give prime consideration to weather protection at the entrances, and have forecourts sized appropriately for the number of people likely to gather outside (larger for Chapels, for example).
- Buildings involving the unloading of coffins from hearses for services should include a covered porte-cochere or designated unloading area. The porte-cochere may also form the principal point of entry into the building.

MATERIALS

The choice of materials for each building will depend on the function of that building. In general, buildings which are expected to last for perpetuity or very long periods such as crypts, mausolea and chapels should use extremely robust and durable materials. On the other hand, general administration type of buildings such as offices may be designed for to be renewed every 15-20 years.

Below are some suggestions on the use of materials for specific building types

Crypts, Mausolea, Chapels

- Use of high quality architectural precast concrete encouraged. Various finishes available such as sandblasted, etched, polished, exposed aggregate, etc.
- Natural Stone, used as cladding, both externally and internally, as well as flooring. Light coloured granite preferred for external surfaces due to its durability, with darker granite and marble suitable for internal surfaces, protected from the sun and elements.
- Brick: High quality, high compression strength brick for walls.
- Concrete Pavers: for external flooring.
- Insitu concrete: for walls and roofs, particularly for “permanent” buildings such as crypts.

Office Buildings, Condolence Lounges and other Public Facilities

- Steel and/or concrete structural frames.
- Variety of cladding options including metal cladding (eg. Alucobond), face brick, painted fibre-cement sheet, etc.
- Concrete, metal deck, or tiled roofs.

Workshops Compounds and Buildings

- Precast tilt-up or steel clad shed structures.
- Insitu concrete for walls, and pavements.
- Brick, block and fibre cement cladding for buildings.
- Concrete, metal-deck or tiled roofs.

DESIGN CHECKLIST FOR PROPOSED DEVELOPMENTS

Name of Proponent (Trust):	
Description of Proposal:	
Location (Cemetery Unit Number):	
Submission Date:	
Name of Architect/Designer:	

Documents Included with this Submission

	Yes	No	N/A
Site Location Plan			
Existing Plan (minimum 1:200 scale)			
Proposed Plan (minimum 1:200 scale)			
Proposed Section(s) (minimum 1:200 scale)			
Proposed Elevations (minimum 1:200 scale)			
3D Sketch Illustrations			

Compliance Schedule

The proponent should refer to the Design Guidelines for Proposed Developments and confirm compliance with the criterion contained therein using the table below.

	Complies		
Criterion	**Yes**	**No**	**Reason for Non-Compliance or General Comments**
Location Complies with siting criteria listed for specific building category.			
Site Context			
Visual Impact			
Heritage and Conservation			
Scale			
Parking			
General Design Characteristics			
Materials			

Response from Trusts:

Name of Trust:

Date:

Comments:

BIBLIOGRAPHY

BIBLIOGRAPHY

- "*Urban Landscape Management*" by J.D. Highmough, 1994
- "*Canberra Landscape Guidelines* " by Public Works Department , 1993.
- "*The Sleeping City*", by D.A. Weston 1989.
- "*Cemeteries, Our heritage*" by Celestina Sagazio, National Trust, 1992
- "*Conserving our cemeteries*" by Celestina Sagazio, National Trust, 2003

REPORTS:

LIST OF REPORTS SUPPLIED:

- *Rookwood Necropolis – Draft Plan of Management*, February 2012 (updated March 2014)
- *Rookwood Necropolis – Management Unit Policies*, November 2011 (updated March 2014)
- *Chair's Introduction*, February 2013 (updated March 2014)
- *Bushland Plan of Management for Rookwood Necropolis*, NPWS Issue, 31 October 2003
- Rookwood Visual Significance Study – Parts 1-7, August 2010
- *Trial Fire Monitoring Program*, January 2013
- *Biodiversity Studies, Flora and Fauna Investigations for Native Bushland at Rookwood Necropolis*, April 2013
- *Drainage Investigation Canals 10a and 10b*, Rookwood, November 1996
- *Haslam's Creek Flood Study* by Auburn Municipal Council, 1989
- *Rookwood Necropolis, Report on the Canals, Ponds, Bridges and Selected Drains*, December 2010
- *Aboriginal Archaeological Potential Desktop Assessment*, June 2010
- *Report on Buildings and Structures at Rookwood Necropolis*, January 2011
- *Archaeological Appraisal of Sites of Former Buildings and Abandoned and Derelict Buildings, Ruins and Structures*, April 1996
- *Tree Assessment Reports for Boundary on Railway Crescent & East Street Lidcombe*, December 2012
- *Tree Assessment Reports for Corner Haslem Drive & Weekes Avenue*, December 2012
- *Tree Management Study,* June 1989
- *Signage Policies*, 1991 & 2006
- *Road Hierarchy Report*, March 1996
- *Road Hierarchy Report*, August 2010
- *Primary Roads Audit Report*, March 2012
- *Secondary Roads Audit Report*, December 2011
- T*raffic Issues, Strathfield Gates*, July 2010
- *Groundwater Review and Contamination Issues, Rookwood Necropolis* by Woodward-Clyde, 1995

TOGETHER WITH THE FOLLOWING RECORDS:

- Information plans on Electrical, Water, Gas, Sewerage and Telstra (hand-drawn, 2008)
- Proposed Primary, Secondary and Tertiary Roads Typical Sections
- "*Briefing paper- Cemeteries, churchyards and burial grounds*" by the Commission for Architecture and the Built Environment (CABE) (UK)- 2005

WEBSITES:

www.rookwood.nsw.gov.au

www.auburn.nsw.gov.au/Explore/RoadSafety/RoadSafetyDocuments/Cycle-n-Walk_Alive-n-Active-in-Auburn.pdf

www.strathfield.nsw.gov.au/assets/Parks-and-Facilities/Cycleway-Map.pdf

http://en.wikipedia.org/wiki/Rookwood_Cemetery_railway_line

http://en.wikipedia.org/wiki/Cemetery_Station_No._1_railway_station

http://www.dailymail.co.uk/news/article-2628003/Dead-dug-reburied-make-space-new-graves-cemeteries-MPs-warn.html

http://www.spotlightnews.com/news/2014/apr/01/bringing-new-life-cemetery/

http://www.metroweekly.com/2014/05/pet-cemetery/

http://www.washingtonpost.com/blogs/innovations/wp/2013/11/20/arlington-national-cemetery-debated-allowing-qr-codes-on-tombstones-does-technology-belong-in-cemeteries/

http://www.newsday.com/long-island/towns/catholic-cemetery-in-west-babylon-proposes-large-scale-solar-energy-project-1.8012395

http://www.tv20detroit.com/news/The-Run-of-the-Dead-229634151.html

http://www.environment.nsw.gov.au/resources/climatechange/08519Sydney.pdf

http://www.sacbee.com/2014/06/16/6486292/qr-code-headstone-keeps-memory.html

http://www.remindernews.com/article/2013/10/24/high-tech-imaging-could-help-preserve-historic-cemeteries)

http://www.pacsoa.org.au/

APPENDICES

APPENDICES

APPENDICES LIST

ROOKWOOD NECROPOLIS TRUST
LANDSCAPE MASTERPLAN

Reverse brief for scoping of the Landscape Masterplan and Vision for the Necropolis

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February 2014

VERSION	DATE	PREPARED BY	COMMENTS
1	13/ 02/ 2014	FLORENCE JAQUET	
2	14/ 06/ 2014	FLORENCE JAQUET	

CONTENTS

OVERVIEW

On 2nd April 2012 the Minister for Primary Industries announced a new structure for Rookwood Necropolis as part of the cemetery reform in NSW. A new streamlines "two-trust" management structure, overseen by the Rookwood Necropolis Trust (RNT) is now in place.

The two Trust share the 288Ha site with the Catholic Cemeteries Trust (CCT) holding approximately 1/3 and the Rookwood General Cemeteries Trust (RGCRT) holding the remaining 2/3.

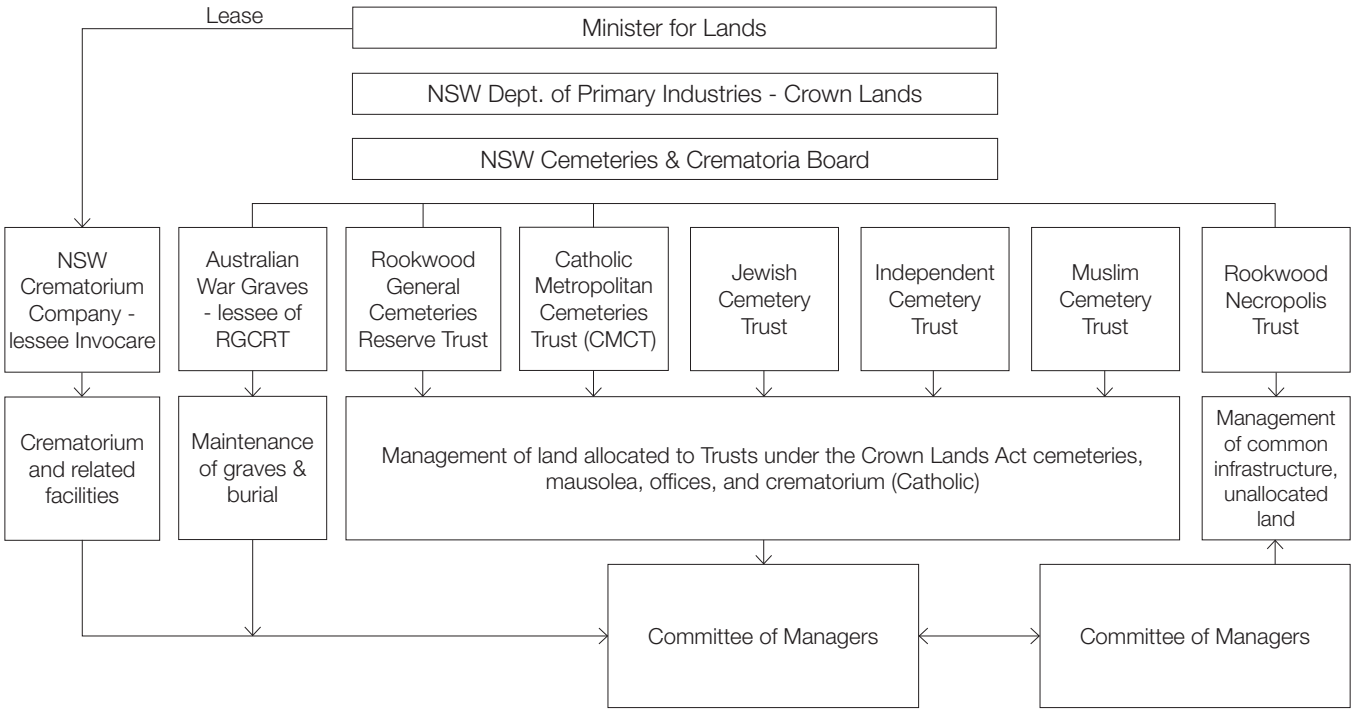
Both Trusts handle a similar number of burial interments per year (approximately 1,500/year). The Catholic Cemeteries Trust also provides cremation through their crematorium.

The RNT manages unallocated land (primary roads and buffer zones), services and fences which lay within.

A separate Crematorium (on RGCRT's land) is managed and leased by Invocare. Their lease to the RNT expires in 2025.

The Commonwealth War Graves commission manages the Garden of Remembrance and War Graves.

The governance structure is as below:



BACKGROUND

On 27th November 2012 an initial brief for an Expression of Interest was sent to 4No Landscape consultants , followed by an information session on 5th December 2012.

A revised brief was sent to the same consultants on 20th December 2012 highlighting a two-phase process:

- Phase 1 –Scope of the consultancy including a Vision for the site, Masterplan and Implementation Plan.

- Phase 2 – Ideas and Opportunities exercise relating to the Vision for Rookwood, its sustainability, Social Equity, Ecological and Historical significance and Infrastructure.

This led to the selection of a consultant team to deliver the Landscape Masterplan for this significant site.

PURPOSE OF BRIEF

Due to the various interpretations of the word "Masterplan", the number of previous reports and studies conducted for the site and the complexity of the task, a reverse brief was suggested to firm up the process, issues and deliverables for the project so a clearer sense of direction could be had by all involved.

A Reverse Brief aims at getting the consultant (us) to clarify what they believe are your needs, the deliverables, scope, timeframe and costs to ensure that you (RNT and Trusts) are happy with their interpretation and confident to proceed.

It is good project Management and best for the client/ consultant relationship.

The contents of the Reverse Brief may not be exhaustive. It may be expanded and refined with the collaboration of all Trusts and Consultants, throughout the Masterplanning process.

SUBJECT SITE

The whole of Rookwood Necropolis shall be addressed. The site is bordered by Railway St to the North, East St to the West, Centenary Dr to the East and the railway line to the South.

Having said that, the Necropolis shall be considered in the context of the surrounding suburbs in terms of pedestrian and vehicular circulation and ecological connections.

KEY PRINCIPLES FOR THE NECROPOLIS

- Rookwood must remain, first and foremost, a cemetery – a place where people are buried or cremated with the utmost dignity and respect.
- Equity across beliefs, cultures and social standing is to be at the basis of all operations at Rookwood. All people are to be given equal standing in their quest for cemetery lands and all must be accorded the dignity of interment in keeping with their beliefs and cultural background.
- The substantial ecological significance of Rookwood is to be valued, retained and protected.
- Rookwood is to be acknowledged as a place of major heritage significance. The cultural heritage of the site is to be acknowledged, protected ad interpreted in its future management and development.

KEY OBJECTIVES

The key objectives for the plan are for:

- The beautification of the whole site and an increased sense of cohesion and consistency throughout the site.
- Increased recreational activities
- Sustainability including extending the life of the cemetery

In general the following should be considered:

Best practice/ state of the art	A masterplan which has the potential to serve as a role model worldwide.
Integrated with its surroundings	A site that considers the established neighbouring landscapes and makes use of the "borrowed" landscape beyond its boundaries.
Attractive and inviting	A site which welcomes visitors and takes pride in its appearance.

Recreation	A plan which encourages community recreation and any interest and attachment to the site.
Sustainability	A plan which is environmentally sensitive by limiting its environmental impact, be low maintenance and low running costs.
Accessibility	A plan which considers accessibility by all, DDA compliance, and improved experience by all sectors of the community especially the elderly.
Quality	Provide a high quality experience and memories which generates pride for the users and managers.
Promotion	Create a unique and inspiring site which provides quality amenities in line with the Necropolis' objectives as world leader.
Land use	Maximise the site's yield potential through creativity and rationalisation to ensure that the Necropolis continues to provide for cremation, interment and memorialisation for as long as possible.

PROJECT CONTROL

The project with be overseen by the Project Steering Group (PSG) which will comprise of:

- David Harley – Chair
- Peter O'Meara and John Richardson (CCT)
- Fiona Heslop (RGCRT)
- Ian McIntosh, Lisa Elliott (RNT)
- Relevant consultants (as required)

The consultant will be required to present to this group at regular intervals (min 5 times) for:

- Briefing/ Project Inception
- Presentation of Analysis
- Presentation of Vision (possibly run as a workshop)
- Presentation of Preliminary Masterplan
- Presentation Draft Masterplan and Preliminary Implementation Plan

Throughout the project the consultant shall meet for Project Meetings (PM) on a monthly basis. The following persons will attend and steer these meetings

- Ian McIntosh - Chair
- John Richardson (CCT)
- Fiona Heslop (RGCRT)
- Relevant consultants (as required)

SCOPE OF THE CONSULTANCY

Familiarisation	
	• Review of all available reports. • Compile list of useful and supplied information. • Site visits as required. • Meetings/ Briefing/ Introductions with all Trust relevant personnel (as nominated by the Trusts). • Meetings/ Briefing with stakeholders and information sources (Council, Heritage, Lands Department, War Graves Commission, Invocare).
Analysis	

	• Understand the issues affecting the landscape masterplan, sometimes with the assistance of the listed sub-consultants
	  • Context/ neighbourhood
	  • Views (Internal, External)
	  • Circulation (Primary, Secondary and Tertiary vehicular, railway, public transport, pedestrian, site access points)
	  • Services
	  • Heritage layers and character precincts
	  • Ability to absorb change (Heritage)
	  • Significant Items
	  • Landmarks
	  • Topography
	  • Drainage, flooding, WSUD and irrigation
	  • Geology and soils
	  • Vegetation (Protected, boundary, avenues, canals)
	  • Infrastructure (depots, buildings, toilets, roads, entrances)
	  • Consistency of landscape details
	  • Climate change implications
	  • Usable land
	  • Potential for renewable tenure, renewal, re-use and in-fill and impact on life of the cemetery

Landscape	• Provide up-to-date maps for all the above. • Analyse from aerial photos. • Analyse from existing maps, DPoM Unit Management maps. • Analyse from discussions with Trusts and staff. • Consider/ present overseas experience relating to extending the life of cemeteries.
Ecology	• Review of numerous reports on ecology on the site. • Conduct field survey (one day) for verification and mapping in line with BioBanking assessment requirements.
Heritage	• Review monuments guidelines, in-fill potential (if any). • Comment on suitability of overseas experience (see above) in Rookwood's context. • Investigate potential for Heritage Tourism. • Review landscape construction detailing in Heritage areas. • Determine the Heritage's Constraints and Opportunities for the site. • Refer to attached document for details.

Architecture	• Review the list of buildings and structures with both trusts, confirming the following:
	  • Current use
	  • Planned use
	  • Any proposals to develop/ modify/ repair/ demolish any buildings or structures
	• Obtain all current masterplanning proposals from the CMCT and RGCRT.
	• Plot the proposed masterplans and key existing facilities on an overall. Rookwood Cemetery plan in block form with colour coding to differentiate the various functions.
	• Identify any key issues, including conflicts or synergies within the current masterplanning proposals.

Stormwater	• Review of various reports made available on catchment and canals. • Review flooding issues. • Review waterlogging issues. • Appraisal of world standard on cemetery groundwater management. • Review WSUD initiatives. • Review Irrigation / sceptic issues.
Constraints and Opportunities	
Ecology	• Summarise ecological issues and requirements in a Constraints and Opportunities format. • Ditto for Bio-banking potential. • Pros and Cons list for BioBanking versus PMP to enable informed decision by the Trusts.
Landscape	• Summary maps of Constraints and Opportunities (C&O) by discipline and other they affect each other.
Architecture, Heritage, Stormwater	• Supply Constraints and Opportunities to Main Consultant. • Review Landscape Architect's "clean slate/ open sky" Constraints and Opportunities plan. • C&O map based on the Trusts current plans and vision. (refer to page 86) • C&O map based on "Preferred" scenario. (refer to Appendix 4: Architectural Drawings - SK20 Building Locations Plan - page 355)
Vision	
	• Develop a Vision for the site. • Develop agreed planning principles.
Masterplan proposals	
Landscape	• Define the landscape treatment of the site. • Define the potential for increased burial and memorialisation yield. • Define the potential for increased yield based on potential legislation change. • Masterplan showing roads treatments, vegetation (avenues, Protected Vegetation areas, screening and others), land available for burial, land for Open space/ Recreational purposes, unallocated land. • (NOTE) Trusts have indicated they wish to use land as they see fit. • Review of existing construction details in a view to provide more consistency. • Landscape guidelines for the treatment of Unit edges. • Maintenance guidelines.

Architecture	• Critically review, in collaboration with Florence Jaquet, the proposed masterplans and suggest if appropriate, proposals which provide:
	  • An optimum, or improved result for cemetery operations.
	  • An optimum or improved experience for users of the cemetery.
	  • Some integration between the requirements and objectives of the individual trusts.
	• Participate in discussions with the trusts on the “open sky” option.
	• Assist Landscape Arch. In their preparation of the revised masterplan which theoretically incorporates appropriate aspects of the “open sky” option and the current masterplans, in particular providing input regarding the planning of buildings and facilities and their immediate environs.

Implementation strategy	
Architecture	• Develop a matrix of building projects recommendations to accompany the masterplan, which will identify key projects agreed upon, responsibilities, timeframes, etc. • Prepare broad design guidelines for new buildings and structures that provide guidance on siting of buildings, sightlines, materiality, design principles, etc.
Landscape	• Prepare landscape and maintenance guidelines
Heritage	• Prepare heritage guidelines relating to tourism, development applications and monument infill. • Prepare a concise Heritage Impact Commentary.

DELIVERABLES

Stakeholder's consultation	
Trust	Through regular meetings
Lands/ Primiary Industries Department	Through sporadic attendance to Project Meetings (John Filicamo)
Commonwealth War Graves Commission	Via meetings at Issues, C&O and preliminary proposals stage (unable to make contact).
Invocare	Via meetings at Issues, C&O and preliminary proposals stage.
Heritage Council	Through sporadic attendance to Project Meetings (Siobhan Lavelle & Stuart Read).
Constraints and Opportunities Plan	Graphic representation of all issues affecting landscape.
Issues Paper	Description of issues in a report format (to accompany the above plan).
Agreed Principles/ Vision	List of principles by which the masterplan will be defined.
Preliminary Masterplan	For comments by all stakeholders.
Draft Masterplan	Revised following the outcomes of the above discussions.
Final Masterplan	Approved final version. Any enlargements as required to detail key areas. Sections and Elevations as required (all above to be selected by Trusts/ Client).
Implementation Plan	Plans and matrix defining the logical sequencing of implementation of the masterplan recommendations. (NOTE) No costings required.
Heritage guidelines for grave infills/ re-use (and other issues affecting the presentation of the cemetery)	Defining the allowable visual impact when infilling "new" graves into "old" sections.
Process guidelines for Trust's on-going projects	Defining the process to follow for each Trust to advise other Trusts of their capital works plan and other issues which may affect the potential presentation of the site.
Landscape guidelines	Defining the presentation standards and principles relating to soft and hard landscape, to ensure consistency of presentation.
Maintenance guidelines	As above – but relating to maintenance regimes.
Architectural guidelines	Defining the presentation standards and principles relating to buildings, to ensure consistency of presentation and cohesion.
Heritage impact commentary	Comments on proposals from a heritage perspective.
Development applicant guidelines	Easy to use guidelines for applications to Auburn Council and NSW Heritage Council.

All to supplied electronically.

PROJECT PROGRAM

The project should preferably be completed by the end of the financial year.

However it is recognised that the process is complex and delivery is dependent on availability of key information and the number of discussions and workshops needed to come to an agreed plan.

Extensions of time can be submitted throughout the process.

Rookwood Landscape Master Plan Heritage Return Brief
17 February 2014

GRAHAM BROOKS AND ASSOCIATES
ARCHITECTS PLANNERS AND HERITAGE CONSULTANTS

Heritage Component
Rookwood Landscape Master Plan

Objective

To contribute heritage enhancement and cultural tourism opportunities, in the context of the Landscape Master Plan, into the overall Objective of formulating a comprehensive, coordinated and strategic transformation of Rookwood Necropolis into one of the leading cemeteries internationally.

Likely Scope of Work

Progressive Heritage Review of Landscape Master Plan

The aim of this component is to provide an on-going review and commentary on the emerging LMP, including researching and reviewing the likely heritage impacts on particular ideas and opportunities being explored during the design phase. This work will concentrate the heritage review of such a large and complex site onto the relevant issues, constraints and opportunities that are emerging through the LMP process.

- Receive and review of relevant heritage, character and visual assessments and studies of the Necropolis as a whole and the various established sub-precincts (management units).

- Receive and review of aerial photos, topographical information and emerging landscape master planning analysis to develop a background understanding of the historic cultural landscape of Rookwood, eg historical expansion of land accumulation, rail corridors, roadways and access routes, religious precincts, drainage channels, tree lines, cultural plantings and areas of natural bushland.

- Undertake detailed site inspection (1 day) of the Necropolis to review documentary information in relation to the actual site conditions.

Liaise progressively with LMP team as questions and options are raised and assessed, in particular undertake specific analysis of ideas to judge their likely heritage impacts and acceptability to statutory heritage agencies and other relevant commentators. Issues could include re-use of redundant spaces and corridors, re-use of specific redundant buildings, upgrading or recapturing of historic site features, thematic upgrading of road verges and remnant open spaces.

Deliverables:

- Review and comment on emerging ideas and concepts within the LMP, including discussions within the project team and with Steering Committee.

- Preparation of concise heritage impact commentary within the final Landscape Master Plan document

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Heritage Management Processes for Implementation

This section will provide clear advice on the nature and extent of supporting heritage related documentation for specific development applications for components of the Landscape Master Plan

- Review of current cemeteries and heritage legislation to confirm procedures and processes for future development proposals within or parallel to LMP

Deliverable:

- Easy to use guidelines for preparation and submission of development applications for the progressive implementation of agreed ideas, with supporting information to NSW Heritage Council and Auburn Council

- Excludes any specific Statements of Heritage Impact or Conservation Management Plans

Cultural Tourism Potential

A large cemetery such as Rookwood contains the graves of many well known and/or significant personalities in the history of Australia, NSW and Metropolitan Sydney. Historic cemeteries around the world have attracted large numbers of visitors interested in commemorating the life and work of such personalities, or just curious in the famous or infamous. Major historic sites internationally have also developed strong communication and merchandising programmes to exploit this interest. Merchandise could include reproductions or recordings of the works of famous authors, artists, musicians, composers, explorers, adventurers etc.

Tourism programmes could expand on the other major reasons for visiting Rookwood, those associated with burials/cremations, commemorating friends and family, active recreation along defined walking or cycling pathways, or passive recreation in the open spaces.

- Review current visitation and tourism to identify main sectors, motivations and activities

- Review current visitor amenities and general use, including organised events

- Conduct tourism related SWOT Analysis (Strengths, Weaknesses, Opportunities, Threats)

- Review applicability of *ICOMOS International Cultural Tourism Charter*, UNWTO *Communicating Heritage for the Tourism Sector* Handbook and UNWTO *Tourism Congestion Management at Natural and Cultural Heritage Sites* Handbook, all of which were prepared by Graham Brooks in his role as Chairman of the ICOMOS International Cultural Tourism Committee

- Assess potential of redundant buildings for possible adaption to visitor facilities

- Formulate preliminary ideas regarding tourism potential, promotion and and merchandising.

Deliverables:

- Ideas for the re-use of otherwise redundant buildings and spaces
- Ideas to complement the recreation strategies emerging within the LMP
- Preliminary Rookwood Tourism and Visitor Management Plan
- Excludes preparation of a formal Heritage Interpretation Plan

Yours faithfully
GRAHAM BROOKS AND ASSOCIATES

Graham Brooks
Director
grahambrooks@gbaheritage.com

APPENDIX 02

FLORA AND FAUNA CONSTRAINTS ASSESSMENT - BIOSIS

Rookwood Cemetery

Flora and Fauna Constraints Assessment

FINAL REPORT

Prepared for Florence Jaquet

21 May 2014

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Final version 02	Nathan Garvey	21/05/2014

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- Client: Florence Jaquet

The following Biosis staff were involved in this project:

- Ben Coddington, Ed Cooper, Josephine Dessmann & Jane Murray for assistance in the field
- James Shepherd for mapping

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Summary

Biosis Pty Ltd was commissioned by Florence Jaquet to undertake a flora and fauna constraints assessment of the Rookwood Cemetery (study area). Rookwood Cemetery is the largest necropolis in the Southern Hemisphere, located in Sydney, New South Wales, Australia. Rookwood is a suburb, close to Lidcombe railway station about 17 kilometres (km) west of the Sydney Central Business District (CBD). Refer to Figure 1 and Figure 2 for locality and study area overviews.

Ecological values

Key ecological values identified within the study area include:

- Two threatened ecological communities (Cumberland Plain Woodland in the Sydney Basin Bioregion and Cooks River Castlereagh Ironbark Forest in the Sydney Basin Bioregion).
- One threatened flora species listed under both the EPBC Act and TSC Act (Downy Wattle *Acacia pubescens*) and one threatened flora species listed under the TSC Act (*Epacris purpurascens* var. *purpurascens*).
- Two threatened populations listed under the TSC Act (Plum Leaf Pomaderris *Pomaderris prunifoli* and Tadgell's Bluebell *Wahlenbergia multicaulis*).
- Various hollow bearing trees, which may provide habitat for threatened arboreal mammals, hollow dependent birds and microchiropteran bats, such as the Eastern Bentwing -bat *Miniopterus schreibersii oceanensis*.
- Foraging resources for Grey-headed Flying Fox *Pteropus poliocephalus* and other threatened birds.
- A small creek line, which is an upper reach of the Cooks River, which has the potential to support the threatened Green and Golden Bell Frog *Litoria aurea.*

A preliminary BioBanking assessment has assessed three possible scenarios to allow more space for burials. The three scenarios include:

- Scenario 1 - remove the low condition vegetation and offset with a BioBanking Agreement for the remaining vegetation on the site.
- Scenario 2 – remove all low condition Cooks River Castlereagh Ironbark Forest as well as areas that are outside of reserves and are currently mown.
- Scenario 3 – remove all low condition Cooks River Castlereagh Ironbark Forest, all areas that are outside of reserves and are currently mown, as well as Cooks River Castlereagh Ironbark Forest in moderate to good condition in Area 8, Area 27, Area 28 and Area 7.

Scenarios 1 and 2 allow for removal of native vegetation by offsetting with retained native vegetation elsewhere, and result in a significant surplus of credits. However they only free up 1.99 to 1.88 hectares for burial. Scenario 3 frees up 6.08 hectares for burial but results in the need to source additional credits offsite.

1. Introduction

1.1 Introduction

Biosis Pty. Ltd. was engaged by Florence Jaquet to conduct a flora and fauna constraints assessment for the Rookwood Necropolis Cemetery (the study area). The constraints assessment has been developed to identify biodiversity values within the study area and assess the implications of these according to relevant legislation. The purpose of this constraints assessment is to inform the Landscape Master Plan being prepared for the study area.

This assessment identifies constraints with a particular focus on threatened flora and fauna species, populations and ecological communities (biota) as listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act) and matters of national significance as listed under the Commonwealth *Environmental Biodiversity Conservation Act 1999* (EPBC Act). A preliminary BioBanking assessment has also been conducted to identify opportunities that are available through offsetting using a BioBanking Agreement.

The broad aims of the Landscape Master Plan are to plan burial areas to maximise the usable space and alleviate the current pressure caused by diminishing availability of burial space at Rookwood Necropolis Cemetery, as well as to guide the development of a consistent look throughout the cemetery which will be achieved through design.

The study area is well known to have a variety of ecological constraints which have been documented in many ecological studies over past decades.

1.2 Location of the study area

The study area is located in the central portion of the Cumberland Plain approximately 17 km west of the Sydney CBD (Figure 1). It encompasses 297 hectares zoned as SP1 Special Activities – Cemetery.

The study area is within the:

- Sydney Basin Bioregion.
- Hawkesbury-Nepean Catchment Management Authority (HNCMA), formerly the Sydney Metropolitan Catchment Management Authority (SMCMA).
- Auburn City Council (ACC) Local Government Area (LGA).

1.3 Scope

The biodiversity values of the study area have been assessed and documented in many studies, as the cemetery is well known to support numerous threatened biota. Reviewing and summarising these studies to identify the constraints within the study area is a key part of this assessment. A brief field survey was focused on ground truthing the mapping of threatened ecological communities (TECs) within the study area, as well as collecting vegetation condition data using the BioBanking assessment methodology. Highly modified areas within the cemetery that do not support native vegetation were not surveyed in detail during the field survey.

The broader aim of the assessment was to identify ecological constraints and opportunities to inform the development of the landscape master plan, which included:

- Background research of relevant ecological studies, regional vegetation mapping and databases.

- Undertaking field surveys to ground truth vegetation mapping and collect vegetation condition data using the BioBanking assessment methodology.
- Conducting preliminary BioBanking assessment calculations to assess opportunities that a BioBanking Agreement may present.
- Interpreting and summarize the biodiversity constraints of the study area.

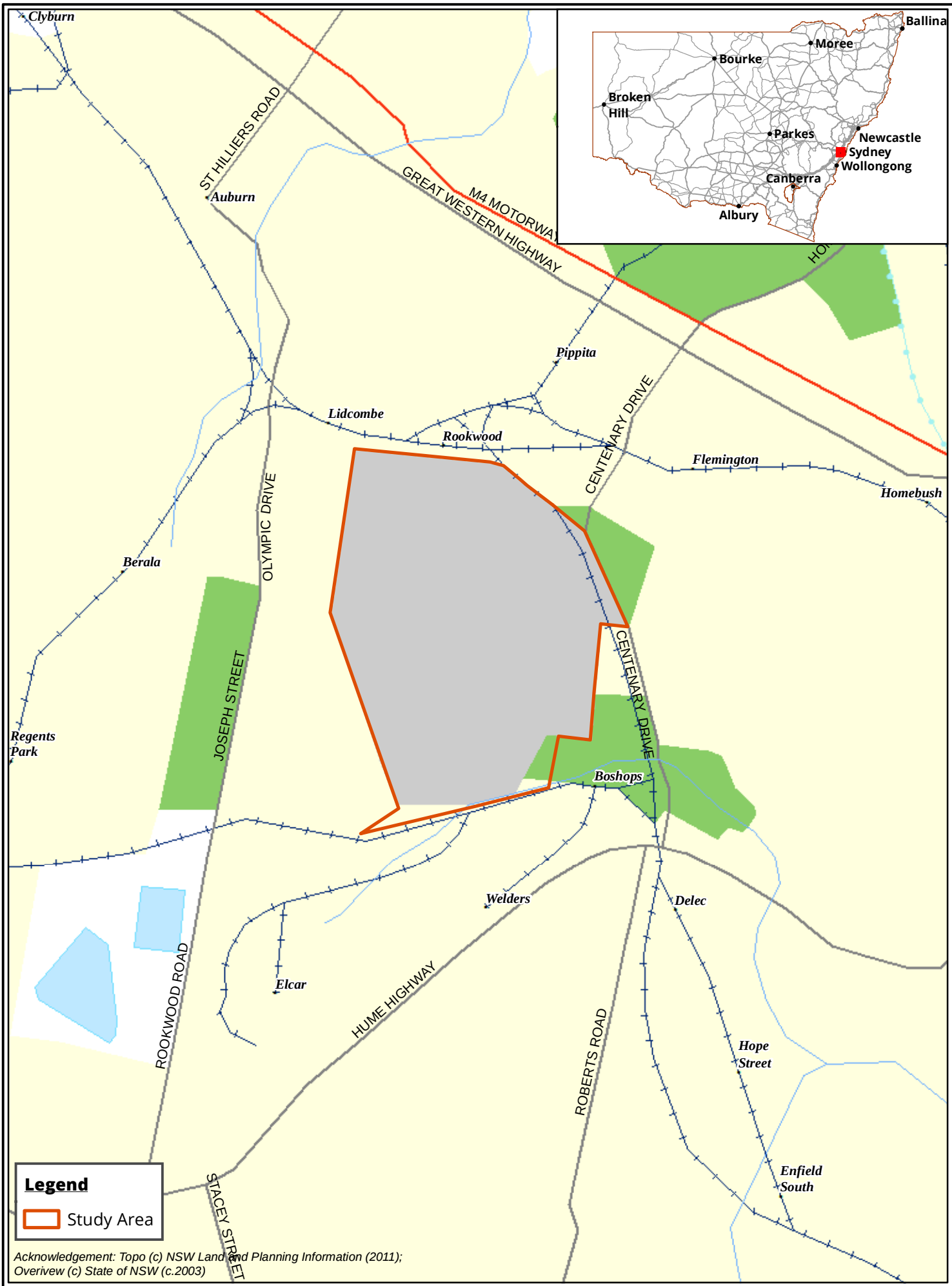

Figure 1: Rookwood Cemetery – The study area in a regional context

Matter: 16308
Date: 11 February 2014,
Checked by: BC, Drawn by: JMS, Last edited by: jshepherd
Location:P:\16300s\16308\Mapping\

Scale 1:30,000 @ A4, GDA 1994 MGA Zone 55

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Legend

- Study Area
- Reserve boundaries

isterplan

Acknowledgements: Topo (c) NSW LPI
Imagery (c) Nearmap 2014

Figure 2: Study area overview

0 90 180 270 360 450

Metres
Scale: 1:9,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56

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biosis

Biosis Pty Ltd

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Matter:
Date: 07 March 2014,
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16308_F2_Overview

2. Methods

2.1 Desktop review

In order to provide a context for the study area, records for threatened flora and fauna from within 5 km (the locality) were obtained from relevant public databases. Records from the following databases were collated and reviewed:

- Atlas of NSW Wildlife, © NSW Office of Environment and Heritage (OEH).
- Protected Matters Search Tool of the Department of the Environment (DoE) for matters protected by the EPBC Act.

Regional vegetation mapping reviewed included:

- *Native Vegetation of the Sydney Metropolitan Catchment Management Authority Area* (SMCMA, 2009).
- *Southeast NSW Native Vegetation Classification and Mapping* (SCIVI 2006).
- *Native Vegetation of the Cumberland Plain* (Tozer *et al.* 2003).

Reports reviewed included:

- *Bushland Plan of Management for the Rookwood Necropolis NPWS Issue* (UBM 2003).
- *Property Management Plan Rookwood Necropolis – Threatened Species Conservation Act 1995* (revised and updated 2009 DEM/Landscan and UBM).
- *Threatened Plant Census for Native Vegetation at Rookwood Necropolis* (UBM 2012).
- Wahlenbergia multicaulis *Survey of Rookwood Necropolis* (Smith and Smith 2011).
- *Biodiversity Studies: Flora and Fauna Investigations for the Native Bushland at Rookwood Necropolis* (UBM 2013).

2.2 Field Survey

Field surveys have been carried out according to the 'Field methodology for measuring condition' from the *BioBanking Assessment Methodology and Credit Calculator Operational Manual* (DECC 2009). This data was processed using the BioBanking Credit Calculator (Version 2.0).

Field surveys were undertaken on 11 October 2013 by three ecologists and the 16 of January 2014 by one ecologist. The focus of the field survey was to ground truth vegetation mapping and conduct survey plots across the study area using the BioBanking assessment methodology. This included:

- Traversing the conservation reserves.
- Conducting 20 x 20 metre quadrats and 50 metre step point transects.
- Conducting spot location surveys to gain a representative sample of the native vegetation occurring within the study area.

Areas of native vegetation outside of Conservation reserves that potentially constitute TEC's were also assessed.

The flora and fauna assessment was conducted under the terms of Biosis Research's Scientific Licence issued by NSW Environment and Heritage under the *National Parks and Wildlife Act* (SL100758, expiry date 31 March 2013). Fauna survey was conducted under approval 11/355 from the NSW Animal Care and Ethics Committee.

2.3 Survey Limitations

Ecological surveys provide a sampling of flora and fauna at a given time and season. There are a number of reasons why not all species will be detected at a site during survey, such as species dormancy as well as the migration and breeding behaviours of some fauna. In many cases these factors do not present a significant limitation to assessing the overall biodiversity values of a site and potential habitat for such species was assessed during the field survey.

The current flora and fauna assessment was conducted in summer which is not an optimal time to survey for all species, particularly for some cryptic flora species such as orchids which have a very specific flowering season and finite flowering duration.

2.4 Mapping

The aerial photography was supplied by Florence Jaquet (NearMap © 2014). Field survey mapping was conducted using hand-held (uncorrected) GPS units (WGS84) and aerial photo interpretation. The accuracy of this mapping is therefore subject to the accuracy of the GPS units (generally ± 7 metres) and dependent on the limitations of aerial photo rectification and registration.

Mapping has been produced using a Geographic Information System (GIS). Electronic GIS files which contain our vegetation, flora and fauna spatial data are available to incorporate into design concept plans. However this mapping may not be sufficiently precise for detailed design purposes.

3. Results

The ecological constraints determined through desktop review and field survey within the study area are described below and mapped in Figure 3.

3.1 Vegetation Communities

The native vegetation within the study area has been disturbed and comprises regrowth from previous clearing. The study area has been used for burials since 1847 and is reported to have been used as pastoral land prior to this date. The majority of the native vegetation present occurs in four clusters of reserves (Figure 2):

- Northern cluster – Areas 19 and 20.
- Western cluster – Area 18, 8, 27, 28 and 7.
- Central cluster – Areas 9, 10, 11, 12.
- Southern cluster – Areas 6 and 25.

Much of the vegetation within the southern, central and western clusters occurs as a dense thicket of shrubs and small trees with a distinct lack of canopy trees throughout and a relatively low diversity of native species. The northern cluster is dominated by planted and naturalised non local native trees. Some native trees and small patches of bushland also occur outside of the conservation reserves.

This assessment has identified two TEC within the study area (Figure 3):

- *Cooks River Castlereagh Ironbark Forest in the Sydney Basin Bioregion* (Cooks River Castlereagh Ironbark Forest) - listed as Endangered under the TSC Act, not listed under the Commonwealth EPBC Act.
- *Cumberland Plain Woodland in the Sydney Basin Bioregion* (Cumberland Plain Woodland) - Listed as Critically Endangered under both the TSC Act and EPBC Act.

Cooks River Castlereagh Ironbark Forest within the study area occurs within the conservation reserves of the western, central and southern clusters (Figure 3). A review of the regional vegetation mapping (NPWS 2003, Tozer *et al.* 2006 and SMCMA 2009) shows a general consensus regarding the vegetation within these reserves. The only variation to this is SMCMA (2009) have mapped a portion of Area 8 in the western cluster as another TEC Castlereagh Scribbly Gum Woodland which intergrades with Cooks River Castlereagh Ironbark Forest and shares many common species. This area has been assessed during the current field survey as Cooks River Castlereagh Ironbark Forest. UBM (2013) have also mapped these reserves as Cooks River Castlereagh Ironbark Forest and have split the community into five variants, all of which equate to the TEC. The community also occurs outside of conservation reserves as a small patch of bushland in the eastern portion of the study area and as a stand of canopy trees with a mown grassy understorey to the south of the central cluster.

The Cooks River Castlereagh Ironbark Forest is characterised by a dense thicket reaching from two to seven metres. The structure is generally a closed scrub with few scattered emergent Eucalypts and little light penetration resulting in sparse or absent ground layer vegetation. Dominant species are Melaleuca *decora,* and Prickly-leaved Paperbark *Melaleuca nodosa.* Other common species are Needlebush *Hakea sericea*, Blackthorn *Bursaria spinosa* var *spinosa*, Hairy Bush-pea *Pultenaea villosa*, Sydney Golden Wattle *Acacia longifolia* and Native Daphne *Pittosporum undulatum*. Tick Bush *Kunzea ambigua,* Flaky-barked Tea-tree *Leptospermum trinervium* and Thyme Honey-myrtle *Melaleuca thymifolia* dominate in areas. Canopy trees are

restricted to sparsely scattered emergents. Canopy trees occurring within the central cluster are Forest Red Gum *Eucalyptus tereticornis*, Woollybutt *Eucalyptus longifolia* and Thin-leaved Stringybark *Eucalyptus eugenioides* Narrow-leaved Apple. *Angophora bakeri* is common in Areas 7, 8, 27, and 28 in the western cluster and in these areas structural layers including canopy, shrub and ground layers are formed. Ground layer vegetation is generally sparse throughout the Cooks River Castlereagh Ironbark Forest, and is dominated by native grasses including Blady Grass *Imperata cylindrica,* Kangaroo Grass *Themeda australis* and Weeping Grass *Microlaena stipoides* as well as Kidney Weed *Dichondra repens* and *Centella asiatica* .

The Cooks River Castlreagh Ironbark Forest within the reserves is in moderate to good condition as it is relatively free of weeds and is dominated by native species. This community is compromised however by past clearing, fragmentation and a lack of fire which has resulted in the dense regrowth thickets that characterise the community within the study area.

Outside of the conservation reserves, the Cooks River Castlereagh Ironbark Forest to the south of the central cluster occurs as clumped and individual canopy trees to 25 metres with a mown grassy understorey. White Stringybark *Eucalyptus globoidea* and Red Mahogany *Eucalyptus resinifera* are common with Turpentine *Syncarpia glomulifera* also occurring. Prickly-leaved Paperbark occurs at the base of trees. The ground layer is dominated by native grasses including Kangaroo Grass, *Microlaena stipoides* Weeping Grass and Three-awn Speargrass *Aristida ramosa*. This area is in good to moderate condition as it is relatively free of weeds and dominated by native species in the ground and canopy layers.

A relatively small triangular patch of Cooks River Castlereagh Ironbark Forest occurs in the eastern portion of the study area. This area is highly modified with changes to the soil profile evident by mounds of dumped soil, and rubble throughout. The area includes dense stands of Parramatta Wattle *Acacia parramattensis*, Flaky-barked Tea-tree *Leptospermum trinervium* and Tick Bush. Other common shrubs are Needlebush, Stiff Bottlebrush *Callistemon rigidus* and *Melaleuca decora.* The threatened species *Acacia pubescens* Downy Wattle makes up a significant proportion of the vegetation in the central portion of the patch. The area is dominated by weeds in the ground layer including Blackberry *Rubus fruiticosus* Paspalum *Paspalum dilatatum* and *Sporobolus africanus* Parramatta Grass. This area is in poor condition as native canopy species are absent and the ground layer is dominated by exotics. The soil profile is highly disturbed and as a result of this and the small patch size the area has very limited regeneration potential.

Cumberland Plain Woodland occurs in the northern cluster of reserves as well as in two stands of canopy trees within mown areas. The northern cluster reserves are is mapped as vegetation that equates to the TEC Cumberland Plain Woodland by NPWS (2002), Tozer *et al.* (2006) and UBM (2012). SMCMA (2009) maps the area as Weeds and Exotics.

The area is disturbed by past burials and clearing. The canopy throughout the majority of the area is dominated by Lemon Scented Gum *Corymbia citriodora* which is native to northern NSW and QLD and is naturalised throughout the Sydney Basin bioregion. Mature Forest Red Gum and Fine-leaved Ironbark *Eucalyptus crebra* occur in the eastern portion of Area 20 and Forest Red Gum occur in the Area 19. The shrub layer throughout is sparse with a combination of naturally occurring and planted specimens. Shrub layer species that appear to be naturally occurring include Parramatta Wattle *Acacia falcata,* Red-Stemmed Wattle *Acacia myrtifolia,* Blackthorn, Prickly leaved Paperbark and *Melaleuca decora*. The ground layer is a mix of native and exotic species. All areas mapped as Cumberland Plain Woodland (Figure 3) have at least a 50% cover of native species in the ground layer which is dominated by Kangaroo Grass as well as Blady Grass with Weeping Grass also common. While the ground layer throughout areas mapped as Cumberland Plain Woodland is dominated by native species, there is al low diversity of native species and the suite of herbs that typically occur within this community are absent. Common exotic species include *Watsonia sp.* which grows in large clumps with *Vinca major,* Kikuyu *Pennisetum clandestinum* and Coreopsis *Coreopsis lanceolata* also common.

The highly modified condition of the vegetation in Areas 19 and 20 makes it difficult to determine the original community, especially given the history of planting. However the Forest Red Gum appear to be the most established tree in the area and although sparsely distributed do occur throughout the majority of the northern cluster. This, together with the dominance of Kangaroo Grass indicates the area represent a simplified form of the community.

The western portion of Area 20 lacks canopy species other than Lemon Scented Gum and is therefore assessed as Cumberland Plain Woodland based the ground and shrub layer vegetation present. This area equates to Cumberland Plain Woodland as listed under the TSC Act (Figure 3); however, does not meet the criteria for the EPBC listed community as the first criteria for this is that the vegetation must have a native canopy present with a minimum projected foliage cover of at least 10% (DEWHA,1999). The majority of the remaining portion of the reserve equates to the TSC listed TEC and meets the criteria for the EPBC listed community as the canopy of native species is greater or equal to 10% the patch is greater than 0.5 of a hectare and the ground layer vegetation is comprised of at least 50% native vegetation cover.

The vegetation within Area 20 that is mapped as TSC Act (only) Cumberland Plain Woodland (Figure 3) and has been assessed as being in poor to moderate condition as the native canopy is dominated by non local native species, the shrub layer is sparse and the ground layer is a mix of native and exotic species. The areas mapped as the TSC Act and EPBC Act TEC is assessed as being in a moderate condition as the structural layers are present and each layer contains a proportion of native species. Based on the native species present and the current level of regeneration observed the Cumberland Plain Woodland within Areas 19 and 20 has the potential to regenerate with the continuation of regeneration works however this will always lack the diversity of species typical of this community and therefore represent a simplified form of the community.

3.2 Fauna habitat

Broad habitat types that the study area supports are forest / woodland in the northern cluster, low closed forest / scrub predominately in the western, central and southern clusters of reserves, grasslands, aquatic environments and modified environments such as exotic gardens and planting.

Forest / woodland in the northern cluster supports a connected canopy of Eucalypts throughout which provides nesting and roosting resources for some bird species as well as a seasonal food resource for nectar as well as insect feeding birds and other species such as Grey-headed Flying Fox *Pteropus poliocephalus.* The shrub layer is very sparse and provides limited habitat resources. The ground layer has leaf litter to 10 centimeters (cm) as well as fallen and cut logs and densely vegetated grassy areas providing a diversity of habitats for a range of reptiles ground dwelling mammals and invertebrates. Four hollows were recorded during the field survey in Area 20 including a 35 cm wide hollow in a Forest Red Gum, and pipe hollows to 10 cm in diameter as well as exfoliating bark from stags and mature trees. The larger hollow provides potential habitat for arboreal mammals as well as a hollow dependent bird species. The smaller hollows and crevices created by exfoliating bark provide habitat for a range of microchiropteran bats.

An open forest habitat is also provided by patches of canopy trees outside of reserves (Figure 3). These areas have are relatively small and are disconnected from other bushland areas. The shrub layer is suppressed by mowing. The ground layer is mown grasses dominated by native species.

UBM (2012) recorded only one species of arboreal mammal, Common Brushtail Possum *Trichosurus vulpecula* within the study area. While this habitat type supports habitat for a diversity of arboreal mammals it is likely these are limited to one or two species common to urban environments due to the cleared and fragmented condition of the surrounding landscape.

Low closed forest / scrub supports a dense low canopy of predominately *Melaleuca* spp. with occasional emergent Eucalypts and where a break in the canopy allows, a dense shrub layer. The low dense canopy and

shrub layer provides ideal shelter and nesting resources for small birds. While the canopy and shrub layers are not particularly diverse in species they do include abundant flowers providing seasonal food resources for nectar feeding birds. The ground layer is generally sparse with little leaf litter with grasses thick at the edges of reserves.

Grasslands are generally mown and of the areas surveyed much of the grasslands are comprised of native species, predominately Kangaroo Grass. These areas support habitat for small reptiles and grass seed feeding birds.

Aquatic environments within the study area include the upper part of the Cooks River which flows through Area 25 in the southern cluster to the adjacent Golf Course. This was not inspected during the field survey. UBM (2012) describe a creekline with earthen banks and creek bed with areas of emergent reeds where light penetration allows and several pools approximately one metre wide and two metres long. There are no other significant aquatic environments within the study area. There are some small landscaped ponds. The series of concrete drainage channels throughout the study area does not support any native vegetation or pools.

Modified environments occur throughout the study area as exotic gardens and lawns and mixed exotic plantings amongst burials. These areas provide habitat for a range of fauna species common to urban environments and are unlikely to provide important habitat to any threatened species.

3.3 Biodiversity Values

A summary threatened flora and fauna species, populations and TECs recorded or considered likely to occur within the study area is provided below.

3.3.1 Threatened flora species and populations within the study area

A total of 23 threatened flora species (or their habitats) and two threatened populations listed under the TSC Act and/or EPBC Act have previously been recorded or are predicted to occur within 5 km of the study area. Of these species four species have been recorded within the study area. No further species or populations were assessed as likely to occur within the study area.

The records of threatened flora locations within the study area have been taken from The *Threatened Plant Census for Native Vegetation at Rookwood Necropolis* (UBM 2012) and the *Wahlenbergia multicaulis Survey of Rookwood Necropolis* (Smith &Smith 2011) as well as additional opportunistic records made during the field survey. The locations of threatened flora species are shown in (Figure 3). Threatened flora species, populations and their status are shown in Table 1.

Table 1: threatened flora species and populations within the study area

Species or population	EPBC Act Status	TSC Act Status
Downy Wattle *Acacia pubescens*	Vulnerable	Vulnerable
Epacris purpurascens* var. *purpurascens	Not Listed	Vulnerable
Plum Leaf Pomaderris *Pomaderris prunifolia*	Not Listed	Endangered Population
Tadgell' Bluebell *Wahlenbergia multicaulis*	Not listed	Endangered Population

The implications of the presence of these threatened flora species is discussed in Section 5 below.

3.3.2 Threatened fauna species within the study area

A total of 43 threatened fauna species (or their habitats) listed under the TSC Act and/or EPBC Act have previously been recorded or are predicted to occur within the locality. A total of 32 migratory species listed under the EPBC Act have also been previously recorded within the locality. Of these species, two threatened species and two migratory species have been recorded within the study area in recent times by UBM (2012). These species are listed in Table 2 below. No threatened or migratory species were recorded by Biosis during the current survey. One additional threatened fauna species is considered likely to occur within the study area.

Table 2: threatened fauna species recorded or likely to occur within the study area

Species	EPBC Act Status	TSC Act Status	Recorded/ Predicted to occur	Area within study area that provides habitat / resources	Importance of habitat provided to the local population
Eastern Bentwing -bat *Miniopterus schreibersii*	Not Listed	Vulnerable	Recorded by UBM (2012)	Recorded in the western and central cluster (UBM 2012). No breeding habitat within the study area. Foraging habitat in all of the areas of native vegetation.	Low - although the species has been recorded in the study area, it is unlikely to support important habitat.
Green and Golden Bell Frog *Litoria aurea*	Vulnerable	Endangered	Recorded within Area 25 in the southern cluster in 1965	May utilize Areas 25 in the southern portion of the study area.	Moderate – Study area is listed as historically occupied or strategic potential habitat for the Greenacre key population. Uppear reaches of the Cooks River in Reserve 25 may be considered important habitat for this species.
Grey-headed Flying Fox *Pteropus*	Vulnerable	Vulnerable	Recorded by UBM (2012)	All areas of native vegetation	Low – the study area is likely to provide a very

piliocephalus				throughout the cemetery as well as exotic plantings provide potential foraging resources.	small proportion of the foraging resources for this very mobile species.
Little Eagle ***Hieraaetus morphnoides***	Not listed	Vulnerable	Predicted to occur	Limited breeding habitat in the northern cluster and prey species throughout the study area.	Low – the study area is unlikely to provide a significant proportion of the foraging resources for this very mobile species.
Regent Honeyeater ***Xanthomyza phrygia***	Endangered	Critically Endangered	Recorded in the northern cluster most recently in 1987		Low – the study area is unlikely to provide a significant proportion of the foraging resources for this mobile species.
Rufous fantail ***Rhipidura rufifrons***	Migratory	Not listed	Recorded by UBM (2012)	No Breeding Habitat within the study area. Foraging habitat occurs within dense Cooks River Castlereagh Ironbark Forest within the reserves of the western, central and southern clusters.	Low - the study area is unlikely to provide a significant proportion of the foraging resources for this species.
Clamerous Reed Warbler ***Acrocephalus stentoreus***	Migratory	Not listed	Recorded by UBM (2012)	No Breeding Habitat within the study area. Foraging habitat occurs within dense Cooks River	Low - the study area is unlikely to provide a significant proportion of the foraging resources for

				Castlereagh Ironbark Forest within the reserves of the western, central and southern clusters.	this species.

The study area is considered to be at least of moderate importance to one of the species listed in Table 2:

- Green and Golden Bell Frog: Database records show the Greenacre population of this species has been recorded in 2005 at Cox's Creek Reserve and the 'Old Brick Works' at Juno Parade, Greenacre, approximately 2.2 kilometres to the south-southeast of the study area. The most recent records of the species from the locality are from 2012, adjacent to Bark Hut Reserve on the Cook's River approximately 2.6 kilometres to the southeast of the study area. Potential habitat in the southern portion of the study area is referenced in *The Green and Golden Bell Frog Key Population at Greenacre – Management Plan* (DECC 2007) as an area likely to be at least transiently occupied by the species and having value as a potential a movement corridor. An upper part of the Cooks River flows through Area 25 to the adjacent Golf Course.

The study area is assessed as being of low importance to the remaining six species list in Table 2. Assessments, as detailed in Section 5.2, would be required for all TSC Act or EPBC listed species occurring or likely to occur that are potentially impacted by a proposed activity.

3.3.3 Threatened Ecological Communities

Two TEC's occur within the study area (Figure 3):

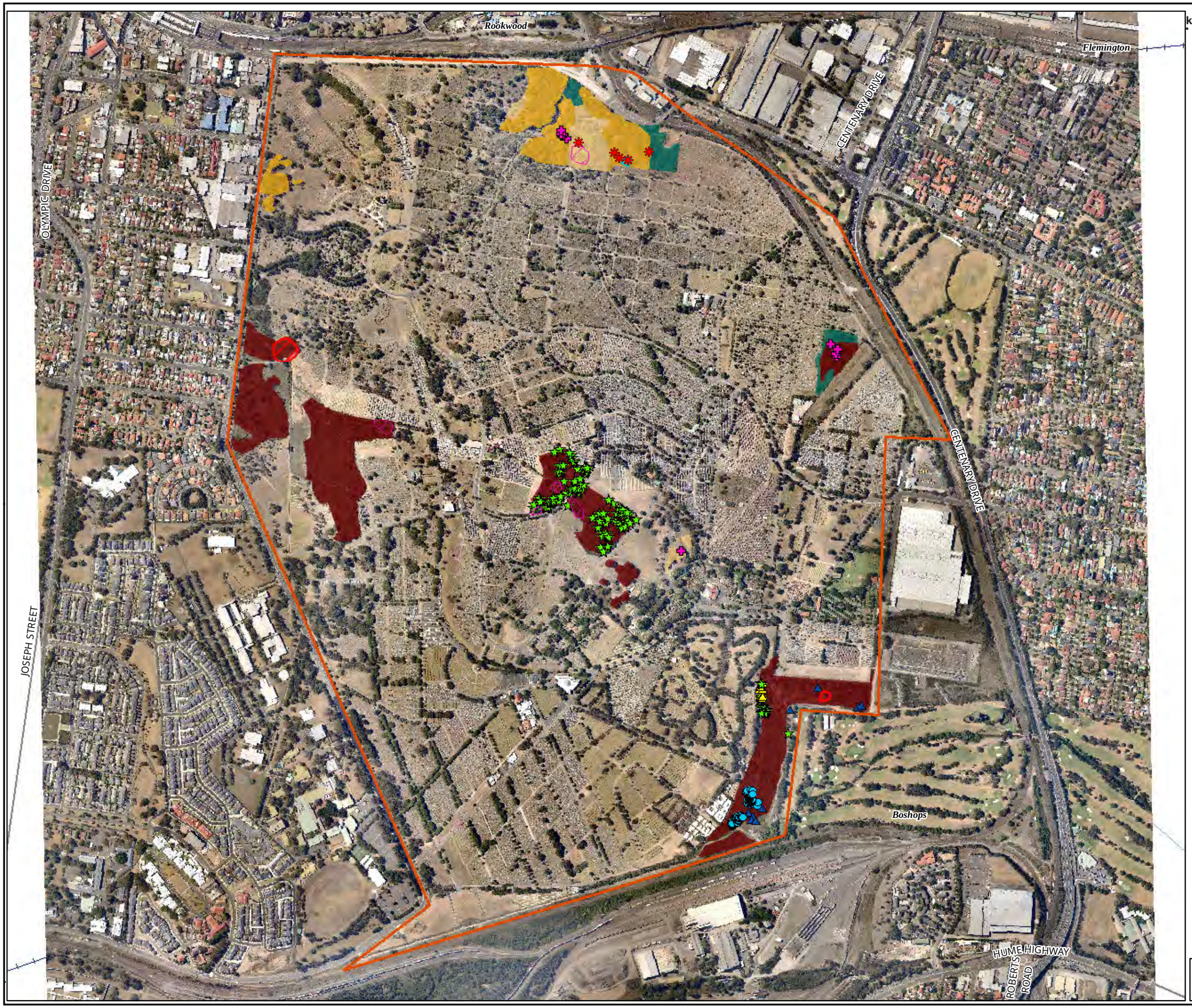
- Cooks River Castlereagh Ironbark Forest.
- Cumberland Plain Woodland.

The conservation status of these communities, the area of each within the cemetery and proportion of the community within the region represented within the study area is shown in Table 3.

Table 3: TEC's within the study area

Community	EPBC Act Status	TSC Act Status	Area of the community within the study area	% of the community within a 5km buffer of the study area represented	% of the community within a 10km buffer of the study area represented
Cooks River Castlereagh Ironbark Forest	Not listed	Endangered	17.26	34.65%	24.89%
Cumberland Plain Woodland	Critically endangered	Critically endangered	6.83	29.82%	4.71%

The implications of the presence of these TEC's is discussed in Section 5.



Legend

- Study Area
- Hollow bearing trees

Threatened spcies (individuals)

- *Epacris purpurascens* (UBM 2012)
- *Wahlenbergia multicaulis* (P & J Smith 2011)
- *Acacia pubescens* (Biosis 2014)
- *Pomaderris Pruifolia* (UBM 2012)
- *Acacia pubescens* (UBM 2012)

Threatened species (patches)

- *Acacia pubescens* (Biosis 2014)
- *Acacia pubescens* (UBM 2004)
- *Pomaderris prunifolia* (UBM 2013)

Vegetation communities

- Cooks River Castlereagh Ironbark Forest
- Cumberland Plain Woodland
- Cumberland Plain Woodland (TSC Act only)
- Urban Exotic / Native

Acknowledgements: Topo (c) NSW LPI.
Imagery (c) Nearmap2014

Figure 3: Ecological Features of the Study Area

0 90 180 270 360 450

Metres
Scale: 1:9,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56

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4. Preliminary BioBanking Assessment

A preliminary BioBanking assessment has been conducted to assess the feasibility of a BioBanking Agreement as a way of managing the biodiversity values within the cemetery while allowing some clearing to increase burial space. A formal BioBanking agreement may allow the removal of vegetation to create space for burial by setting aside and registering areas of retained native vegetation as a BioBanking site and committing to enhancing and protecting the biodiversity values of these areas. Registering retained areas of vegetation under a BioBanking Agreement would create ecosystem credits which can then be retired to offset impacts. Areas of vegetation retained under a BioBanking Agreement would then be managed for conservation in perpetuity.

A constraint to this is that TEC and threatened species are red flag areas and therefore cannot be subject to a BioBanking agreement without applying for a red flag variation. All of the Cooks River Castlereagh Ironbark Forest and Cumberland Plain Woodland and any areas supporting threatened species and or populations as mapped in Figure 3 would be considered 'red flag' areas. A red flag variation is determined by the NSW Environment and Heritage Director General who would determine whether a red flag variation can be granted. Criteria required to be met required for a red flag variation are:

- That reasonable measures have been considered to avoid impacts on red flag areas.
- Highly cleared vegetation types have been considered.
- Contribution to regional biodiversity values must be low.
- Viability of the red flag area must be low or not viable.
- Consistency with regional plans.
- Whether extra environmental contributions have been made or are being considered.

Information would need to be provided within the BioBanking Assessment Report, that accompanies an application for a BioBanking Statement, to demonstrate that all other reasonable measures (i.e. adjusting the configuration of plots, and incorporating alternative, low impact memorials) have been considered to avoid impacts to the TEC and threatened species present and that the proposal is able to improve or maintain the viability of the TEC and threatened species occurring. The latter would usually be achieved through a vegetation management plan which would likely be a revised version of the current Bushland Plan of Management for Rookwood Necropolis (UBM 2003).

A formal BioBanking Assessment Report and application would be prepared including documentation of the BioBanking Assessment, conducted by an accredited BioBanking Assessor using the data collected to date.

A BioBanking statement would set out the credit requirements to offset impacts of the proposal. This would be submitted with a development application.

One of the major benefits of the BioBanking is that NSW Assessments of Significance re not required. A BioBanking Agreement and would therefore exempt the Rookwood Necropolis Trust from requiring Assessments of Significance and / or Species Impact Statements under the *Environmental Planning & Assessment Act 1979* (EP&A Act).

4.1 BioBanking Assessment Results

The vegetation communities mapped in Figure 3 have been further classified into management zones based on condition. The BioBanking condition classes for the study area are shown in Figure 4 and include:

- Cooks River Castlereagh Ironbark Forest – low condition.
- Cooks River Castlereagh Ironbark Forest – moderate to good condition.
- Cooks River Castlereagh Ironbark Forest – moderate to good condition (mown).
- Cumberland Plain Woodland – low condition.
- Cumberland Plain Woodland – moderate to good condition.
- Cumberland Plain Woodland – moderate to good condition (mown).

Under the BioBanking assessment methodology vegetation condition is classed as either 'moderate – good' or 'low'. A further classification has been added to separate areas of clumped native trees outside of reserves with mown grass in the ground layer as 'mown'. These areas have been assessed as good to moderate condition however need to be differentiated from areas with intact shrub and ground strata as this effects the credit value for these areas.

The preliminary BioBanking assessment has calculated the amount of credits required for each area if the vegetation is removed and credits gained if vegetation is retained and the area is reserved under a BioBanking Agreement. These values can now be applied to scenarios that would allow additional space for burials and conserve the better quality remnants within the study area.

- Scenario 1 - *remove the low condition vegetation (Figure 4) and offset with a BioBanking Agreement for the remaining vegetation on the site.*

The offset required for the removal of the low condition vegetation is 12 ecosystem credits. Retaining the remaining vegetation under a BioBanking Agreement would provide 153 ecosystem credits. This would achieve the offset and provide a surplus of 141 ecosystem credits and would allow up to **1.99 hectares** of vegetation to be cleared for burial space. However, as some sections of low condition Cumberland Plain Woodland in the northern cluster (Area 20) have been buried out, this option may not be suitable.

- Scenario 2 – *remove all low condition Cooks River Castlereagh Ironbark Forest as well as areas that are outside of reserves and are currently mown.*

The offset required for scenario 2 is 37 ecosystem credits. Retaining the remaining vegetation under a BioBanking Agreement would provide 155 ecosystem credits. This would achieve the offset and provide a surplus of 118 ecosystem credits and would allow **1.88 hectares** of vegetation to be cleared for burial space. Again, as some sections of low condition Cumberland Plain Woodland in the northern cluster (Area 20) have been buried out, this may reduce the land released for burials.

- Scenario 3 – *remove all low condition Cooks River Castlereagh Ironbark Forest, all areas that are outside of reserves and are currently mown, as well as Cooks River Castlereagh Ironbark Forest in moderate to good condition in Area 8, Area 27, Area 28 and Area 7.*

The offset required for scenario 2 is 159 ecosystem credits. Retaining the remaining vegetation under a BioBanking Agreement would provide 124 ecosystem credits. This would not achieve the offset and would result in a deficit surplus of 35ecosystem credits that would need to be sourced off-site. This scenario would allow **6.08 hectares** of vegetation to be cleared for burial space.

This analysis has also shown that retention of areas of native vegetation where all strata are present can provide offsets for removal of the low condition and mown areas with a significant surplus of credits. Removal of moderate to good condition Cooks River Castlereagh Ironbark Forest in Areas 8, 27, 28 and 7 in addition to low condition Cooks River Castlereagh Ironbark Forest and mown areas may require additional offsite offsets. While Scenarios 1 and 2 do not free up large areas for burial these are proposals that are likely to be granted a red flag variation by NSW Office of Environment and Heritage. Scenario 3 frees up the largest area for burials but will require the sourcing of credits offsite. In addition, Scenario 3 would require a red flag variation. Negotiations would be required in order to gain a red flag variation.

Legend

Study Area

Reserve boundaries

Threatened spcies (individuals)

Epacris purpurascens (UBM 2012)

Wahlenbergia multicaulis (P & J Smith 2011)

Acacia pubescens (Biosis 2014)

Pomaderris Pruifolia (UBM 2012)

Acacia pubescens (UBM 2012)

Threatened species (patches)

Acacia pubescens (Biosis 2014)

Acacia pubescens (UBM 2004)

Pomaderris prunifolia (UBM 2013)

Biobanking classifications

Cooks River Castlereagh Ironbark Forest - Low condition

Cooks River Castlereagh Ironbark Forest Good to moderate condition

Cooks River Castlereagh Ironbark Forest - Mown

Cumberland Plain Woodland Low condition

Cumberland Plain Woodland Moderate to good condition

Cumberland Plain Woodland - Mown

Acknowledgements: Topo (c) NSW LPI
Imagery (c) Nearmap 2014

Figure 4: BioBanking Assessment Classifications

0 90 180 270 360 450

Metres

Scale: 1:9,000 @ A3

Coordinate System: GDA 1994 MGA Zone 56

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5. Constraints analysis

5.1 Ecological constraints mapping

The study area includes a number of biodiversity values, as documented in Section 3 and Figure 3, which form constraints to any proposed development within these areas. Many of these biodiversity values occur together, such as in Area 20 where TSC Act listed *Pomaderris prunifolia* endangered population occurs within Cumberland Plain Woodland that is listed under both the TSC Act and the EPBC Act. Figure 5 shows biodiversity constraints scoring for the study area. The biodiversity constraints scoring is based on four factors that influence the level of constraint within an area. These are:

- Presence and conservation status of TEC as listed under the TSC Act and EPBC Act.
- Percent of TEC within a 10 km buffer that is represented within the study area.
- Presence and conservation status of threatened species as listed under the TSC Act and EPBC Act.
- Condition based on the BioBanking assessment methodology condition classes.

Each of the four factors listed above has been assigned a range of scores, or weighting, based on the level of constraint. The four factors influencing the various levels of constraint and the range of scores are detailed in Table 4.

Table 4: Environmental constraints factors and weighting

Factor effecting level of constraint	Presence of TEC and status	Percentage of the community occurring with a 10 km buffer represented within the study area	Presence of threatened species and their status	Condition
Score range	TSC listed community = 2	Vegetation represents <20% of community in 10 km = 3	TSC listed species = 2	Poor condition = -1
	EPBC listed community = 3	Vegetation represents >20% of community in 10 km = 3	EPBC listed species = 3	Moderate to good condition = 0

5.2 Implications of biodiversity constraints

A summary of the assessment pathway and any further assessment requirements for threatened species, populations and ecological communities listed under the TSC Act and protected matters listed under the EPBC Act is given below.

5.2.1 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The assessment process for Matters of National Environmental Significance (MNES) listed under the EPBC Act requires consideration against the Significant Impact Criteria as set out in the Matters of National Significance:

Significant impact Guidelines. This includes a set of criteria required for consideration. Significant impact criteria are set out for critically endangered and endangered ecological communities listed under the EPBC Act. If a proposal is assessed as likely to have a significant impact on a MNES a referral to the Federal Minister for the Environment is required to determine whether the proposed works are considered a Controlled Action.

5.2.2 Matters of NES relevant to the study area are summarised in *Threatened Species Conservation Act 1995* (TSC Act)

The TSC Act provides for the protection and conservation of biodiversity in NSW through the listing of threatened species, populations and communities; key threatening processes; and critical habitat for threatened species, populations and communities.

If the proposal poses a risk of harm to a TEC, threatened flora or fauna species or populations or habitat for a threatened species listed under the TSC Act an Assessment of Significance (7-part test) is required under Section 5A of the EP&A Act. Where an Assessment of Significance determines that a development will result in a significant effect to threatened biota, a Species Impact Statement (SIS) is required. In this instance the project is referred to the Director General of NSW Environment and Heritage who determines further assessment requirements, mitigation measures and/or offset requirements.

TSC Act listed species communities and populations relevant to the study area are summarised Table 6**.**

Table 6: TSC listed species populations and communities

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Table 5: Matters listed under the EPBC Act

Matter of NES	Assessment required for any proposal works that may impact mater of NES	Implication
Cumberland Plain Woodland	Assessment of any potential impact against significant impact criteria for endangered and critically endangered community. EPBC Act Referral to DoE if potential impact meets the significant impact criteria.	Any significant reduction of the EPBC listed Cumberland Plain Woodland or activity that is likely to impact on a significant area of the understory will require a referral to DoE. Consultation with DoE is required if such a proposal is considered.
Downy Wattle ***Acacia pubescens***	Assessment of any potential impact against significant impact criteria for a vulnerable species. EPBC Act Referral to DoE if potential impact meets the significant impact criteria.	This species within the study area constitutes an important population as defined by the Significant Impact Guidelines 1.1. Any significant reduction of this population or habitat for the population will require a referral to DoE. Consultation with DoE is required if such a proposal is considered.
Green and Golden Bell Frog ***Litoria aurea***	Any proposed impacts to the riparian area or vegetation within 200 metres of the creekline requires surveys as defined in the survey guidelines for this species. If the species is found to occur or potential habitat is present then potential impacts to	Potential habitat for this species is limited to the creekline within Area 25. No implications for the rest of the study area.

	this need to be assessed against the significant impact criteria for a vulnerable species.	
Grey-headed Flying Fox *Pteropus poliocephalus*	Assessment of any potential impact against significant impact criteria for a vulnerable species. EPBC Act Referral to DoE if potential impact meets the significant impact criteria.	Study area does not support important habitat for this species.
Rufous fantail *Rhipidura rufifrons* **Clamerous Reed Warbler *Acrocephalus stentoreus***	Assessment of any potential impact against significant impact criteria for migratory species. EPBC Act Referral to DoE if potential impact meets the significant impact criteria.	The study area is not important habitat for these migratory species. These species are not considered significant constraints.

5.2.3 *Threatened Species Conservation Act 1995* (TSC Act)

The TSC Act provides for the protection and conservation of biodiversity in NSW through the listing of threatened species, populations and communities; key threatening processes; and critical habitat for threatened species, populations and communities.

If the proposal poses a risk of harm to a TEC, threatened flora or fauna species or populations or habitat for a threatened species listed under the TSC Act an Assessment of Significance (7-part test) is required under Section 5A of the EP&A Act. Where an Assessment of Significance determines that a development will result in a significant effect to threatened biota, a Species Impact Statement (SIS) is required. In this instance the project is referred to the Director General of NSW Environment and Heritage who determines further assessment requirements, mitigation measures and/or offset requirements.

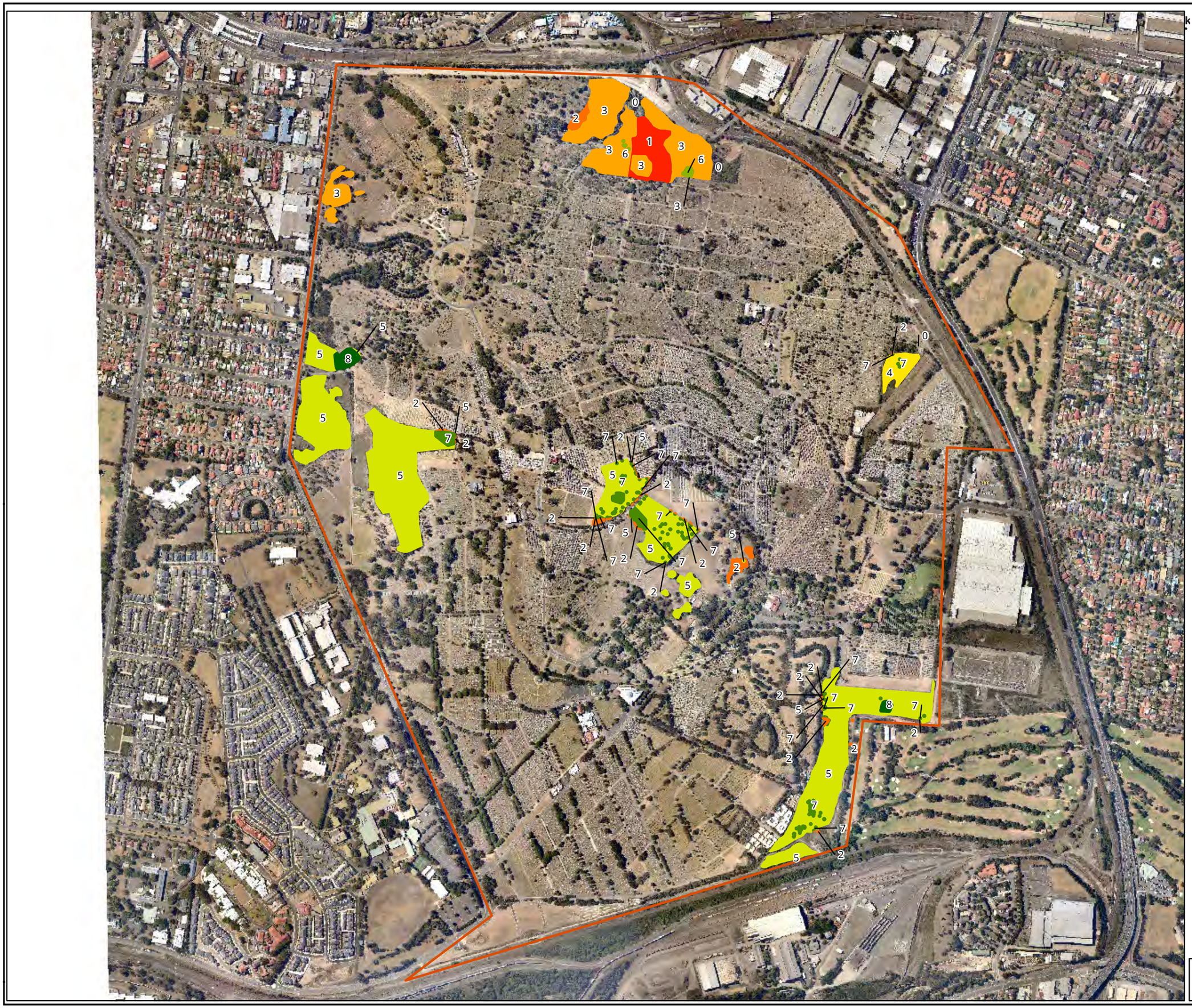
TSC Act listed species communities and populations relevant to the study area are summarised Table 6**.**

Table 6: TSC listed species populations and communities

TSC listed community, population, species	Assessment required for any proposal works that may impact mater of NES	Implication
Cumberland Plain Woodland	Assessment of significance required for any proposal that may impact the community. SIS required for any significant impact to the community. Red flag variation required to be able offset impact to this community.	Areas of Cumberland Plain Woodland mapped as TSC Act only (Figure 3) are in poor condition. Proposed activities in these areas are unlikely to constitute a significant impact. A proposal requiring significant removal of vegetation outside of low condition areas will require an SIS.

TSC listed community, population, species	Assessment required for any proposal works that may impact mater of NES	Implication
Cooks River Castlereagh Ironbark Forest	Assessment of significance required for any proposal that may impact the community. SIS required for any significant impact to the community. Red flag variation required to be able offset impact to this community.	The patch of this community outside of conservation reserves to the eastern portion of the study area is in low condition. Removal of this vegetation is unlikely to have a significant impact on the community; however nine large Downy Wattle are a further constraint in this area. A proposal requiring significant removal of vegetation outside of low condition areas will require an SIS. The study area includes 24.89 % of the community occurring within a 10 km buffer of the study area. This raises the importance of the TEC within the study area and reduces the likelihood for any significant amount of vegetation removal.
Downy Wattle *Acacia pubescens*	Assessment of significance required for any proposal that may impact the species. SIS required for any significant impact to the community. Red flag variation required to be able offset impact to species or habitat for the species.	Any significant reduction of this population or habitat for the population will require an SIS.
Epacris purpurascens var. purpurascens ***Plum Leaf Pomaderris Pomaderris prunifolia endangered population*** **Tadgell' Bluebell *Wahlenbergia multicaulis* endangered population**	Assessment of significance required for any proposal that may impact the species. SIS required for any significant impact to the community. Red flag variation required to be able offset impact to species or habitat for the species.	Any significant removal of these species is likely to require an SIS.
Green and Golden Bell Frog *Litoria aurea*	Any proposed impacts to the riparian area or vegetation within 200 metres of the creekline in Area 25 requires surveys as defined in the survey guidelines for this	Potential habitat for this species is limited to the creekline within Area 25. No implications for the rest of the study area. The targeted surveys required for works

TSC listed community, population, species	Assessment required for any proposal works that may impact mater of NES	Implication
	species. If the species is found to occur or potential habitat is present then potential impacts to this need to be assessed.	will inform of the potential implications of this species.
Grey-headed Flying Fox *Pteropus poliocephalus*	Assessment of significance required for any proposal that may impact the species. SIS required for any significant impact to the species. Red flag variation required to be able offset impact to species or habitat for the species.	Study area does not support important habitat for this species.
***Miniopterus schreibersii* Eastern Bentwing -bat**	Assessment of significance required for any proposal that may impact the species. SIS required for any significant impact to the species. Red flag variation required to be able offset impact to species or habitat for the species.	Study area does not support important habitat for this species.
Little Eagle *Hieraaetus morphnoides*	Assessment of significance required for any proposal that may impact the species. SIS required for any significant impact to the species. Red flag variation required to be able offset impact to species or habitat for the species.	Study area does not support important habitat for this species.
Regent Honeyeater *Xanthomyza phrygia*		



Acknowledgements: Topo (c) NSW LPI
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Figure 5: Biodiversity Constraints

0 90 180 270 360 450

Metres
Scale: 1:9,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56

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References

UBM (2003) *Bushland Plan of Management for the Rookwood Necropoli. NPWS Issue.* Prepared for The Joint Committee of Necropolis Trustees.

DEM/Landscan and UBM (revised and updated 2009) *Property Management Plan Rookwood Necropolis – Threatened Species Conservation Act 1995*. Prepared for The Joint Committee of Necropolis Trustees.

UBM (2012)*Threatened Plant Census for Native Vegetation at Rookwood Necropolis*. Prepared for the Rookwood Necropolis Trust.

Smith and Smith (2011) *Wahlenbergia multicaulis Survey of Rookwood Necropolis*. Prepared for the Rookwood Necropolis Trust.

UBM (2013) *Biodiversity Studies: Flora and Fauna Investigations for the Native Bushland at Rookwood Necropolis* . Prepared for the Rookwood Necropolis Trust.

DECC (2007) *The Green and Golden Bell Frog Key Population at Greenacre – Management Plan*. Department of Environment and Conservation, Sydney.

APPENDIX 03
SURFACE WATER REPORT - ENGENY

ENGENY
WATER MANAGEMENT

Rookwood Necropolis Trust

Surface Water Report

Rookwood Necropolis Landscape Masterplan

2 April 2014

V1100_162

www.engeny.com.au
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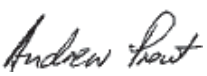
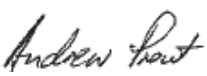
V1100_162 Rookwood Cemetery					
DOC PATH FILE: V:\Projects\V1100_162 Rookwood Cemetery\Documents\Revisions\Rev_0\V1100_162 Rookwood Cemetery Drainage and Flooding Report.docx					
REV	**DESCRIPTION**	**AUTHOR**	**REVIEWER**	**APPROVED BY**	**DATE**
Rev 1	Client Issue	Glenn Ottrey	Andrew Prout	Andrew Prout	2 April 2014
Signatures					

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Appendices

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1. INTRODUCTION

Engeny have been engaged to provide input to the Rookwood Cemetery Landscape Masterplan. Engeny are surface water management engineers specialised in drainage design, flood modelling and management, stormwater quality management and environmental compliance.

Glenn Ottrey from Engeny visited the Rookwood Cemetery on 3 February 2014 and met with Ian McIntosh from the Rookwood Necropolis Trust (RNT), John Richardson from the Catholic Cemeteries Board (CCB) and Jeff and Mark from the Rookwood General Cemeteries Trust (RGCT). During this visit the main drainage and flooding issues being experienced in the various parts of the site were discussed and viewed.

1.1 Data inputs

Ian McIntosh and Florence Jaquet have also provided drainage and flooding reports and information including the following that have been reviewed as part of this project.

- Drainage Investigation of Canals 10a and 10b, Rookwood, 1996 (Willing and Partners)
- Drainage Investigation of Canals 10a and 10b, Rookwood, 1996 (Willing and Partners)
- Groundwater Review and Contamination Issues Rookwood Necropolis by Woodward-Clyde 1999
- Haslam Creek Floodplain Risk Management Study and Plan, 2003 (Bewsher Consulting Pty Ltd)
- Haslam Creek Flood Study for Auburn Municipal Council, 1989 (E S Rowe and Ennis)
- Photos of 16/09/2010 flooding experienced at Rookwood Cemetery
- Photos of 6/12/2007 flooding experienced at Rookwood Cemetery
- Rainfall observations from Rookwood from 2005-2013
- Report by L R Squires into stormwater detention basins at Rookwood dated July 2013
- Rookwood Cemetery Canal/catchment plan
- Rookwood General Cemetery Reserve Trust Report to CEO – Stormwater detention basins at Rookwood, 2013 (L R Squires)
- Rookwood Necropolis Topography and Drainage plan dated November 2010
- Rookwood Necropolis Unit Boundaries plan

- Rookwood Necropolis: Report on the Canals, Ponds and Bridges and Selected Drains, 2010 (Hyder)

A full list of references including other reports referred to during the preparation of this report can be found in Section 9.

2. SURFACE WATER DRAINAGE

The main drainage of the site is performed by a series of canals. Many of these canals are over 100 years old and are heritage listed. Most are also in generally good condition however some are in poor condition and their ability to function properly is limited. A plan in **Appendix A** shows the catchment boundaries and canal locations within the cemetery. Hyder (2010) undertook a detailed review of the condition of the canals and the recommendations of that report are being investigated by RNT. The canals have been designed with aesthetic form in mind as much as hydraulic efficiency and as such they may be undersized based on modern design standards. The canals that were noted as being in particularly poor condition were the Catholic Branch Canal and the other adjacent tributary from the Rookwood Main Canal.

There is some underground drainage in the cemetery, generally underneath the roads. There is no consolidated register or list of drainage assets within the cemetery however some plans do exist. The condition of the underground drainage also varies significantly; the newer pipe are believed to be functioning largely as intended but much of the older pipework is not being regularly maintained and is most likely blocked. This means that in even relatively small rainfall events the roads and other overland flow paths are the primary means of conveying runoff to the canals. Given that this is not interfering with the operations of the Cemetery this is not considered to be a major issue that needs to be resolved however a formalised asset mapping, condition assessment and maintenance plan may help to extend the functional life of the newer and older drainage assets.

New buildings in the cemetery area will also pose an issue for the cemetery as the increase in runoff that they generate will need to be retained so that there is no net increase in flows from the cemetery. The Catholic Cemetery area is handling this by building one larger detention basin to offset the construction of a number of crypts, including some which are yet to be built. This is a good approach as it will remove the need to build multiple small storages every time a building is constructed.

2.1.1 Detention Basins

There are six existing detention basins within the Rookwood Cemetery and one which has been proposed by Auburn Council. Table 2.1 gives a description of each detention basin at the cemetery. The detention basins have been installed to meet the Auburn Council requirement that stormwater flows leaving the cemetery not increase as new buildings are built at the cemetery.

Table 2.1 – Detention Basins (Squires 2013)

Catchment	Description	Location	Remarks
Powells Ck	Small concrete	Mitchell Rd reserve on boundary of Strathfield and Auburn LGA	Retards stormwater generated at Weeroona Rd at eastern entrance to Rookwood
Powells Ck	Small vegetated swale	Graham Ave south	Retards stormwater flow generated at Weeroona Rd at eastern entrance to Rookwood
Cooks River	Structure integrated into building	CMCT Mausoleum	Retards stormwater flow generated by large building
Cooks River	1500 m^3 shallow detention over Lot 10	Lot 10	Restrains flow into Freshwater Creek via railway culvert.
Haslams Ck – Crematorium Branch canal	Mounds	Upstream of GO Chapel	Constrains flood to canal channel
Haslams Ck	Wide shallow pit with sump	Necropolis Drive west at East Street fence	Retards stormwater run-off across East St.
Haslams Ck – Crematorium and Main Branch canals	Proposed earth weir about 2.0 m high. For 30,000 m^3 of storage.	On boundary road next to East St fence at Main Branch efflux.	Reduces significant flood damage in Lidcombe.

2.2 Recommendations

2.2.1 Existing drainage network

The state of much of the existing underground drainage network is not known although it is suspected to not be functioning as originally designed. It is understood that new drainage pipes are occasionally being installed at Rookwood Necropolis, especially by the Catholic Trust. It is recommended that "as constructed" or at the least "detailed design" plans be kept in a central location in both hard and soft copy for all new works constructed. Ideally the locations and sizes of all drainage pits and pipes should be mapped.

Cleaning and general maintenance should also be carried out on the drainage network, especially on the newer assets. Given that maintaining underground assets is difficult for the cemetery trust consideration should be given in future to the use of formalised overland drainage methods such as swales and kerbside channels. These options can have the disadvantage of requiring more land than a conventional pit and pipe system, however they may be able to be accommodated within the road reserves.

2.2.2 New buildings

The Catholic Cemetery Trust is planning to build new crypts and has planned for this by meeting its future detention requirements in one single location. In our opinion this is a good approach as it will minimise the number of additional detention tanks/basins needed at the cemetery. If the General Cemeteries Trust is planning on building similar crypts or other facilities then they should be encouraged to undertake a similar level of planning and where possible consolidate detention requirements in a single location.

3. FLOODING

There have been a number of studies conducted by the Auburn Council on flooding in the Haslams Creek catchment, however these studies do not extend up into the cemetery. The studies can still provide some guidance for flooding at the cemetery boundary. The "Drainage investigation of Canals 10a and 10b, Rookwood" by Willing and Partners provides flood levels based on 1d models created for Canals 10a and 10b. Flooding observation and reports from the people who have been working at Rookwood indicate that flooding does occur at Rookwood Cemetery on a relatively frequent basis (more frequently than once every 10 years). This is in line with the findings by Willing and Partners (1996) which indicated that most of the drainage canals have a 1 to 5 year ARI capacity. In events larger than this some overland flow or flooding could be expected.

Most of the flooding occurs at the cemetery boundary where flows are restricted by road or rail embankments or adjacent to the canals. Water ponds up behind the road and rail embankments and creates a temporary pool behind the embankment which then drains away in well under 24 hours. **Appendix B** contains a plan of the cemetery showing the areas prone to flooding at the sites boundaries. These areas have been determined from photographs of floods which occurred on 16/09/2010 and 6/12/2007 and from values contained within the "Haslam Creek Floodplain Risk Management Study and Plan" (Bewsher Consulting 2003). The "Drainage investigation of canals 10a and 10b, Rookwood" (Willing and Partners 1996) also provides some 100 year ARI flood levels that have been included on the plan in **Appendix B**. The flood prone areas plan in **Appendix B** has been prepared using 2 m contour data as a base. As such there may be some inaccuracy in the areas shown as prone to flooding.

The size of the culverts or drains under the roads and railway embankments may be below modern design standards, however it is unlikely that the size of these outlets would be increased as it will increase flooding issues further downstream in the catchments.

The Bewsher (2003) report proposed many flood mitigation options within the Haslams Creek catchment, one of which was a retarding basin on cemetery land. The report by Squires (2013) reported on this option of creating a retarding basin on the boundary of the cemetery adjacent to East Road where the Main Branch Canal leaves the cemetery. Squire's report found that a retarding basin would provide a significant reduction in flooding for residents in Lidcombe and noted that the cemetery trust raised no objections to the concept of this basin when the flood study was presented for public comment in 2002 by Auburn Council. "It was acknowledged at the time that most of the area affected has been buried out and that detained water storage would not be of long duration" (Squires 2013). Engeny have confirmed with Auburn Council that this option is still being considered by the council for implementation sometime in the future although it was noted they are currently undertaking new flood mapping in the Haslams Creek Catchment which may change this recommendation.

Most of the outlet canals also have grates at the exit of the cemetery. These grates trap litter, organic matter, such as leaves, palm fronds and also bark used in landscaping.

Capturing this material significantly reduces the capacity of the outlet and will increase the flooding issues at the cemetery.

Engeny believes that the flooding that has been documented to date should not be considered a major problem for the following reasons:

- It is temporary in nature with flood flows draining away quickly and not impacting significantly on cemetery operations;
- It does not occur over major access roadways and so presents no safety access or evacuation issues; and
- It does not appear to damage graves or tombstones due to the low velocities of pooled floodwaters.

3.1 Recommendations

Much of the flooding being experienced at Rookwood Necropolis is being exacerbated by blocking of grates largely by organic matter at the site boundaries where the drainage channels transition to culverts under railway and roads. There are a couple of measures that could be investigated to help reduce this blockage and thus the frequency, duration and impact of flooding.

- Regular cleaning maintenance on drainage channels. On the site visit it was observed that there was a large amount of palm fronds, small branches, leaves and plastic flowers in the drainage channels. Ensuring that these materials are removed from the channels (where access is possible) on a regular basis and at the very least before predicted storm events would significantly help to reduce blockage at the key outlet points and would reduce flooding.
- Avoid construction of crypts or other buildings in areas known to be prone to flooding. If buildings are proposed near (within 30 metres of) existing drainage channels or in areas known to be prone to flooding then a flood investigation should be carried out to determine a suitable floor level for the building. This will ensure it is not flooded in the 100 year ARI flood and to ensure that safe access to the building can be maintained.

4. GROUNDWATER

4.1 Issues

There are several areas of the cemetery which are prone to being boggy due to waterlogging, a high ground water table, poor drainage or a combination of these things. The key areas where this was identified as an issue were:

1) The Mary MacKillop Catholic burial area and adjacent general burial areas adjacent to the Rookwood Main Branch Canal near Haslem Drive and Penola Street.

2) Greek Orthodox Burial area adjacent to the Crematorium Branch Canal.

3) The Catholic burial area south of Sheehy Avenue and Courtney Avenue.

These three locations present a problem as they are impacting on the ability of the Cemetery to conduct burials in these areas as digging machinery is not able to access the graves without risk of becoming bogged or tearing up the ground. Groundwater monitoring carried out by the Catholic Cemetery Trust showed that the watertable rose to within 1.2 m from the surface in some locations, but fluctuated lower during dry periods of the year.

4.2 International Standards

From Engeny's investigations the most thorough research on the impact of potential groundwater contamination or pollution from cemeteries we reviewed was conducted by Dent (2002). In this paper standards and cemetery practices from all around the world were reviewed and some of the key findings and recommendations summarised. The study was reviewing international standards and practices with a view as to how they should be applied in Australia. The relevant recommendations and findings were as follows:

- "No burials should lie at the cemetery boundary – buffer zones are needed; 5 – 10 m in clayey soils, 20 m or more in sandy soils";
- "The depth of burial is only limited by site conditions and ability to safely excavate";
- "The invert of a grave and hence the deepest burial depth, must be at least 1 m above any level to which a watertable fluctuates – more in clean coarse sandy or gravelly soils";
- "Drinking water wells should be at least 200 m (default) horizontally from any cemetery or 100-day travel days from the boundary after groundwater modelling";
- "The influences of perch and ephemeral watertables and springs need to be taken into account: don't bury near springlines and never in swampland"; and

- "Preserve and plant deep-rooting native trees and shrubs – particularly in buffer zones".

A number of other international standards from the UK and the European Union were reviewed as part of this study (NIEA undated, WHO 1998, EA 2004, and Cemetery Development Services undated). Each of these sources drew the following conclusions:

- Burial plots should be a minimum of 250 m away from any potable groundwater source;
- Burial plots should be at least 10 m from any field drains;
- Burial plots should be at least 30 m from any spring or watercourse;
- Graves should not hold standing water when dug (NIEA undated and EA 2004); and
- The base of burial pits should have a minimum 1 m clearance above the highest natural water table, taking into account natural variability of the watertable (WHO 1998 and Cemetery Development Services undated).

4.3 New South Wales Standards

There are no guidelines specifically setting out the acceptable clearance for a burial from a known watertable or aquifer in New South Wales. The laws preventing the pollution of groundwater would apply, however much of the literature reviewed suggests that the impact of groundwater pollution from interment is very localised (contained to within metres of the grave site).

Environmental Protection Agency guidelines exist in New South Wales for the burial of animals on farm properties (EPA 2014). There are significant differences between burying animals and interring human remains as animals are usually buried together in a single large pit whereas human interment is at a much lower density. The guidelines however have very similar recommendations to those found in Section 4.2. The EPA recommendations are that:

- "A burial area should be 100 m away from houses and watercourses";
- "The pit base at least 1 m above the level of the watertable"; and
- The site should have "Heavy soil of low permeability and good stability".

The guidelines also recommend that it is best to avoid:

- "Site sloping towards watercourses"; and
- "Areas that are likely to drain to watercourses of groundwater".

While these guidelines are aimed at burial of animals they can provide some guidance for the principles that would apply to interring human remains.

4.4 Previous reports

The Woodward-Clyde (1995) report into groundwater contamination at Rookwood Cemetery provides the most site specific recommendations for addressing groundwater issues at Rookwood. Some of the key findings from this report were:

- The groundwater within a 5 km radius of Rookwood Necropolis is categorised as "non-resource" status and there are no licenced groundwater bores or registered users of groundwater within that area;
- The construction of graves on the Rookwood Necropolis is generally within the surface weathered zone of clayey soil and weathered shaley materials;
- The estimated depth of the watertable would be within the range of 3 – 6 m of the surface with water tables closer to the surface likely being the results of "perched" water table;
- Some graves on the western boundary were supporting a perched water table close to the surface. This was explained as occurring due to the presence of nearby graves which act as a "bath tub" following rainfall events as the disturbed soil in the filled in grave allows water to enter the ground much more easily that the undisturbed surface; and
- The risk of bacterial and viral contamination would diminish within 3 – 5 m and any groundwater contamination would mainly comprise nitrogen.

4.5 Recommendations

The areas of the cemetery that are experiencing a high water table do present a constraint to expanding burials to these areas.

The clay soils of Rookwood Necropolis will help to prevent pollutant migration.

Based on the available information that has been reviewed the following recommendations are made:

- As is current practice no burials should be allowed within 10 m of the boundary of Rookwood Necropolis;
- Burials should not be allowed in areas where the groundwater is within 1 m of the base of the grave pit; and
- It is understood that in the past burials occurred to within 2 m of the existing drainage channels. In new burial areas this distance should be extended to 5 m. This is the

range by which pollutants should have significantly diminished according to the literature reviewed.

In order to help lower water tables in areas where the depth of the water table would prevent burials the following options should be investigated:

- Planting of as many deep rooted trees in the area as possible. Deep rooted trees can help to lower the watertable by drawing water up and transpiring it to the atmosphere. This is a longer term option that could be initiated now to help lower the water table in planed future burial areas;

- Maintaining existing drains upstream of problem areas. If the drainage system is working efficiently it will help to reduce the opportunity for surface water to pond and infiltrate to the groundwater;

- Install sub-surface drainage to help remove groundwater. Given that the infiltrate that flows into the sub-surface drains could potentially be contaminated disposing of this to the stormwater system would not be appropriate without conducting potentially ongoing tests on the composition of the leachate. A more appropriate option may to be discharge this leachate directly to the sewerage system. This would require a trade waste agreement with Sydney Water; and

- Installation and monitoring of groundwater bores in current and future burial areas to determine watertable levels to determine suitability of an area for burials. The recommended steps to undertake and interpret the results from a groundwater monitoring plan are described below

    - Step 1: Engage a hydrogeologist who can assist with siting, installation and monitoring plan for the bores. Bores may need to be monitored for 12 months or more to gain accurate information on groundwater fluctuations. Cemetery staff may be able to monitor and record data from bores.
    - Step 2: Engage a hydrogeologist to interpret the results of bore monitoring and make recommendations on whether area under observation is suitable to burials or if works are required to lower groundwater table. If lowering of the water table is required then a hydrogeologist can advise on how to achieve this.

5. WATER SENSITIVE URBAN DESIGN (WSUD)

Water Sensitive Urban Design is about integrating the water cycle and managing the impact of stormwater from development on waterways. The key principles of WSUD are to protect waterways, manage stormwater in the landscape and add multiple benefits while minimising development costs. The way these goals are generally achieved is by removing pollutants from stormwater before it enters waterways and reducing the total amount of runoff from developed areas.

The Rockwood Necropolis is not a highly developed area in the WSUD sense. The main impervious surfaces are roads and some scattered buildings. The majority of the site is covered by grass or stone/concrete graves which are not directly hydraulically connected to the stormwater system. Direct hydraulic connection is a key consideration of WSUD. An example of this the downpipe on a building that directly connects it to the stormwater system, however if that pipe discharged to a grassed drain or swale then that direct connection is broken as the flow will slow down and some will soak into the ground.

WSUD is mainly concerned with the impacts of development on waterways. The Rookwood Necropolis is not envisaged to have high levels of development in the near future as most development is limited to a few structures. As the level of development is low, the need for WSUD treatments is also fairly low.

A key consideration for Rookwood Necropolis is that many WSUD treatment measures such as wetlands and raingardens or biofilters require land that can be excavated. This means that WSUD treatments would compete for land with areas that could be used for burials. If there were plans to implement large scale WSUD treatments at Rookwood Necropolis the channels would most likely need to be altered in order to extract the water under gravity to get it to a treatment location.

5.1 Recommendations

Some WSUD treatments such as rainwater tanks, grey water harvesting and porous pavement can be implemented on a small scale and could be considered for future development at the cemetery however retrofitting the existing drainage system would be a costly and difficult exercise.

It is likely that planning permits will have some conditions that relate closely to WSUD goals, such as the requirement for detention tanks to be associated with new buildings. Meeting these permit conditions could give the opportunity to adopt some simple WSUD treatments in the future that does not require a large amount of burial suitable land to be forfeited.

6. SEPTIC TANKS

Engeny understand that there are areas of the cemetery that are not connected to the main sewerage system, primarily within the Catholic Trust controlled burial areas. The exact type of septic system(s) has not been confirmed, however all septic systems share the same need to dispose of treated effluent (liquid) usually through a system of absorption trenches.

Septic systems present minimal health risks assuming that they are well managed and regularly maintained. The main part of the septic process that can potentially pose a health risk is the area covered by the absorption trench. The Easy Septic Guide (NSW Department of Local Government 2000) doesn't list any legal requirements to restrict access to the absorption trench area however it does advise against letting children play in that area. As Rookwood Cemetery is open to the public it may be worthwhile for risk management to limit public access to areas where the absorption trenches are located or effluent disposal occurs if this does not already occur.

6.1 Recommendations

Consider limiting public access to the absorption trench area if not already done.

7. SUMMARY

The drainage and flooding issues that are present at Rookwood Necropolis do not pose a large constraint to future burials. Flooding experienced is short term in nature and to date is not causing damage to graves or buildings. The potentially biggest constraint to future burials is the presence of shallow water tables in some locations. Further work is recommended to more accurately determine the groundwater levels in these areas and to assess what actions could be undertaken to lower the groundwater levels if required.

Some of the current practices of burial do not match with recommended burial practices, as follows:

- Burying within 2 metres of the existing drainage channels is not considered appropriate based on the literature reviewed. A 5 metre buffer would be considered more appropriate given the conditions of the site and the information reviewed at this time; and

- Burying in areas where the groundwater is within 1 metre of the base of the grave pit is also not recommended. Based on the information provided to Engeny it is likely that burials are occurring in areas where the groundwater is within 1.2 metres of the surface which is not recommended by experts in this field.

8. QUALIFICATIONS

a. In preparing this document, including all relevant calculation and modelling, Engeny Management Pty Ltd (Engeny) has exercised the degree of skill, care and diligence normally exercised by members of the engineering profession and has acted in accordance with accepted practices of engineering principles.

b. Engeny has used reasonable endeavours to inform itself of the parameters and requirements of the project and has taken reasonable steps to ensure that the works and document is as accurate and comprehensive as possible given the information upon which it has been based including information that may have been provided or obtained by any third party or external sources which has not been independently verified.

c. Engeny reserves the right to review and amend any aspect of the works performed including any opinions and recommendations from the works included or referred to in the works if:

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   (ii) Engeny considers it prudent to revise any aspect of the works in light of any information which becomes known to it after the date of submission.

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f. If any claim or demand is made by any person against Engeny on the basis of detriment sustained or alleged to have been sustained as a result of reliance upon the report or information therein, Engeny will rely upon this provision as a defence to any such claim or demand.

9. REFERENCES

Bewsher Consulting Pty Ltd, 2003, *Halsams Creek Floodplain Risk Management Study and Plan* Bewsher Consulting Pty Ltd, Epping

Cemetery Development Services undated , *"Grey Water"… The law is Black and White"* Cemetery Development Services.

Dent, B, 2002, *The Hydrogeological Context of Cemetery Operations and Planning In Australia.* A thesis submitted to The University of Technology, Sydney

Environment Agency (EA) (2004), *Assessing the Groundwater Pollution Potential of Cemetery Developments* Environment Agency.

Environmental Protection Agency (EPA), undated, *Dead stock disposal*, Environmental Protection Agency New South Wales, viewed 18/02/2014, www.epa.nsw.gov.au/mao/deadstockdisposal.htm

Hyder, 2010, *Report on the canals, ponds, bridges and selected drains,* Hyder

Northern Ireland Environment Agency (NIEA), undated, *Cemeteries, Burials and The Water Environment* Northern Ireland Environment Agency Water Management Unit.

NSW Department of Local Government. 2000. *The Easy Septic Guide*. Developed by Social Change Media for the New South Wales Department of Local Government.

Squires, L.R, 2013, *Report to CEO – Stormwater detention basin at Rookwood*, Squires, L.R.

Willing and Partners, 1996 *Drainage Investigation of Canals 10a and 10b, Rookwood*, Willing and Partners, Crows Nest NSW

Woodward-Clyde, 1998, *Groundwater Review and Contamination Issues Rookwood Necropolis* Woodward-Clyde.

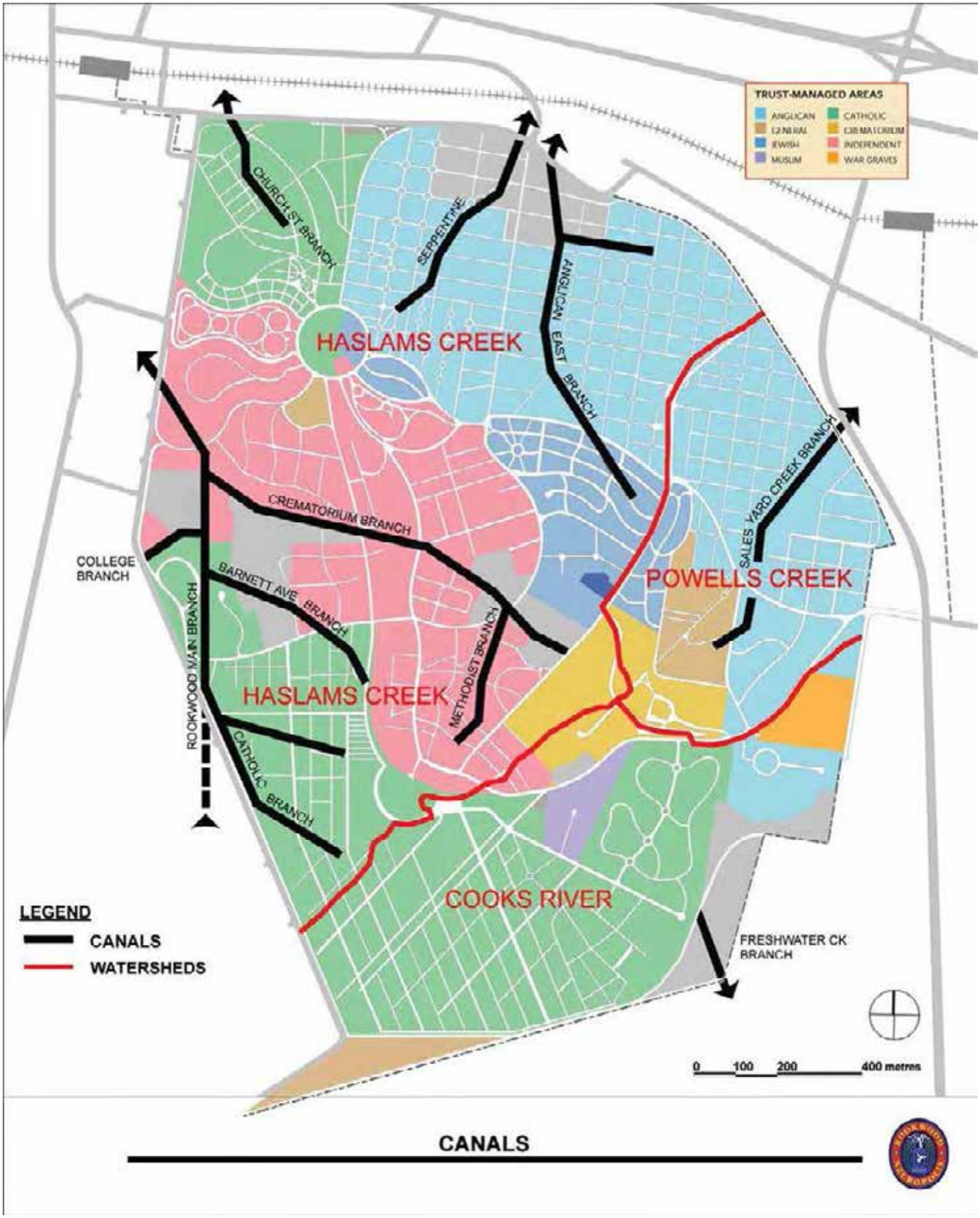
World Health Organisation (WHO), 1998, *The impacts of cemeteries on the environment and public health*. Waste Management WHO Regional Office for Europe.

APPENDIX A

Catchment Plan and Drainage Canal Layout

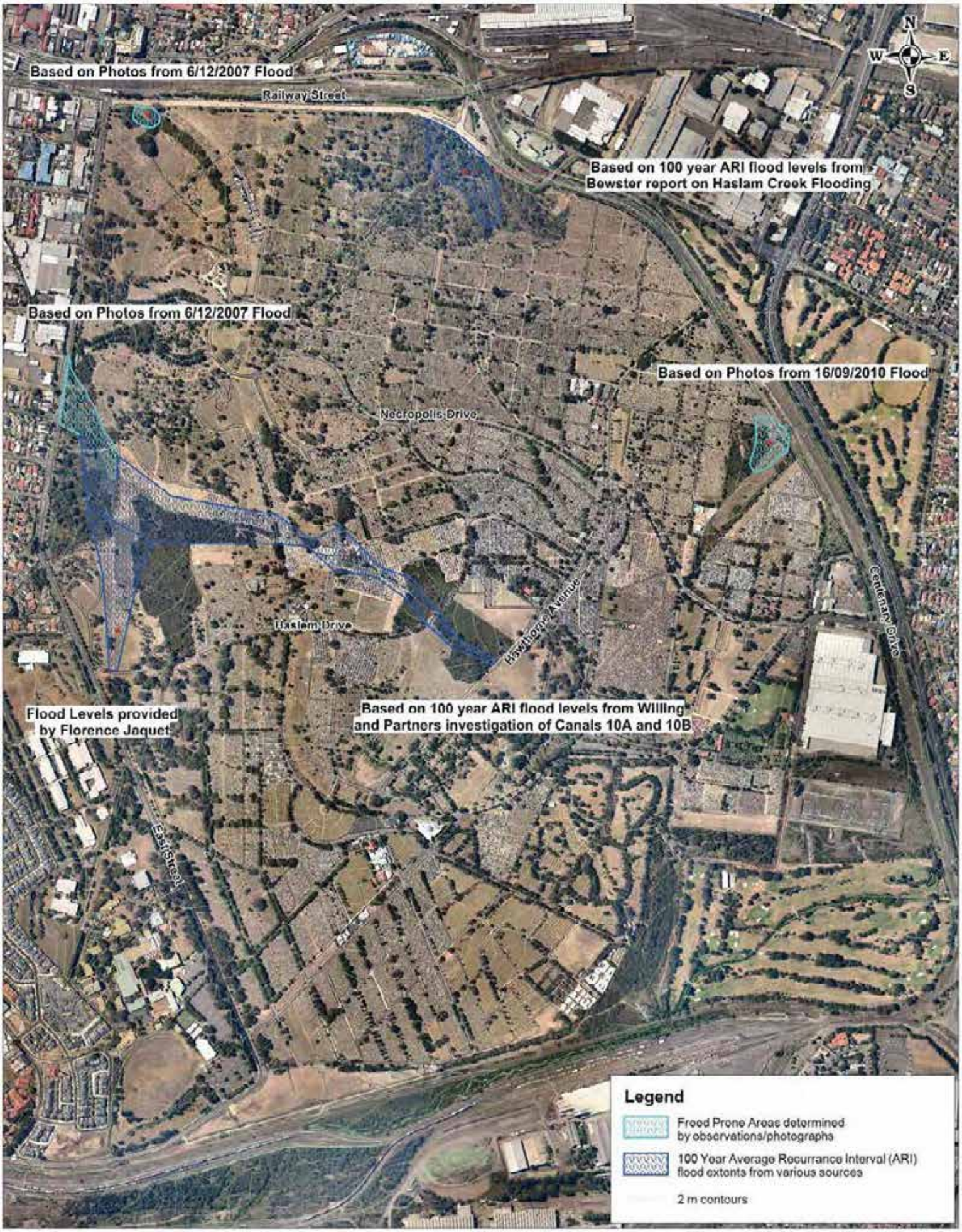
ROOKWOOD NECROPOLIS TRUST
SURFACE WATER REPORT

ENGENY WATER MANAGEMENT



APPENDIX B

Flood Prone Areas



ENGENY
WATER MANAGEMENT

0 150 300
Scale in Kilometers (1:7,500 @ A3)

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994, (GDA94)
Vertical Datum: Australia Height Datum
Grid: Map Grid of Australia, Zone 56

Rookwood Necropolis

Figure 1

Flood Prone Areas

Job Number: V1100_162
Revision: 0
Drawn: GD
Checked: AP
Date: 07/03/2014

APPENDIX 04

ARCHITECTURAL DRAWINGS - IGNITE ARCHITECTS

APPENDIX 04: ARCHITECTURAL DRAWINGS


By1 EAST GATEWAY - WEEROONA ROAD 21


By2 VICTORIA STREET GATEWAY 1


By3 LOGGIA - SYDNEY WAR CEMETERY 21


By4 MERCHANT NAVY WALL 5


By5 CREMATORIUM GARDEN WALLS 21


By6 BRICK BOUNDARY WALL 14B


By7 MARKERS TO CATHOLIC CEMETERY 9


By8 ISOLATED GATEWAY 3


Bg1 MORTUARY CHAPEL 2


Bg2 SACRED HEARTS CHAPEL 17


Bg3 ANGLICAN WAR MEMORIAL CHAPEL 4


Bg4 CHURCH OF ST ATHANASIUS 13


Bg5 OFFICE OF AUSTRALIAN WAR GRAVES 21


Bg6 ANGLICAN OFFICE 4


Bg7 INDEPENDENT CT OFFICE 12


Bg8 CATHOLIC CEMETERIES OFFICE 17


Bg9 JEWISH CEMETERY OFFICE 14A


Bg10 MUSLIM OFFICE 23


Bg11 RNT OFFICE 14B


Bg12 RNT MEETING ROOM 14B


Bg13 EAST STREET TRAINING CENTRE 8


Bg14 CAFE 21


Bg15 FLOWER STALL 21


Bg16 FLOWER SHOP NR GREEK CHURCH 13


Bg17 ANGLICAN RESIDENCE 4


Bg18 RNT RESIDENCE 14B


Bg19 CREMATORIUM RESIDENCE 15A


Bg20 RESIDENCE 21


Cr1 CREMATORIUM AND CHAPELS 15B


Cr2 CREMATORIUM COLUMB/M PAVILION 15B


Cr3 OCTAGONAL COLUMBARIUM - CREM 15B


Cr4 MERCHANT NAVY COLUMBARIUM 5


Cr5 MARY, MOTHER OF MERCY CHAPEL 17


Ms1 MAUSOLEUM OF THE RESURRECTION 17


Ms2 MAUSOLEUM OF ETERNAL REST 13


Ms3 FRAZER MAUSOLEUM 8


Ms4 UKRAINIAN CATHOLIC VAULT 18B


Mm1 RUSSIAN ORTHODOX SHRINE 6


Mm2 MILLENNIUM RUSSIAN ORTH/X SHRINE 13


Mm3 ARMENIAN MARTYRS' SHRINE 6


Mm4 QUONG SIN TONG MONUMENT & MOAT 8A


Mm5 CHINESE WAR PAVILION 20A


Mm6 CROWN OF THORNS SHRINE 17


Mm7 MEMORIAL TO MARTYRS 7


Mm8 LUTHERAN CHAPEL 16


Mm9 LUTHERAN WAR MEMORIAL 16


Mm10 CIRCLE OF LOVE MEMORIAL 13


Mm11 JEWISH WAR MEMORIAL 14A


Ot1 SITE OF MORTUARY RECEIVING STATION 7


Ot2 RNT ARBOUR 14B


Ot3 CARPARK OVER CANAL 13


Ot4 VARIOUS SHIPPING CONTAINERS -


Sh1 BRICK AND SLATE REST HOUSE 3


Sh2 ANGLICAN PAVILION No.1 4


Sh3 ANGLICAN PAVILION No.2 4


Sh4 ANGLICAN PAVILION No.3 4


Sh5 STONE SHELTER - ANGLICAN 5


Sh6 OLD GRAVE DIGGERS' HUT 4


Sh7 TIMBER LATTICE SHELTER No.1 3


Sh8 TIMBER LATTICE SHELTER No.2 3


Sh9 TIMBER LATTICE SHELTER No.3 5


Sh10 GAZEBO 13


Sh11 BUS SHELTER - ANGLICAN 5


Sh12 BUS SHELTER - TERMINUS 17


Sh13 SMALL BRICK SHELTER No.1 9


Sh14 SMALL BRICK SHELTER No.2 18B


Sh15 BRICK PAVILION WITH IRON ROOF 11


To1 TOILET BLOCK (OLD CATHOLIC) 2


To2 TOILET BLOCK (ANGLICAN) 4


To3 CHINESE TOILET BLOCK 20A


To4 TOILET BLOCK BEHIND CHAPEL 13


To5 TOILET BLOCK (RUSSIAN ORTHODOX) 6


To6 M & F TOILET AT CHAPEL 18A


To7 CMCT TOILET BLOCK 18B


To8 TOILET BLOCK 22


To9 JEWISH AMENITIES 14B


To10 JEWISH SMALL TOILET 14A


To11 TOILET NEAR INDEPENDENT OFFICE 12


Ws1 STATIONMASTER R'S STORE 7


Ws2 LUNCH ROOM & AMENITIES 15A


Ws3 CREMATORIUM WORKSHED 15A


Ws4 GARAGE NEAR CREMATORIUM W/SHED 15A


Ws5 ANGLICAN WORKSHEDS 4


Ws6 ICT AMENITIES & WORKSHOP 11


Ws7 AWGO WORKSHOP & AMENITIES 21


Ws8 AWGO STORAGE SHED 21


Ws9 CMCT EMPLOYEES' AMENITIES 17


Ws10 CMCT GARAGE & WORKSHOPS 17


Ws11 CMCT LARGE GARAGE & STORE 17

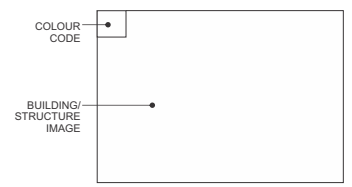

Ws12 SHED NEAR INDEPENDENT OFFICE 12


Ws13 JCT AMENITIES SHED (BEIGE) 14A


Ws14 JCT MACHINERY SHED (green) 14A


Ws15 RGCRT EASTERN WORKSHOPS 5


Ws16 RGCRT EASTERN WORKSHOPS 5



STRUCTURE

- OFFICES
- CHAPELS / CONDOLENCE LOUNGES
- CREMATORIA
- MAUSOLEA
- WORKSHOPS / SEHDS
- CAFES / PUBLIC FACILITIES / TOILETS
- MISCELLANEOUS

NOTE: Building tags taken from *Howard Heritage Consultancy "REPORT ON BUILDINGS AND STRUCTURES AT ROOKWOOD NECROPOLIS"* Dated January 2011.

ROOKWOOD NECROPOLIS TRUST MASTERPLAN **EXISTING STRUCTURES IMAGES**

DATE: 30th JUNE 2014
SCALE: NO SCALE
REVISION: D
DRAWING NO: **SK-02**

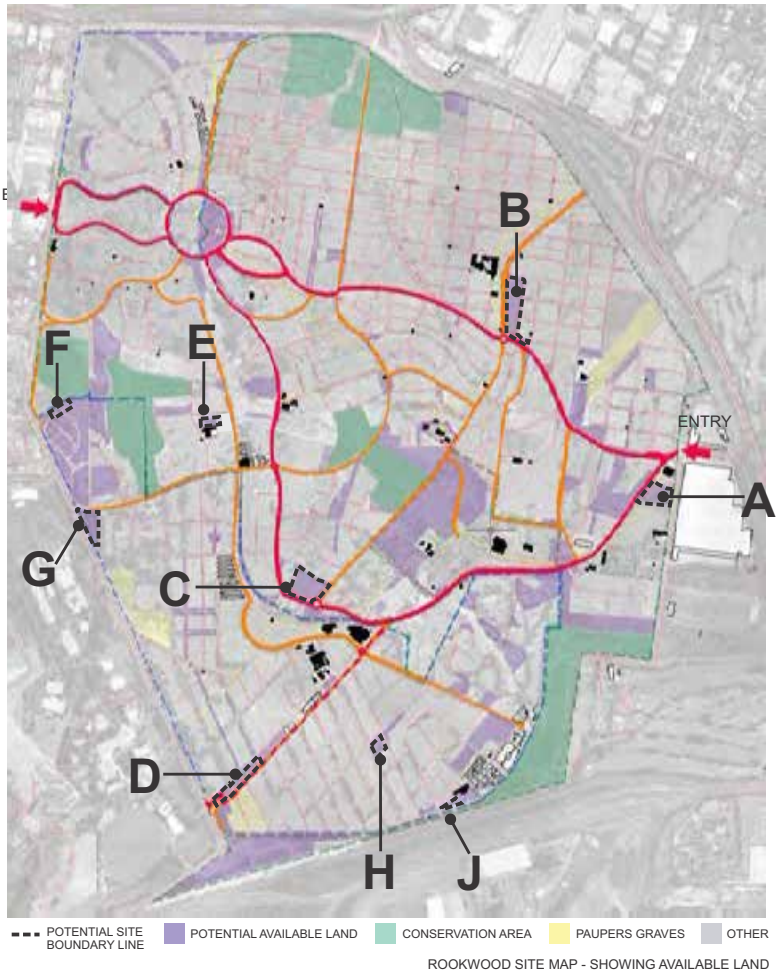
IGNITE

A

VIEW FROM CARPARK

VIEW TO REFLECTIONS CAFE

VIEW FROM AUSTRALIAN WAR GRAVES MEMORIAL



ROOKWOOD SITE MAP - SHOWING AVAILABLE LAND

VIEW FROM CARPARK

VIEW FROM AUSTRALIAN WAR GRAVES MEMORIAL

B

SOUTH VIEW

SOUTH VIEW

NORTH VIEW

VIEW TO ANGLICAN CHAPEL

VIEW TO MERCHANT NAVY COLUMBARIUM

EXISTING GRAVES

NORTH POINT

ROOKWOOD NECROPOLIS TRUST MASTERPLAN **POTENTIAL SITE LOCATION AND IMAGES**

DATE: 24th APRIL 2014
SCALE: NO SCALE
REVISION: D
DRAWING NO: **SK-06**

IGNITE

B

EXISTING GRAVES

NORTH VIEW

EXISTING MEMORIALS

C

VIEW FROM WEEKES AVENUE FACING EAST

NORTH VIEW

VIEW FROM HAWTHORNE AVE FACING SOUTH

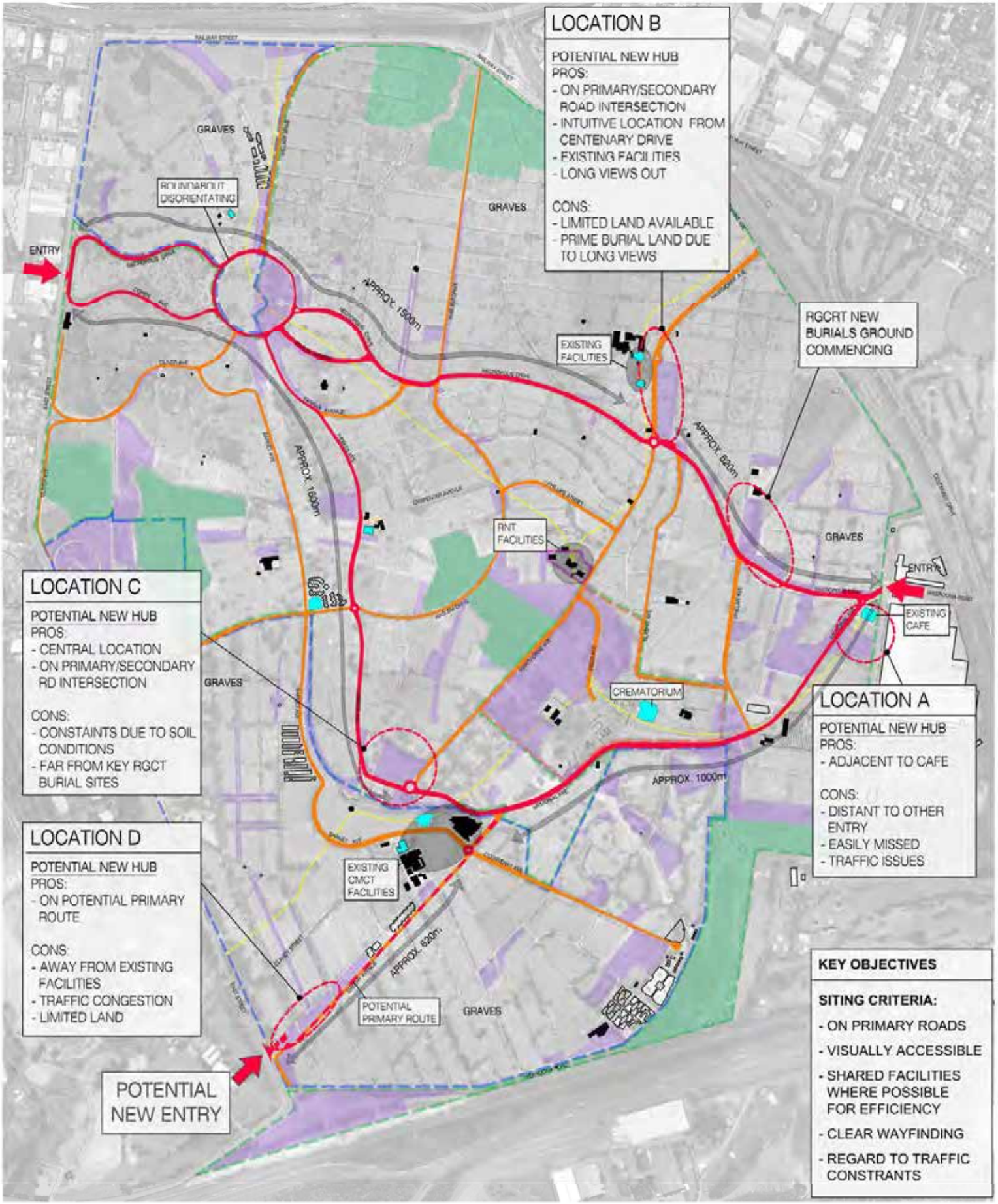
E

EAST VIEW TOWARDS EXISTING WORKSHOPS

EAST VIEW TOWARDS EXISTING WORKSHOPS

VIEW FROM BARNET AVE

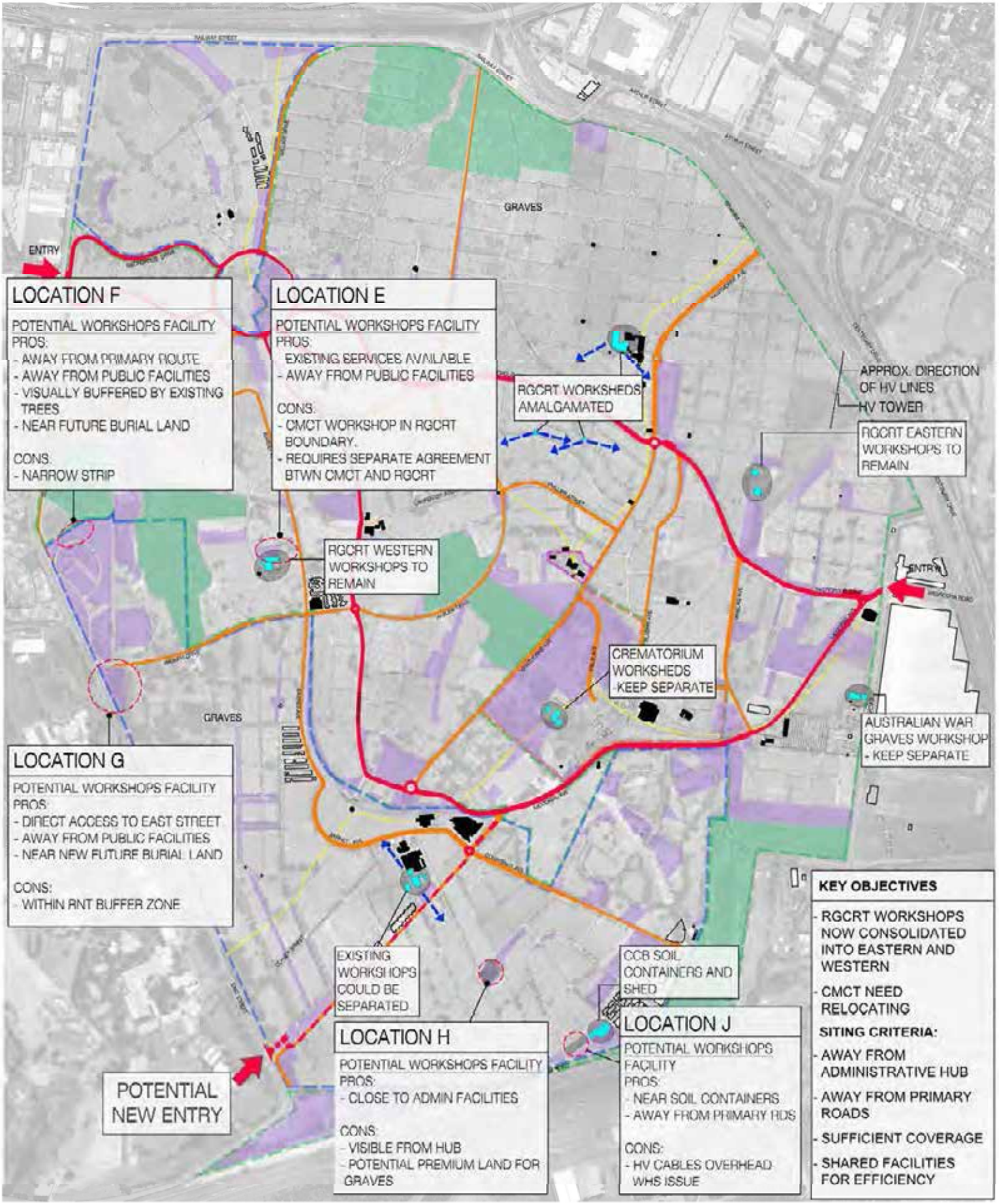
NORTH POINT



ROOKWOOD NECROPOLIS TRUST MASTERPLAN **SITE ANALYSIS - ADMINISTRATIVE FACILITIES**

SK08

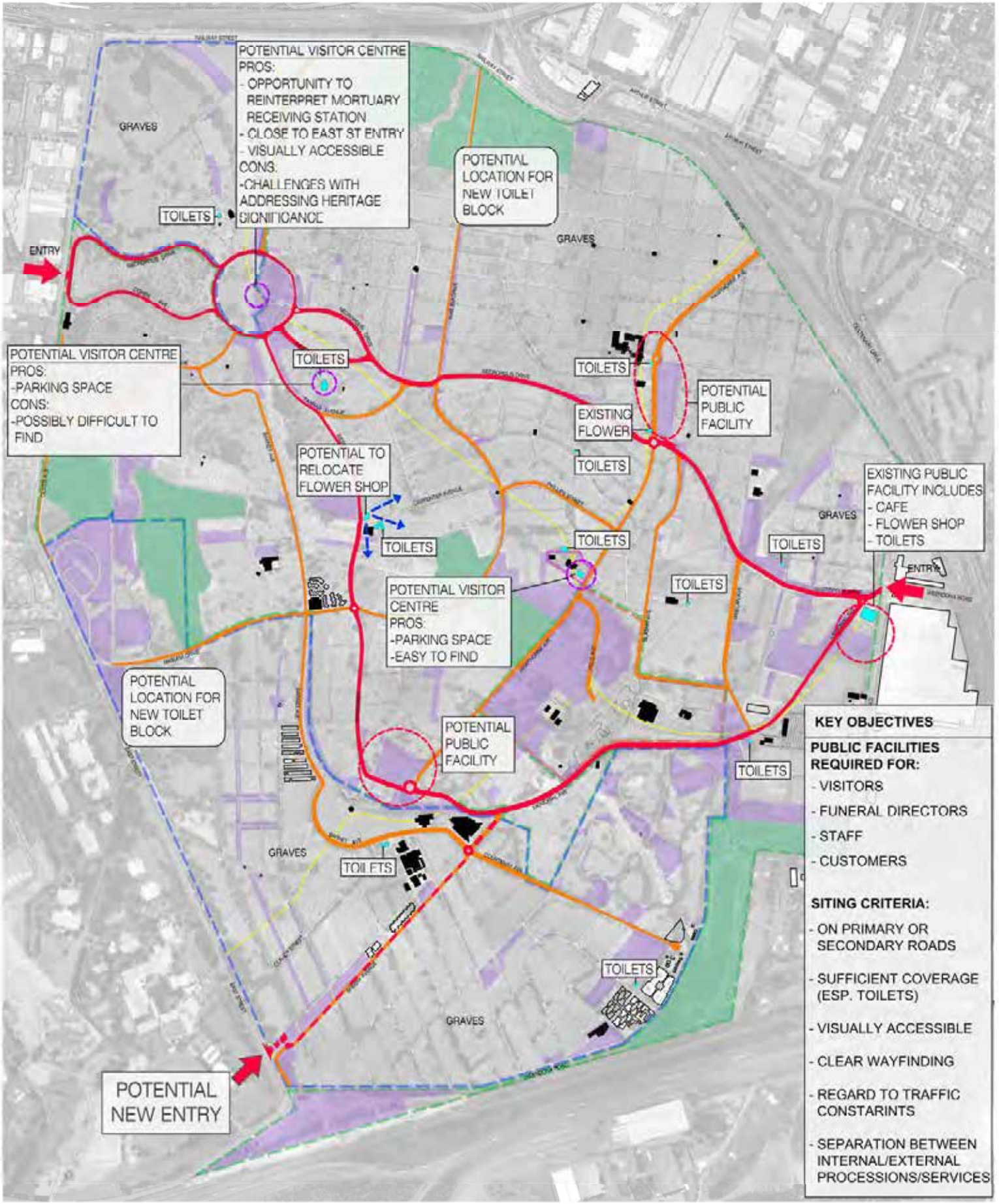
IGNITE



ROOKWOOD NECROPOLIS TRUST MASTERPLAN **SITE ANALYSIS - WORKSHOP FACILITIES**

SK09

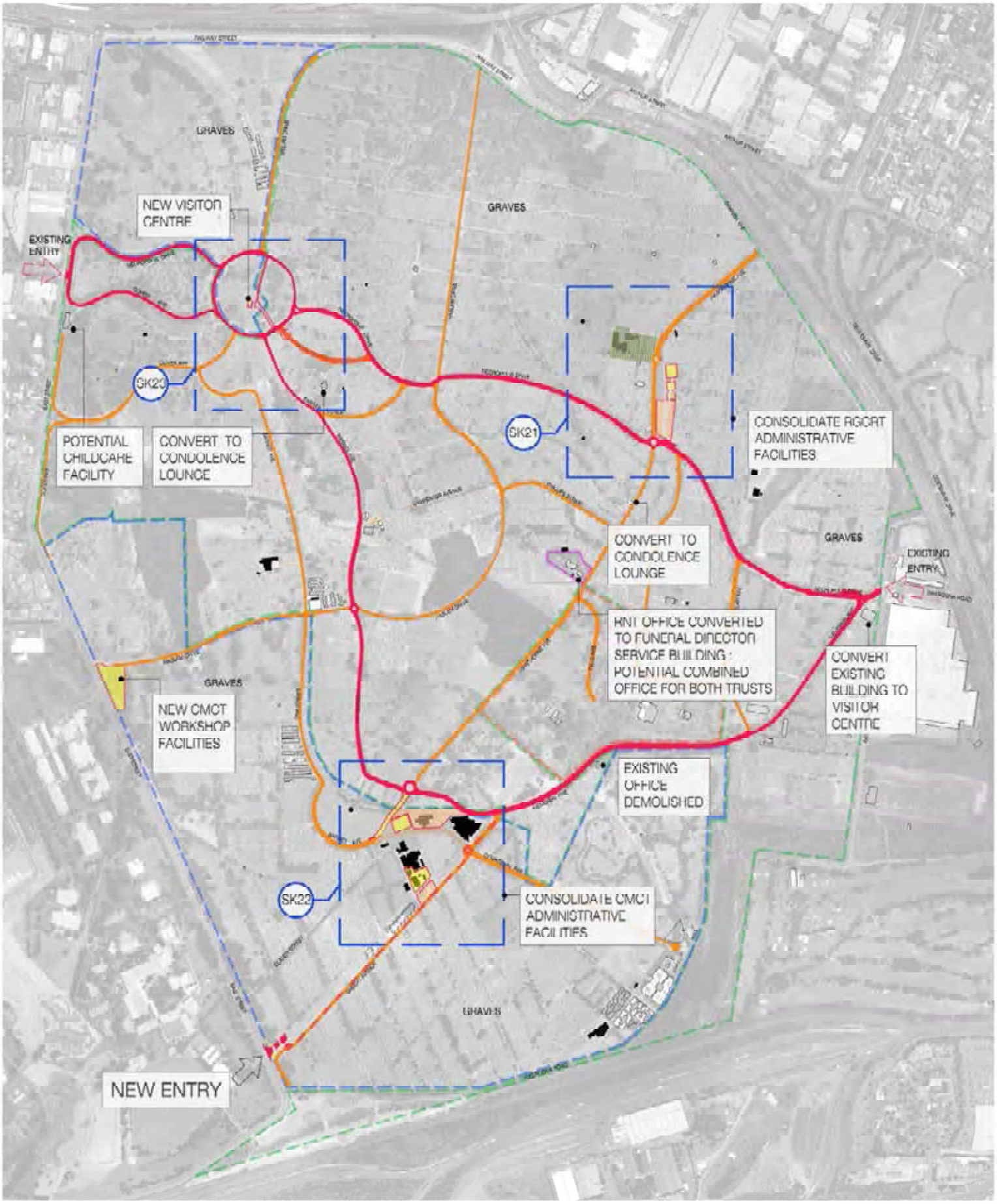
IGNITE



ROOKWOOD NECROPOLIS TRUST MASTERPLAN **SITE ANALYSIS - PUBLIC FACILITIES**

SK10

IGNITE



SCALE BAR

ROADS
- PRIMARY ROADS
- SECONDARY ROADS
- TERTIARY / DIRT ROADS

BOUNDARY
- RGCRT - ROOKWOOD GENERAL CEMETERIES RESERVE TRUST
- CMCT - CATHOLIC METROPOLITAN CEMETERIES TRUST
- UNALLOCATED LAND - RNT
- CROWN LAND RESERVE

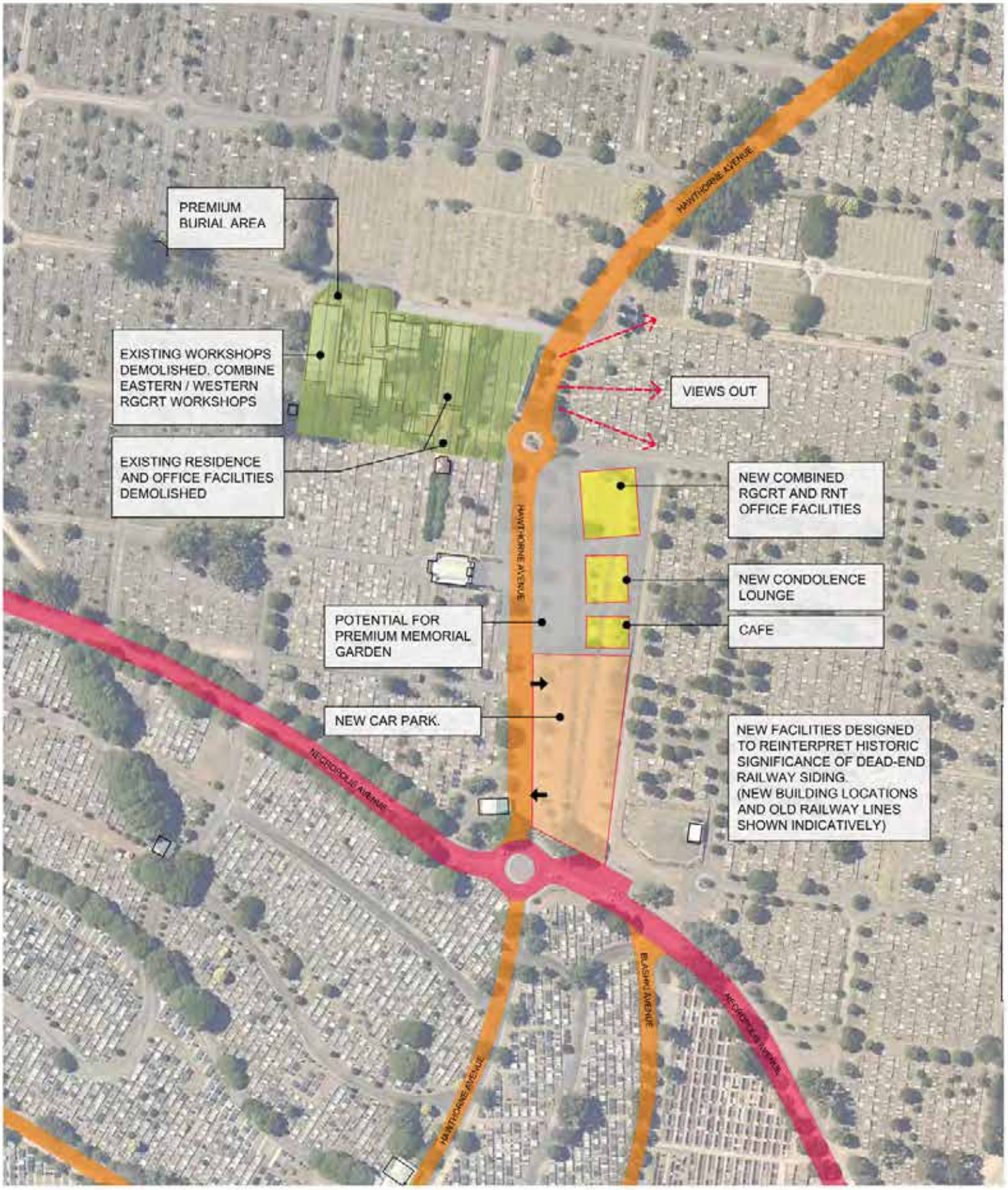
GENERAL
- PROPOSED
- CAR PARKING
- CONVERT TO BURIAL LAND
- BUILDINGS

NORTH POINT

ROOKWOOD NECROPOLIS TRUST MASTERPLAN **PROPOSED - BUILDINGS LOCATION PLAN**

DATE: 29th JAN 2015
REVISION:
DRAWING NO: SK20

IGNITE



SCALE BAR

0 10m 50m

ROADS

- PRIMARY ROADS
- SECONDARY ROADS
- TERTIARY / DIRT ROADS

BOUNDARY

- RGCRT - ROOKWOOD GENERAL CEMETERIES RESERVE TRUST
- CMCT - CATHOLIC METROPOLITAN CEMETERIES TRUST

GENERAL

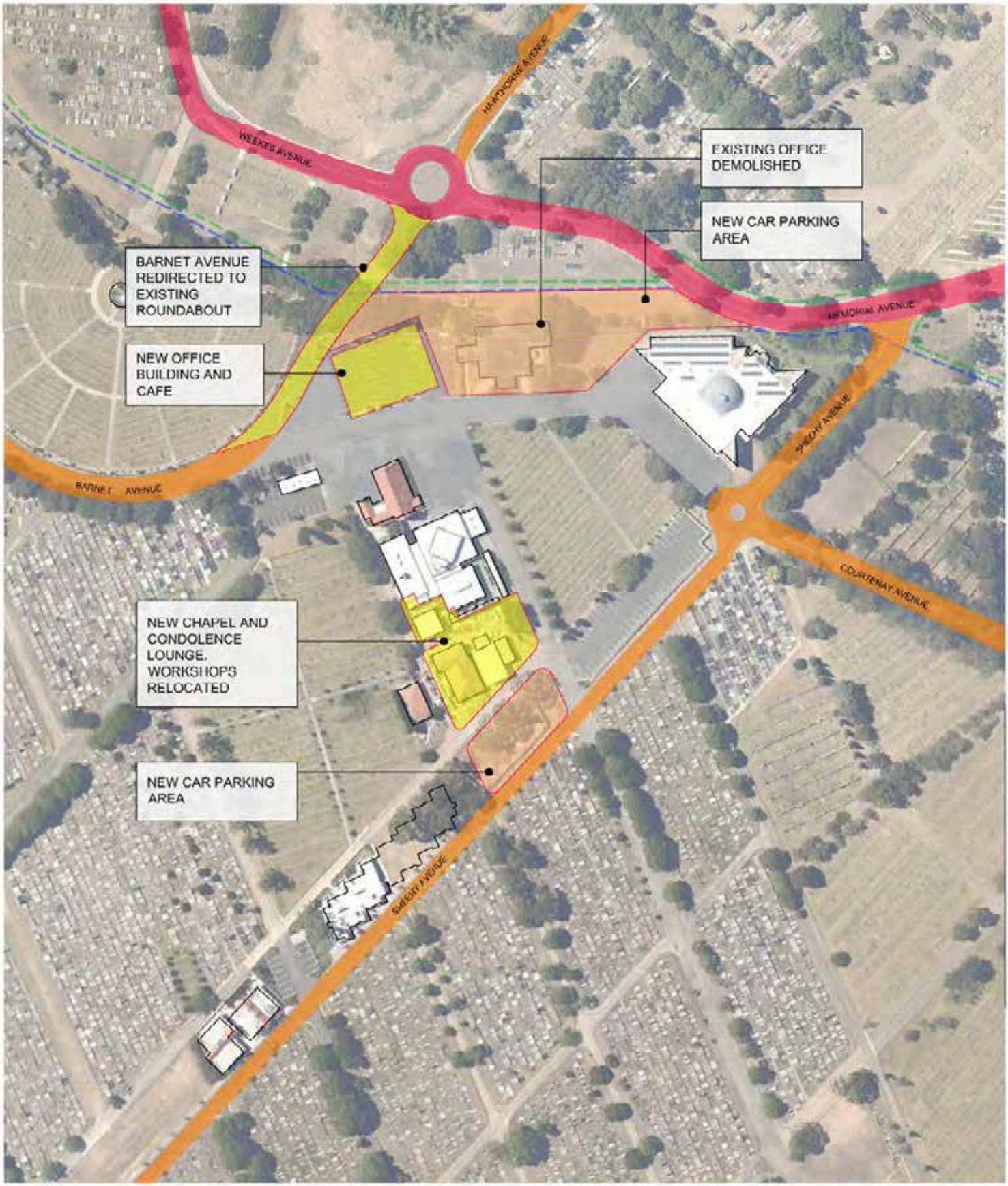
- PROPOSED
- CAR PARKING
- PROPOSED BURIAL LAND
- BUILDINGS

NORTH POINT

ROOKWOOD NECROPOLIS TRUST MASTERPLAN **PROPOSED - RGCRT ADMINISTRATIVE HUB**

DATE: 26th JUNE 2019
SCALE: 1:1000 @ A3 or 1:2000 @ A1
DRAWING NO: SK21

IGNITE



SCALE BAR

0 10m 50m

ROADS

- PRIMARY ROADS
- SECONDARY ROADS
- TERTIARY / DIRT ROADS

BOUNDARY

- RGCRT - ROOKWOOD GENERAL CEMETERIES RESERVE TRUST
- CMCT - CATHOLIC METROPOLITAN CEMETERIES TRUST

GENERAL

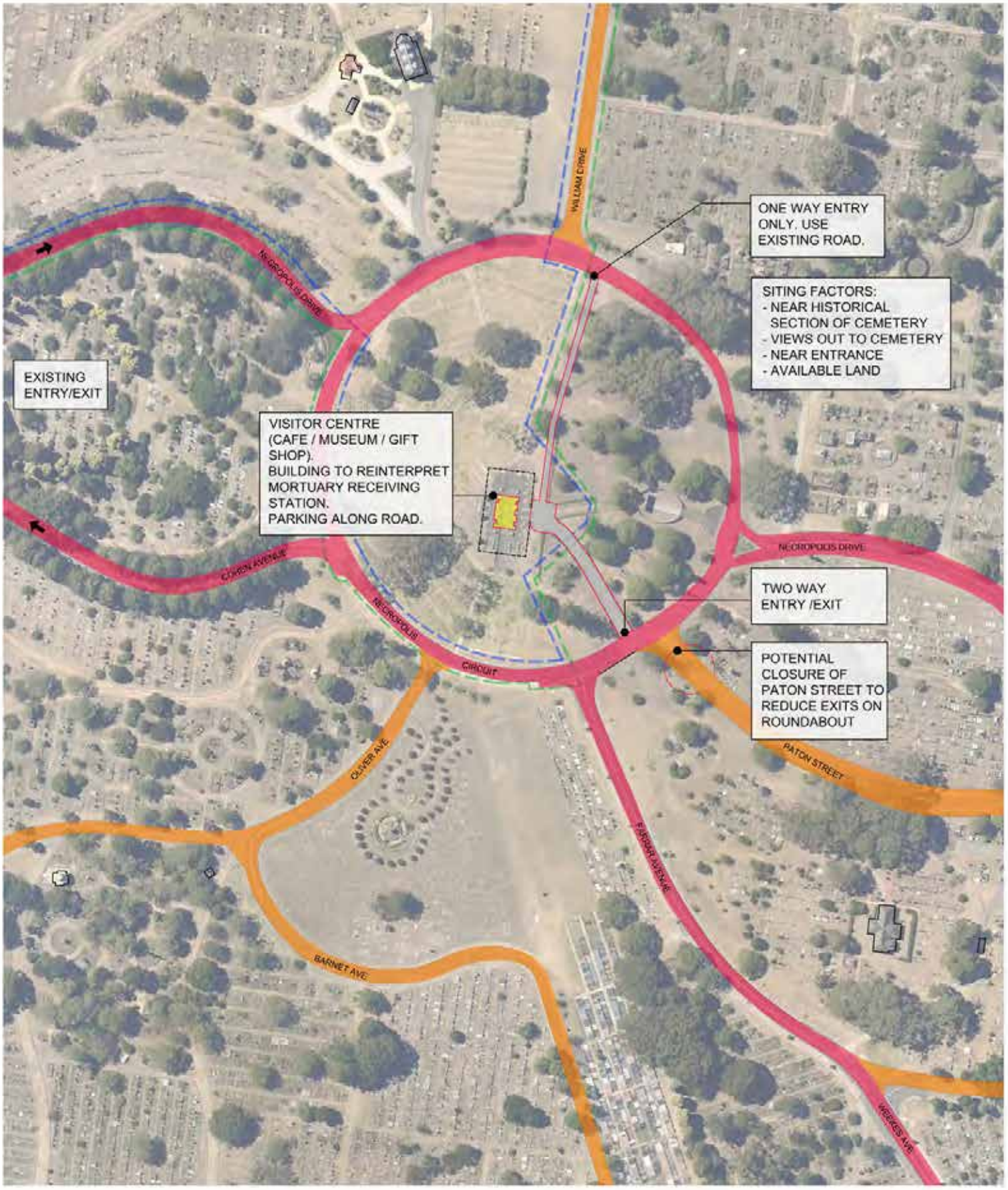
- PROPOSED
- CAR PARKING
- BUILDINGS

NORTH POINT

ROOKWOOD NECROPOLIS TRUST MASTERPLAN PROPOSED - CMCT ADMINISTRATIVE HUB

SK22

IGNITE



SCALE BAR

0 10m 50m

ROADS

- PRIMARY ROADS
- SECONDARY ROADS
- TERTIARY / DIRT ROADS

BOUNDARY

- RGCRT - ROOKWOOD GENERAL CEMETERIES RESERVE TRUST
- CMCT - CATHOLIC METROPOLITAN CEMETERIES TRUST

GENERAL

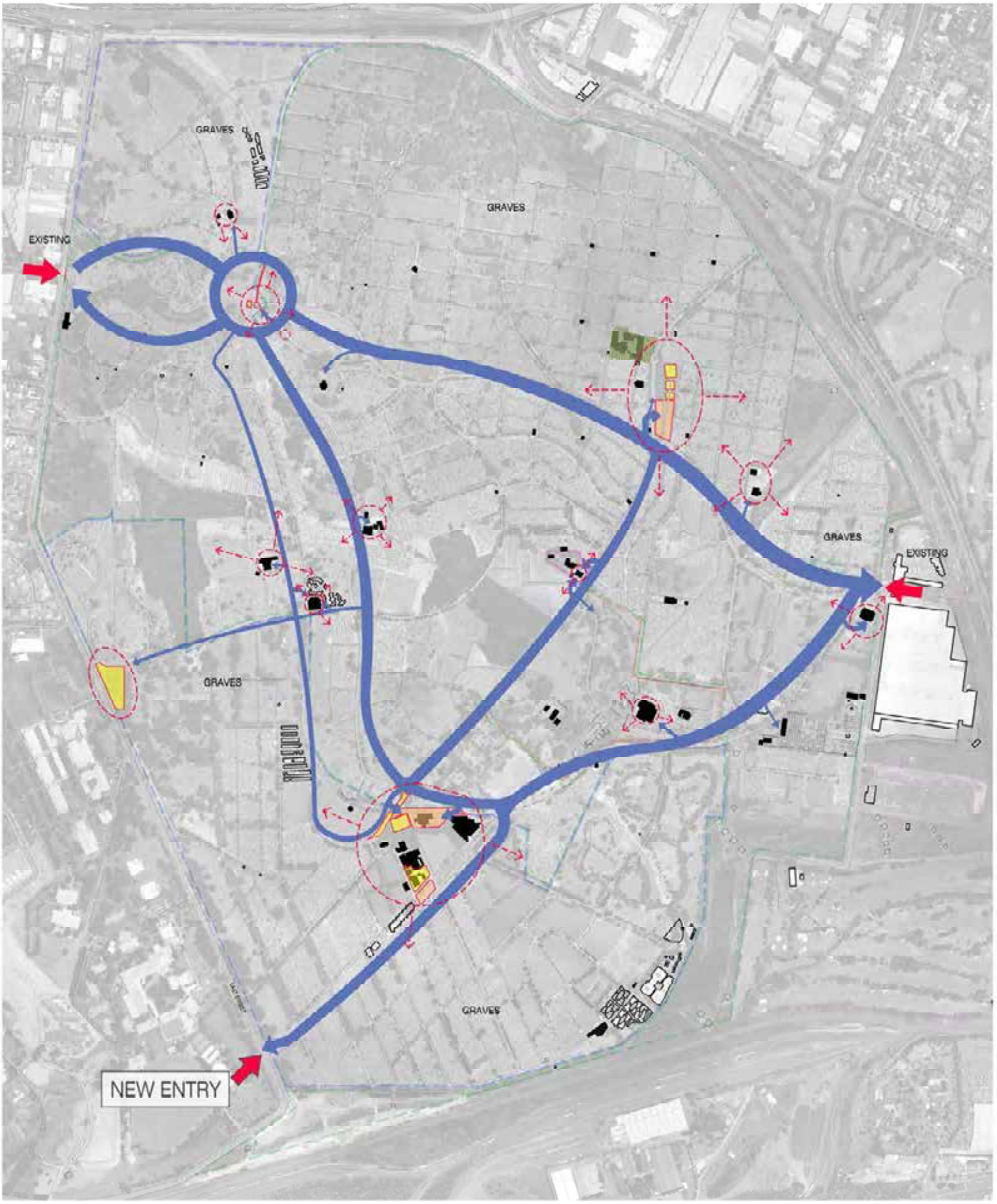
- PROPOSED
- PROPOSED ROAD
- BUILDINGS

NORTH POINT

ROOKWOOD NECROPOLIS TRUST MASTERPLAN **PROPOSED - VISITOR CENTRE**

DATE: 26th JUNE 2019
SCALE: 1:1000 @ A3 or 1:2000 @ A1
DRAWING NO: SK23

IGNITE



SCALE BAR

0 50m 250m

ROADS

- PRIMARY ROADS
- SECONDARY ROADS
- TERTIARY / DIRT ROADS

BOUNDARY

- RGCRT - ROOKWOOD GENERAL CEMETERIES RESERVE TRUST
- CMCT - CATHOLIC METROPOLITAN CEMETERIES TRUST
- UNALLOCATED LAND - RNT
- CROWN LAND RESERVE

GENERAL

- PRIMARY TRIPS
- SECONDARY TRIPS
- PRIMARY DESTINATION
- PROPOSED
- CAR PARKING
- BUILDINGS
- CONVERT TO BURIAL LAND

NORTH POINT

ROOKWOOD NECROPOLIS TRUST MASTERPLAN PROPOSED - TRAFFIC FLOW

SK24

IGNITE

APPENDIX 05
PLANT LISTS

General Forest Tree Surgeon

A.B.N. 61 104-092-739 A.C.N. 104-092-739
P.O. Box 6948, SILVERWATER, N.S.W. 1811
Telephone Business Hours: 9748-2323
Facsimile: 9748-2424
E-mail: generalforest@bigpond.com

Planting Lists for Rookwood Cemetery Rookwood

Planning

Planning for tree planting on your property should start well before you order or consider planting a tree species. You should consider and know why you want the species and where they should be planted. A successful planting job requires the following:

- Properly prepared site
- Good planting stock
- Tree species matched to the site and soils
- Proper planting methods

Adequate protection and care after planting.

This guide will help you create a good planting plan. If you need further assistance or need help in planning a large plantation please contact a Level 5 arborist for help and advice.

Prepare Your Site

Site preparation is an extremely important step in a successful tree planting project. Controlling competing vegetation is usually necessary so the newly planted trees have a better chance of survival. There are two methods of site preparation: mechanical and chemical. Mechanical site preparation involves physically removing the competing vegetation from the planting site. Leave vegetation between the tree rows will help prevent soil erosion. Chemical site preparation consists of using herbicides to control competing vegetation. Usually the herbicide is sprayed in a spot treatment around each individual seedling or in strips where the tree rows will be planted. There are many different herbicides with many different characteristics. Please contact a Level 5 Arborist for the latest recommendations and always follow label directions.

Choose Trees That Are Right for Your Growing Conditions

Selecting the proper species for your site is one of the most important planting decisions you can make. Because a seedling obtains moisture and nutrients from the soil, matching the species to the type of soil on your property is necessary. Some species prefer wet soils and some grow best on drier soils. Most trees have a tolerance for a range of soils, but they will make their best growth on the soil types. Consider the amount of sunlight your growing site receives. Most trees prefer full sunlight and other species need shade, they will likely die if planted in full sunlight.

PLANT LIST A

General Forest Tree Surgeon

A.B.N. 61 104-092-739 A.C.N. 104-092-739
P.O. Box 6948, SILVERWATER, N.S.W. 1811
Telephone Business Hours: 9748-2323
Facsimile: 9748-2424
E-mail: generalforest@bigpond.com

Plan for Adequate Spacing

When planting consider the height and spread to which the tree will eventually grow and the primary use of the plant. As a general rule the trees should be spaced for your purpose and species selection.

The attached tree recommended list is for Rookwood Cemetery Rookwood in the Local Government Area, as well as any person designing or creating any form of Landscape in the Rookwood Cemetery Area. This list is a mix of native and exotic plants that are both suited to and proven performers in the area.

Planting Lists for Rookwood Cemetery Rookwood

This list is to offer a guide for trees which will do well in Rookwood Cemetery Area.

This list is not exclusive but can be used as a helpful guide.

The selection of street trees should have regard to the following:

• Power/Gas/Water/Sewer/Cable Lines
• Street Lights
• Pruning and shaping resilience of trees
• Easements
• Driveways & Bus Stops
• Pedestrian crossings
• Set Backs
• Lateral spreading habits of trees
• Road Verge & Nature Strip widths
• Waste Service collections
• Vehicle vision lines
• Cultural and Heritage amenity.
• Above ground Services.

PLANT LIST A

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Telephone Business Hours: 9748-2323
Facsimile: 9748-2424
E-mail: generalforest@bigpond.com

Tree Selection (some examples of trees to consider)

SPECIES NAME	COMMON NAME	HEIGHT	WIDTH	NATIVE
Agonis Flexuosa	Willow Myrtle	8m	4m	Yes
Angophora Costata Dwarf Darni	Dwarf Angophora Costata 'Darni'	4m	2m	Yes
Bauhinia Hookeri	Mountain Ebony	10m	5m	Yes
Brachychiton Populneus	Kurrajong	8m	5m	Yes
Brachychiton Rupestris	Bottle tree	8m	5m	Yes
Cescis Occidentalis	Californian Redbud	5m	2m	No
Cercis Siliquastrum	Judas tree	15m	5m	No
Ceretopetalum Gummiferum	NSW Xmas Bush	6m	3m	Yes
Cupaniopsis Anarcardiodes	Tuckeroo	7m	3m	Yes
Eucalyptus: Dwarf Grafted Varieties	E.g. - Baby Orange – 'Summer Red' – 'Summer Beauty' – 'Orange Beauty' – 'Wild Fire'	Varieties from 1m to 5m high	1m to 4m spread	Yes
Jacaranda mimosifolia	Blue Haze Tree	15m	10m	No
Magnolia Grandiflora 'Exmouth'	Evergreen Magnolia 'Exmouth'	7m	3m	No
Magnolia grandiflora 'Little Gem'	Dwarf Evergreen Magnolia	4m	2m	No
Magnolia grandiflora 'Kay Parris'	Dwarf Evergreen Perfumed Magnolia	4m	2m	No
Magnolia x Soulangeana	Tulip Magnolia	7m	4m	No
Melaleuca Styphelioides	Prickly Paperbark	6m	4m	Yes
Melaleuca Decora	White Cloud Tree	5m	2m	Yes
Melaleuca linariifolia	Snow in Summer	6m	4m	Yes
Quercus palustris 'Pringreen'	Narrow Green Pillar Narrow form Oak	10m	3m	No
Angophora Costata	Sydney Red Gum	30m	10m	Yes
Angophora floribunda	Rough Barkes Apple	20m	6m	Yes
Angophora subvelutina	Broad Leaf Apple	18m	6m	Yes

PLANT LIST A

General Forest Tree Surgeon

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Araucaria araucana	Monkey Puzzle tree	35m	8m	Yes
Araucaria cunninghamii	Hoop Pine	45m	6m	Yes
Brachychiton Acerifolis	Illawarra Flame Tree	30m	6m	Yes
Brachychiton discolour	Lacebark Kurrajong	30m	6m	Yes
Caloedendron Capense	Cape Chestnut	15m	8m	No
Cedrus Atlantica	Atlas Cedar	30m	8m	No
Cedrus deodara	Deodar Cedar	30m	6m	No
Cupressus Funebris	Funeral Cypress	20m	5m	No
Eucalyptus Amplifolia	Cabbage Gum	30m	5m	Yes
Eucalyptus Benthamii	Camden White Gum	35m	8m	Yes
Magnolia Grandifolia	Bull Bay tree	18m	8m	No
Podocarpus Elatus	Illawarra Pine	25m	8m	yes
Quercus coccinea	Pin Oak	25m	5m	No
Quercus Robur	English Oak	30m	6m	No

Discussion

Over the past 20 year I Shiu Narayan from General Forest Tree Surgeon have been contracted to work at Rookwood Cemetery Rookwood. I have seen the wrong species been planted in Rookwood Cemetery. Rookwood Cemetery has had a lot of trouble in terms of the selection of the tree that have been chosen. I recommend that Rookwood Cemetery Rookwood does not choose trees of these species such as London Plane, Cinnomamum Camphora, Norfolk Island Hibiscus, Ficus Hilli, Eucalyptus Nicholii, Eucalyptus Scoparia, Eucalyptus Microcory, and Golden Robinia. Rookwood Cemetery has a lot of Phoenix Palms in the area and has lost a few of them due to fusarium wilt, no need to plant any more until an arborist finds out what the cause and treatment for the fusarium wilt. Eucalyptus Citriodora trees are not recommended to be planted as they are known for branch failures. Golden Cypress Pine trees and Bunya Pine trees are not to be planted in public areas and the root systems have very limited space for them to grow. Rookwood Cemetery has more than enough Crepe Myrtle trees in the area. When planting any Eucalyptus spp trees you are required to consider the height and spread to which the tree will eventually grow and the primary use of the plant.

New specimen of the Botanical program at Nieuwer Oster Cemetery, Amsterdam

Example of Botanical program at Nieuwer Oster Cemetery, Amsterdam

PLANT LIST B

SPECIMEN TREES (For botanical Interest)

The list would be too long as a large quantity of trees are suitable candidates.

The trees should be selected from available specialist nursery lists and subject to the following criteria:

- Not yet used on site (Check register)
- From list C, if not already on site.
- Suitable for clayey soils
- Non-poisonous or allergenic
- Non-suckering
- With no reputation for limb dropping
- With no known sensitivity to disease.
- With seasonal interest
- Unusual or not commonly used

PLANT LIST C

PLANTS SUITABLE for 19th CENTURY LANDSCAPES

(Compilation of list given by Stuart Read, OEH-Heritage Division & John Hawker and Dr Roger Spencer for National Trust)

*= Denotes plants suitable for use throughout the cemetery as theme plants. Both Trust are encourage to feature them on their plant list for both old and new sections

CONIFERS			
Abies nordmanniana	Caucasian Fir		
Abies pinsapo	Spanish Fir		
Araucaria bidwillii	Bunya Pine		Beware dangerous fruits
Araucaria columnaris	Cook's Pine		
Araucaria cunninghamiana*	Hoop Pine		
Araucaria heterophylla*	Norfolk Island Pine		
Callitris ssp	Cypress pine		
Calocedrus decurrens	Incense Cedar	40+	
Cedrus atlantica	Atlas Cedar		
Cedrus atlantica 'Glauca'	Blue Cedar		
Cedrus deodara	Himalayan Cedar		
Chamaecyparis funebris	Funeral cypress		
Chamaecyparis lawsoniana	Lawson Cypress		
Cupressus glabra	Arizona Cypress		
Cupressus lusitanica	Mexican Cypress		
Cupressus macrocarpa	Monterey Cypress		
Cupressus sempervirens	Mediterranean Cypress		
Cupressus torulosa	Bhutan Cypress		
Juniper chinensis	Chinese juniper		
Juniper virginiana	Pencil juniper		
Picea abies	Norway Spruce		
Picea sitchensis	Sitka Spruce		
Picea smithiana	West Himalayan Spruce		
Pinus nigra var. nigra	Corsican pine		
Pinus pinea	Stone pine		
Pinus roxburghii	Chir pine		
Pinus canariensis	Canary Island pine		
Taxus baccata	Yew		
Taxus baccata 'Fastigiata'	Irish Yew		
Thuja plicata	Western Red Cedar		
Thuja orientalis	Chinese Arbor-Vitae		

DECIDUOUS TREES			
Magnolia grandiflora*	Evergreen Magnolia		
Quercus robur	Enruopean oak		
Quercus coccinea	Scarlet oak		
Quercus rubra	Red oak		
Quercus palustris	Pin oak		
Schinus molle var. areira	Peruvian peppercorn		
Ulmus procera	English oak		
Ulmus glabra	Wych Elm		

EVERGREEN NATIVE TREES (other than conifers)			
Acmena smithii	Lilly Pilly		
Agonis flexuosa	Weeping Myrtle		
Brachychiton populneus*	Kurrajong		
Corymbia citriodora*	Lemon-scented gum		
Corymbia ficifolia*	Red flowering gum		
Eucalyptus microcorys*	Tallwood		
Eucalyptus leucoxylon 'Rosea'*	Mugga ironbark		
Lophostemon confertus*	Brush box		

EVERGREEN TREES (other than conifers)			
Arbutus unedo*	Strawberry tree	5-10	
Arbutus x andrachnoides	Hybrid strawberry		
Ceratonia siliqua	Carob tree	15	
Cinnamum camphora	Camphor laurel	20-25	
Ficus macrocarpa var. hilii*	Hill's weeping fig	16	
Ficus platypoda	Taromeo		
Ficus macrophylla	Moreton Bay fig	40+	
Ficus rubiginosa	Port Jackson fig	30	
Ilex aquifolium	English Holly		
Laurus nobilis	Bay tree		
Morus alba	White Mulberry		
Platycladus orientalis	Chinese Arbor-Vitae		
Prunus laurocesrasus			
Quercus ilex	Holly oak	20	
Quercus cerris	Turkey Oak		
Quercus canariensis	Algerian Oak		

Quercus suber	Cork Oak		
Stenocarpus sinuatus	Firewheel tree	30	
Syzygium species	Lilly pilly	30	
Ulmus parvifolia	Chinese Elm		
Waterhousia floribunda	Weeping lilly pilly	25-30	

PALMS			
Butia capitata	Jelly Palm	6	
Chamaerops humilis	Dwarf Fan palm	3	
Jubaea chilensis	Chilean wine palm	20	
Livistonia australis	Cabbage tree palm	15	
Phoenix canariensis*	Canary Island Palm	20	Attacked by fungi
Phoenix syllvestris	Silver date palms	15-20	
Trachycarpus fortunei	Chinese Windmill palm	10	
Washingtonia robusta	Desert fan palm	20	
Washingtonia filifera	Cotton palm	15-20	

SHRUBS			
Berberis species	Barberry	1-2	
Buxus sempervirens	English Box	1	
Camellia japonica	Camellia	2-4	
Chamaecyparis lawsoniana (Golden)	Dwarf conifer	1.5	
Choisya ternate	Mexican Orange		
Cordyline australis	NZ cabbage tree		
Coleonema album	White Diosma		
Coleonema pulchrum	Pink Diosma		
Cotoneaster species	Cotoneaster		
Crataegus oxycantha	Hawthorn	5-6	
Duranta erecta	Sky flower		
Elaeagnus pungens	Thorny Elaeagnus		
Euonymus japonica	Japanese laurel	3-7	
Gordonia axillaris	Poached egg bush	3-5	
Hebe species			
Ilex aquifolium	Holly	5-8	
Lavandula dentate/stoechas/spica	Lavendas	1.5	
Malvaviscus arboreus	Scarlet Wax-mallow		
Michelia figo	Port Wine Magnolia		

Myrtus communis	Common Myrtle		
Philiadelphus coronaries	Mock Orange		
Photinia robusta/serrulata	Photinia	3-6	
Punica granatum	Pomegranate	5-8	
Raphiolepis indica	Indian Hawthorn		
Raphiolepis umbellate	Yedda Hawthorn		
Ribes sanguineum	Flowering currant	2	
Roses (moss/cabbage/Bourbon/ climbing/ floribunda)			
Rosmarinus officinalis	Rosemary	2	
Spiraea species	Mayflower		
Syringa vulgaris	Lilac	6-7	Suckers
Tecomaria capensis	Cape honeysuckle	2-3	
Thuja orientalis (Golden)	Dwarf conifer	2	slow
Viburnum tinus	Laurel	3-7	
Viburnum suspensum		3-4	
Viburnum odoratissimum	Sweet Viburnum	4	

SUCCULENTS			
Agave species		Below 1m	
Crassula species			
Echeveria species			
Kalanchoe			
Sedum species			

TUFTIES and GRASSES			
Agapanthus praecox	African lily	0.7	
Arundo donax (+'Variegata')	Danubian reed	6	
Doryanthes excelsa	Gymea lily	2	
Furcraea selloa/foetida	Mauritius hemp	1.5	
Iris germanica	Bearded iris	0.5	
Dianella tasmanica/revolute	Flax lilies	1	
Stylidium graminifolium	Grass trigger plant	0.4	
Thysanotus tuberosus	Fringed lily	0.5	
Themeda species	Kangaroo and wallaby grasses	1-1.5	
Yucca species	Yucca	2-3	

GROUND-COVERS AND BULBS	Less than 0.5m unless otherwise indicated		
Amaryllis belladonna	Belladona Lily		
Canna x generalis and cultivars	Garden Canna	1m	
Freesia species			
Hyacinthoides hispanicus	Blue bell		
Iris species			
Leucojum vernum	Snowflake		
Narcissus species	Jonquils/daffodils		
Scilla peruviana	Cuban lily		
Tritonia lineata			
Viola odorata	Violet		