

Illustrated in the image above, there will be an underground pedestrian link, which is listed as a 'high' risk element within the risk assessment matrix. This link will provide direct access between both Lynton Avenue and Birch Crescent. A concerted effort was made to ensure the length of the culvert was as short as possible, whilst also aligning with the road and footpath to maximise visibility. The proposed link will measure 4.3 metre in width, 3.0 metres in height and approximately 16.5 metres in length. The link will be internally lit with views of both access points clearly visible from both street frontages, and dense plantings located at the end of the culvert (adjacent the stairs) to discourage negative loitering.

### **5.2.2 Design to Attract**

The proposed design and layout is a high quality, contemporary public space that utilises durable materials with substantial and appropriate landscaping that will create an inviting, welcoming and functional public. As a result, it is considered the space will require a relatively low level of maintenance in order to maintain its quality over an extended period of time.

Providing a high quality public space, such as proposed, attracts users to the space. Given the proposed space is surrounded land uses that are highly frequented, such as the Flinders Hospital and Flinders University the proposed public space is envisaged to be extensively used, which has a flow on effect when it comes back to passive surveillance and people taking ownership and responsibility for the maintenance of the space.

### **5.2.3 Restrict Access to High-Risk Areas and Assets**

As detailed within the risk assessment matrix, the following areas were considered high risk:

- Rail infrastructure (i.e. tracks and associated equipment);
- Pedestrian culvert link between Lynton Avenue and Birch Crescent;
- Internal areas of shared use path over viaduct; and
- Stairwell to Main South Road.

Having regard to the high-risk areas identified above, the proposed development seeks to minimise risk with regards to both criminal / anti-social behaviour and both public safety. This is achieved through the appropriate use of lighting, CCTV cameras, appropriately placed fencing and well-designed, open public spaces.

By way of example, one of the high-risk areas identified, was access to the rail tracks along the shared use path, which will be restricted through the inclusion of a 2.40-metre-high metal fence, which will extend the entire length of this shared use path over the viaduct. Fencing is also proposed along the northern end of the station platform to prevent access from the public ovals.

### **5.2.4 Separation and protection of pedestrians from vehicles**

Appropriately placed street furniture, such as seating, will be installed at key locations to ensure vehicles utilising the eastern carpark are not able to mount the kerbing and enter the plaza / station platform area. Further details of these locations will be provided and implemented further along in the design process.

## **5.3 Territorial Reinforcement**

The proposed layout and design is considered to incorporate sufficient detail with regards achieving the core principles of territorial reinforcement. More detailed design will further improve this, with exact locations of directional signage to be provided.

### 5.3.1 Design of Space to Encourage Ownership and Responsibility

As illustrated in the images below, the existing Tonsley Station is not an inviting public space, and therefore does not encourage its users, and other members of the public, to take ownership of the space, to ensure it is well maintained and presented.

Image 9: Pedestrian access from carpark off Lynton Avenue.



Image 10: Extent of the built form and public space at the existing Tonsley Station.



Having regard to the above, the proposal, as previously stated, is of a high architectural quality that is open, inviting and provides users with a wide range of facilities and access. This creates a sense of ownership and responsibility to maintain and respect the built form. Regular users who become familiar with the facilities will become more aware of the need for maintenance and / or repair and typically make comment or report issues as they arise ensuring the public space and associated infrastructure is appropriately maintained.

### **5.3.2 Design of Space to Clearly Define Public and Private / Restricted Access**

Restricted areas associated with the proposed development include:

- access to the rail tracks and associated support infrastructure;
- train driver amenities;
- cleaning and driver amenities room; and
- equipment room.

The proposed design incorporates measures which will act to discourage people from accidentally, or purposefully, entering spaces which are restricted. Access to these spaces will be restricted by measures including the installation of fencing adjacent the shared use path along the viaduct, fencing adjacent the battered slopes to the norther end of the station platform and key lock doors that are covered by the extensive CCTV network.

### **5.3.3 Use of 'Environmental Markers' to Define Space**

Environmental markers are used to define and determine how a space is to be used. This can be through the use of signage, landscaping, variations in paving, line marking and the like. The proposed development seeks to utilise all of these methods in one form or another to define and instruct how a space is intended to be used.

By way of example the plaza area utilises variations in paving colours and patterns to direct pedestrians and cyclists to the covered canopy link (see **Image 5**). It should also be noted, that more detailed design will instruct the location and details of elements such as directional signage, which will further reinforce the direction of traffic and the intended use of space.

## **5.4 Space Management**

As detailed earlier in the report, space management refers to the ongoing maintenance needs and the longevity of the space and associated infrastructure. It is one thing to present a product and space of high quality in the short term, but another to ensure that over time the quality and usability of this space can be reasonably maintained at a high level over an extended period of time and at a reasonable cost.

### **5.4.1 Maintenance of Public Spaces**

The station and associated infrastructure, with the likely exclusion of landscaping, will be managed and maintained by contractors engaged by DPTI with the ongoing maintenance of the landscaped areas likely to be managed by the City of Mitcham, however it should be noted that this is still being determined.

Regardless, there is a clear intent that the space, and associated infrastructure, will be regularly maintained to ensure the space is kept in an inviting and tidy manner.

#### 5.4.2 Durability of External Materials, Finishes and Fixtures

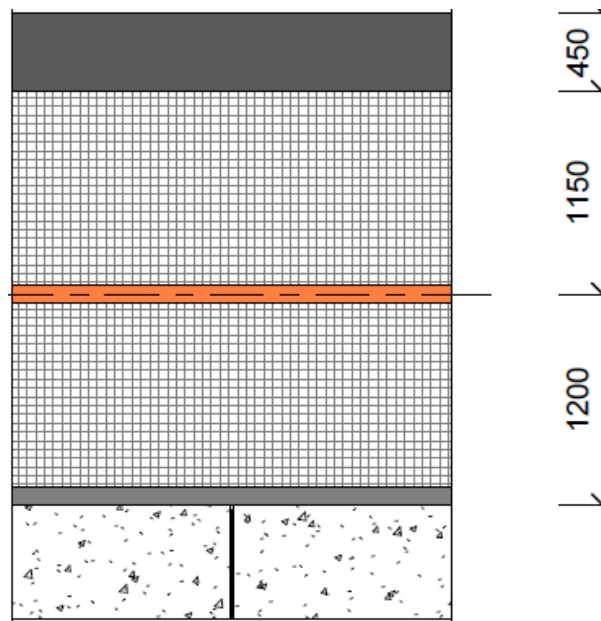
The proposed development seeks to utilise an extensive palette of materials and external finishes that are of a high architectural quality, but also durable and resistant to acts of vandalism. Some of the key materials to be used include the following:

- perforated Aluminium screening;
- patterned concrete wall panelling;
- structural steel; and
- painted steel railing.

It is also worth noting that in response to recent reports and incidents of rock throwing, the following elements have been incorporated into the design:

- the rail corridor will comprise a concrete base (no rocks);
- there will be no accessible rocks either on or below the viaduct; and
- all sides of the viaduct and rail corridor that are elevated above Main South Road will incorporate throw screens of 2.80 metres in height as illustrated in **Image 11** below.

Image 11: Throw Screen Section.



Having regard to the above, these materials will ensure the built form elements are relatively low maintenance, whilst presenting a high-quality form and finish that are highly durable with long lifespans. It is also important to note that the maintenance and replacement of these external materials, finishes and fixtures is able to be undertaken in a cost-effective manner with many of the components able to be repaired and / or replaced individually.

## 6. Summary

It is important to acknowledge and note that crime and anti-social behaviour is an inherent part of human behaviour, and whilst good design can deter and limit the occurrence of these behaviours, they cannot eliminate them completely. It is therefore important that upon completion of the project a strategy to undertake an ongoing review of the facility and space is implemented to address concerns and trends that present themselves over time.

In summary, the project team has presented a proposal that is of high quality, low maintenance and highly transparent public space, which successfully manages to integrate CPTED techniques, into every facet of the design, whilst delivering on the key outcome of providing a valuable piece of rail infrastructure. It is worth noting that this assessment has been undertaken based on the 70% Design Development Issue, and elements discussed within this report will be further developed and detailed, improving on the existing elements of this design.

4





# **Flinders Link Detailed Design**

Gateway South JV

## **Design Report - Landscaping**

FLD-RDP12-REP-9999-31-0001 | B

27 March 2018



## Flinders Link Detailed Design

Project No: IW162000  
Document Title: Design Report - Landscaping  
Document No.: FLD-RDP12-REP-9999-31-0001  
Revision: B  
Date: 27 March 2018  
Project Director: Simon Kokar  
Design Manager: Daniel Richter  
Author: Nathan Noack  
File Name: FLD-RDP12-REP-9999-31-0001

### Document history and status

Revision	Date	Description	By	Review	Approved
A	19/12/2017	Issued for 30% Review	N.Noack	G.Gentner	D.Richter
B	27/03/2018	Issued for 70% Design	N.Noack	G.Gentner	D.Richter



## Contents

<b>1.</b>	<b>Introduction.....</b>	<b>2</b>
1.1	Project.....	2
1.2	Scope.....	2
<b>2.</b>	<b>Status.....</b>	<b>4</b>
2.1	Hold Points .....	4
2.2	Changes from previous revision .....	4
<b>3.</b>	<b>Design Basis .....</b>	<b>5</b>
3.1	Site Assessment Report .....	5
<b>4.</b>	<b>Compliance with CSTR .....</b>	<b>6</b>
4.1	Waivers.....	6
4.2	Type Approval for Safety Critical Rail Assets.....	6
<b>5.</b>	<b>Safety Assurance Statement.....</b>	<b>7</b>
<b>6.</b>	<b>Technical .....</b>	<b>8</b>
6.1	Design Details .....	8
6.2	Items to be resolved before next issue.....	10
<b>7.</b>	<b>Design Integration .....</b>	<b>11</b>
7.1	Digital.....	11
7.2	Environmental.....	11
7.3	Sustainability .....	11
7.4	Interdisciplinary Review.....	12
7.5	Safety in Design .....	12
7.6	Future Expansion .....	12
7.7	Constructability .....	12
<b>8.</b>	<b>Stakeholder Consultation.....</b>	<b>13</b>
<b>9.</b>	<b>Operations and Maintenance in design .....</b>	<b>14</b>
9.1	Asset Management Register .....	14
<b>10.</b>	<b>Internal Verification .....</b>	<b>15</b>
<b>11.</b>	<b>External Verification.....</b>	<b>16</b>
11.1	Independent Design Certifier (IDC) .....	16
11.2	DPTI.....	16

**Appendix A. Asset Management Register**

**Appendix B. Interdisciplinary Review**

**Appendix C. Internal Verification**

**Appendix D. Independent Design Certifier Comments**

**Appendix E. DPTI Comment Register**

**Appendix F. Requirements Analysis, Allocation and Traceability Matrix (RAATM)**

## Important note about your report

The sole purpose of this report and the associated services performed by Jacobs Group (Australia) Pty Ltd is to document the design in accordance with the scope of services set out in the contract between Jacobs Group (Australia) Pty Ltd and the joint venture of Fulton Hogan Construction Pty Ltd and Laing O'Rourke Australia Construction Pty Ltd trading as Gateway South ('the Client').

Jacobs derived the data in this report primarily from information provided by the Client, inspection of the Site by Jacobs, and with reference to relevant technical standards and guidelines available in the public domain. The passage of time, manifestation of latent conditions or impacts of future events may require further exploration at the site and subsequent data analysis, and re-evaluation of the findings, observations and conclusions expressed in this report.

In preparing this report, Jacobs has relied upon and presumed accurate certain information, (or absence thereof), relative to the Site provided by the Client and others identified herein. Except as otherwise stated in the report, Jacobs has not attempted to verify the accuracy or completeness of any such information.

The findings, observations and conclusions expressed by Jacobs in this report are not, and should not be considered, an opinion concerning the technical standards. Further, such data, findings, observations and conclusions are based solely upon site conditions and information supplied by the Client in existence at the time of the investigation.

The report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the provisions of the agreement between Jacobs and the Client, which permits the use of the document by the Principal for the purposes set out in the Contract Scope and Technical Requirements. Jacobs accepts no liability or responsibility whatsoever for or in respect of any use of the reliance upon this report by any third party.

# 1. Introduction

## 1.1 Project

The Australian and South Australian Governments announced funding for the \$85 million Flinders Link Project last 13 May 2016. This project builds on the previous Tonsley Public Transport Project (2014) which was undertaken to improve public transport patronage on the Tonsley Line.

The primary purpose of the Flinders Link Project is to:

- Connect the Flinders Precinct to the rail network;
- Improve public transport passenger access to the Flinders Precinct;
- Facilitate an interchange between bus and train services for the passengers;
- Improve pedestrian & cycling connectivity between Flinders Precinct, Laffers Triangle and Tonsley development;
- Enable and integrate with the future development of Flinders Precinct

The project will include approximately 650m of single track rail extension via a rail viaduct starting at the existing Tonsley Station which will go over Sturt Road, Laffer Road, Southern Expressway, and Main South Road, and will finish on the proposed Flinders Station. It will also include the track reconstruction from south of Alawoona Avenue through to the start of the viaduct structure, removal of the existing Tonsley Station and vertical transport from the proposed bus interchanges along Main South Road as part of the Darlington Project.

A pedestrian and cyclist connection is also provided from Sturt Road to the Flinders Precinct through the viaducts and a ramp at the vicinity of Birch Crescent and Sturt Road intersection.

## 1.2 Scope

This report covers the 70% design development phase of Flinders Link package RDP12 – Landscape design – which includes:

- Landscape plans and details for:
  - Station plaza layout and planting, including seating, paving design, lighting co-ordination and shared use path connections
  - A developed batter design option for landscaping between station precinct and detention basin, comprising contoured batters no more than 1:3 grades to ensure stabilisation / erosion measures aren't required and drought tolerant planting.

Landscape treatments below viaduct and adjacent to vertical transport access, comprising shade tolerant low lying planting and tree planting where feasible.

The drawings covered under this package are listed in Table 1.1.

**Table 1-1: List of drawings under this package**

Drawing No.	Rev	Description
CS1-DRG-351772	B	TITLE AND INDEX
CS1-DRG-351773	B	LEGEND AND SCHEDULE
CS1-DRG-351774	B	PLAN SHEET 01
CS1-DRG-351775	B	PLAN SHEET 02
CS1-DRG-351776	B	PLAN SHEET 03

Drawing No.	Rev	Description
CS1-DRG-351777	B	PLAN SHEET 04
CS1-DRG-351778	B	STATION PLAZA PLAN
CS1-DRG-351781	B	SECTIONS SHEET 01
CS1-DRG-351782	B	SECTIONS SHEET 02
CS1-DRG-351783	B	SECTIONS SHEET 03
CS1-DRG-351786	B	DETAILS SHEET 01
CS1-DRG-351787	B	DETAILS SHEET 02

## 2. Status

### 2.1 Hold Points

Table 2.1: Hold Points

Ref.	Hold Point	Response Time	Status
9	Provision of palette of materials, colours and finishes	10 Business Days	Open
10.1	Provision of the palette of plant species	10 Business Days	Open
10.2	Vegetation management for train operations	10 Business Days	Open
11	Provision of information demonstrating durability & maintenance of urban and landscaping elements	10 Business Days	Open

### 2.2 Changes from previous revision

The spiral ramp and bio-detention basin at the Sturt Road and Birch Crescent juncture have been deleted to provide a better commuter connection via a switchback ramp that allows for greater sight lines, a better integration to surrounding street level connections and ramp grades that better balance the requirements of Australian Standards and Austroads. Landscape elements altered as a result are:

- Larger handstand area to provide connections to viaduct via switchback ramps from Sturt Road, Lynton Avenue and Birch Crescent.
- Greater SUP connection to future works on Birch Crescent via switchback ramp and plaza (to be completed by others).
- Greater planting adjacent to switchback ramp to soften the built interface between Lynton Avenue and the rail corridor. Planting aims to deter access to the switchback ramp to facilitate as a CPTED measure to deter vandalism.

The eastern lift core has had wholesale architectural changes and re-configuration since 30% design. The lift core has been separated from the stairs and also re-located closer to the viaduct abutment. The amended vertical transport arrangement and viaduct connection to the station platform creates a superior user experience. Landscape elements altered as a result are:

- Planting beds and furniture arrangement in station plaza.
- Planted batter between stairs and RSS wall
- Updated handstand plaza (main south road to flinders stations interface) to reflect vertical transport changes.
- Low height retaining wall and planting interface to stairs and plaza.
- Removal of retaining wall terracing on batter between South Road and Flinders Station.

Addition of contoured earthworks to provide naturalistic batter planting on batter between South Road and Flinders Station.

### 3. Design Basis

The relevant design basis documents for this package are listed in Table 3.1.

**Table 3.1: Design Basis Reports**

<b>Discipline</b>	<b>Document Number</b>
Design Basis Report - Station Precinct	FLD-RDP01-REP-9999-32-0001
Design Basis Report – Viaduct	FLD-RDP01-REP-9999-21-0001
Design Basis Report – Spiral Ramp	FLD-RDP20-REP-9999-21-0001

#### 3.1 Site Assessment Report

Refer Site Assessment Report FLD-RDP01-REP-9999-PMG-0001.

## 4. Compliance with CSTR

This design package complies with the requirements of CSTR with the exception of the noted departures. Table 4-1 shows the proposed departures for this package.

**Table 4-1: CSTR Departures**

Element	CSTR Reference	Departure
Nil		

A CSTR compliance register Requirements Analysis, Allocation and Traceability Matrix (RAATM) is attached in Appendix F

### 4.1 Waivers

**Table 4-2: Waivers**

Element	CSTR Reference	Departure
Nil		

### 4.2 Type Approval for Safety Critical Rail Assets

**Table 4-3: Type Approval**

Element	CSTR Reference	Departure
Nil		



## 5. Safety Assurance Statement

Refer Safety Assurance Statement FLD-RDP01-REP-9999-PMG-0002

## 6. Technical

### 6.1 Design Details

The landscape design principles are based on improving user connectivity, community benefits and providing a sound aesthetic outcome using low maintenance soft and hard landscaping treatments. These form the design guidelines for the landscape design development to ensure an integrated, quality urban design outcome adjacent to and beneath all structures (Viaduct, Bridge Abutments, Lift / Stair Cores, Switchback Ramp and Station Platform).

Extensive stakeholder consultation has been undertaken to refine the Darlington planting species list. By employing this same mix of plant species on the Flinders Link Project, a visual and environmental consistency will be established, providing a greater continuity to the overall habitat corridor by re-establishing tree canopy cover to the perimeter of the sports fields and FMC road reserve. Additionally, all stakeholders are comfortable that the plants selected are resilient, native and appropriate for the area. See below tables outlining the species mixes for individual areas.

#### Flinders Station Central Plaza & Battered Planting

The CSTR states that the urban design shall ensure a high standard of design to achieve quality infrastructure that is visually attractive and interesting, robust, sophisticated and contemporary. In co-ordination with the urban design for the Station Platform and Shelter Canopy, the landscape design shall provide amenity and usable public space to assist pedestrian circulation.

The plaza shall include large unit granite pavers, shared use linkages to connect to Flinders University, low level planting and trees and bespoke seating plinths to provide rest/waiting areas for commuters. A combination of groundcovers and low lying plants will form the landscape treatment across the batter between the detention basin and station plaza. 2-3m high bamboo and low lying plants will be used to screen to the RSS wall adjacent to the stairs which also assists in vandalism prevention.

The below table outlines the species selection:

Botanic Name	Common Name
<b>TREES</b>	
Zelkova serrata 'Green Vase'	Japanese Elm
Allocasuarina verticillata	Weeping sheoak
Angophora costata	Smooth Barked Apple
Eucalyptus camaldulensis	River Red Gum
Eucalyptus leucoxylon ssp. Leucoxylon	S.A. Blue Gum
Eucalyptus microcarpa	Grey Box
<b>SHRUBS</b>	
<b>Groundcover Flowering Mix</b>	
Carpobrotus rossii	Pigface
Correa pulchella	Salmon correa
Eremophila glabra 'Kalbarri carpet'	Compact Yellow Tar Bush
Senecio mandraliscae	Blue Chalk Sticks

Botanic Name	Common Name
<b>Groundcover Mix</b>	
Atriplex semibaccata	Berry saltbush
Austrostipa flavescens	Spear-grass
Enchylaena tomentosa	Ruby Saltbush
<b>Low Level Mix @ 4/m<sup>2</sup></b>	
Dianella revoluta var revoluta	Black-Anther Flax-lily
Lomandra Densifolia	Pointed Mat Rush
Eremophila glabra 'Kalbarri carpet'	Compact Yellow Tar Bush

### Planting beneath viaduct

Landscaped treatments beneath the viaduct require a shade tolerant species integrated with banded gravel treatments to provide landscaped spaces without reducing sight lines and keeping provision for future development north of the viaduct. Rock boulders form informal bollards and low maintenance space to allow for potential works by others in the future.

The below table outlines the species selection:

Botanic Name	Common Name
<b>TREES</b>	
Zelkova serrata 'Green Vase'	Japanese Elm
Lagerstroemia indica x faurei 'Natchez'	Crepe Myrtle
<b>SHRUBS</b>	
<b>Shade Tolerant Mix</b>	
Arthropodium cirrhatum	Rock Lily
Clivia miniata	Kaffir Lily
Liriope muscari	Lily Turf
Plectranthus argentatus	Silver Spur Flower
Rhaphiolepis x indica	Dwarf Indian Hawthorn
Bambusa textilis var. gracilis	Slender Weavers Bamboo

### Basin Planting:

Where opportunities have been assessed and adopted as appropriate, a mix of macrophyte / terrestrial planting and rock mulch have been proposed.

The below table outlines the species selection:

Botanic Name	Common Name
<b>SHRUBS</b>	
<b>Bio-Retention Basin Mix</b>	
Carex tereticaulis	Tall Sedge
Cyperus Vaginatus	Stiff Flat Sedge
Ficinia Nodosa	Knobby club-rush
Juncus krassii	Sea rush
Lomandra dura	Stiff mat rush

## 6.2 Items to be resolved before next issue

- Investigate pedestrian lighting requirements for areas adjacent to stairs and rest areas in plaza to ensure the space meets lighting to public spaces (AS1158)
- Irrigation – water meter location, automatic controller (including power source) and flow requirements as well as consultation with stakeholders regarding watering methodology during establishment period. Scope of works to be developed.

## 7. Design Integration

### 7.1 Digital

Throughout the design development process the design team has utilised a BIM workflow to integrate the 3D design modelling across each of the design disciplines. A project Digital Engineering Execution plan has been developed and is being used through the detailed design phase ([FLD-RDP01-STD-9999-ENG-0002](#)) to detail the processes to incrementally develop a fully integrated 3D model. This model is updated weekly, used for our weekly coordination meetings and issued as a federated Navisworks model for all parties to undertake an ongoing review.

### 7.2 Environmental

This section addresses the environmental requirements of the CSTR as it relates to this package.

Section 4 of Part D20 of the CSTR requires the design and construction methodology to maximise achievement of a range of environmental and sustainability objectives where possible subject to the broader requirements of the CSTR. Sustainability is addressed under Section 6.3. Environmental objectives specifically relevant to this package include incorporation of Water Sensitive Urban Design (WSUD), prevention of disturbance to heritage sites and vegetation and enhancement of the amenity in the project area with urban design and landscaping. These objectives are addressed as follows:

- WSUD and protection of water quality is addressed in a separate Design Package – RDP021.
- Enhancement of amenity through landscape design is addressed through application of key principles detailed in Section 5.1.
- Limit the destruction or disturbance of native flora and significant trees. Where regulated or significant trees are required to be removed replacements will be planted (2:1 regulated and 3:1 significant at a minimum of 1.5m in height).

### 7.3 Sustainability

Sustainability has been considered and implemented throughout this package. The key principles that inform the Landscaping Design solution are detailed in Section 5.1 and these principles promote sustainable outcomes. In addition, the design incorporates the following principles:

- Water Sensitive Urban Design (WSUD) methods
- minimisation of operating costs
- minimisation of maintenance and asset replacement (to consequently minimise lifecycle cost and disruption to operations)
- minimisation of equipment replacement costs
- minimisation of cleaning costs
- minimisation of energy and water usage
- minimisation of waste

A Sustainability Management Plan (SMP) was prepared by DPTI for the Public Works Committee submission which identifies a range of sustainability benefits of the Flinders Link project and additional opportunities to enhance sustainability. Many of these opportunities have been considered and will be developed further at future stages of design including incorporation of LED lighting and improving connectivity for walking and cycling.

Sustainability in Design Workshop was held on 30th November 2017 as per the CSTR (part D20, Section 5). Discussion at the workshop highlighted the importance of addressing connectivity with existing and future greenways and walking/cycling routes, integration with existing and planned future land use to enable

sustainable development and opportunities to reduce material use and minimise waste. The outcomes of the workshop including initiatives and actions will be documented in a separate report to inform future stages of the design.

## 7.4 Interdisciplinary Review

Prior to issue this package has undergone an interdisciplinary review. The evidence of this review is provided in Appendix B.

## 7.5 Safety in Design

Safety in Design is integral to all stages of design development and has been considered throughout this package.

Overall key principles to be undertaken for Safety in Design include:

- Design for safe construction:
  - to facilitate safe handling and installation;
- Design to facilitate safe use:
  - Giving consideration to the intended function of the detention basin and battered area, ensuring it is not welcoming people to loiter or use as an informal walkway to the plaza.
  - Provide an appropriate species selection to maximise sight lines beneath structures and where shared use traffic meets junctures.
  - Provide sufficient sightlines where users are travelling beneath structures and to and from station.
  - Greater planting adjacent to structures where possible as a CPTED measure to deter vandalism.
- Design for safe maintenance:
  - Grassed area adjacent to car park for maintenance access to basin and reno mattress swale.

Key identified issues at this stage listed below:

- Lighting requirements for plaza rest area and stairs adjacent to lift core.

Key identified considerations / solutions at this stage listed below:

- Planting adjacent to RSS walls will deter vandalism to built structures by acting as a physical buffer.
- No internal corners to provide hiding spots, particularly where exiting lift and stairs beneath viaduct.

## 7.6 Future Expansion

No future expansion applies to the Landscaping Design.

## 7.7 Constructability

Preliminary discussions with structural team as well as the contractor have taken place and influenced decision making along the way. This process is likely to continue through design development. Key identified issues at this stage listed below:

- Details of stairs to plaza are still being developed using precedents from previous projects where a similar method has been used.

## 8. Stakeholder Consultation

The following stakeholders have been consulted in the design process so far:

- City of Marion Council (Landscape layout and species selection) – 15/11/2017
- Flinders University (future development plans, cyclist connectivity) – via urban design team
- Flinders Medical Centre (circulation) – via urban design team
- ODASA 30% Design review / SCAP presentation
- City of Marion Council 30% design review
- DPTI 30% design review
- Weekly design meetings with DPTI representatives and frequent workshops with stakeholders has also taken place.

The following stakeholders require additional consultation to be undertaken in future:

- City councils
  - City of Marion
  - City of Mitcham
- Environmental groups
- Cyclist groups
- Resident groups
  - Clovelly Park
  - Mitchell Park
- ODASA



## **9. Operations and Maintenance in design**

As per the CSTR, landscape and planted areas are to be low maintenance, easily accessible and procedures are considered in order to safely maintain. The key principles include:

- Provide landscape treatments that will become self-sustaining over time and are cost effective with regard to ongoing maintenance.

### **9.1 Asset Management Register**

There are no rail assets pertained to the Landscaping package.

## 10. Internal Verification

A list of the internal verification reviewers is presented in Table 10.1 with the signed verification records provided in Appendix C.

**Table 10.1: Internal Verification**

<b>Discipline</b>	<b>Reviewer</b>
Design Manager	Daniel Richter
Rail Systems	Homer Milanes
Geo-Technical	Steven Turner
Drafting	Tony Hill

## **11. External Verification**

### **11.1 Independent Design Certifier (IDC)**

30% IDC comments can be found in Appendix D.

### **11.2 DPTI**

30% DPTI comments can be found in Appendix E.

CS

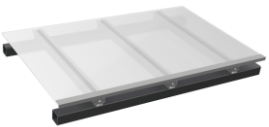
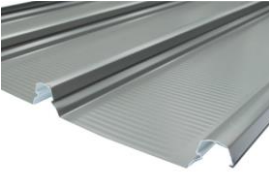

FINISHES + FF+E SCHEDULE      Flinders Link



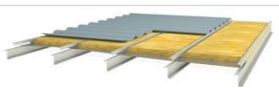
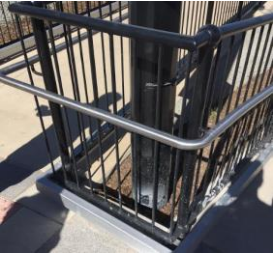

CONTRACT NUMBER

PROJECT TITLE      Flinders Link



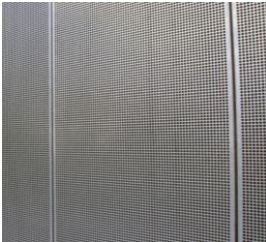
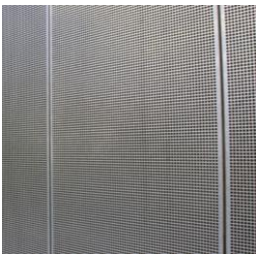
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BIM ID / Tag	Supplier	Product Description	Colour/Pattern/Finish type	Example Image	Warranty/Remarks	General Location
EXTERNAL FINISHES						
Roofing						
RF-01	Danpal	Danpalon Multicell	Polycarbonate sheeting: Ice Glazing Bars: Powder coated , anti-graffiti Interpon D2015 “Colour to be confirmed” Ultra Durable Polyester Powder Coat Finish To be applied and cured in accordance with the Interpon D2015 Technical Data Sheet to a minimum coating thickness of 70µm		DPTI compliant	Station Canopy, plaza canopy
RF-02	Lysaght	Lysaght Klip Lok 700 Classic concealed fix roofing	Shale Grey Matt			Elevated walkway roofing, stair roof
Ceilings						
CL-01	Alucobond	Alucobond Plus	Spectra Cupral 913 to match FCIC building Colour TBC with sample			Elevated walkway ceiling
Doors						

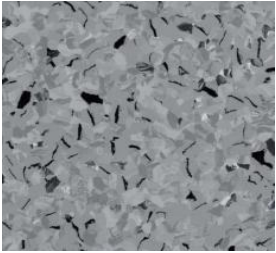


BIM ID / Tag	Supplier	Product Description	Colour/Pattern/Finish type	Example Image	Warranty/Remarks	General Location
DT-01		Steel Frame, solid-core steel faced fire door. 60min Fire Rating Single Leaf. Externally - key escutcheon only Internally - D-lever for emergency egress scissor arm door closer. The Security System Enclosure within the Equipment Room entrance door shall be fitted with a lock, Assa Abloy Proteq 'Cliq' - Australian Oval Cylinder 570 - CYL 504 (entry to these rooms shall be logged by an electronic signature held in the cylinder). The door shall be fitted with weather and dust seals to prevent ingress of water or contaminants into the room. The external door shall be fitted with a lock keyed to suit a Minister supplied "K11/K12" Security Key. The door shall have a self closing mechanism which shall automatically lock from the outside but can still be opened without the use of a key from the inside.	Powder coated , anti-graffiti Interpon D2015 "Colour to be confirmed" Ultra Durable Polyester Powder Coat Finish To be applied and cured in accordance with the Interpon D2015 Technical Data Sheet to a minimum coating thickness of 70µm			Communications room
DT-02			Powder coated , anti-graffiti Interpon D2015 "Colour to be confirmed" Ultra Durable Polyester Powder Coat Finish To be applied and cured in accordance with the Interpon D2015 Technical Data Sheet to a minimum coating thickness of 70µm			
G-01		Gate within Rail Corridor Fence Lockable, keyed to suit a Minister supplied "K11/K12" Security Key	As TS-03	As TS-03		Rail Corridor to Shared Path fence
Insulation						


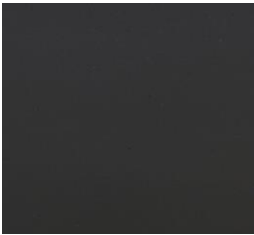
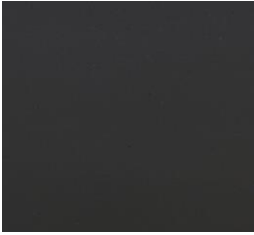

BIM ID / Tag	Supplier	Product Description	Colour/Pattern/Finish type	Example Image	Warranty/Remarks	General Location
INS-02	CSR Bradford	Foil Faced Insuation	Anticon R values to be confirmed Requires CSR Ashgrid to create insulation zone above the purlins			To CER building
Linings						
PB-01		Gyprock Fyrchek or Knauf FireShield / TruRock fire rated, moisture resistant plasterboard to achieve 60/60/60 fire rating.	16mm P-04 Paint finish			To CER building
Fixtures & Metalwork						
BAL-01	Monowills or equal approved	Proprietary balustrade "Monowills Platform" or equal approved. To include offset CHS steel handrail to NCC requirements.	Powercoat finish to balustrade: Interpon Steelplex Diamond 10 + Interpon D2015 as per attached specification "colour to be confirmed" Handrail - P-02 finish "Golden Yellow"			Western Ramp
BAL-02		Balustrade as BAL-01 with no handrail or kick rail	Powercoat finish to balustrade: Interpon Steelplex Diamond 10 + Interpon D2015 as per attached specification "colour to be confirmed"			Between elevated walkway and station plaza
BAL-03		Custom fabricated handrail	Stainless steel stanchions with HR-01 handrail			Station plaza staircase
BAL-04		Steel Balustrade with CHS steel rubrail as detailed	Powercoat finish to balustrade: Interpon Steelplex Diamond 10 + Interpon D2015 as per attached specification "colour to be confirmed" Rubrail: P-02 finish "Golden Yellow"		To be confirmed by DPTI	Shared Use Paths

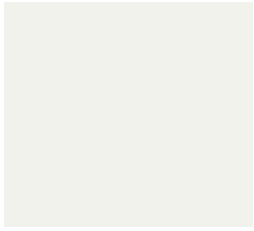


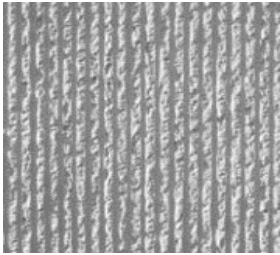


BIM ID / Tag	Supplier	Product Description	Colour/Pattern/Finish type	Example Image	Warranty/Remarks	General Location
BAL-05		Custom fabricated steel Balustrade with handrail as detailed	Powercoat finish to balustrade: Interpon Steelplex Diamond 10 + Interpon D2015 as per attached specification "colour to be confirmed" Handrail - P-02 finish "Golden Yellow"			to viaduct stairs
HR-01		CHS handrail on fabricated bracket as detailed	Handrail - P-02 finish "Golden Yellow" Supports - P-02 finish to match stanchion or support			handrails generally
ST-01	Webforge or equal approved	Proprietary trafficable steel mesh stair and landings "Webforge" (product code : A325MSG12) or similar approved including all required structure, fittings and fixings as well as contrasting stair nosings to AS1428.2. Stair to be measured on site, Risers and goings according to NCC requirements for an egress stair.	A325MSG12. Pattern A. Bar Size 325. Mild Steel, Serrated, Galvanised. 1000x5800			emergency and service areas only
Throwscreens & Fences						
TS-01		Perforated 4mm aluminium throwscreen panel face fixed to supporting structure.	Interpon D2015 "colour to be confirmed" Ultra Durable Polyester Powder Coat Finish To be applied and cured in accordance with the Interpon D2015 Technical Data Sheet to a minimum coating thickness of 70µm Interpon		Perforation pattern to be confirmed	Viaduct, station weatherscreen
TS-02A		Folded, perforated 4mm aluminium throwscreen panel. Fixed to profiled T-staunchions as detailed. Concealed fixings.	Interpon D2015 "colour to be confirmed" Ultra Durable Polyester Powder Coat Finish To be applied and cured in accordance with the Interpon D2015 Technical Data Sheet to a minimum coating thickness of 70µm Interpon		Perforation pattern to be confirmed	stair/lift cores, CER building, bicycle cage
TS-02B		Folded, perforated 4mm aluminium throwscreen panel. Fixed to profiled T-staunchions as detailed. Concealed fixings.	Interpon D2015 "colour to be confirmed" Ultra Durable Polyester Powder Coat Finish To be applied and cured in accordance with the Interpon D2015 Technical Data Sheet to a minimum coating thickness of 70µm Interpon		Perforation pattern to be confirmed	stair/lift cores

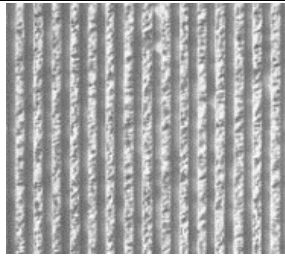
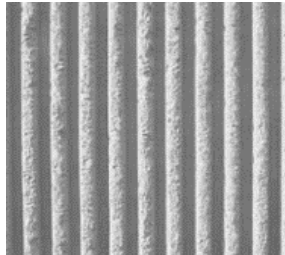
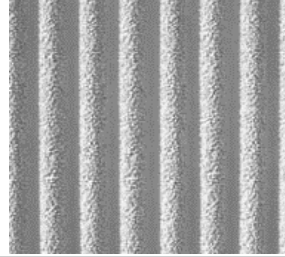
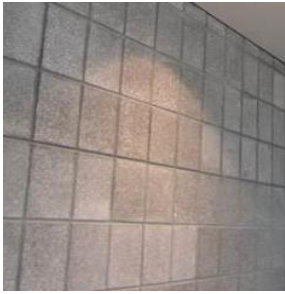
BIM ID / Tag	Supplier	Product Description	Colour/Pattern/Finish type	Example Image	Warranty/Remarks	General Location
TS-03		Gryffin SECURIFOR 358 substructure as detailed	Aluminum			Fence to rail on viaduct. Between rail and pedestrian walkway.
TS-05		Locker Group Planar 441 Aluminium woven mesh with perimeter angle frame and retaining plate. Max panel size 2400 w. Countersunk socket fixings.	Aluminum			Elevated walkway
Furniture & Furnishings						
BE-01	Spark Furniture	"Transit suite "Mawson"" seat Single Sided with 316L Stainless steel perforated seat and angled back rest planks. Arm Rests, frame and base to be hot dip galvanised. Dimensions to comply with AS1428.2 Surface mounted with base plate to manufacturers recommendations See standard DPTI drawing S7071-12 for more details	Stainless steel			free standing station bench
WB-01	Spark Furniture	"Transit" 120L waste bin 316L stainless steel with galvanised litter bin insert and support frame, smooth top and perforated sides as per landscape architects package. Surface mounted with base plate to manufacturers recommendations See standard DPTI drawing S7071-13 for more details	Stainless steel			free standing station waste bin
AL-01	Alpolic	Folded Alpolic signage and lighting strip as per DPTI standard detail Internally lit using LED strip lighting Lettering and symbols cutout and backed using translucent perspex.	Colour to be confirmed			To station platform
BO-01	SPARK or similar approved	<b>Bollard</b> Type: Senate Description: Impact Rated + Removable Fixing: Install to manufacturers recommendations. Refer to package C-410-10 for structural detailing.	Finish: Stainless steel, unpainted. Finish: Be provided with a cap. Finish: A minimum height of 1.2 m from the ground surface level to the top of the bollard.			Ramp, Lift + Stair cores, station
Floor Finishes						






BIM ID / Tag	Supplier	Product Description	Colour/Pattern/Finish type	Example Image	Warranty/Remarks	General Location
FF-01		broom finish natural grey concrete to achieve at least Classification “R11” resistant, as defined in Table 5 of AS 4586. This shall be read in conjunction with HB 197 The broom finish shall run in the same direction as the cross fall to ensure surface run off and avoid ponding of water.	broom finish The colour of the concrete shall be grey within the following colour range in accordance with AS 2700: a) Lightest tone – Dark Grey (N64); and b) Darkest tone – Graphite Grey (N65). Platform edge between TGSIs and rail edge to be natural grey concrete			Platform
FF-02		broom finish natural grey concrete to achieve at least Classification “R11” resistant, as defined in Table 5 of AS 4586. This shall be read in conjunction with HB 197 The broom finish shall run in the same direction as the cross fall to ensure surface run off and avoid ponding of water.	broom finish natural grey concrete			Paths Generally
FF-03		Floors shall be covered in a static dissipative vinyl with electrical resistance within the range of surface resistance specified in AS 2834 clause 2.1.2, when tested to AS 4155.6. The vinyl sheeting shall joined by hot or cold welding and finished to offer a smooth washable surface. It shall be coved up all wall and upstand surfaces by 100mm minimum. It shall be installed on a copper grid comprising copper tape 80 µm thick x 10 mm wide adhered to the floor with conductive adhesive. The copper tape shall be run up the wall adjacent to the Distribution Board. The Electrical Contractor shall connect the vinyl to earth via a 1 MΩ flame-proof safety resistor (RS Components, stock code 214-3159 or equivalent).	Dark Grey			CER Building, cleaners room, drivers toilets
Tactile Indicators						
TAC-01	Best Pavers (local product) Boral Pavers or equal approved	Cautional tactile indicator pavers 300x300x40	Terracota			TGSIs generally
TAC-02	Staircare or equal approved	Composite fibreglass reinforced matreial with silicon carbide anti-slip grit	SCR-70 yellow			Western stair core

BIM ID / Tag	Supplier	Product Description	Colour/Pattern/Finish type	Example Image	Warranty/Remarks	General Location
TAC-03	Latham Australia or equal approved	Mill Finish extruded Slip Resistant Safety Stair Nosings with granular silicon carbide mineral infill. Cast in to precast concrete stair and landings to achieve minimum R13 slip resistance and in compliance with AS1428.2	ACS-50SK Safety Insert Tread Aluminium with black carbide insert		A higher standard of finish is desired to the plaza steps.	Precast stairs to plaza.
Paint & Anti-Graffiti Finishes						
P-01		Clear coat anti-graffiti finish either: NTS EcoBarrier NK-M1 on top of an approved primer or Dulux 1st coat of APP Surfacesheild HD (2 passes) and 2nd coat of APP Surfaceshield S as per manufacturer's specifications	Matt			applied to all exposed concrete vertical elements
P-02		Industrial grade polysiloxane or equal anti-graffiti paint finish to steelwork either: As per paint spec: 170610-MASIMO-3633/6 prepared by International Paints and included in the Specification.	"colour to be confirmed"			Light poles and steelwork generally.
P-03		Industrial grade polysiloxane or equal anti-graffiti paint finish to steelwork that is in constant or near constant proximity to water, As per page 5 of paint spec: 170610-MASIMO-3633/6 prepared by International Paints and included in the Specification.	"colour to be confirmed"			Gutters, Downpipes, steel elements penetrating concrete or earth
P-04		Internal water-based semi-gloss enamel paint system suitable for use directly on concrete for comms room	white			communication and equipment room walls and ceiling
P-05		Industrial grade polysiloxane or equal anti-graffiti paint finish to concrete. Nanokote ProGuard NK-TC 01 or similar	"colour to be confirmed"			Concrete elements
P-06		Industrial grade polysiloxane or equal anti-graffiti paint finish to steelwork either: As per paint spec: 170610-MASIMO-3633/6 prepared by International Paints and included in the Specification.	"colour to be confirmed"			Viaduct and station screen horizontal girts.



BIM ID / Tag	Supplier	Product Description	Colour/Pattern/Finish type	Example Image	Warranty/Remarks	General Location
P07		Industrial grade polysiloxane or equal anti-graffiti paint finish to steelwork either: As per paint spec: 170610-MASIMO-3633/6 prepared by International Paints and included in the Specification.	"colour to be confirmed"			Elevated walkway trusses
Drains						
DS-01	ACO	Drainage trench grate, stainless steel to comply with AS 1428.2 Clause 9 (c) Pedestrian friendly Heelsafe Anti-Slip grate with AS 3996 and ASME A112 compliant. AS 4586 Slip resistance test: rated to P3 (wet pendulum), C/B1 (wet-barefoot platform) and R10/R101 (oil-wet platform). Meets AS 3996 for bicycle tyre penetration resistance. ACO Type 443Q-444Q / 643Q-644Q / 843Q-844Q	Stainless steel			Drainage grates generally  Notes:  - Drainage grille generally outside of station platform therefore less likely to be an issue with vision impaired  - DPTI have recommended black grilles. Cast iron black grilles typically prone to rusting.
DP-01		CHS downpipe as detailed on structural engineers drawings	P-03			Platform canopies
DPS-01		Boslok Stainless Pipe Bracket	Stainless steel			Platform canopies
Concrete Finishes						
RS-01	Reckli	RS walls with textured finish - extra fine ribbed texture	colour to be confirmed pattern to be confirmed			Western Ramp



BIM ID / Tag	Supplier	Product Description	Colour/Pattern/Finish type	Example Image	Warranty/Remarks	General Location
RS-02	Reckli	RS walls with textured finish - fine ribbed texture	colour to be confirmed pattern to be confirmed			Western Ramp
RS-03	Reckli	RS walls with textured finish - medium ribbed texture	colour to be confirmed pattern to be confirmed			Western Ramp
RS-04	Reckli	RS walls with textured finish - rough ribbed texture	colour to be confirmed pattern to be confirmed			Retaining walls generally
PC-01		Acid etched precast concrete panels with chamfered edges to panel joins, anti graffiti coating	colour to be confirmed pattern to be confirmed			Lift cores
PC-02		Acid etched precast concrete stair treads	colour to be confirmed pattern to be confirmed			Station plaza staircase
Blockwork						
CB-01		Concrete core filled hollow core block, stretcher bond. Product Reference: Boral Connex Range 200 series. 400 x 200 x 200	colour to be confirmed			CER Building, cleaners room, drivers toilets
Glazing						
GL-01		Frameless single glazed panels, toughened and laminated with anti-graffiti properties	specification to be confirmed			Lift glazing

BIM ID / Tag	Supplier	Product Description	Colour/Pattern/Finish type	Example Image	Warranty/Remarks	General Location
Paving Treatment						
PT-01	Beyond Stone or Halls Granite	600 x 300 x 40mm Bluestone granite paver	Blue stone granite paver with honed finish			Station Plaza
PT-02	Beyond Stone or Halls Granite	300x 300 x 40mm Bluestone granite paver	Blue stone granite paver with honed finish			Station Plaza
PT-03	Beyond Stone or Halls Granite	300x 300 x 40mm Bluestone granite paver	Blue stone granite paver with Bush Hammered finish			Station Plaza
PT-04	Beyond Stone or Halls Granite	300x 300 x 40mm Moonlight granite paver	Moonlight light grey granite paver exfoliated finish			Station Plaza
PT-05	Hansons	Exposed Aggregate footpaths. Slip resistance R10 required for all walkways.	Hansons Country Tan or approved equivalent. Class 2 finish. 80% White, 15% Tan, 5% Bluestone mix.			Plaza areas connecting to vertical transport and connections beneath culvert.



BIM ID / Tag	Supplier	Product Description	Colour/Pattern/Finish type	Example Image	Warranty/Remarks	General Location
PT-06	Fitzgerald quarry	Surface treatments between garden beds.	Fitzgerald 15-30mm Aggregate or approved equivalent.			Mainly beneath viaduct adjacent to Flinders Drive. Also within plaza connecting to switchback ramp.
PT-07	Barossa Quarry	Surface treatments between garden beds.	Calca Red 15-30mm Aggregate or approved equivalent.	 <small>Calca Granite 6mm</small>		Mainly beneath viaduct adjacent to Flinders Drive. Also within plaza connecting to switchback ramp.

6



# **Flinders Link Detailed Design**

Gateway South JV

## **Design Report - Environmental**

FLD-RDP25-REP-9999-30-0001 | A

17 May 2018



## Flinders Link Detailed Design

Project No: IW162000  
Document Title: Design Report - Environmental  
Document No.: FLD-RDP25-REP-9999-30-0001  
Revision: A  
Date: 17 May 2018  
Project Director: Simon Kokar  
Design Manager: Daniel Richter  
Author: Zeta Bull  
File Name: FLD-RDP25-REP-9999-30-0001

### Document history and status

Revision	Date	Description	By	Review	Approved
A	17/05/2018	Issued for 70% Review	Z. Bull	L Daddow	D. Richter

## Contents

<b>1.</b>	<b>Introduction.....</b>	<b>2</b>
1.1	Project.....	2
1.2	Scope.....	2
<b>2.</b>	<b>Status.....</b>	<b>3</b>
2.1	Hold Points .....	3
2.2	Changes from previous revision .....	3
<b>3.</b>	<b>Design Basis .....</b>	<b>4</b>
3.1	Site Assessment Report .....	4
<b>4.</b>	<b>Compliance with CSTR .....</b>	<b>5</b>
4.1	Waivers.....	5
4.2	Type Approval for Safety Critical Rail Assets.....	5
<b>5.</b>	<b>Safety Assurance Statement.....</b>	<b>6</b>
<b>6.</b>	<b>Technical .....</b>	<b>7</b>
6.1	Design Details .....	7
6.1.1	Summary of Vegetation Types .....	7
<b>7.</b>	<b>Design Integration .....</b>	<b>19</b>
7.1	Digital.....	19
7.2	Environmental.....	19
7.2.1	Environmentally Sensitive Areas .....	19
7.2.2	Flora and Fauna .....	19
7.2.3	Heritage .....	20
7.2.4	Contamination .....	20
7.2.5	Water Quality.....	20
7.2.6	Noise and Vibration .....	21
7.3	Sustainability .....	21
7.4	Interdisciplinary Review .....	22
7.5	Safety in Design .....	22
7.6	Future Expansion .....	22
7.7	Constructability .....	22
<b>8.</b>	<b>Stakeholder Consultation.....</b>	<b>23</b>
<b>9.</b>	<b>Operations and Maintenance in design .....</b>	<b>24</b>
9.1	Asset Management Register .....	24
<b>10.</b>	<b>Internal Verification .....</b>	<b>25</b>
<b>11.</b>	<b>External Verification.....</b>	<b>26</b>
11.1	Independent Design Certifier (IDC) .....	26
11.2	DPTI.....	26

### Appendix A. Asset Management Register

### Appendix B. Interdisciplinary Review

### Appendix C. Internal Verification

**Appendix D. Independent Design Certifier Comments**

**Appendix E. DPTI Comment Register**

**Appendix F. Requirements Analysis, Allocation and Traceability Matrix (RAATM)**

## Important note about your report

The sole purpose of this report and the associated services performed by Jacobs Group (Australia) Pty Ltd is to document the design in accordance with the scope of services set out in the contract between Jacobs Group (Australia) Pty Ltd and the joint venture of Fulton Hogan Construction Pty Ltd and Laing O'Rourke Australia Construction Pty Ltd trading as Gateway South ('the Client').

Jacobs derived the data in this report primarily from information provided by the Client, inspection of the Site by Jacobs, and with reference to relevant technical standards and guidelines available in the public domain. The passage of time, manifestation of latent conditions or impacts of future events may require further exploration at the site and subsequent data analysis, and re-evaluation of the findings, observations and conclusions expressed in this report.

In preparing this report, Jacobs has relied upon and presumed accurate certain information, (or absence thereof), relative to the Site provided by the Client and others identified herein. Except as otherwise stated in the report, Jacobs has not attempted to verify the accuracy or completeness of any such information.

The findings, observations and conclusions expressed by Jacobs in this report are not, and should not be considered, an opinion concerning the technical standards. Further, such data, findings, observations and conclusions are based solely upon site conditions and information supplied by the Client in existence at the time of the investigation.

The report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the provisions of the agreement between Jacobs and the Client, which permits the use of the document by the Principal for the purposes set out in the Contract Scope and Technical Requirements. Jacobs accepts no liability or responsibility whatsoever for or in respect of any use of the reliance upon this report by any third party.

## 1. Introduction

### 1.1 Project

The Flinders Link Project was announced by Federal and State Governments on 13 May 2016, with the two levels of government sharing equally the estimated \$85.5m cost. The project comprises an extension of the Tonsley Rail Line to the Flinders Medical Centre, creating a new connection to the health precinct and Flinders University, with a terminus at Flinders Station.

The primary elements are:

- Rail viaduct providing a grade separated extension of the Tonsley line.
- Flinders terminus station.
- Integration with other transport modes:
  - shared path for cycling and walking access
  - bus connections on South Road.

### 1.2 Scope

This report addresses the 70% Vegetation removal specification for the Flinders Station and forms part of the Design Documentation for the package RDP25 – Vegetation Removal.

The drawings covered under this package are listed in Table 1-1

**Table 1-1: List of drawings under this package**

Drawing No.	Revision	Description
CS1-DRG-352323	A	TITLE AND INDEX
CS1-DRG-352324	A	VEGETATION REMOVAL PLAN - SHEET 01
CS1-DRG-352325	A	VEGETATION REMOVAL PLAN - SHEET 02
CS1-DRG-352326	A	VEGETATION REMOVAL PLAN - SHEET 03
CS1-DRG-352327	A	VEGETATION REMOVAL PLAN - SHEET 04
CS1-DRG-352328	A	VEGETATION REMOVAL PLAN - SHEET 05
CS1-DRG-352329	A	VEGETATION REMOVAL PLAN - SHEET 06
CS1-DRG-352330	A	VEGETATION REMOVAL PLAN - SHEET 07
CS1-DRG-352331	A	VEGETATION REMOVAL PLAN - SHEET 08
CS1-DRG-352332	A	VEGETATION REMOVAL PLAN - SHEET 09



## 2. Status

### 2.1 Hold Points

The Hold Points relevant to this package are summarised in Table 2-1

**Table 2-1: Hold Points**

Hold Point	CSTR Reference	Status
10.2	Landscaping assessment and vegetation management shall constitute a HOLD POINT	

### 2.2 Changes from previous revision

Not applicable to this issue.

### 3. Design Basis

The relevant design basis documents for this package are listed in Table 3-1.

**Table 3-1: Design Basis Reports**

Discipline	Document Number
Not Applicable	

#### 3.1 Site Assessment Report

Refer Site Assessment Report FLD-RDP01-REP-9999-PMG-0001.

## 4. Compliance with CSTR

This design package complies with the requirements of CSTR with the exception of the noted departures. Table 4-1 shows the proposed departures for this package.

**Table 4-1: CSTR Departures**

Element	CSTR Reference	Departure
Nil		

A CSTR compliance register Requirements Analysis, Allocation and Traceability Matrix (RAATM) is attached in Appendix F.

### 4.1 Waivers

**Table 4-2: Waivers**

Element	CSTR Reference	Status
Nil		

### 4.2 Type Approval for Safety Critical Rail Assets

**Table 4-3: Type Approval**

Element	CSTR Reference	Status
Nil		

## 5. Safety Assurance Statement

Refer Safety Assurance Statement FLD-RDP01-REP-9999-PMG-0002

## 6. Technical

### 6.1 Design Details

The design details for this package are contained on the Package 25 drawings.

Background / supporting information is provided below.

#### 6.1.1 Summary of Vegetation Types

The DPTI Vegetation Removal Policy outlines the responsibilities in relation to activities affecting vegetation, including:

- Native vegetation in accordance with the *Native Vegetation Act 1991* including terrestrial and marine plant species indigenous to South Australia and dead trees with trunk diameter >600mm, measured at 300mm above natural ground level in all areas of the state except defined areas of the Adelaide metropolitan area. Also includes native vegetation planted to comply with a condition of clearance approval under the Native Vegetation Act.
- Native vegetation that is outside the Native Vegetation Act boundary
- Native vegetation which provides habitat for threatened flora and fauna species listed under *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth).
- Amenity vegetation including planted exotic and non-local native species, planted roadside vegetation, residential gardens, orchards (olives, citrus etc).
- Regulated trees which are any trees that occur in areas defined in the Development Regulations 2008 and have a trunk circumference of 2 m (or 625 mm for multi-stem) measured at a point 1 m from natural ground level. And trees declared to be a significant tree by the relevant Development Plan. Some trees may be exempt from regulated and significant tree controls because of their location or their species as defined in the Development Regulations.
- Significant trees which are trees that have a trunk circumference of 3 m or more (or 625 mm for multi-stem) measured at a point 1 m from natural ground level and are either a regulated tree (as per Development Regulations) or a significant tree (as per Development Plan). The Development Plans relevant to the project are Marion Council Development Plan (areas west of South Road) and Mitcham Council Development Plan (areas east of South Road – i.e. the proposed Flinders Station).

Refer to the policy for full criteria and additional definitions.

Vegetation within the project corridor comprises amenity vegetation outside the Native Vegetation Act boundary, significant trees, regulated trees and exotic vegetation. Two surveys have been undertaken throughout the project site to inform the design process and ensure the design minimises the impact on significant vegetation. The surveys and associated reports are as follows:

Survey for Darlington Project:

EBS Ecology (2014) Flora and Fauna Assessment Darlington Upgrade Project (Revised). Prepared by EBS Ecology for AECOM (updated for DPTI 2014). Version 4.0, 22 December 2014. FLINKP1-DPTI-REP-0000-TEN0022.A.IFT; RFI-R-FLINKP1-DPTI-RFI-R-000052-DUP Environment - Vegetation Services - vs 2014\_022 - all stages - Datasheet

Vegetation Survey Summary 2014/022 – for South Road Upgrade Darlington (DPTI Transport Services Division). FLINKP1-DPTI-REP-0000-TEN0014.A.IFT

Additional Survey for Flinders Link Project:

EBS (2016) Vegetation Survey Main Report 2016/072 for South Road Darlington Flinders Link Project Extension of Tonsley Rail Line (DPTI Transport Services) TSD 2016/1449/01. and associated data RFI-R-FLINKP1-DPTI-RFI-R-000052-FLNK Environment\_-\_Veg\_Services\_-\_VS\_2016\_072\_-\_Flinders\_Link\_-\_report; RFI-R-FLINKP1-DPTI-RFI-R-000052-FLNK Environment\_-\_Veg\_Services\_-\_VS\_2016\_072\_-\_Flinders\_Link\_-\_data

The majority of vegetation (not subject to the Native Vegetation Act) identified to date within the project corridor is described in the Vegetation Survey Main Report 2016/072 – Vegetation Survey Main Report (TSD 2016/1449/01).

### Land use

The land surrounding the survey area generally consists of residential properties, but also contains the redeveloped Mitsubishi site and the Flinders Medical Centre and Flinders University.

### Vegetation

The vegetation is modified non-remnant vegetation and consists of amenity planted trees and shrubs that provide a buffer between the rail line and the adjacent residential area; and amenity planting around car parks. Significant and Regulated trees (as defined by the *Development Act*) are present within the project corridor.

A number of Weeds Declared under the *Natural Resources Management Act 2004*, as well as environmental weeds are present within the corridor. In addition, a large proportion of the amenity vegetation present consists of planted exotic species or planted non-local natives, particularly in the vicinity of the existing Tonsley Railway Station. A number of local natives have been planted near the FMC carpark where the new station will be constructed.

Table 6-1 provides a summary of all the amenity vegetation present within the project corridor, including the significant and regulate trees. Removal status per tree and additional information is provided, where necessary.

**Table 6-1 Flinders Link Vegetation Removal Status**

DRAWING	TREE IDENTIFIER	VEGETATION TYPE	REMOVAL STATUS	DESCRIPTION	NATIVE / EXOTIC
CS1-DRG-352326	CS1-DRG-352326	Amenity	VEGETATION TO BE REMOVED THROUGH SWALE	not part of EBS survey, north of Handley Road, low vegetation between existing railway track and fence	unknown
CS1-DRG-352326	CS1-DRG-352326	Amenity	VEGETATION TO BE REMOVED THROUGH SWALE	not part of EBS survey, north of Handley Road, low vegetation between existing railway track and fence	unknown
CS1-DRG-352326; CS1-DRG-352327	838	Amenity / declared weed patch	VEGETATION TO BE REMOVED THROUGH SWALE	Regenerating: <i>Acacia iteaphylla</i> (Flinders Ranges Wattle), <i>Eucalyptus sp.</i> , <i>Acacia saligna</i> (WA Golden Wattle), <i>Olea europea</i> (declared weed); environmental weeds include: <i>Cynodon dactylon</i> (Couch), <i>Ehrharta longiflora</i> (Annual Veldt Grass), <i>Galenia pubescens</i> (Coastal Galenia) and <i>Vicia sativa</i> (Vetch).	Exotic / SA natives
CS1-DRG-352326; CS1-DRG-352327	792/793	Amenity / declared weed patch	Remain	Screen planting between residential street and rail corridor. Includes <i>Eucalyptus sp.</i> , <i>Melaleuca decussata</i> (Totem Poles), <i>Melaleuca nesophila</i>	Exotic / non-local natives