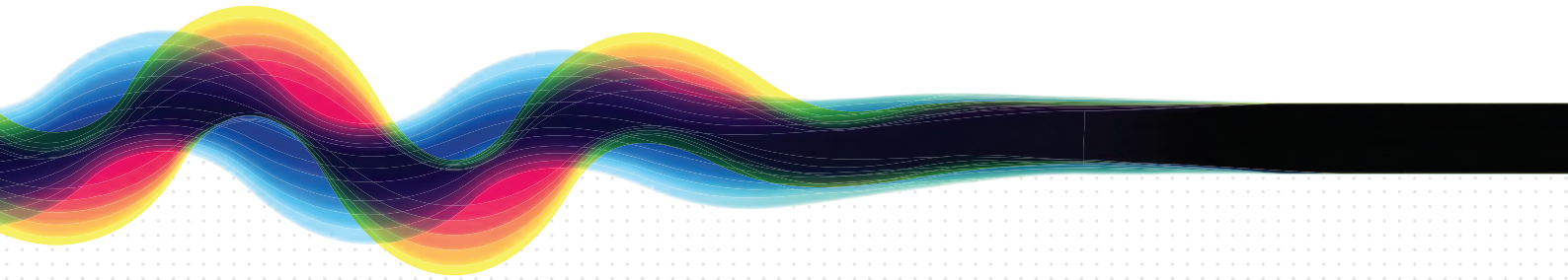
Bayswater Station

Appendices Part 1 – Appendix D1-J

October 2020 | 20-362



element.

the art and science of place

We acknowledge the custodians of this land, the Whadjuk Noongar and their Elders past, present and emerging. We wish to acknowledge and respect their continuing culture and the contribution they make to the life of this city and this region.

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Architectural Plans and Design Report prepared by Hassell

BAYSWATER STATION

PACKAGE 110 - STATION, PRECINCT & BUILDINGS
ARCHITECTURAL DRAWINGS

DRAWING NUMBER:	DRAWING TITLE:	REVISION:
12-A-114-AR0113	Drawing Cover Sheet & Index	A
12-A-114-AR0117	Locality Plan	A
12-A-114-AR0118	Site Plan	A
12-A-114-AR0119	Limit of Works Plan	A
12-A-114-AR0120	Land Management Plan - Sheet 01	A
12-A-114-AR0121	Land Management Plan - Sheet 02	A
12-A-114-AR0130	General Arrangement Plan - Platform - Sheet 01	A
12-A-114-AR0131	General Arrangement Plan - Platform - Sheet 02	A
12-A-114-AR0132	General Arrangement Plan - Ground - Sheet 01	A
12-A-114-AR0133	General Arrangement Plan - Ground - Sheet 02	A
12-A-114-AR0134	Reflected Ceiling Plan - Platform - Sheet 01	A
12-A-114-AR0135	Reflected Ceiling Plan - Platform - Sheet 02	A
12-A-114-AR0136	Reflected Ceiling Plan - Ground - Sheet 01	A
12-A-114-AR0137	Reflected Ceiling Plan - Ground - Sheet 02	A
12-A-114-AR0138	Roof Plan - Platform - Sheet 01	A
12-A-114-AR0139	Roof Plan - Platform - Sheet 02	A
12-A-114-AR0142	External Elevations and Sections - Sheet 01	A
12-A-114-AR0143	External Elevations and Sections - Sheet 02	A
12-A-114-AR0144	General Arrangement Sections - Sheet 01	A
12-A-114-AR0145	General Arrangement Sections - Sheet 02	A
12-A-114-AR0146	General Arrangement Sections - Sheet 03	A
12-A-114-AR0147	General Arrangement Sections - Sheet 04	A

DETAILED DESIGN

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	29.09.20	ISSUED FOR INITIAL DETAILED DESIGN	JPD/PR	PR/AH	PR	JPD
A1	10.08.20	ISSUED FOR INITIAL DETAILED DESIGN - DRAFT	JPD/PM	PR/AH	PR	JPD

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

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REFERENCE DRGS

SCALE : 1:100 (@ A1)

DATUM :
HORIZONTAL: PCG94
VERTICAL: AHD71

DOC REVIEW NOTE No.

DESIGNED JPD
DRAWN PR/AH
CHECKED PR

APPROVED FOR ISSUE

EXECUTIVE DIRECTOR
PTA Division / External Company

DATE

Government of Western Australia
Public Transport Authority

BAYSWATER STATION

STATION & STATION PRECINCT
ARCHITECTURE
DRAWING COVERSHEET & INDEX

PTA Drawing No: 12-A-114-AR0113 REV : A

CAD DRAWING PATHNAME \\proj01\PER\014238-61A-P\2_Work\2-1_Models\3_AutoCAD\1_Work\12-A-114-AR0113.dwg



NOTE: BRIDGE STRUCTURE INITIAL DETAILED DESIGN ONLY IS SHOWN FOR COORDINATION PURPOSES, REFER STRUCTURAL ENGINEER'S DWG'S FOR ADDITIONAL DETAIL

NOTE: REFER TO TRACK ENGINEER'S DRAWINGS FOR EXTENTS OF NEW RAIL AND TURNOUT WORKS STAGING, ALL VERTICAL AND HORIZONTAL TRACK DESIGN GEOMETRY, AND PLATFORM EDGE LEVELS

N

LOCALITY PLAN
SCALE 1:1000 @ A1

DETAILED DESIGN

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	29.09.20	ISSUED FOR INITIAL DETAILED DESIGN	JPD/PR	PR/AH	PR	JPD
A1	10.08.20	ISSUED FOR INITIAL DETAILED DESIGN - DRAFT	JPD/PM	AH/PR	PR	JPD

ORIG SIZE A1 — 0 10 20 30 40 50 100mm — AT ORIGINAL PLOT SIZE

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evolve bayswater
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REFERENCE DRGS
8584 landgate scdb_crop
rail_mel_optimum_geom
Rail Strings w Chainage
HSL_ROOF_PLAN
014238_GA
XR_C_0007_FENCING-RWALLS-NWALLS_20200924
Abutment Locations_200915
XR12C-CARPARK
XR_C_0001_CAD DESIGN
xr_c_0006_linemarking

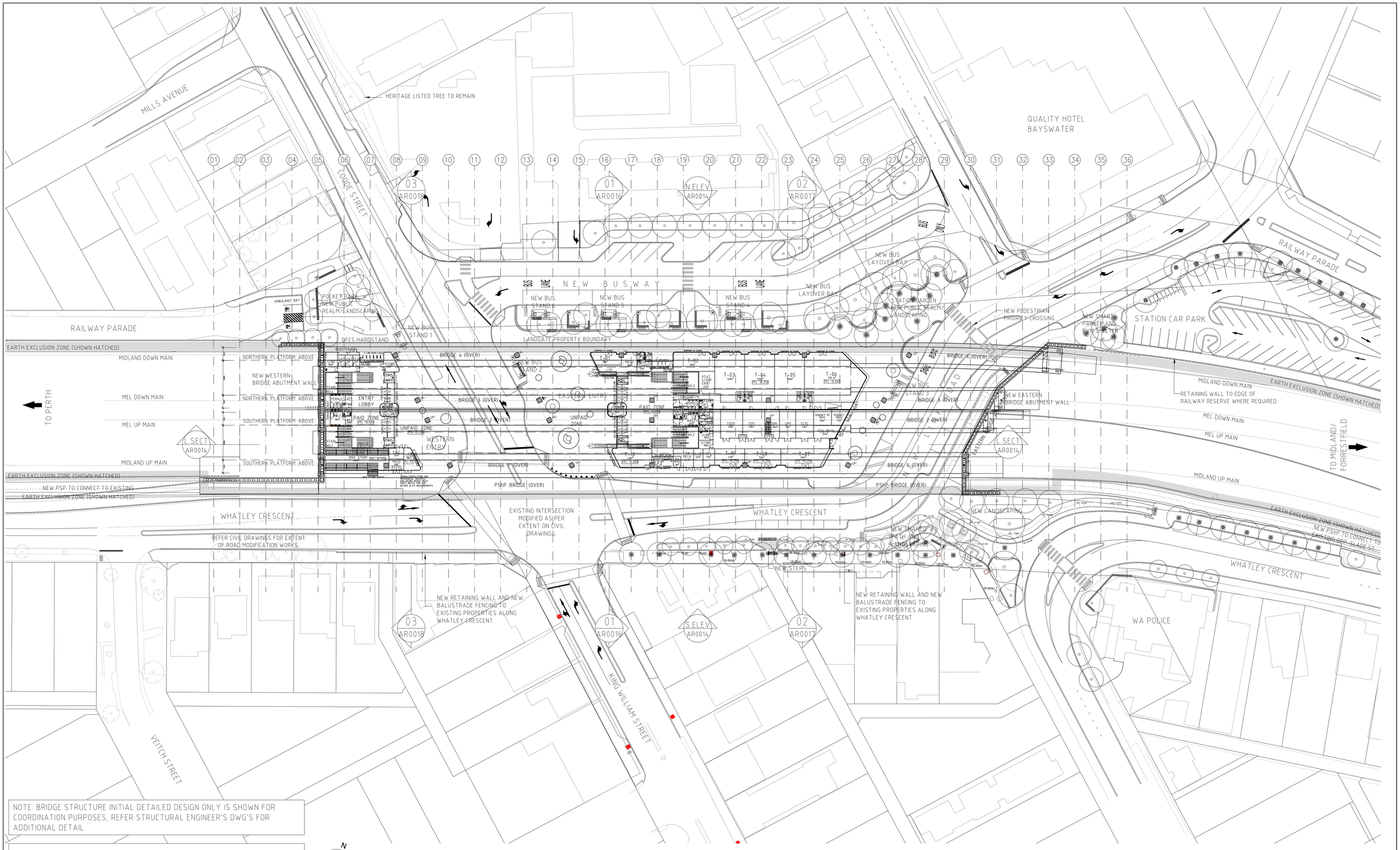
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DATUM : HORIZONTAL: PCG94 VERTICAL: AHD71
DOC REVIEW NOTE No.

DESIGNED JPD
DRAWN AH/PR
CHECKED PR
APPROVED FOR ISSUE
EXECUTIVE DIRECTOR PTA Division / External Company
DATE

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BAYSWATER STATION
STATION & STATION PRECINCT
ARCHITECTURE
LOCALITY PLAN
PTA Drawing No: 12-A-114-AR0117 REV : A

CAD DRAWING PATHNAME \\proj01\PER\014238-61A-P\2_Work\2-1_Models\3_AutoCAD\1_Work\12-A-114-AR0117.dwg



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NOTE: REFER TO TRACK ENGINEER'S DRAWINGS FOR EXTENTS OF NEW RAIL AND TURNOUT WORKS STAGING, ALL VERTICAL AND HORIZONTAL TRACK DESIGN GEOMETRY, AND PLATFORM EDGE LEVELS

N

SITE PLAN
SCALE 1:500

DETAILED DESIGN

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	29.09.20	ISSUED FOR INITIAL DETAILED DESIGN	JPD/PR	AH/PR	PR	JPD
A1	10.08.20	ISSUED FOR INITIAL DETAILED DESIGN - DRAFT	JPD/PR	AH/PR	PR	JPD

ORIG SIZE A1 — 0 10 20 30 40 50 100mm AT ORIGINAL PLOT SIZE

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REFERENCE DRGS
8584 landgate scdb_crop
rail_mel_optimum_geom
EarthExclusionZone
014238_GA
XR_C_0007_FENCING-RWALLS-NWALLS_20200924
hsl_concourse_plan_200722_option_3_ESCALATORS
Abutment Locations_200915
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STRUCTURE_CURRENT
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SCALE : 1:500 (@ A1)
DATUM :
HORIZONTAL: PCG94
VERTICAL: AHD71
DOC REVIEW NOTE No.

DESIGNED JPD/PR
DRAWN AH
CHECKED PR
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EXECUTIVE DIRECTOR
PTA Division / External Company
DATE

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BAYSWATER STATION
STATION & STATION PRECINCT
ARCHITECTURE
SITE PLAN
PTA Drawing No: 12-A-114-AR0118 REV : A

CAD DRAWING PATHNAME \\proj01\PER\014238-61A-P\2_Work\2-1_Models\3_AutoCAD\1_Work\12-A-114-AR0118.dwg

FOR CONTINUATION OF LIMIT OF WORKS REFER CIVIL DRAWINGS WHERE WORKS LIMITS ARE TO BE WITHIN RAIL RESERVE UP TO CH3430.

FOR CONTINUATION OF LIMIT OF WORKS REFER CIVIL DRAWINGS WHERE WORKS LIMITS ARE TO BE WITHIN RAIL RESERVE UP TO CH5108.027.

CODE ST
MILLS AVE
HALLIDAY PARK
DRAKE ST
ROSE AVE
BEECHBORO RD STH
RAILWAY PARADE
CHAINAGE 4340
WHATLEY CRESCENT
LEAKE ST
VEITCH ST
MURRAY ST
KING WILLIAM ST
HAMILTON ST
SLADE ST

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NOTE: BRIDGE STRUCTURE INITIAL DETAILED DESIGN ONLY IS SHOWN FOR COORDINATION PURPOSES, REFER STRUCTURAL ENGINEER'S DWG'S FOR ADDITIONAL DETAIL

NOTE: REFER TO TRACK ENGINEER'S DRAWINGS FOR EXTENTS OF NEW RAIL AND TURNOUT WORKS STAGING, ALL VERTICAL AND HORIZONTAL TRACK DESIGN GEOMETRY, AND PLATFORM EDGE LEVELS

N

LIMIT OF WORKS PLAN
SCALE 1:1000 @ A1

DETAILED DESIGN

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
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A1	10.08.20	ISSUED FOR INITIAL DETAILED DESIGN - DRAFT	JPD/PR	AH/PR	PR	JPD

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

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REFERENCE DRGS
8584 landgate scdb_crop
rail_mel_optimum_geom
Rail Strings w Chainage
XR12C-CARPARK
xr_c_0006_linemarking
XR_C_0001_CAD DESIGN

SCALE : 1:1000 (@ A1)
DATUM : HORIZONTAL: PCG94
VERTICAL: AHD71
DOC REVIEW NOTE No.

DESIGNED JPD
DRAWN AH
CHECKED PR
APPROVED FOR ISSUE
EXECUTIVE DIRECTOR PTA Division / External Company
DATE

Government of Western Australia Public Transport Authority

BAYSWATER STATION
STATION & STATION PRECINCT
ARCHITECTURE
LIMIT OF WORKS PLAN
PTA Drawing No: 12-A-114-AR0119 REV : A

CAD DRAWING PATHNAME \\proj01\per\014238-61A-P\2_Work\2-1_Models\3_AutoCAD\1_Work\12-A-114-AR0119.dwg

FOR CONTINUATION OF LIMIT OF WORKS REFER PTA DRAWING 12-C-11-0055 REV B WHERE WORKS LIMITS ARE TO BE WITHIN RAIL RESERVE UP TO CH3430.

FOR CONTINUATION OF LIMIT OF WORKS REFER PTA DRAWING 12-C-11-0057 REV B WHERE WORKS LIMITS ARE TO BE WITHIN RAIL RESERVE UP TO CH5108.027.

HALLIDAY PARK

MILLS AVE

ROSE AVE

DRAKE ST

BEECHBORO RD STH

RAILWAY PARADE

WHATLEY CRESCENT

LEAKE ST

VEITCH ST

KING WILLIAM ST

HAMILTON ST

SLADE ST

Underpass Managed by PTA

Managed by PTA

Managed by CofB

Managed by PTA

Managed by PTA

Rail Corridor Over - Refer Sheet 02

Rail Corridor Over - Refer Sheet 02

Managed by CofB

- PTA - Rail Corridor
- PTA
- City of Bayswater
- Transfer to PTA
- Transfer to City of Bayswater
- MRWA

NOTE: BRIDGE STRUCTURE INITIAL DETAILED DESIGN ONLY IS SHOWN FOR COORDINATION PURPOSES, REFER STRUCTURAL ENGINEER'S DWG'S FOR ADDITIONAL DETAIL

NOTE: REFER TO TRACK ENGINEER'S DRAWINGS FOR EXTENTS OF NEW RAIL AND TURNOUT WORKS STAGING, ALL VERTICAL AND HORIZONTAL TRACK DESIGN GEOMETRY, AND PLATFORM EDGE LEVELS

N

LIMIT OF WORKS PLAN
SCALE 1:1000 @ A1

DETAILED DESIGN

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	29.09.20	ISSUED FOR INITIAL DETAILED DESIGN	JPD/PR	AH	PR	JPD
A1	13.08.20	ISSUED FOR INITIAL DETAILED DESIGN - DRAFT	JPD/PM	PR/AH	PR	JPD

ORIG SIZE A1

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AT ORIGINAL PLOT SIZE

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REFERENCE DRGS

SCALE : 1:1000 (@ A1)
DATUM :
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VERTICAL: AHD71
DOC REVIEW NOTE No.

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BAYSWATER STATION
STATION & STATION PRECINCT
ARCHITECTURE
LAND MANAGEMENT PLAN - SHEET 01

PTA Drawing No: 12-A-114-AR0120 REV : A

CAD DRAWING PATHNAME \\proj01\PER\014238-61A-P\2_Work\2-1_Models\3_AutoCAD\1_Work\12-A-114-AR0120.dwg

FOR CONTINUATION OF LIMIT OF WORKS REFER PTA DRAWING 12-C-11-0055 REV B WHERE WORKS LIMITS ARE TO BE WITHIN RAIL RESERVE UP TO CH3430.

FOR CONTINUATION OF LIMIT OF WORKS REFER PTA DRAWING 12-C-11-0057 REV B WHERE WORKS LIMITS ARE TO BE WITHIN RAIL RESERVE UP TO CH5108.027.

COODE ST

HALLIDAY PARK

DRAKE ST

BEECHBORO RD STH

ROSE AVE

MILLS AVE

RAILWAY PARADE

Ground Level Below - Refer Sheet 01

Ground Level Below - Refer Sheet 01

WHATLEY CRESCENT

PShP over underpass
Managed by PTA

LEAKE ST

VEITCH ST

RAY ST

KING WILLIAM ST

HAMILTON ST

SLADE ST

PTA - Rail Corridor

PTA

City of Bayswater

Transfer to PTA

Transfer to City of Bayswater

MRWA

NOTE: BRIDGE STRUCTURE INITIAL DETAILED DESIGN ONLY IS SHOWN FOR COORDINATION PURPOSES, REFER STRUCTURAL ENGINEER'S DWG'S FOR ADDITIONAL DETAIL

NOTE: REFER TO TRACK ENGINEER'S DRAWINGS FOR EXTENTS OF NEW RAIL AND TURNOUT WORKS STAGING, ALL VERTICAL AND HORIZONTAL TRACK DESIGN GEOMETRY, AND PLATFORM EDGE LEVELS

N

LIMIT OF WORKS PLAN
SCALE 1:1000 @ A1

DETAILED DESIGN

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	29.09.20	ISSUED FOR INITIAL DETAILED DESIGN	JPD/PR	AH	PR	JPD
A1	13.08.20	ISSUED FOR INITIAL DETAILED DESIGN - DRAFT	JPD/PM	PR/AH	PR	JPD

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

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REFERENCE DRGS

SCALE : 1:1000 (@ A1)

DATUM :
HORIZONTAL: PCG94
VERTICAL: AHD71

DOC REVIEW NOTE No.

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APPROVED FOR ISSUE
EXECUTIVE DIRECTOR
PTA Division / External Company
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Government of Western Australia
Public Transport Authority

BAYSWATER STATION

STATION & STATION PRECINCT
ARCHITECTURE
LAND MANAGEMENT PLAN - SHEET 02

PTA Drawing No: 12-A-114-AR0121 REV : A

CAD DRAWING PATHNAME \\proj01\PER\014238-61A-P\2_Work\2-1_Models\3_AutoCAD\1_Work\12-A-114-AR0121.dwg

RAILWAY PARADE

WESTERN BRIDGE ABUTMENT RETAINING & NOISE WALL

AMBULANCE BAY

ACCESSIBLE PARKING BAYS
REFER CIVIL ENGINEERS
DRAWINGS

POCKET PARK
LANDSCAPING BELOW, REFER
LANDSCAPE ARCHITECTURE
DRAWINGS

CODE STREET

SHORT TERM PARKING
(5 x PARKING BAYS)

NEW SHARED ZONE

BUS LANE

ACTIVE BUS BAY

ACTIVE BUS BAY

NEW BUS
STAND 6

NEW BUS
STAND 5

NEW BUS
STAND 1

LANDSCAPING BELOW, REFER
LANDSCAPE ARCHITECTURE
DRAWINGS

6-CAR EMU

EMERGENCY REFUGE AREA

EMERGENCY REFUGE AREA

TO MIDLAND

TO ELLENBROOK

TO PERTH

TO PERTH

NEW PShP

NEW PShP

NEW PShP BRIDGE

NEW SHARED PATH

W H A T L E Y C R E S C E N T

W H A T L E Y

REFER CIVIL DRAWINGS FOR EXTENT OF
ROAD MODIFICATION WORKS.

NEW RETAINING WALL AND NEW
BALUSTRADE FENCING TO
EXISTING PROPERTIES ALONG
WHATLEY CRESCENT

K I N G W I L L I A M S T R E E T

NOTE: BRIDGE STRUCTURE INITIAL DETAILED DESIGN ONLY IS SHOWN FOR COORDINATION PURPOSES, REFER STRUCTURAL ENGINEER'S DWG'S FOR ADDITIONAL DETAIL

NOTE: REFER TO TRACK ENGINEER'S DRAWINGS FOR EXTENTS OF NEW RAIL AND TURNOUT WORKS STAGING, ALL VERTICAL AND HORIZONTAL TRACK DESIGN GEOMETRY, AND PLATFORM EDGE LEVELS

PLATFORM PLAN

SCALE 1:250

FOR CONTINUATION REFER PTA DRAWING 12-1-114-AR0131

DETAILED DESIGN

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
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A3	09.09.20	ARCHITECTURAL LAYOUT FREEZE FOR 15%IDD SUBMISSION	JPD/PM	PR/AH	PR	JPD
A2	07.09.20	ISSUED FOR REVIEW AND COMMENT ONLY	JPD/PM	AH/PR	PR	JPD
A1	10.08.20	ISSUED FOR INITIAL DETAILED DESIGN - DRAFT	JPD/PM	AH/PR	PR	JPD

ORIG SIZE A1 — 0 10 20 30 40 50 100mm — AT ORIGINAL PLOT SIZE

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REFERENCE DRGS

8584 landgate scdb
858401 BAYSWATER FEATURE 2D_NO_RASTERS_ISO02_NO_LEVELS
RAIL_MEL_OPTIMUM_GEOM
hsl_platform_plan_200722_Option_3
014238_GA
XR_C_0007_FENCING-RWALLS-NWALLS_20200924
XR12C-CARPARK
HSL_GRID
xr_c_0006_linemarking
Abutment Locations_200915
XR_C_0001_CAD DESIGN

SCALE : 1:250 (@ A1)
DATUM :
HORIZONTAL: PCG94
VERTICAL: AHD71
DOC REVIEW NOTE No.

DESIGNED JPD
DRAWN AH
CHECKED PR
APPROVED FOR ISSUE
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PTA Division / External Company
DATE

Government of Western Australia
Public Transport Authority

BAYSWATER STATION

WESTERN PLATFORMS & EMERGENCY REFUGE AREA
ARCHITECTURE
GENERAL ARRANGEMENT PLAN - PLATFORM - SHEET 01

PTA Drawing No: 12-A-114-AR0130 REV : A

CAD DRAWING PATHNAME \\proj01\PER\014238-61A-P\2_Work\2-1_Models\3_AutoCAD\1_Work\12-A-114-AR0130.dwg

FOR CONTINUATION REFER PTA DRAWING 12-A-114-AR0130

SHORT TERM PARKING (5 x BAYS)

SHORT TERM PARKING (5 x BAYS)

02 AR0145

C AR0142

BUS ONLY

ROSE AVE

BUS LAYOVER BAY

BUS LAYOVER BAY

14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36

7500

LANE

RAILWAY PARADE

BUS

LANE

BEECHBORO ROAD

B5

ACTIVE BUS BAY

B4

ACTIVE BUS BAY

BUS STAND

BUS STAND

BUS STAND

NEW LANDSCAPING BELOW REFER TO LANDSCAPE ARCHITECT'S DRAWINGS

STATION GARDEN
NEW LANDSCAPING BELOW REFER TO LANDSCAPE ARCHITECT'S DRAWINGS

STATION CARPARK

NC

SC-02 SC-03

PC-01 HR-01

BS-01

TILES FL-08 FL-01 FL-06

6-CAR EMU

PT-08 FL-10 WT-06

PLATFORM EDGE

CANOPY ABOVE SHOWN DASHED

SAFE ZONE

SEATING

PSM

ESCALATOR NO.1

LIFT NO.4

STAIR NO.1

COL.

ACOL.

STAFF OFFICE

WC TEA PREP 7.4m²

MECH 7.4m²

ELEC 8m²

CMS 8m²

NON-OPERATIONAL PLATFORM

RL 22.485m

FL-06 TILES

MAINTENANCE WALKWAY

LANE

BS-02

BS-03

STAIR NO.12

STAIR NO.11

STAIR NO.10

EASTERN ABUTMENT RETAINING / NOISE WALL

TO MIDLAND

TO ELLENBROOK

BS-02 GL-01

UPTO 3500 AFL 900 TO 2700 AFL

WT-GD

TO PERTH

ESCALATOR NO.2

LIFT NO.2

STAIR NO.2

CMMS 8m²

STAIR NO.8

STAIR NO.7

STAIR NO.6

A AR0142

NEW PShP BRIDGE

NEW PShP BRIDGE

NEW PShP

WHATLEY CRESCENT

KING WILLIAM STREET

HAMILTON ST

NEW LANDSCAPING BELOW REFER TO LANDSCAPE ARCHITECT'S DRAWINGS

TW. 15.200 15.75 TW. 16.200 TW. 17.800 17.70(e) 18.00(e) 15.50(e) 15.90 16.20 16.80(e) 18.20(e) 19.00(e) 19.40(e) 19.80(e) 19.50(e) 20.00(e) 20.20(e) 20.40(e) 20.80(e)

FFL. 16.700 FFL. 17.300 FFL. 17.900 FFL. 18.500 FFL. 19.100 FFL. 19.700 FFL. 20.300

TW. 19.100 19.900 TW. 20.300 20.900 TW. 20.000 TW. 20.600

01 AR0145

B AR0142

NOTE: BRIDGE STRUCTURE INITIAL DETAILED DESIGN ONLY IS SHOWN FOR COORDINATION PURPOSES, REFER STRUCTURAL ENGINEER'S DWG'S FOR ADDITIONAL DETAIL

NOTE: REFER TO TRACK ENGINEER'S DRAWINGS FOR EXTENTS OF NEW RAIL AND TURNOUT WORKS STAGING, ALL VERTICAL AND HORIZONTAL TRACK DESIGN GEOMETRY, AND PLATFORM EDGE LEVELS

N

PLATFORM PLAN

SCALE 1:250

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	29.09.20	ISSUED FOR INITIAL DETAILED DESIGN	JPD/PR	AH/PR	PR	JPD
A3	09.09.20	ARCHITECTURAL LAYOUT FREEZE FOR 15%IDD SUBMISSION	JPD/PM	PR/AH	PR	JPD
A2	07.09.20	ISSUED FOR REVIEW AND COMMENT ONLY	JPD/PM	PR/AH	PR	JPD
A1	10.08.20	ISSUED FOR INITIAL DETAILED DESIGN - DRAFT	JPD/PM	PR/AH	PR	JPD

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

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REFERENCE DRGS

8584 landgate scdb
858401 BAYSWATER FEATURE 2D_NO_RASTERS_ISO02_NO_LEVELS
RAIL_MEL_OPTIMUM_GEOM
hsl_platform_plan_200722_Option_3
014238_GA
XR_C_0007_FENCING-RWALLS-NWALLS_20200924
HSL_GRID
XR12C-CARPARK
xr_c_0006_linemarking
Abutment Locations_200915
XR_C_0001_CAD DESIGN

SCALE : 1:250 (@ A1)

DATUM :
HORIZONTAL: PCG94
VERTICAL: AHD71

DOC REVIEW NOTE No.

DESIGNED JPD
DRAWN AH
CHECKED PR

APPROVED FOR ISSUE

EXECUTIVE DIRECTOR
PTA Division / External Company

DATE

DETAILED DESIGN

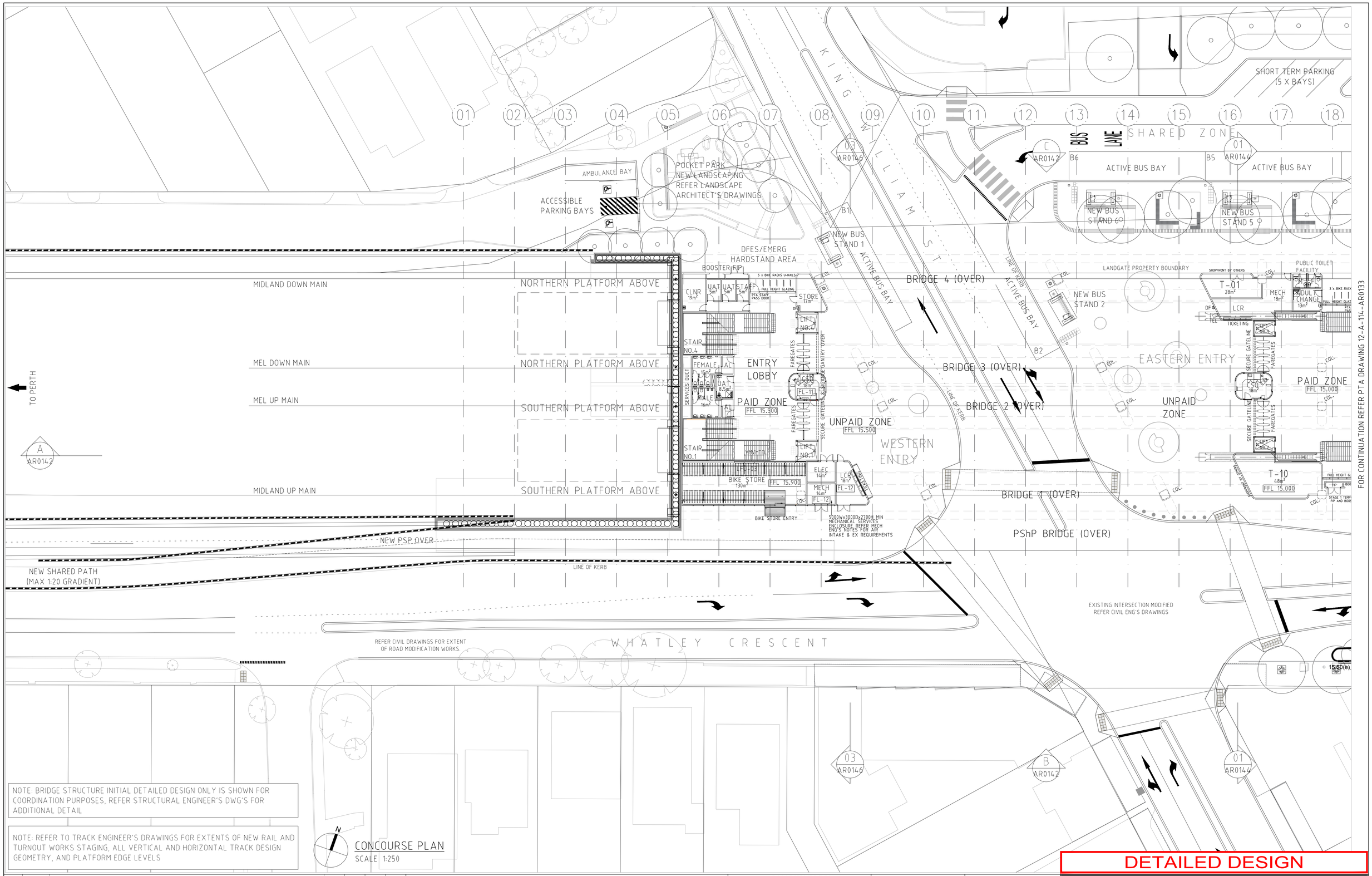
Government of Western Australia Public Transport Authority

BAYSWATER STATION

EASTERN PLATFORMS & BRIDGE ABUTMENT
ARCHITECTURE
GENERAL ARRANGEMENT PLAN - PLATFORM - SHEET 02

PTA Drawing No: 12-A-114-AR0131 REV : A

CAD DRAWING PATHNAME \\proj01\PER\014238-61A-P\2_Work\2-1_Models\3_AutoCAD\1_Work\12-A-114-AR0131.dwg



NOTE: BRIDGE STRUCTURE INITIAL DETAILED DESIGN ONLY IS SHOWN FOR COORDINATION PURPOSES, REFER STRUCTURAL ENGINEER'S DWG'S FOR ADDITIONAL DETAIL

NOTE: REFER TO TRACK ENGINEER'S DRAWINGS FOR EXTENTS OF NEW RAIL AND TURNOUT WORKS STAGING, ALL VERTICAL AND HORIZONTAL TRACK DESIGN GEOMETRY, AND PLATFORM EDGE LEVELS

CONCOURSE PLAN
SCALE 1:250

DETAILED DESIGN

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	29.09.20	ISSUED FOR INITIAL DETAILED DESIGN	JPD/PR	AH/PR	PR	JPD
A3	09.09.20	ARCHITECTURAL LAYOUT FREEZE FOR 15%IDD SUBMISSION	JPD/PM	PR/AH	PR	JPD
A2	07.09.20	ISSUED FOR REVIEW AND COMMENT ONLY	JPD/PM	PR/AH	PR	JPD
A1	10.08.20	ISSUED FOR INITIAL DETAILED DESIGN - DRAFT	JPD/PM	PR/AH	PR	JPD

ORIG SIZE A1 — 0 10 20 30 40 50 100mm — AT ORIGINAL PLOT SIZE

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REFERENCE DRGS
858401 BAYSWATER FEATURE 2D_NO_RASTERS_ISO02_NO_LEVELS
8584 landgate scdb_crop
RAIL_MEL_OPTIMUM_GEOM
STRUCTURE_CURRENT
HSL_GRID
hsl_concourse_plan_200722_option_3_ESCALATORS
014238_GA
XR_C_0007_FENCING-RWALLS-NWALLS_20200924
XR12C-CARPARK
xr_c_0006_linemarking
Abutment Locations_200915
XR_E_0001_EAD DESIGN

SCALE : 1:250 (@ A1)
DATUM :
HORIZONTAL: PCG94
VERTICAL: AHD71
DOC REVIEW NOTE No.

DESIGNED JPD
DRAWN AH
CHECKED PR
APPROVED FOR ISSUE
EXECUTIVE DIRECTOR PTA Division / External Company
DATE

Government of Western Australia Public Transport Authority

BAYSWATER STATION
WESTERN ENTRY BUILDING CONCOURSE
ARCHITECTURE
GENERAL ARRANGEMENT PLAN - GROUND - SHEET 01

PTA Drawing No: 12-A-114-AR0132 REV : A

CAD DRAWING PATHNAME \\proj01\PER\014238-61A-P\2_Work\2-1_Models\3_AutoCAD\1_Work\12-A-114-AR0132.dwg

SHORT TERM PARKING (5 X BAYS)

SHORT TERMPARKING (5 X BAYS)

BUS ONLY

ROSE AVE

LAYOVER BUS BAY

BR

14 15 16 17 18 19 20 21 22 23 24 25 L2 26 27 28 29 30 31 32 33 34 35 36

7500

BUS LANE

SHARED ZONE

02 AR0145

C AR0142

ACTIVE BUS BAY B5 ACTIVE BUS BAY B4 ACTIVE BUS BAY L1

LAYOVER BUS BAY

BEECHBORO ROAD

SHORT-TERM PARKING (5 X BAYS)

NEW BUS STAND 6

NEW BUS STAND 5

NEW BUS STAND 4

STATION CARPARK

LANDGATE PROPERTY BOUNDARY

SHOPFRONT BY OTHERS

T-01 28m²

MECH 18m²

ADULT CHANGE 13m²

3 x BIKE RACKS

FULL HEIGHT GLAZING

PTA STAFF PASS DOOR

DF

LCR

TEL

TICKETING

LIFT NO.3

SECURE GATELINE

PARAGATES

EASTERN ENTRY

UNPAID ZONE

PAID ZONE FFL 15.000

LIFT NO.2

STAIR NO.2

T-02 50m²

PTA STAFF CRIB 27m²

STAIR NO.3

T-03 120m²

T-04 120m² FFL 15.250

T-05 120m²

T-06 210 m² FFL 15.500

FUTURE WC PROVISIONS

CORRIDOR

STAIR

FEMALE 15m²

UAT 10m²

UAT 8.5m²

DOOR

STAIR 9.5m²

MALE 16m²

STAIR 8.5m²

CLNR 10m²

STORE 10m²

LOUVRES

TENANCY KE MECH 20m²

TENANCY MECH 17m²

TSER 48m²

CER 48m²

BIN 30m²

UPS 35m²

ELEC 40m²

PTA MECH 34m²

GSS

T-10 48m² FFL 15.000

FULL HEIGHT GLAZING

STAGE 1 TEMPORARY FIP AND BOOSTER

TEN. MECH 6m²

PTA MECH 24m²

ELEC 14m²

TRC 15m²

T-09 43m² FFL 15.250

T-08 52m² FFL 15.250

T-07 65m² FFL 15.250

SHOPFRONT BY OTHERS

NEW BUS STAND 3

NEW ROAD LINK

BUS LANE

BRIDGE 4 (OVER)

BRIDGE 3 (OVER)

BRIDGE 2 (OVER)

BRIDGE 1 (OVER)

PSHP BRIDGE (OVER)

NEW PEDESTRIAN PRIORITY CROSSING

MIDLAND DOWN MAIN

MEL DOWN MAIN

MEL UP MAIN

MIDLAND UP MAIN

EASTERN BRIDGE ABUTMENT

NEW EASTERN BRIDGE ABUTMENT WALL

A AR0142

SHORT-TERM PARKING BAYS 5 6

ACC/DROP ACC/TAXI SHORT-TERM DROP OFF BAYS

DFES/EMERG

WHATLEY CRESCENT

1 2 3 4 SHORT-TERM PARKING BAYS

NEW LANDSCAPING

TW 16.200 15.75 TW 16.200 TW 17.800 TW 16.200

15.50(e) 15.90 16.20 16.80(e) 17.70(e) 18.00(e) 18.20(e) 19.00(e) 19.40(e) 19.80(e) 19.50(e) 20.00(e) 20.20(e) 20.40(e) 20.80(e)

FFL 16.700 FFL 17.300 FFL 18.500 FFL 19.100 FFL 19.700 FFL 20.300 TW 20.000

NEW 1.20m WIDE PATH

HAMILTON ST

01 AR0145

B AR0142

FOR CONTINUATION REFER PTA DRAWING 12-A-114-AR0132

TO PERTH

TO MIDLAND / FORRESTFIELD

NOTE: BRIDGE STRUCTURE INITIAL DETAILED DESIGN ONLY IS SHOWN FOR COORDINATION PURPOSES, REFER STRUCTURAL ENGINEER'S DWG'S FOR ADDITIONAL DETAIL

NOTE: REFER TO TRACK ENGINEER'S DRAWINGS FOR EXTENTS OF NEW RAIL AND TURNOUT WORKS STAGING, ALL VERTICAL AND HORIZONTAL TRACK DESIGN GEOMETRY, AND PLATFORM EDGE LEVELS

N

CONCOURSE PLAN

SCALE 1:250

DETAILED DESIGN

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	29.09.20	ISSUED FOR INITIAL DETAILED DESIGN	JPD/PR	AH/PR	PR	JPD
A3	09.09.20	ARCHITECTURAL LAYOUT FREEZE FOR 15%IDD SUBMISSION	JPD/PM	PR/AH	PR	JPD
A2	07.09.20	ISSUED FOR REVIEW AND COMMENT ONLY	JPD/PM	PR/AH	PR	JPD
A1	10.08.20	ISSUED FOR INITIAL DETAILED DESIGN - DRAFT	JPD/PM	PR/AH	PR	JPD

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

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REFERENCE DRGS

8584 landgate scdb
8584.01 BAYSWATER FEATURE 2D_NO_RASTERS_ISOC2_NO_LEVELS
RAIL_MEL_OPTIMUM_GEOM
STRUCTURE_CURRENT
HSL_GRID
hsl_concourse_plan_200722_option_3_ESCALATORS
014238_GA
XR_C_0007_FENCING-RWALLS-NWALLS_20200924
XR12C-CARPARK
xr_c_0006_linemarking
Abutment Locations_200915
XR_C_0001_CAD DESIGN

SCALE : 1:250 (@ A1)

DATUM :
HORIZONTAL: PCG94
VERTICAL: AHD71

DOC REVIEW NOTE No.

DESIGNED JPD
DRAWN AH
CHECKED PR

APPROVED FOR ISSUE

EXECUTIVE DIRECTOR
PTA Division / External Company

DATE

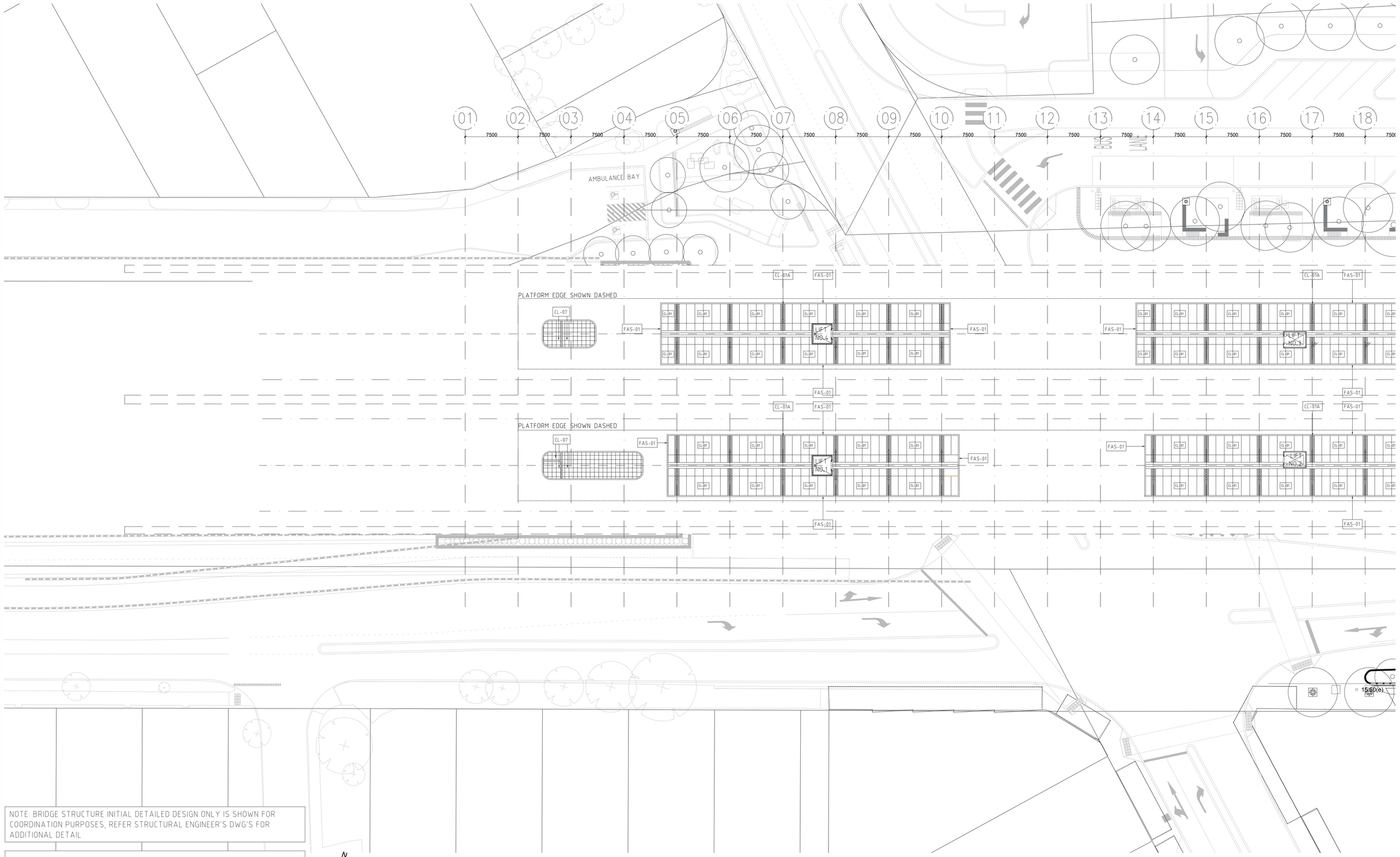
Government of Western Australia Public Transport Authority

BAYSWATER STATION

EASTERN ENTRY BUILDING CONCOURSE
ARCHITECTURE
GENERAL ARRANGEMENT PLAN - GROUND - SHEET 02

PTA Drawing No: 12-A-114-AR0133 REV : A

CAD DRAWING PATHNAME \\proj01\per\014238-61A-P\2_Work\2-1_Models\3_AutoCAD\1_Work\12-A-114-AR0133.dwg



FOR CONTINUATION REFER PTA DRAWING 12-A-114-AR0135

NOTE: BRIDGE STRUCTURE INITIAL DETAILED DESIGN ONLY IS SHOWN FOR COORDINATION PURPOSES, REFER STRUCTURAL ENGINEER'S DWG'S FOR ADDITIONAL DETAIL

NOTE: REFER TO TRACK ENGINEER'S DRAWINGS FOR EXTENTS OF NEW RAIL AND TURNOUT WORKS STAGING, ALL VERTICAL AND HORIZONTAL TRACK DESIGN GEOMETRY, AND PLATFORM EDGE LEVELS

N

REFLECTED CEILING PLAN (PLATFORM)
SCALE 1:250

DETAILED DESIGN

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	29.09.20	ISSUED FOR INITIAL DETAILED DESIGN	JPD/PR	AH/PR	PR	JPD
A1	10.08.20	ISSUED FOR INITIAL DETAILED DESIGN - DRAFT	JPD/PM	PR/AH	PR	JPD

ORIG SIZE A1 — 0 10 20 30 40 50 100mm — AT ORIGINAL PLOT SIZE

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REFERENCE DRGS
8584 landgate scdb
858401 BAYSWATER FEATURE 2D_NO_RASTERS_ISO02_NO_LEVELS
HSL_PLATFORM_REFLECTED_CEILING_PLAN
014238_GA
XR_C_0007_FENCING-RWALLS-NWALLS_20200924
XR12C-CARPARK
xr_c_0006_linemarking
Abutment Locations_200915
XR_C_0001_CAD DESIGN
HSL_GRID

SCALE : 1:250 (@ A1)
DATUM :
HORIZONTAL: PCG94
VERTICAL: AHD71
DOC REVIEW NOTE No.

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Public Transport Authority

BAYSWATER STATION
WESTERN PLATFORMS & BRIDGE ABUTMENT
ARCHITECTURE
REFLECTED CEILING PLAN - PLATFORM - SHEET 01

PTA Drawing No: 12-A-114-AR0134 REV : A

CAD DRAWING PATHNAME \\proj01\PER\014238-61A-P\2_Work\2-1_Models\3_AutoCAD\1_Work\12-A-114-AR0134.dwg

FOR CONTINUATION REFER PTA DRAWING 12-A-114-AR0134

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7500 7500 7500 7500 7500 7500 7500 7500 7500 7500 7500 7500 7500 7500 7500 7500 7500 7500 7500 7500 7500 7500 7500

BUS LANE

BUS LANE

CL-01A FAS-01

FAS-01

CL-01 CL-01 CL-01 CL-01 CL-01 CL-01 CL-01

FFL 17.70 FFL NO.3

CL-01 CL-01 CL-01 CL-01 CL-01 CL-01 CL-01

FAS-01

CL-06

NON-OPERATIONAL PLATFORM

PLATFORM C/L

TRACK C/L

PLATFORM EDGE SHOWN DASHED

TRACK C/L

FAS-01

CL-01A FAS-01

TRACK C/L

FAS-01

CL-01 CL-01 CL-01 CL-01 CL-01 CL-01 CL-01

FFL 17.70 FFL NO.2

CL-01 CL-01 CL-01 CL-01 CL-01 CL-01 CL-01

FAS-01

CL-06

NON-OPERATIONAL PLATFORM

PLATFORM C/L

PLATFORM EDGE SHOWN DASHED

TRACK C/L

FAS-01

LANE

MC MC MC MC MC MC MC MC

FFL 16.700

FFL 17.300

FFL 17.900

FFL 18.500

FFL 19.100

FFL 19.700

TW 20.000

TW 20.000

TW 20.000

FFL 20.300

FFL 20.300

FFL 20.300

TW 16.200

15.75

TW 16.200

TW 16.200

TW 17.800

TW 19.100

FFL 19.100

15.50(e)

15.90

16.20

16.80(e)

17.70(e)

18.00(e)

18.20(e)

19.00(e)

19.40(e)

19.50(e)

19.80(e)

20.00(e)

20.20(e)

20.40(e)

20.80(e)

NOTE: BRIDGE STRUCTURE INITIAL DETAILED DESIGN ONLY IS SHOWN FOR COORDINATION PURPOSES, REFER STRUCTURAL ENGINEER'S DWG'S FOR ADDITIONAL DETAIL

NOTE: REFER TO TRACK ENGINEER'S DRAWINGS FOR EXTENTS OF NEW RAIL AND TURNOUT WORKS STAGING, ALL VERTICAL AND HORIZONTAL TRACK DESIGN GEOMETRY, AND PLATFORM EDGE LEVELS

N

REFLECTED CEILING PLAN (PLATFORM)

SCALE 1:250

DETAILED DESIGN

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	29.09.20	ISSUED FOR INITIAL DETAILED DESIGN	JPD/PR	AH/PR	PR	JPD
A1	10.08.20	ISSUED FOR INITIAL DETAILED DESIGN - DRAFT	JPD/PM	PR/AH	PR	JPD

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

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REFERENCE DRGS

8584 landgate scdb
858401 BAYSWATER FEATURE 2D_NO_RASTERS_ISOC2_NO_LEVELS
RAIL_MEL_OPTIMUM_GEOM
HSL_PLATFORM_REFLECTED_CEILING_PLAN
014238_GA
XR_C_0007_FENCING-RWALLS-NWALLS_20200924
XR12C-CARPARK
xr_c_0006_linemarking
Abutment Locations_200915
XR_C_0001_CAD DESIGN
HSL_GRID

SCALE : 1:250 (@ A1)

DATUM :
HORIZONTAL: PCG94
VERTICAL: AHD71

DOC REVIEW NOTE No.

DESIGNED JPD
DRAWN AH
CHECKED PR

APPROVED FOR ISSUE

EXECUTIVE DIRECTOR
PTA Division / External Company

DATE

Government of Western Australia
Public Transport Authority

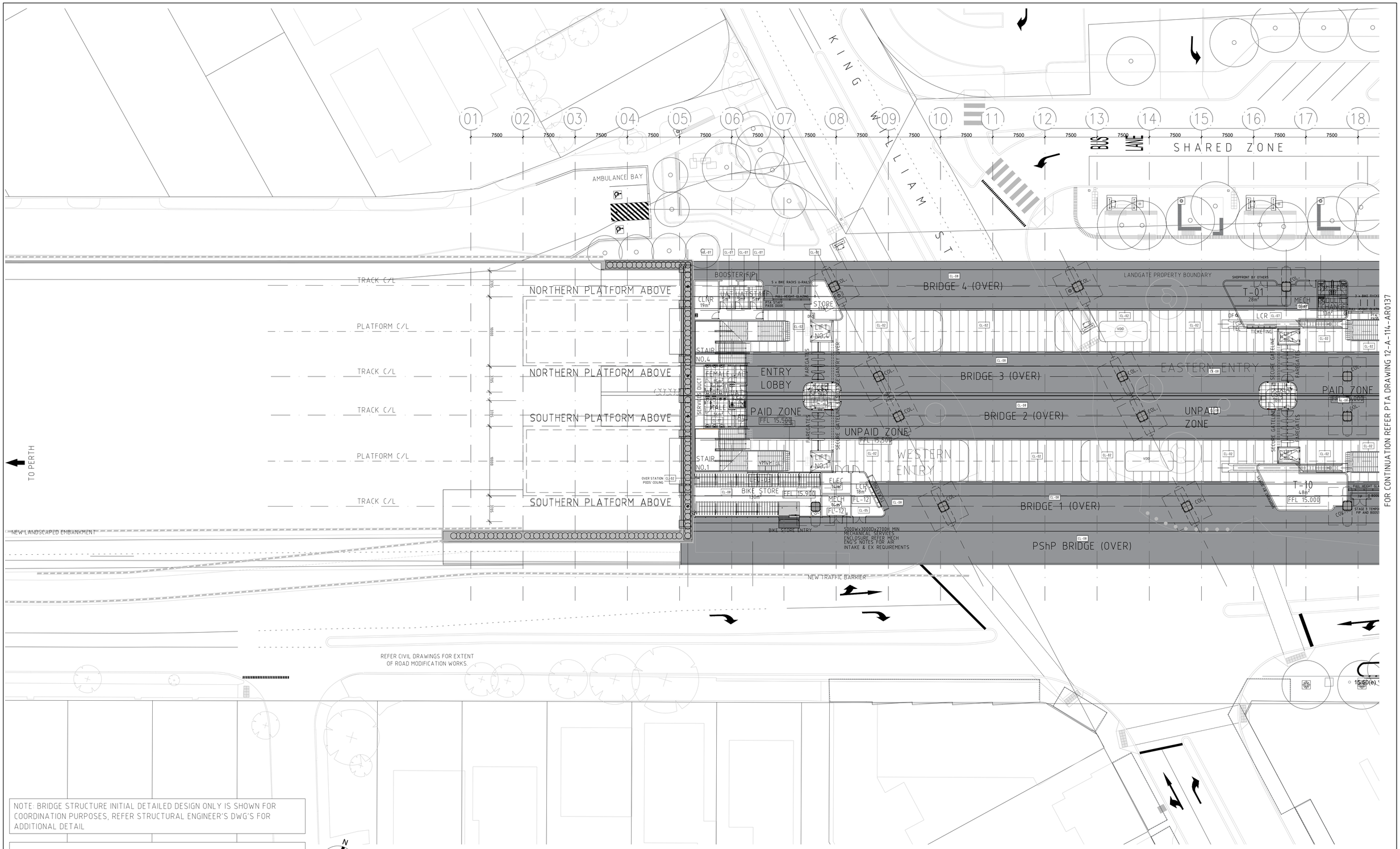
BAYSWATER STATION

EASTERN PLATFORMS & BRIDGE ABUTMENT ARCHITECTURE

REFLECTED CEILING PLAN - PLATFORM - SHEET 02

PTA Drawing No: 12-A-114-AR0135 REV : A

CAD DRAWING PATHNAME \\proj01\per\014238-61A-P\2_Work\2-1_Models\3_AutoCAD\1_Work\12-A-114-AR0135.dwg



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N

REFLECTED CEILING PLAN (CONCOURSE)

SCALE 1:250

FOR CONTINUATION REFER PTA DRAWING 12-A-114-AR0137

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
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A1	10.08.20	ISSUED FOR INITIAL DETAILED DESIGN - DRAFT	JPD/PM	PR/AH	PR	JPD

ORIG SIZE A1 — 0 10 20 30 40 50 100mm AT ORIGINAL PLOT SIZE

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REFERENCE DRGS
858401 BAYSWATER FEATURE 2D_NO_RASTERS_ISOCP2_NO_LEVELS
8584 landgate scdb_crop
hsl_concourse_reflected_ceiling_plan_CURRENT
structure_current
014238_GA
XR_C_0007_FENCING-RWALLS-NWALLS_20200924
hsl_concourse_plan_200722_option_3_ESCALATORS
XR12C-CARPARK
xr_c_0006_linemarking
Abutment Locations_200915
XR_C_0001_CAD DESIGN
HSL_GRID

SCALE : 1:250 (@ A1)
DATUM :
HORIZONTAL: PCG94
VERTICAL: AHD71
DOC REVIEW NOTE No.

DESIGNED JPD
DRAWN AH
CHECKED PR
APPROVED FOR ISSUE
EXECUTIVE DIRECTOR PTA Division / External Company
DATE

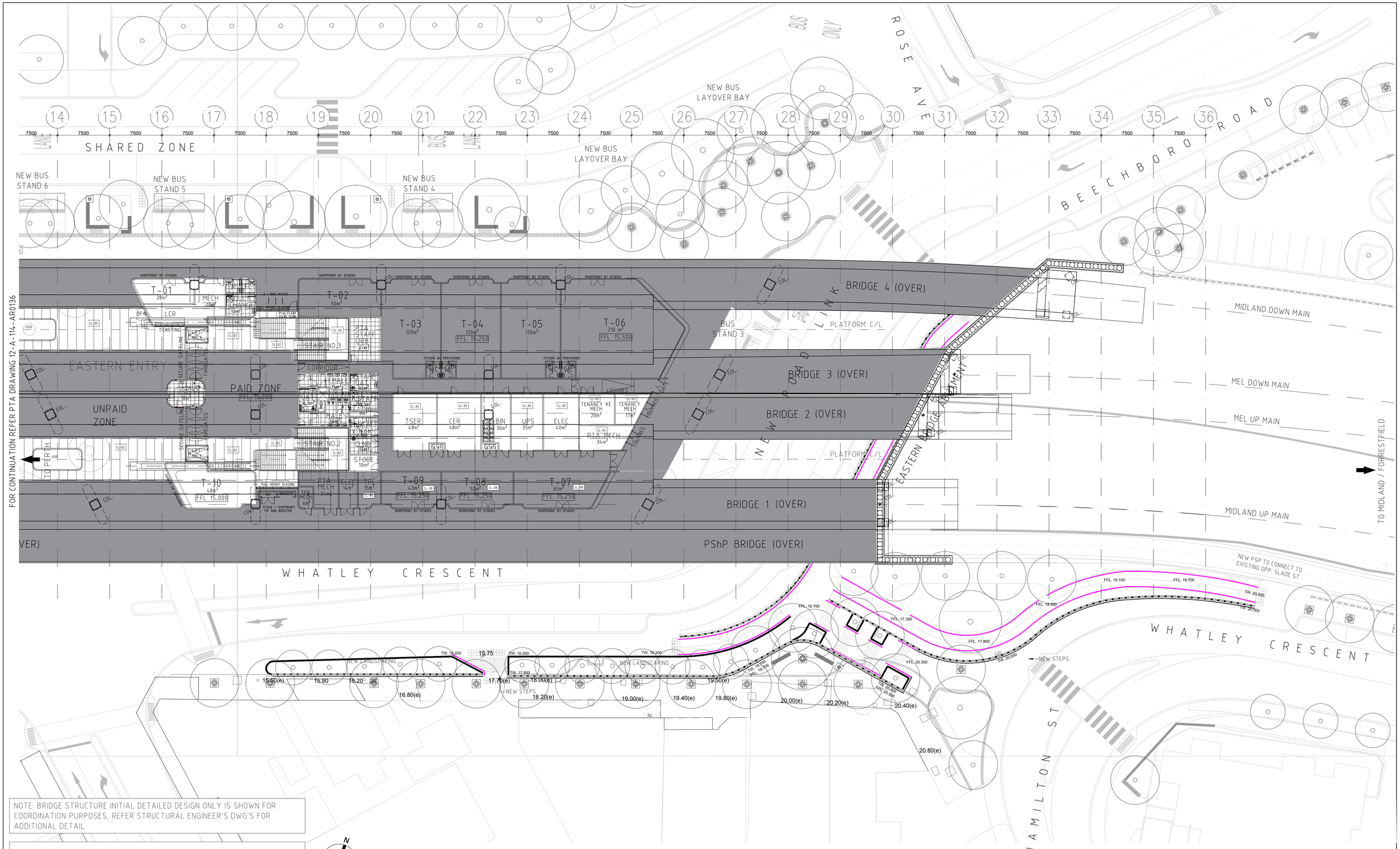
DETAILED DESIGN

Government of Western Australia Public Transport Authority

BAYSWATER STATION
WESTERN ENTRY BUILDING & EMERGENCY REFUGE AREA
ARCHITECTURE
REFLECTED CEILING PLAN - GROUND - SHEET 01

PTA Drawing No: 12-A-114-AR0136 REV : A

CAD DRAWING PATHNAME \\proj01\per\014238-61A-P\2_Work\2-1_Models\3_AutoCAD\1_Work\12-A-114-AR0136.dwg



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N

REFLECTED CEILING PLAN (CONCOURSE)

SCALE 1:250

DETAILED DESIGN

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	29.09.20	ISSUED FOR INITIAL DETAILED DESIGN	JPD/PR	AH/PR	PR	JPD
A1	10.08.20	ISSUED FOR INITIAL DETAILED DESIGN - DRAFT	JPD/PM	PR/AH	PR	JPD

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

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REFERENCE DRGS

8584 landgate scdb
858401 BAYSWATER FEATURE 2D_NO_RASTERS_ISOC2_NO_LEVELS
structure_current
hsl_concourse_reflected_ceiling_plan_current
014238_GA
XR_C_0007_FENCING-RWALLS-NWALLS_20200924
hsl_concourse_plan_200722_option_3_ESCALATORS
XR12C-CARPARK
xr_c_0006_linemarking
Abutment Locations_200915
XR_C_0001_CAD DESIGN
HSL_GRID

SCALE : 1:250 (@ A1)

DATUM :
HORIZONTAL: PCG94
VERTICAL: AHD71

DOC REVIEW NOTE No.

DESIGNED JPD
DRAWN AH
CHECKED PR

APPROVED FOR ISSUE

EXECUTIVE DIRECTOR
PTA Division / External Company

DATE

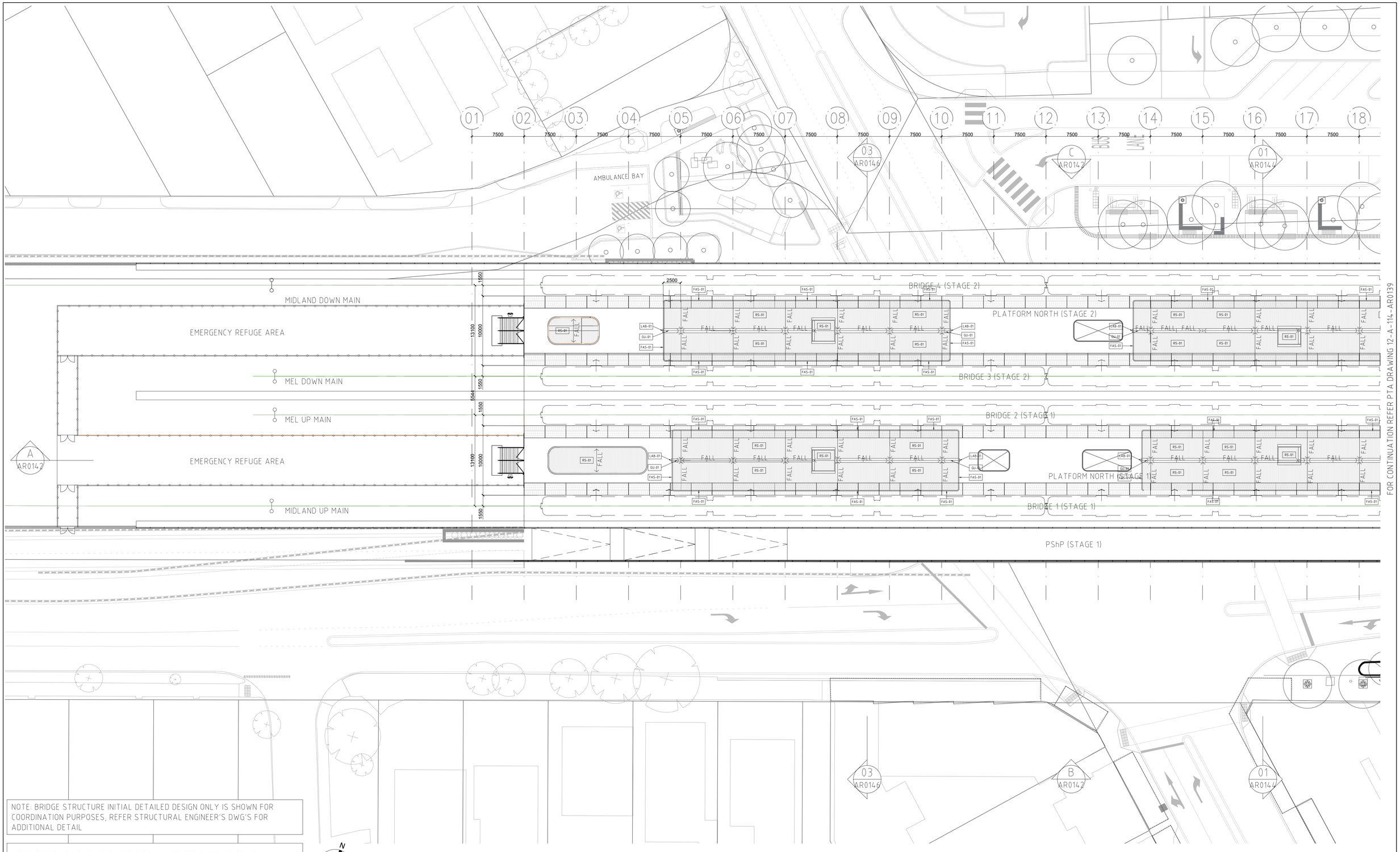
Government of Western Australia
Public Transport Authority

BAYSWATER STATION

EASTERN ENTRY BUILDING & BRIDGE ABUTMENT
ARCHITECTURE
REFLECTED CEILING PLAN - GROUND - SHEET 02

PTA Drawing No: 12-A-114-AR0137 REV : A

CAD DRAWING PATHNAME \\proj01\per\014238-61A-P\2_Work\2-1_Models\3_AutoCAD\1_Work\12-A-114-AR0137.dwg



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N

ROOF PLAN

SCALE 1:250

FOR CONTINUATION REFER PTA DRAWING 12-A-114-AR0139

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	29.09.20	ISSUED FOR INITIAL DETAILED DESIGN	JPD/PR	AH/PR	PR	JPD
A1	10.08.20	ISSUED FOR INITIAL DETAILED DESIGN - DRAFT	JPD/PM	PR/AH	PR	JPD

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

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REFERENCE DRGS

8584 landgate scdb
858401 BAYSWATER FEATURE 2D_NO_RASTERS_ISO02_NO LEVELS
RAIL_MEL_OPTIMUM_GEOM
014238_GA
XR_C_0007_FENCING-RWALLS-NWALLS_20200924
hsl_roof_plan
HSL_GRID
XR12C-CARPARK
xr_c_0006_linemarking
Abutment Locations_200915
XR_C_0001_CAD DESIGN

SCALE : 1:250 (@ A1)

DATUM :
HORIZONTAL: PCG94
VERTICAL: AHD71

DOC REVIEW NOTE No.

DESIGNED JPD
DRAWN AH
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EXECUTIVE DIRECTOR
PTA Division / External Company

DATE

DETAILED DESIGN

Government of Western Australia
Public Transport Authority

BAYSWATER STATION

WESTERN PLATFORM & EMERGENCY REFUGE AREA
ARCHITECTURE
ROOF PLAN - PLATFORM LEVEL - SHEET 01

PTA Drawing No: 12-A-114-AR0138 REV : A

CAD DRAWING PATHNAME \\proj01\per\014238-61A-P\2_Work\2-1_Models\3_AutoCAD\1_Work\12-A-114-AR0138.dwg

FOR CONTINUATION REFER PTA DRAWING 12-A-114-AR0138

RAILWAY PARADE

BUS LANE

BUS ONLY

ROSE AVE

BEECHBORO ROAD

14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36

7500

02 AR0145

C AR0142

A AR0142

01 AR0145

B AR0142

MC MC MC MC MC MC MC MC

BRIDGE 4 (STAGE 2)

PLATFORM NORTH (STAGE 2)

BRIDGE 3 (STAGE 2)

BRIDGE 2 (STAGE 1)

PLATFORM SOUTH (STAGE 1)

BRIDGE 1 (STAGE 1)

NEW PSP- BRIDGE

PShP (STAGE 1)

NEW PSP
MAX 1:20 GRADIENT)

MIDLAND DOWN MAIN

MEL DOWN MAIN

MEL UP MAIN

MIDLAND UP MAIN

WHATLEY CRESCENT

HAMILTON ST

FAS-01 FAS-02 RS-01 FALL LAB-01 XB-01 ZN-01 AS-01 MC-01

FFL 16.700 FFL 17.300 FFL 17.900 FFL 18.500 FFL 19.100 FFL 19.700 FFL 20.300

TW 16.200 TW 16.700 TW 17.200 TW 17.800 TW 18.100 TW 18.400 TW 18.700 TW 19.000 TW 19.300 TW 19.600 TW 19.900 TW 20.000 TW 20.300

15.50(e) 15.75 15.90 16.20 16.80(e) 17.70(e) 18.00(e) 18.20(e) 19.00(e) 19.40(e) 19.50(e) 19.80(e) 20.00(e) 20.20(e) 20.40(e) 20.80(e)

NOTE: BRIDGE STRUCTURE INITIAL DETAILED DESIGN ONLY IS SHOWN FOR COORDINATION PURPOSES, REFER STRUCTURAL ENGINEER'S DWG'S FOR ADDITIONAL DETAIL

NOTE: REFER TO TRACK ENGINEER'S DRAWINGS FOR EXTENTS OF NEW RAIL AND TURNOUT WORKS STAGING, ALL VERTICAL AND HORIZONTAL TRACK DESIGN GEOMETRY, AND PLATFORM EDGE LEVELS

N

ROOF PLAN
SCALE 1:250

DETAILED DESIGN

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	29.09.20	ISSUED FOR INITIAL DETAILED DESIGN	JPD/PR	AH/PR	PR	JPD
A1	10.08.20	ISSUED FOR INITIAL DETAILED DESIGN - DRAFT	JPD/PM	PR/AH	PR	JPD

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

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REFERENCE DRGS
8584 landgate scdb
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RAIL_MEL_OPTIMUM_GEOM
hsl_roof_plan
014238_GA
XR_C_0007_FENCING-RWALLS-NWALLS_20200924
HSL_GRID
XR12C-CARPARK
xr_c_0006_linemarking
Abutment Locations_200915
XR_C_0001_CAD DESIGN

SCALE : 1:250 (@ A1)
DATUM :
HORIZONTAL: PCG94
VERTICAL: AHD71
DOC REVIEW NOTE No.

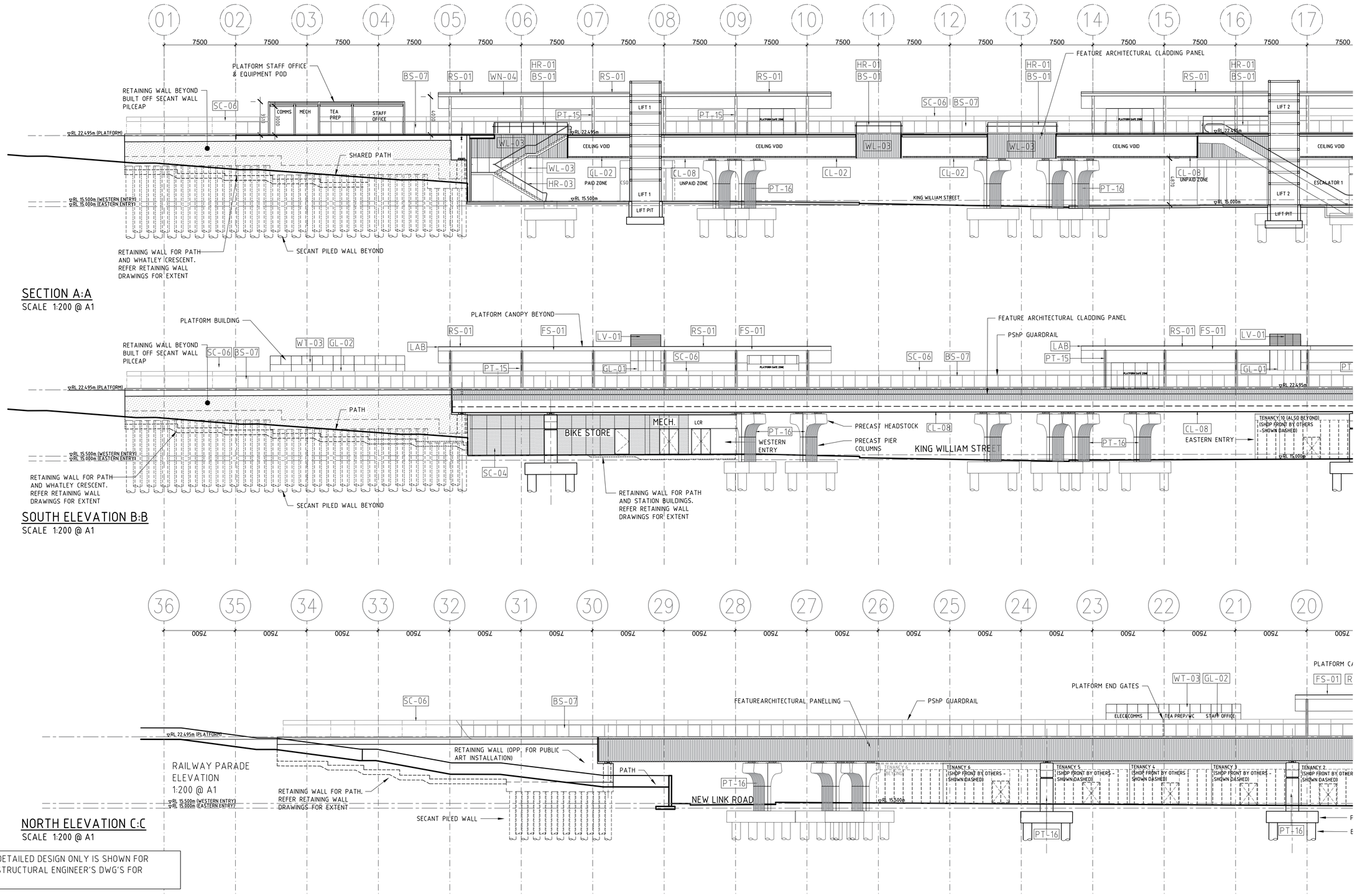
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DRAWN AH
CHECKED PR
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Public Transport Authority

BAYSWATER STATION
EASTERN PLATFORM & BRIDGE ABUTMENT
ARCHITECTURE
ROOF PLAN - PLATFORM - SHEET 02

PTA Drawing No: 12-A-114-AR0139 REV : A

CAD DRAWING PATHNAME \\proj01\per\014238-61A-P\2_Work\2-1_Models\3_AutoCAD\1_Work\12-A-114-AR0139.dwg



FOR CONTINUATION REFER PTA DRAWING 12-A-114-AR0143

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REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
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A1	10.08.20	ISSUED FOR INITIAL DETAILED DESIGN - DRAFT	JPD/PM	PR/AH	PR	JPD

ORIG SIZE A1 — 0 10 20 30 40 50 100mm — AT ORIGINAL PLOT SIZE

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REFERENCE DRGS
RAIL_MEL_OPTIMUM_GEOM
HSL_GRID
HSL_CONCOURSE_PLAN_200722_Option_3
hsl_long_section&elev_current
HSL_GRID_MIRROR

SCALE : 1:200 (@ A1)
DATUM : HORIZONTAL: PCG94 VERTICAL: AHD71
DOC REVIEW NOTE No.

DESIGNED JPD
DRAWN AH
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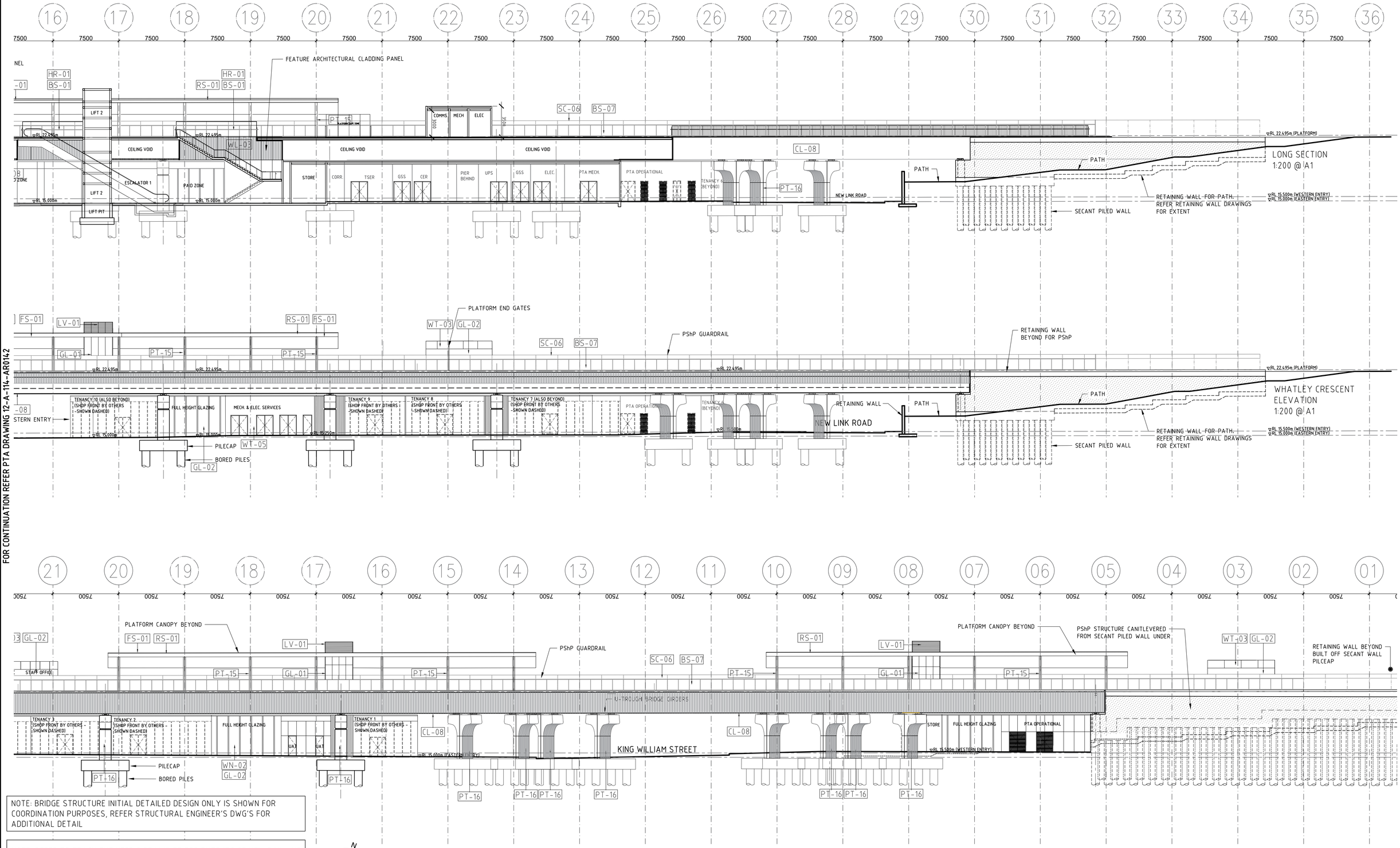
DETAILED DESIGN

Government of Western Australia Public Transport Authority

BAYSWATER STATION
ENTRY BUILDINGS & PLATFORMS
ARCHITECTURE
EXTERNAL ELEVATIONS & SECTIONS - SHEET 01

PTA Drawing No: 12-A-114-AR0142 REV : A

CAD DRAWING PATHNAME \\proj01\PER\014238-61A-P\2_Work\2-1_Models\3_AutoCAD\1_Work\12-A-114-AR0142.dwg



FOR CONTINUATION REFER PTA DRAWING 12-A-114-AR0142

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N

SECTION AND ELEVATIONS

SCALE 1:200

DETAILED DESIGN

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	29.09.20	ISSUED FOR INITIAL DETAILED DESIGN	JPD/PR	AH	PR	JPD
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ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

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REFERENCE DRGS

RAIL_MEL_OPTIMUM_GEOM
HSL_GRID
HSL_CONCOURSE_PLAN_200722_Option_3
hsl_long_section&elev_current
HSL_GRID_MIRROR

SCALE : 1:200 (@ A1)

DATUM : HORIZONTAL: PCG94 VERTICAL: AHD71

DOC REVIEW NOTE No.

DESIGNED	JPD
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CHECKED	PR

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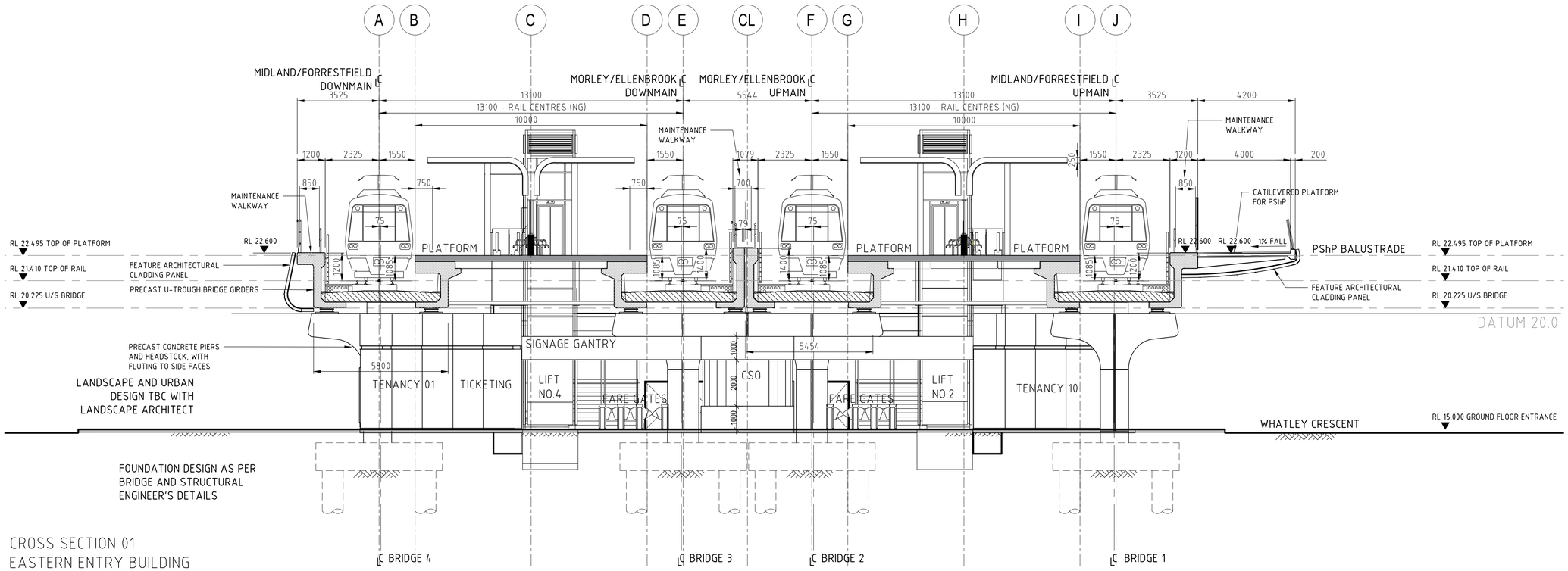
Government of Western Australia
Public Transport Authority

BAYSWATER STATION

STATION ENTRY BUILDINGS & PLATFORMS
ARCHITECTURE
EXTERNAL ELEVATIONS & SECTIONS - SHEET 02

PTA Drawing No: 12-A-114-AR0143 REV : A

CAD DRAWING PATHNAME \\proj01\PER\014238-61A-P\2_Work\2-1_Models\3_AutoCAD\1_Work\12-A-114-AR0143.dwg



CROSS SECTION 01
EASTERN ENTRY BUILDING
1:100 @ A1

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CROSS SECTION

SCALE 1:100 @ A1

DETAILED DESIGN

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ORIG SIZE A1

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AT ORIGINAL PLOT SIZE

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REFERENCE DRGS
RAIL_MEL_OPTIMUM_GEOM
HSL_GRID
HSL_CONCOURSE_PLAN
hsl_crosssections_current

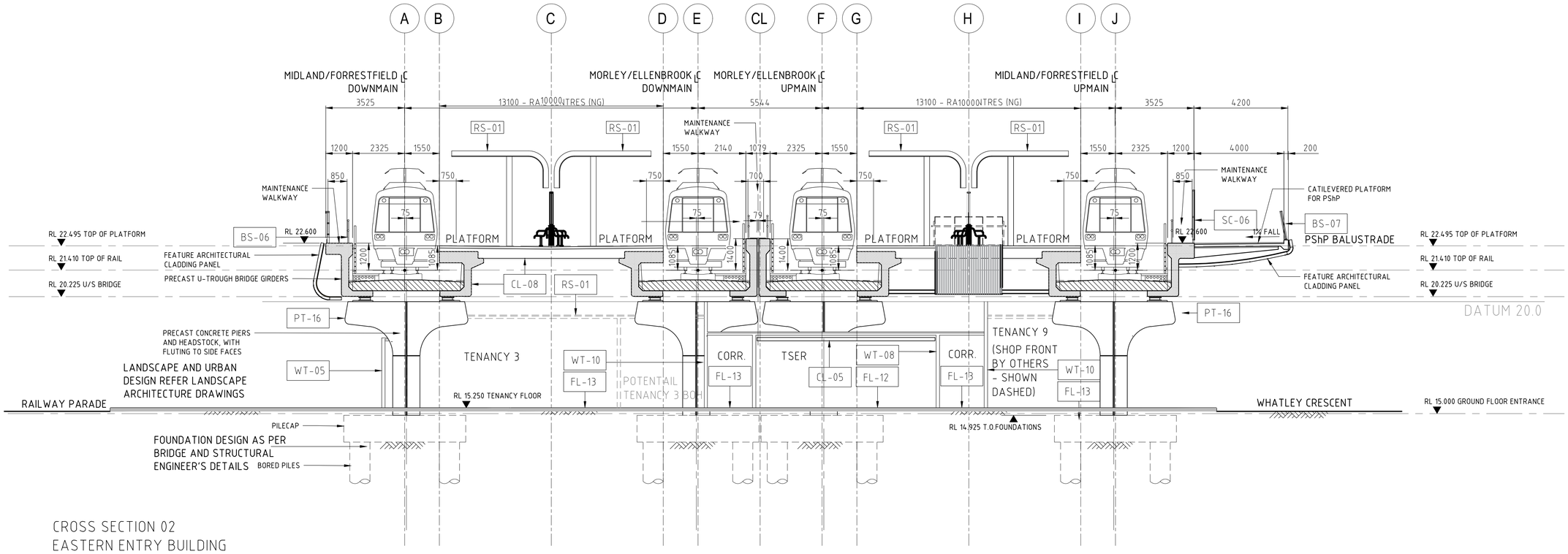
SCALE : 1:100 (@ A1)
DATUM :
HORIZONTAL: PCG94
VERTICAL: AHD71
DOC REVIEW NOTE No.

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BAYSWATER STATION
EASTERN ENTRY BUILDING - PLAZA/UNPAID ZONE
ARCHITECTURE
GENERAL ARRANGEMENT SECTIONS - SHEET 01
PTA Drawing No: 12-A-114-AR0144 REV : A

CAD DRAWING PATHNAME \\proj01\PER\014238-61A-P\2 Work\2-1 Models\3 AutoCAD\1 Work\12-A-114-AR0144.dwg



CROSS SECTION 02
EASTERN ENTRY BUILDING
1:100 @ A1

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CROSS SECTION
SCALE 1:100 @ A1

DETAILED DESIGN

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AT ORIGINAL PLOT SIZE

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REFERENCE DRGS
RAIL_MEL_OPTIMUM_GEOM
HSL_GRID
HSL_CONCOURSE_PLAN
STRUCTURE_PIERS_ALT_OPT
hsl_crosssections_CURRENT

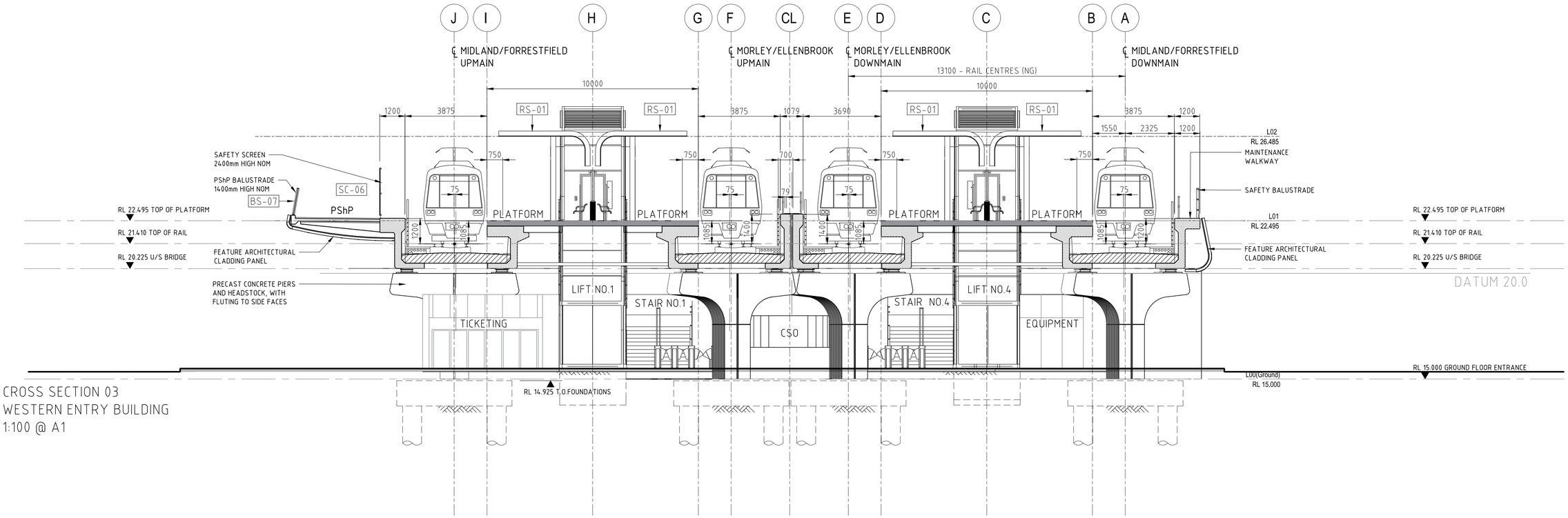
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DATUM : HORIZONTAL: PCG94
VERTICAL: AHD71
DOC REVIEW NOTE No.

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Government of Western Australia Public Transport Authority

BAYSWATER STATION
EASTERN ENTRY BUILDING
ARCHITECTURE
GENERAL ARRANGEMENT SECTIONS - SHEET 02
PTA Drawing No: 12-A-114-AR0145 REV : A

CAD DRAWING PATHNAME \\proj01\PER\014238-61A-P\2 Work\2-1 Models\3 AutoCAD\1 Work\12-A-114-AR0145.dwg



CROSS SECTION 03
WESTERN ENTRY BUILDING
1:100 @ A1

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CROSS SECTION
SCALE 1:100 @ A1

DETAILED DESIGN

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ORIG SIZE A1 — 0 10 20 30 40 50 100mm — AT ORIGINAL PLOT SIZE

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REFERENCE DRGS
RAIL_MEL_OPTIMUM_GEOM
HSL_GRID
HSL_CONCOURSE_PLAN
hsl_crosssections_current
STRUCTURE_CURRENT

SCALE : 1:100 (@ A1)
DATUM : HORIZONTAL: PCG94 VERTICAL: AHD71
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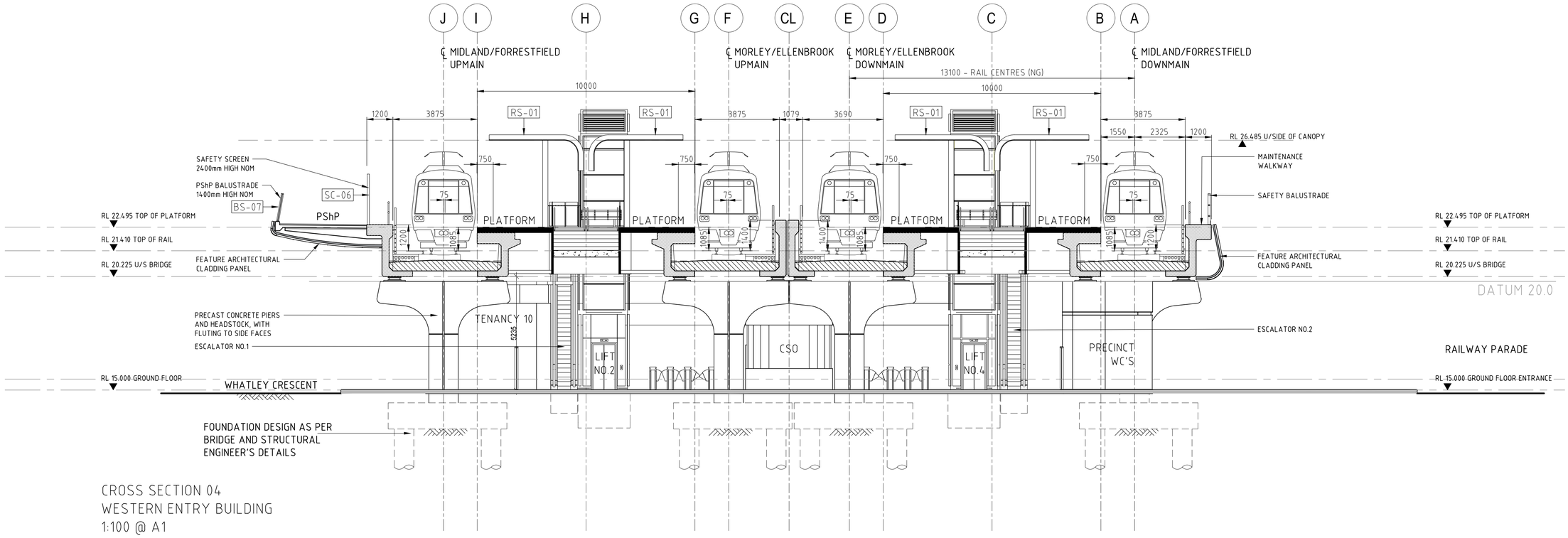
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DRAWN AH
CHECKED PR
APPROVED FOR ISSUE
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BAYSWATER STATION
WESTERN ENTRY BUILDING
ARCHITECTURE
GENERAL ARRANGEMENT SECTIONS - SHEET 03

PTA Drawing No: 12-A-114-AR0146 REV : A

CAD DRAWING PATHNAME \\proj01\PER\014238-61A-P\2_Work\2-1_Models\3_AutoCAD\1_Work\12-A-114-AR0146.dwg



CROSS SECTION 04
WESTERN ENTRY BUILDING
1:100 @ A1

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CROSS SECTION
SCALE 1:100 @ A1

DETAILED DESIGN

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ORIG SIZE A1 — 0 10 20 30 40 50 100mm — AT ORIGINAL PLOT SIZE

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REFERENCE DRGS
RAIL_MEL_OPTIMUM_GEOM
HSL_GRID
HSL_CONCOURSE_PLAN
hsl_crosssections_current
STRUCTURE_CURRENT

SCALE : 1:100 (@ A1)
DATUM : HORIZONTAL: PCG94 VERTICAL: AHD71
DOC REVIEW NOTE No.

DESIGNED JPD
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BAYSWATER STATION
EASTERN ENTRY BUILDING
ARCHITECTURE
GENERAL ARRANGEMENT SECTIONS - SHEET 04

PTA Drawing No: 12-A-114-AR0147 REV : A

CAD DRAWING PATHNAME \\proj01\PER\014238-61A-P\2 Work\2-1 Models\3 AutoCAD\1 Work\12-A-114-AR0147.dwg

014238_BAYSWATER STATION & TURNBACK
LANDSCAPE MATERIALS AND FINISHES LEGEND - IDD 15%

BST-EVO-UD-SCH-00151_A

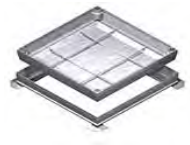
Last Updated - 29/09/2020

Code	Short Description	Material	Proprietary Name/ Profile/ Size/ Description	Colour/ Finish	Digital Sample
VEGETATION - TREES					
LTR-01	500L Mature tree	Vegetation	Tree to be stabilised using underground rootball guying system. Platimat or approved similar. Provide soil conditioner to the tree at rate of a minimum of 30% of the trees container size, mixed well into the existing soil. Within hardstand areas in plaza and precinct trees to have 16m3 of structural cell zone filled with imported soil and suitable growing medium - refer to plans for hatch indicating area required Within hardstand in carparking areas trees to have 9m3 of structural cell zone filled with imported soil and suitable growing medium - refer to plans for hatch indicating area required Species TBC	NA	
LTR-02	200L Tree	Vegetation	Each tree to be provided with 2x2400 high, 50x50 hardwood stakes, set a minimum of 800mm apart, securely placed and tied with flexible rubber or cloth tree ties. Stakes to be painted black. Provide soil conditioner to the tree at rate of a minimum of 30% of the trees container size, mixed well into the existing soil. Within hardstand areas in plaza and precinct trees to have 16m3 of structural cell zone filled with imported soil and suitable growing medium - refer to plans for hatch indicating area required Within hardstand in carparking areas trees to have 9m3 of structural cell zone filled with imported soil and suitable growing medium - refer to plans for hatch indicating area required Species TBC	NA	
LTR-03	100L Tree	Vegetation	Each tree to be provided with two 2400 high, 50x50 hardwood stakes, set a minimum of 800mm apart, securely placed and tied with flexible rubber or cloth tree ties. Stakes to be painted black. Provide soil conditioner to the tree at rate of a minimum of 30% of the trees container size, mixed well into the existing soil. Within hardstand areas in plaza and precinct trees to have 16m3 of structural cell zone filled with imported soil and suitable growing medium - refer to plans for hatch indicating area required Within hardstand in carparking areas trees to have 9m3 of structural cell zone filled with imported soil and suitable growing medium - refer to plans for hatch indicating area required Species TBC	NA	
LTR-04	45L Tree	Vegetation	Each tree to be provided with 2x2400 high, 50x50 hardwood stakes, set a minimum of 800mm apart, securely placed and tied with flexible rubber or cloth tree ties. Stakes to be painted black. Provide soil conditioner to the tree at rate of a minimum of 30% of the trees container size, mixed well into the existing soil. Species TBC	NA	
LTR-EX	Existing tree	Vegetation	Existing Trees to be retained, protected and constructed in accordance with Arborist report and the following AS standards at a minimum - AS 4970 “Protection of Trees on Development Sites” - AS 4373 - Pruning of Amenity Trees Arboriculture consultant to provide specific direction on all works surrounding existing trees to be retained, all works to subsequently be carried out by suitably qualified professionals under direction of arbocultural consultant	NA	
VEGETATION - PLANTING					
LVE-01	Primary garden beds	Vegetation	Shrub planting Species selected to be low-growing shrubs no more that 1000mm mature height 140mm pot size planted at 6plants / m2 300mm Imported topsoil 100mm depth of soil conditioner cultivated into imported topsoil. 100mm imported mulch as per below: Pine bark mulch with particle size between 35-75mm. Low combustibility Ensure all imported topsoils and reconditioned existing soils are in accordance with AS 4419 Soils for Landscaping and Garden Use, AS 4454 Composts, Soil Conditioners and Mulches	NA	
LVE-02	Secondary garden beds - Corridor	Vegetation	Where grade steeper than and equal to 1:3, Geode slope stabilisation to be applied. Species selected to be low-growing groundcovers no more that 500mm mature height Tube stock planted at 1.5 plants / m2 Site topsoil that is deemed to be weed and dieback free, from within the rail reserve and Earthworks boundary, prior to clearing, must be identified and salvaged for reuse in the revegetation of the rail reserve after the completion of the Earthworks. Site topsoil must only be used within the rail reserve. 100mm pine bark mulch with particle size between 35-75mm. Site mulch must be chipped native vegetation, from within the rail reserve Earthworks boundary. Site mulch must only be used within the rail reserve and Permanent Way The following soil preparation must be applied to the rail reserve: I. 50mm depth of site or imported topsoil must be applied to all planting areas; ii. 50mm depth of site mulch must be applied to all planting areas; and iii. site mulch and site topsoil (weed free) must be mixed prior to spreading on planted areas. If site topsoil is unavailable due to extent or quality - 100mm imported topsoil and 100mm soil conditioner to be cultivated into existing subgrade	NA	

Code	Short Description	Material	Proprietary Name/ Profile/ Size/ Description	Colour/ Finish	Digital Sample
LVE-03	Infiltration Garden beds	Vegetation	Infiltration bed shrub planting Species selected to be shrubs no more that 1000mm mature height 140mm pot size planted at 8plants / m2 300mm Imported topsoil 100mm depth of soil conditioner cultivated into imported topsoil. Infiltration bed profile to be reviewed and approved by Civil engineer. Nominally: **50mm** Stone mulch 4–13mm in size. No fines. **500mm** Sandy loam as per Dept. Water Recommendations : https://www.water.wa.gov.au/__data/assets/pdf_file/0005/1598/99305.pdf **200mm** Transition layer. Clean, well-graded sand <2% fines. Clean, fine gravel or crushed rock 2–5mm and carbon source, if submerged **200mm** drainage layer - Aggregate stone and subsoil pipe connected to stormwater outlet Ensure all imported topsoils and reconditioned existing soils are in accordance with AS 4419 Soils for Landscaping and Garden Use, AS 4454 Composts, Soil Conditioners and Mulches	NA	
LST-05	Lawn	Vegetation	Irrigated, roll on Lawn Species: Empire Zoysia (Shade Tolerant) Subsoil: 100mm imported lawn topsoil with 100mm soil conditioner cultivated through existing subgrade	NA	

Code	Short Description	Material	Proprietary Name/ Profile/ Size/ Description	Colour/ Finish	Digital Sample
FLOOR FINISHES					
LST-01A	Concrete Pavers, nominally: (50%) 800x400x70mm (50%) 400x200x70mm	Concrete engineered paver	_70mm thick paver laid on flexible subbase _Refer to Engineers documentation for subgrade, fill and subbase preparation details _All walkways to have minimum slip resistance rating P4, ramps to be min P5 _All to be trafficable as per SWTC requirements _Steel edge to all areas not bound by trafficable kerb or a paving header course. Galvanised Steel 100mm x 75mm x 6mm Unequal angle on concrete beam _Provide testing of the sample and constructed paths in accordance with AS 4663 _Contractor must provide slip resistance and colour contrast test results for DDA certification Jointing on flexible base: _Pavelok to match paving colour _All Expansion and Isolation joints to be 10mm abelfex with tearaway strip removed and Pavelok infill - colour to match paving colour _Refer to Structural Engineers documentation for expansion joint and control joint spacing for pavements, where joint locations are not specified on the landscape drawings. _Isolation/Expansion joints shall be provided between all pavements, walls, structures and facades. Sample: _A single 1m x 1m sample is required for both on slab and on grade samples inclusive of sealer for superintendent's approval prior to commencement of work. Samples to remain onsite for the duration of the works. _Submit evidence of confirmation to Slip Resistance - AS 4586 Supplier: Urbanstone OR a similar to be approved Pavement sealer: Crommelin Enhance Penetrating Water Based, installed to all sides to manufacturers requirements	Colours: Nominally River topaz TBC	
LST-01B	Concrete Pavers to vehicle /council crossovers, nominally: nominally: 400x200x70mm	Concrete engineered paver	_70mm thick paver laid on flexible subbase _Refer to Engineers documentation for subgrade, fill and subbase preparation details _All walkways to have minimum slip resistance rating P4, ramps to be min P5 _All to be trafficable as per SWTC requirements _Steel edge to all areas not bound by trafficable kerb or a paving header course. Galvanised Steel 100mm x 75mm x 6mm Unequal angle on concrete beam _Provide testing of the sample and constructed paths in accordance with AS 4663 _Contractor must provide slip resistance and colour contrast test results for DDA certification Jointing on flexible base: _Pavelok to match paving colour _All Expansion and Isolation joints to be 10mm abelfex with tearaway strip removed and Pavelok infill - colour to match paving colour _Refer to Structural Engineers documentation for expansion joint and control joint spacing for pavements, where joint locations are not specified on the landscape drawings. _Isolation/Expansion joints shall be provided between all pavements, walls, structures and facades. Sample: _A single 1m x 1m sample is required for both on slab and on grade samples inclusive of sealer for superintendent's approval prior to commencement of work. Samples to remain onsite for the duration of the works. _Submit evidence of confirmation to Slip Resistance - AS 4586 Supplier: Urbanstone OR a similar to be approved Pavement sealer: Crommelin Enhance Penetrating Water Based, installed to all sides to manufacturers requirements Crossovers to conform to City of Bayswater requirements	Colour: TBC	
LST-02	Insitu concrete pavement	Concrete	Exposed aggregate concrete 150mm thick, reinforced General: _Refer to Engineers documentation for subgrade, fill and subbase preparation details _All walkways to have minimum slip resistance rating P4, ramps to be min P5 _Provide testing of the sample and constructed paths in accordance with AS 4663 Jointing: _All Control Joints to be saw cut (not trowelled) _All Expansion and Isolation joints to be caulked – colour to match paving colour _Refer to Structural Engineers documentation for expansion joint and control joint spacing for pavements, where joint locations are not specified on the landscape drawings. _Isolation/Expansion joints shall be provided between all pavements, walls, structures and facades. Sample: _The contractor is to provide 3 exposed aggregate samples with differing degrees of aggregate exposure to each. 1 = high exposure, 1 = medium exposure and 1 = low exposure. The samples with then be reviewed and approved by the landscape architect and client. _A single 3m x3m pad sample is required with the approved exposed finish inclusive of sealer for superintendent's approval prior to commencement of work. The sample shall undergo a slip resistance test appropriate for the application in accordance with AS/NZS4586 Slip resistance classification of new pedestrian surface materials (see also HB197:1999). If the panel does not meets slip resistance requirements, adjustments shall be made to the mix design and/or the placing/finish techniques and a new sample panel shall be commissioned. _The approved sample must also include sawn and caulked joints. _Submit evidence of confirmation to Slip Resistance - AS 4586	Colours: Holcim Spinifex and Bottlebrush TBC Finish varies: Honed (30 grit)(50%) Sandblasted (30%) Crommelin Enhance WB, installed to manufacturers requirements	
LST-03	Recycled red brick paving header course	Clay brick unit paver	Midland Brick Heavy Duty 230x110x60mm thick (Kiln 9 - Grain to run length of face) clay brick unit pavers. Herringbone course brick paving laying pattern, as detailed on drawings. Mortared to reinforced concrete base below (Concrete slab to extend 300mm out from edge of brick where brick interfaces with other paving). Concrete slab to engineers details	Colour: Heritage Red Finish: Solvent-based colourless surface sealant which will not alter finish colour or compromise slip resistance of finish.	
LST-04	230x110x60mm heavy duty clay brick unit paver, herringbone pattern or similar	Clay brick unit paver	Midland Brick Heavy Duty 230x110x60mm thick (Kiln 9 - Grain to run length of face) clay brick unit pavers. Herringbone course brick paving laying pattern, as per City of Bayswaters details - **to match existing City of Bayswater brick paving**	Colour: Heritage Red Finish: Solvent-based colourless surface sealant which will not alter finish colour or compromise slip resistance of finish.	
LPV-10	400x400x60mm Directional and/or hazard TGSI precast concrete unit paver or similar	Precast concrete unit paver	Size: 300x300mm Refer drawings – Sizing and tactile profile finish to meet Australian Standard 1428.4.1 Thickness: 60mm Colour: TBC – Following final selections Contractor to confirm Luminance contrast (to AS 1428.1) with onsite sample against proposed adjacent pavers prior to purchasing or installation of tactile pavers. Suitable Supplier: Urbanstone Subbase and Subgrade: Refer to Civil Engineers details Sealant is to be applied to top and bottom faces in accordance with manufacturer's instructions. Slip resistance; Submit evidence of conformance to AS 4586. Luminance contrast Testing; Submit evidence of conformance to AS/NZS 1428.4.1 Appendix E and AS 1428.1 Appendix B.	Colour: TBC Finish: Solvent-based colourless surface sealant which will not alter finish colour or compromise slip resistance of finish.	
LMI-02	Stair Nosing Type 1 75x10x1980mm aluminium stair nosing with coloured insert or similar	Aluminium	Latham/Asbraloy 774 VS Extra Visual Stair Nosing with "black" coloured Suregrip Infill strips. Nosings are to be in a single length across the full width of the stair. Finish ends of Latham nosings 2mm from face of balustrade/wall to ensure expansion and contraction doesn't warp or buckle aluminium nosings. Finished level of nosing to match finished level of stair tread.	Colour: Sparkling Black & anodised aluminium Finish: 20 micron clear anodized finish	

Code	Short Description	Material	Proprietary Name/ Profile/ Size/ Description	Colour/ Finish	Digital Sample
LANDSCAPE STREET FURNITURE & FIXTURES / SEATING					
LFU-01 A/B/C	Bespoke steel and paving plinth seating elements	Powdercoated perforated steel surround 800x300x40mm paving applied to compacted concrete plinth base within a blockwork retaining wall	Paving topped plinth seat with perforated steel surround and internal lighting Sizes: A: 350mm high with second tier at an additional 350mm high - 6m dia B: 450mm high - 4/3m dia refer plans C: 450mm high - 1.5m dia **Lighting:** LED strip lighting to interior of perforated steel surround - refer to lighting engineers documents for product and provision **Paving** to match LPV-01 **Steel Frame and Surround** Surround: 10mm custom perforated painted steel Material: Painted galvanised steel substrate		
LFU-02	Stainless Steel Bicycle Racks	Stainless steel	CBR1'B' 316 stainless steel with electro-polish finish Suitable supplier: Cora or similar approved Sizing :48.3 OD x 2.77 MD Fixings 4x12mm x 75mm stainless steel anchor bolts with tamper resistant fasteners supplied. 150mm x 6mm round base plate	Colour: Natural Finish: Electro-polished stainless steel	
LFU-03	Drink fountain	Stainless steel	Apollo 900 stainless steel drinking fountain with dog bowl and bottle filler attachments.	Colour: Natural Finish: Electro-polished stainless steel	
LFU-04 A	Bollard Type 1 - Fixed - located as per civil drawings	Stainless steel	Proprietary stainless steel bollard. Leada Security 100NB stainless steel bollard Permanent in-ground marine grade 316 stainless steel bollards 900H at 1250 centres. Sub-surface fixings, installation as per manufacturers recommendations.	Colour: Natural / TBC Finish: Electro-polished stainless steel or powdercoated	
LFU-04 B	Bollard Type 1 - Retractable - located as per civil drawings	Stainless steel	Proprietary stainless steel bollard. Leada Security 100NB stainless steel bollard Retractable -ground marine grade 316 stainless steel bollards 900H at 1250 centres. Sub-surface fixings, installation as per manufacturers recommendations.	Colour: Natural / TBC Finish: Electro-polished stainless steel or powdercoated	
LFU-05	Bus shelters		Description: Customised shade and wet weather bus shelter NOTE: Perforated steel screen to be provided to half length of shelter and one edge Shelter to have seating provided as shown in typical detail on page 20 1 bin (LMI-03) to be provided per bus shelter 1x Bus timetable post to be provided as per pta standards per Bus stand (refer website provided below) Material: All aluminium steel frame structure with, concealed frame suspended alucobond panel ceiling with powder coated aluminium surrounds Finish: Metal Frame: Powder coated finish – colour: TBC Fixings: Steel fixings to suit aluminium frame and roof (except class 4 roofing screws) Roof: Corrugated zincalume roofing, to be concealed within surround and frame Gutters and downpipe: Zincalume concealed box gutter within roof structure and surround – down pipe to adjacent Infiltration beds		
LFU-06 A/B	Tree Grate	Recycled Aluminium Square and circle tree grates	Furphy Proprietary tree grates or similar approved: https://furphyfoundry.com.au/the-products/tree-furniture/item/tree-grates 1219mm x 1219mm A - square B- circle 100% Recycled Cast Aluminium Tree Grate Installed with concrete reinfroced haunch and footing	TBC	
LFU-07	Bespoke Bench seat fixed over LWA-01	Extruded Aluminium and timber seating	Aluminium framed seats with timber infil panels. Frame, Timber and fixings to match LFN-008	TBC	
LFU-08	Proprietary Bench	Extruded Aluminium and timber seating	Aluminium framed table with Recycled Jarrah Hardwood timber infil panels. Subsurface fixed to concrete footing below via s/s mechanical fixings Length varies 500mm High x 500mm Wide	TBC	
LFU-09	Proprietary table	Extruded Aluminium and timber seating	Aluminium framed table with Recycled Jarrah Hardwood timber infil panels. Subsurface fixed to concrete footing below via s/s mechanical fixings 1200mm Long x 750mm High x 700mm Wide	Aluminium: Powder coated Colour TBC Timber: Natural oiled timber	
LMI-01	Strata cells	Recycled Plastic Tree Rootzone Cells	Strata Cell Structural soil modules Code: SC250 Size: Refer to product data sheet. Indicative Location: As shown on Landscape Plans Acceptable Supplier: City Green	Colour: Natural Finish: Electro-polished stainless steel	
LMI-02	Tree Anchoring System		Subsoil tree guying system Product: Platipus Tree Anchor System Elements: Cable, anchor system and or sleeper Size: Varies as per tree size All trees 100ltr and above within hardscape areas to have anchoring system		

Code	Short Description	Material	Proprietary Name/ Profile/ Size/ Description	Colour/ Finish	Digital Sample
LMI-03	Stainless Steel Bin	Stainless steel	Perforated stainless steel bins, slot pattern stainless steel finish. Sub-surface fixing, installation as per manufacturers recommendations.	Colour: Natural Finish: Electro-polished stainless steel	
LMI-04	Access Pit Cover	Metal & concrete infill	Aco pavermate access cover or similar equal approved, with paver infill. Sizing to meet civil loading requirements for surrounding pavements		

Code	Short Description	Material	Proprietary Name/ Profile/ Size/ Description	Colour/ Finish	Digital Sample
BALUSTRADES, HANDRAILS & SCREENS					
LRA-01	Handrail Type 1	Stainless steel	Description: SS Handrail with Integrated LED strip lighting Material: Stainless Steel – grade 316 Handrail and posts – 48mm ODI CHS Connection spigot from post to handrail – 20mm ODI CHS	Colour: Natural Finish: Stainless steel satin finish, electro polished	
LRA-02	Balustrade/fence System	Metal	Powdercoated Steel fully welded balustrade Size: Verticals - 50 mm dia rounds, Frame: 150mm RHS base rail Finish: Powdercoated Include all necessary preparation, footings, surface treatments, fixings and sub structure prior to manufacture and installation.	Colour: Australian Standard N65 Graphite Grey	
SIGNAGE (NOTE: ALL SIGNAGE DESIGN AND DELIVERY IS BY TRANSPERTH - REFER TO TRANSPERTH SIGNAGE SCHEDULES)					
NOTE	TRANSPERTH Signage	-	Station signage design is by Tansperth - refer to Transperth Signage Schedules	-	INSERT SAMPLE
WALL TYPES - INTERNAL AND EXTERNAL					
LWA-01	Red Face Brick Seating wall with concrete capping	Dual leaf Red brick wall, concrete core filled with precast concrete copping	Brick Wall: Austral Bricks 230x110x76mm face brick stretcher bond pattern Nominally 400mm high walls Mortar joints - grey, rolled Wall corners to chamfered 10mm All exposed wall surfaces to be fully coated with Crommelins Barricade RGB Anti-graffiti coating Concrete Coping: Material: Insitu Concrete Finish: Class 2 where faces are exposed otherwise float finish Sealants and coatings: Apply Crommelin's anti- graffiti Barricade NS in accordance with manufacturer's requirements Chamfer/Bevel to all edges with 17mm chamfer Reinforcements, footings and subbase: As specified by structural engineer	Brick: Bowral, 'Capitol Red' Concrete: BGC Pewter, class 2 finish	
LWA-02	Red Face Brick wall with soldier course header	Dual leaf Red brick wall, concrete core filled with precast concrete copping	Brick Wall: Austral Bricks 230x110x76mm face brick stretcher bond pattern Nominally 400mm high walls Mortar joints - grey, rolled Wall corners to chamfered 10mm All exposed wall surfaces to be fully coated with Crommelins Barricade RGB Anti-graffiti coating Reinforcements, footings and subbase: As specified by structural engineer	Brick: Bowral, 'Capitol Red'	
LWA-03-A	Landscape retaining wall - finish type 1 Landscape documentation refers to finish only - refer to Civil and structural engineers documentation for wall thickness, sizes, extent etc	Concrete wall with cast in rebate and painted application finish	Description: Artist designed painted mural/graphic with fine paint detail and sandblasted pattern (paint to 20% wall coverage, sandblasted detail to 20% wall coverage) Concrete to be class 2 finish Areas used: Landscape areas near station plaza and crossover - Refer landscape drawings Dulux Weathermax HBR finish coat, refer Dulux protective coatings specification for description of surface preparation coating system and specific recommendations. Rekli liner or similar to be used for concrete rebate relief Height Varies 1.2 - 2.5m	TBC	
LWA-03-B	Landscape retaining wall - finish type 2 Landscape documentation refers to finish only - refer to Civil and structural engineers documentation for wall thickness, sizes, extent etc	Concrete wall with cast in rebate and painted application finish	Description: Artist designed painted mural/graphic with fine paint detail and sandblasted pattern (paint to 5% wall coverage, sandblasted detail to 5% wall coverage) Concrete to be class 2 finish Areas used: Landscape areas near station plaza and crossover - Refer landscape drawings Dulux Weathermax HBR finish coat, refer Dulux protective coatings specification for description of surface preparation coating system and specific recommendations. Rekli liner or similar to be used for concrete rebate relief Height Varies 1.2 - 2.5m	TBC	

END OF SCHEDULE



BAYSWATER STATION UPGRADE DESIGN UPDATE

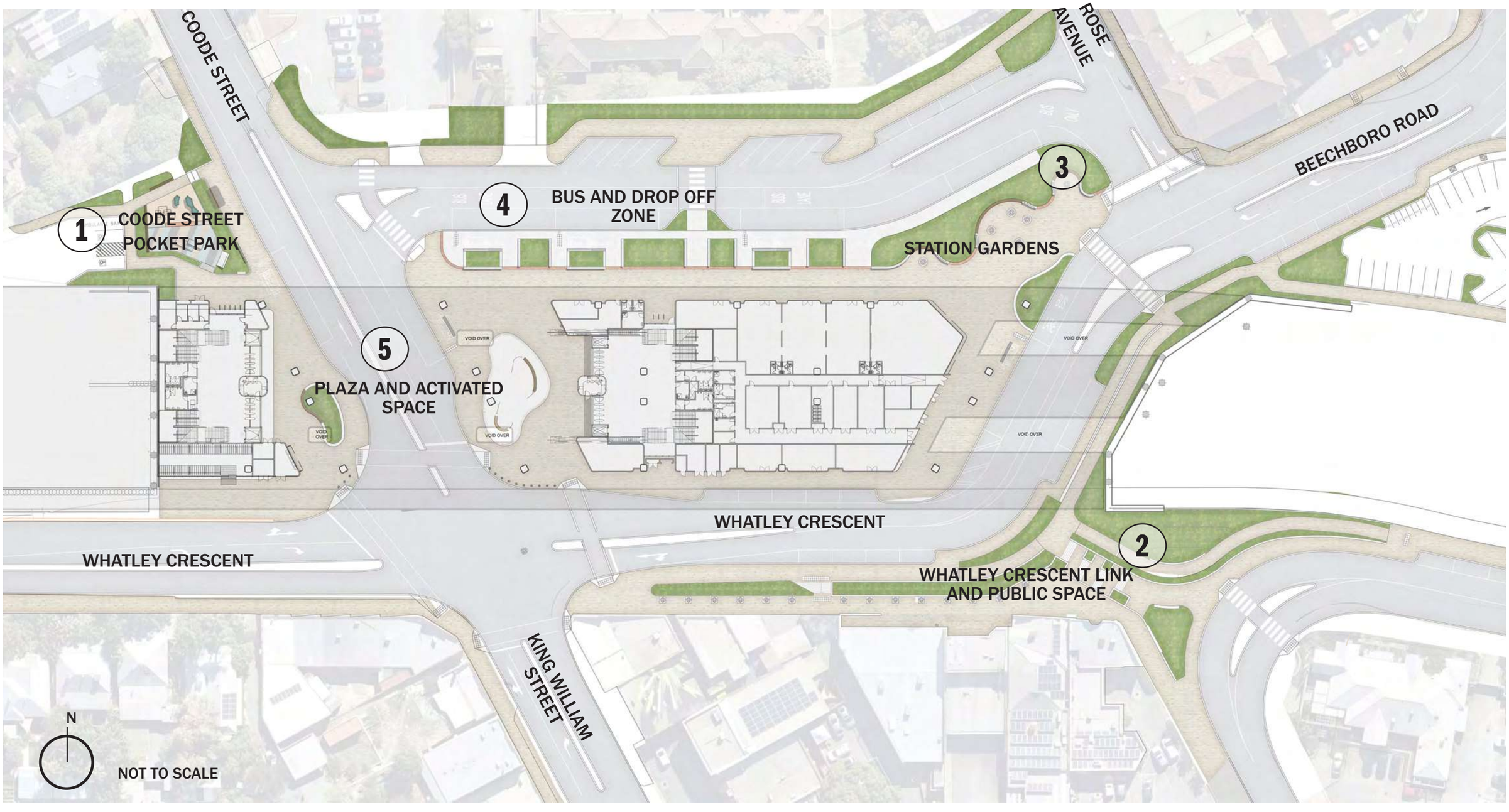
014238
Bayswater Station Upgrade

September 2020

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SITE APPROACH

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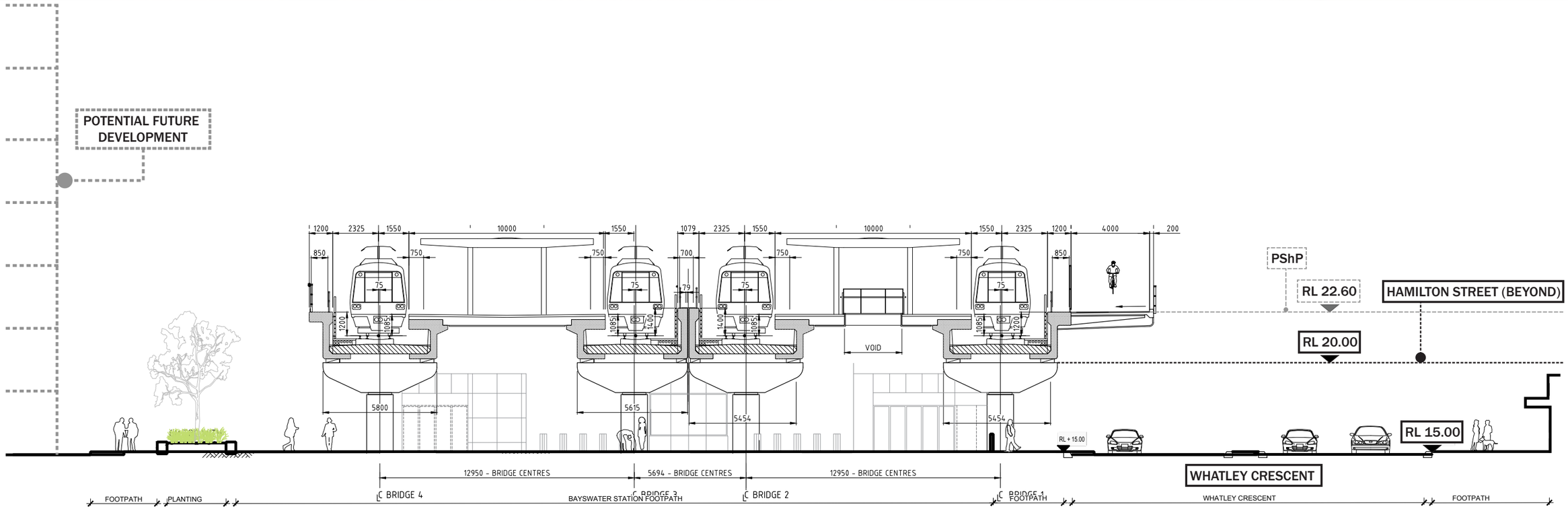


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SECTION

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NORTHERN ELEVATION

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NORTHERN RETAIL + BUSWAY

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BRIDGE FROM COODE STREET

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BRIDGE FROM COODE STREET

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NORTHERN RETAIL

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NORTHERN POCKET PARK

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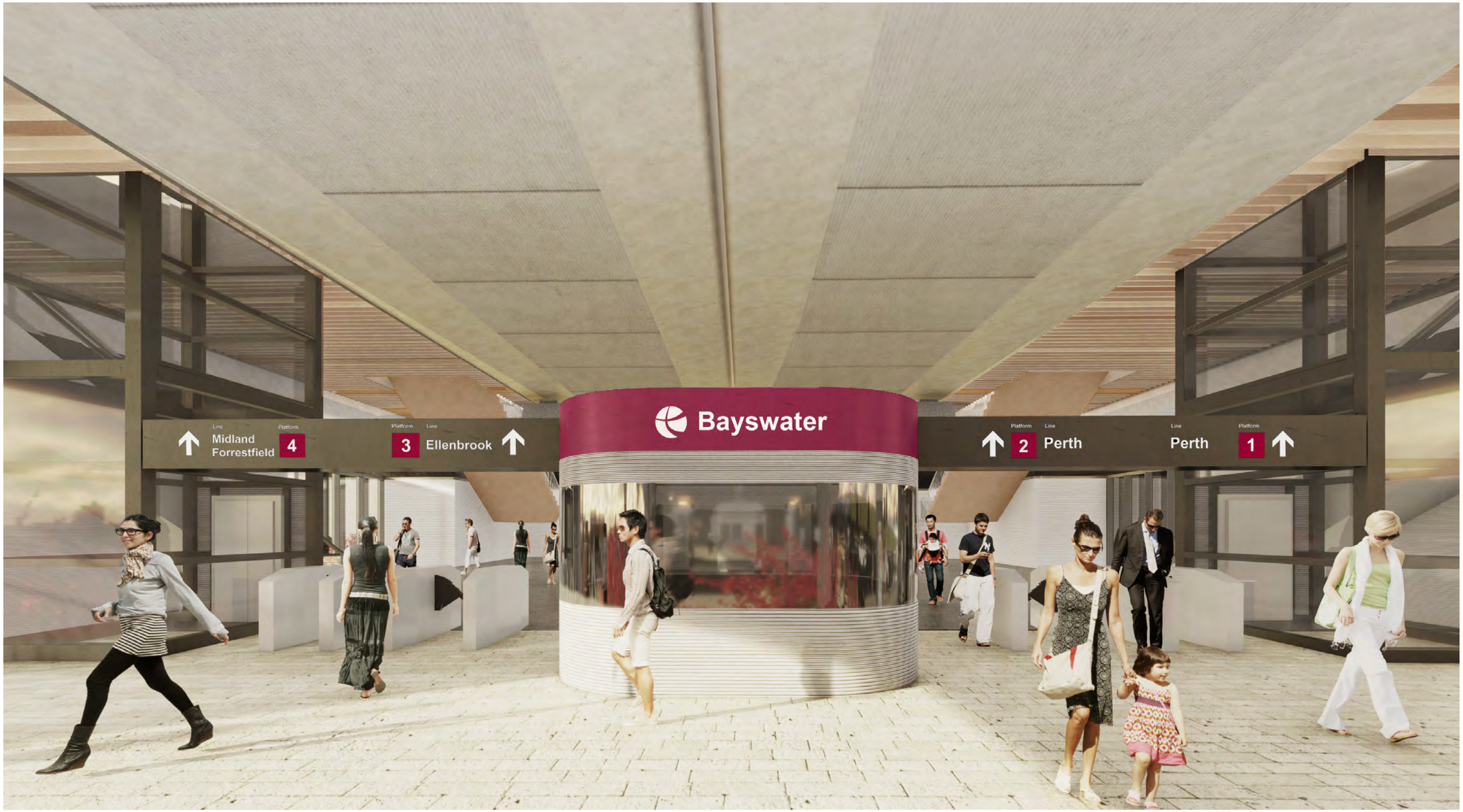
EASTERN ENTRY PLAZA

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STATION ENTRY

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EASTERN PLAZA

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EASTERN PLAZA

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STAIR

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ESCALATOR

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PLATFORM

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PLATFORM

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CANOPY SHELTER

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PLATFORM

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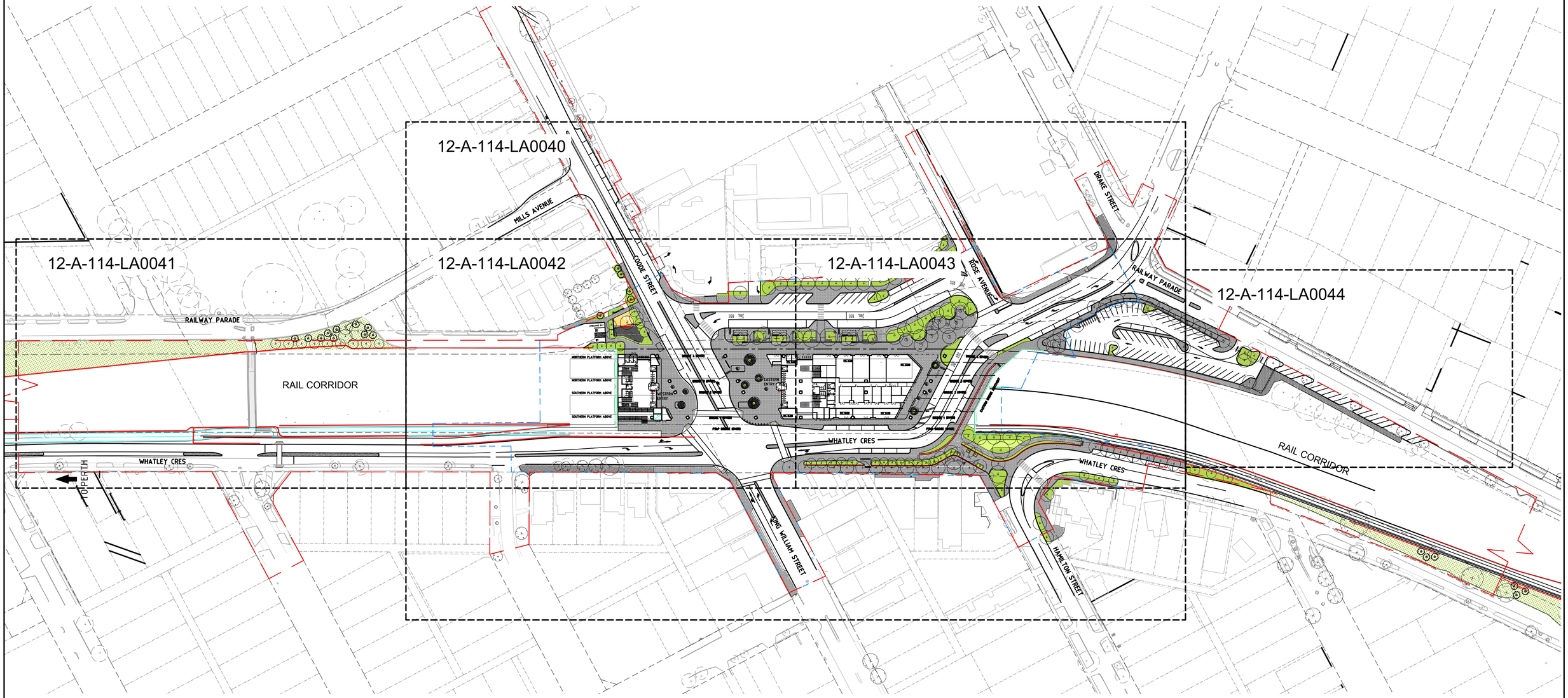
PRINCIPAL SHARED PATH

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Appendix D2

Landscape Concept Plans prepared by Hassell



LANDSCAPE URBAN DESIGN DRAWING INDEX

DRAWING NUMBER	DRAWING NAME	REVISION
12-A-114-LA0034	COVER SHEET AND DRAWING INDEX	A
12-A-114-LA0035	LEGEND AND GENERAL NOTES	A
12-A-114-LA0040	MASTER PLAN (1:500)	A
12-A-114-LA0041	GENERAL ARRANGEMENT PLAN - 01	A
12-A-114-LA0042	GENERAL ARRANGEMENT PLAN - 02	A
12-A-114-LA0043	GENERAL ARRANGEMENT PLAN - 03	A
12-A-114-LA0044	GENERAL ARRANGEMENT PLAN - 04	A

DETAILED DESIGN

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	29.09.2020	ISSUED FOR 15% DETAIL DESIGN - DRAFT	DP	DP	NB	JPD
A1	18.08.2020	IDD - FOR REVIEW BY EBA	DP	DP	NB	JPD

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REFERENCE DRGS

SCALE : 1:500 (@ A1)
DATUM : HORIZONTAL: PCG94 VERTICAL: AHD71
DOC REVIEW NOTE No.

DESIGNED HASSELL
DRAWN DP
CHECKED NB
APPROVED FOR ISSUE
EXECUTIVE DIRECTOR PTA Division / External Company
DATE

BAYSWATER STATION & TURNBACK (BST)
BAYSWATER STATION AND PRECINCT
LANDSCAPE
COVER SHEET AND DRAWING INDEX
PTA Drawing No: 12-A-114-LA0034 REV : A

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LEGEND

SURFACE TREATMENTS

- LST-01A — PAVING TYPE 1A ENGINEERED CONCRETE PAVERS
- LST-01B — PAVING TYPE 1B ENGINEERED CONCRETE PAVERS TO VEHICLE CROSSOVERS
- LST-02 — PAVING TYPE 2 EXPOSED AGGREGATE CONCRETE SLAB PAVING
- LST-03 — PAVING TYPE 3 RECYCLED RED BRICK HEADING COURSE
- LST-04 — PAVING TYPE 4 BRICK UNIT PAVER
- LST-05 — LAWN ROLL ON TURF

PLANTING

- LVE-01 — LVE-01 GARDEN BED TYPE 1 PRIMARY GARDEN BEDS
- LVE-02 — LVE-02 GARDEN BED TYPE 2 RAIL CORRIDORS
- LVE-03 — LVE-03 GARDEN BED TYPE 3 INFILTRATION GARDEN BEDS

TREES

- LTR-01 500ltr TREE
- LTR-02 200ltr TREE
- LTR-03 100ltr TREE
- LTR-04 45ltr TREE
- LTR-EX EXISTING TREE - RETAIN AND PROTECT CURRENTLY UNSUREYED - TO BE CAPTURED IN UPDATED SURVEY
- LTR-EX EXISTING TREE - RETAIN AND PROTECT CURRENTLY SURVEYED
- LTR-EX EXISTING TREE - TO BE REMOVED

FURNITURE FIXTURES

- LFU-01A/B/C - FEATURE BENCHES
- LFU-02 - BIKE RACKS
- LFU-03 - DRINK FOUNTAIN
- LFU-04 - BOLLARD - REFER CIVIL ENGINEERS DOCUMENTATION
- LPV-10 - TGSIs
- LFU-05 - BUS SHELTER
- LFU-06 - TREE GRATE
- LFU-07 - WALL MOUNTED BENCH
- LFU-08 - TABLE
- LFU-09 - BENCH
- LMI-03 - BIN

WALLS

- LWA-01 - CONCRETE CORE FILLED BRICK WALL WITH CONCRETE COPPING BENCH OVER
- LWA-02 - FACEBRICK RETAINING WALL
- LWA-03-A - LANDSCAPE RETAINING WALL TYPE A
- LWA-03-B - LANDSCAPE RETAINING WALL TYPE B

BARRIERS AND RAILS

- LRA-02 - BALUSTRADE / FENCE SYSTEM
- LRA-01 - HANDRAIL TYPE 1

MISC

- EXTENT OF WORKS BOUNDARIES REFER TO PTA DRAWINGS 12-A-114-AR0096 AND 12-A-114-AR0102
- DRAWING SHEET EXTENT
- LMI-01 TREE CELLS

GENERAL NOTES

1. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE RELEVANT ENGINEERING, ARCHITECTURAL, AND SERVICES DRAWINGS AND SPECIFICATIONS.
2. ALL DRAWINGS TO BE PRINTED IN COLOUR FOR CLARITY AND FULL INFORMATION
3. ALL PEDESTRIAN SURFACES ARE TO HAVE CROSSFALLS OF MAX FALL 1:50, MIN FALL 1:100 UNLESS SPECIFICALLY INDICATED OTHERWISE ON DRAWINGS.
4. ALL FALLS ARE TO BE AWAY FROM BUILDINGS UNLESS NOTED OTHERWISE ON DRAWINGS.
5. REFER TO CIVIL ENGINEERS DOCUMENTATION FOR PAVEMENT SUBBASE AND SUBGRADE COMPACTION, REINFORCEMENT AND FOOTINGS.
6. REFER LIGHTING CONSULTANTS DOCUMENTATION AND SPECIFICATIONS FOR EXTERNAL LIGHT LOCATION AND FITTINGS (TO BE DEVELOPED)
7. REFER TO CIVIL ENGINEERS SPECIFICATION FOR ROAD AND DRAINAGE DESIGN AND BULK EARTHWORKS.
8. ALL RETAINING WALLS AND BARRIERS, RAILS AND FENCES AND LEVELS FOR PRELIMINARY DESIGN PURPOSES ONLY - TO BE REVIEWED BY CIVIL ENGINEER
9. CONTRACTORS MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING ANY WORK ON SITE OR MAKING ANY SHOP DRAWINGS WHICH MUST BE SUBMITTED AND APPROVED BEFORE MANUFACTURE / FABRICATION.
10. ALL LEGEND ITEMS ARE TO BE READ IN CONJUNCTION WITH LANDSCAPE SPECIFICATION AND MATERIAL SCHEDULE BST-EVO-UD-SCH-00151
11. HASSELL DOES NOT ACCEPT RESPONSIBILITY FOR THE ACCURACY OR CURRENCY OF OTHER CONSULTANTS DRAWINGS REFERENCED INTO THE CURRENT DOCUMENTATION SET.
12. REFER TO ALL CONSULTANT DRAWINGS FOR MECHANICAL, STRUCTURAL, ELECTRICAL, HYDRAULIC, LIGHTING AND SECURITY FEATURES.
13. ALL FIGURED DIMENSIONS TAKE PRECEDENCE OVER SCALED DIMENSIONS.
14. ISOLATION / EXPANSION JOINTS SHALL BE PROVIDED BETWEEN ALL PAVEMENTS, WALLS, STRUCTURES AND FACADES. ISOLATION AND EXPANSION JOINTS SHALL BE TOPPED IN A NEAT, FLEXIBLE, MASTIC BEAD TO MATCH ADJACENT SURFACE COLOUR.
15. REFER TO CIVIL ENGINEERS DOCUMENTATION FOR EXPANSION JOINT AND CONTROL JOINT SPACING FOR PAVEMENTS, WHERE JOINT LOCATIONS ARE NOT SPECIFIED ON THE LANDSCAPE DRAWINGS.
16. REFER TO RELEVANT ENGINEER'S DOCUMENTATION FOR ALL SERVICE PIT-LID AND SUB-GRADE REQUIREMENTS. PIT LIDS SHALL BE LOCATED WHOLLY WITHIN ONE SURFACE TREATMENT TYPE, WITH A MINIMUM OF 100 mm MARGIN TO THE EDGE OF THE MATERIAL, AND SHALL BE ORIENTED IN ALIGNMENT WITH THE NEAREST PREVAILING EDGE.

REFER TO LANDSCAPE MATERIAL SCHEDULE FOR FURTHER DETAIL - BST-EVO-UD-SCH-00151

NOTE: ALL RETAINING WALLS AND BARRIERS, RAILS AND FENCES AND LEVELS FOR PRELIMINARY DESIGN PURPOSES ONLY - TO BE REVIEWED BY CIVIL AND STRUCTURAL ENGINEERS

DETAILED DESIGN

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	29.09.2020	ISSUED FOR 15% DETAIL DESIGN - DRAFT	DP	DP	NB	JPD
A1	18.08.2020	IDD - FOR REVIEW BY EBA	DP	DP	NB	JPD

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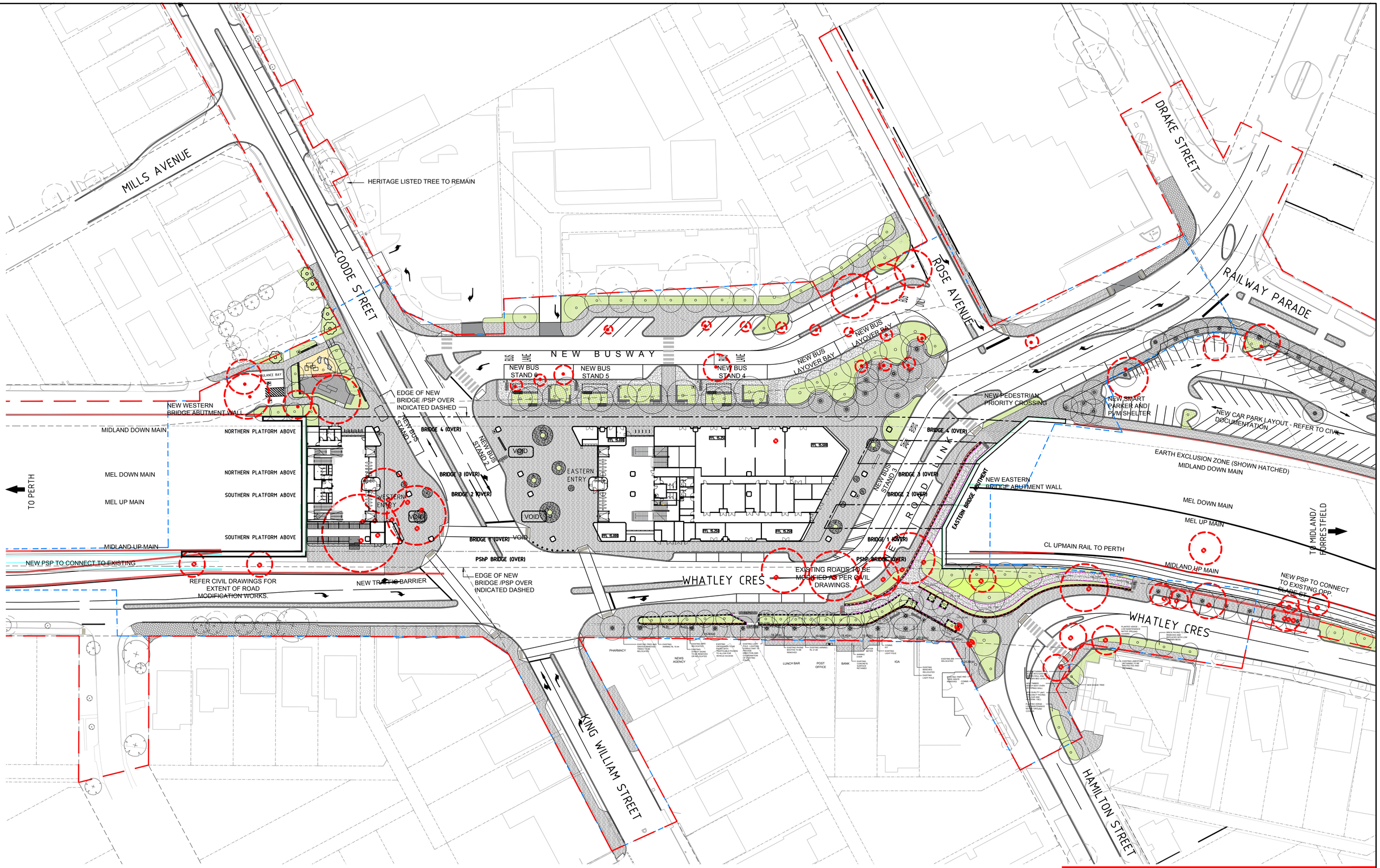
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DOC REVIEW NOTE No.

DESIGNED HASSELL
DRAWN DP
CHECKED NB
APPROVED FOR ISSUE
EXECUTIVE DIRECTOR PTA Division / External Company
DATE

BAYSWATER STATION & TURNBACK (BST)
BAYSWATER STATION AND PRECINCT
LANDSCAPE
LEGEND AND GENERAL NOTES
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DETAILED DESIGN

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DOC REVIEW NOTE No.

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DRAWN DP
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EXECUTIVE DIRECTOR PTA Division / External Company
DATE

BAYSWATER STATION & TURNBACK (BST)

BAYSWATER STATION AND PRECINCT LANDSCAPE PRECINCT MASTERPLAN

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FOR CONTINUATION REFER 12-A-114-LA0042

RAILWAY PARADE

FULL EXTENT OF TREATMENTS TO CORRIDOR TO BE DETERMINED FOLLOWING UPDATED RETAINING WALL DESIGN AND TRACK ALIGNMENT

NEW LANDSCAPING WORKS TO TIE INTO EXISTING LEVELS AND SURFACES - RECTIFICATION WORKS REQUIRED TO ANY EXISTING PATHS, KERBS OR GARDEN BEDS

NEW LANDSCAPING WORKS TO TIE INTO EXISTING LEVELS AND SURFACES - RECTIFICATION WORKS REQUIRED TO ANY EXISTING PATHS, KERBS OR GARDEN BEDS

WORKS TO EXTEND TO VERGE TO ALL DISTURBED AREAS - EXTENT OF WORKS TO BE CONFIRMED

LEAKE STREET UNDERPASS TO BE UPDATED - CURRENT DESIGN BEING AMENDED FOLLOWING CHANGES TO TRACK ALIGNMENT

NEW TRAFFIC BARRIER

WORKS TO EXTEND TO VERGE TO ALL DISTURBED AREAS

WORKS TO EXTEND TO VERGE TO ALL DISTURBED AREAS - EXTENT OF WORKS TO BE CONFIRMED BY CIVIL ENGINEERS

WHATLEY CRES

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	29.09.2020	ISSUED FOR 15% DETAIL DESIGN - DRAFT	DP	DP	NB	JPD
A1	18.08.2020	IDD - FOR REVIEW BY EBA	DP	DP	NB	JPD

ORIG SIZE A1

AT ORIGINAL PLOT SIZE

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REFERENCE DRGS

SCALE : 1:200 (@ A1)

DATUM :
HORIZONTAL: PCG94
VERTICAL: AHD71

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DRAWN DP
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EXECUTIVE DIRECTOR
PTA Division / External Company

DATE

DETAILED DESIGN

BAYSWATER STATION & TURNBACK (BST)

BAYSWATER STATION AND PRECINCT
LANDSCAPE
GENERAL ARRANGMENT PLAN - SHEET 01

PTA Drawing No: 12-A-114-LA0041 | REV : A

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FOR CONTINUATION REFER 12-A-114-LA0041

FOR CONTINUATION REFER 12-A-114-LA0043

GARDEN BEDS

EXISTING BUS STAND TO BE RELOCATED
EXISTING RETAINING TO BE REMOVED AND NEW GARDEN BED TO BATTER LEVEL DIFFERENCE

CODE STREET

EXISTING CROSSOVER

CROSSOVERS TO EXISTING PARKING LOTS TO RETAINED - REFER TO CIVIL ENGINEERS DOCUMENTS

CROSSOVERS TO EXISTING PARKING LOTS TO BE INCLUDED - REFER TO CIVIL ENGINEERS DOCUMENTS

EXISTING CROSSOVER

EXISTING CROSSOVER

FOOTPATH AN
RESOLVED - T
COORDINATE
CONSULTANT

EXISTING TREES AND TURF TO BE RETAIN AND BE PROTECTED

NEW LANDSCAPING WORKS TO TIE INTO EXISTING LEVELS AND SURFACES - RECTIFICATION WORKS REQUIRED TO ANY EXISTING PATHS, KERBS OR GARDEN BEDS

AREA UNDER REVIEW TO BE DEVELOPED FURTHER IN SUBSEQUENT STAGE

AMBULANCE BAY

AREA UNDER REVIEW TO BE INCLUDED IN SUBSEQUENT DD STAGE

FULL EXTENT OF TREATMENTS TO CORRIDOR TO BE DETERMINED FOLLOWING UPDATED RETAINING WALL DESIGN AND TRACK ALIGNMENT

BUS LANE

NORTHERN PLATFORM ABOVE

NORTHERN PLATFORM ABOVE

SOUTHERN PLATFORM ABOVE

SOUTHERN PLATFORM ABOVE

BRIDGE 4 (OVER)

BRIDGE 3 (OVER)

BRIDGE 2 (OVER)

BRIDGE 1 (OVER)

PShP BRIDGE (OVER)

WESTERN ENTRY

EASTERN ENTRY

VOID OVER

FFL

FFL 15.0

NEW PSP

NEW LANDSCAPING WORKS TO TIE INTO EXISTING LEVELS AND SURFACES - RECTIFICATION WORKS REQUIRED TO ANY EXISTING PATHS, KERBS OR GARDEN BEDS

ROAD ALIGNMENT TO BE REVIEWED

EXISTING RETAINING AND BARRIER TO BE REPLACED - DETAIL TBC

NOTE: ALL RETAINING WALLS AND BARRIERS, RAILS AND FENCES AND LEVELS FOR PRELIMINARY DESIGN PURPOSES ONLY - TO BE REVIEWED BY CIVIL AND STRUCTURAL ENGINEERS

DETAILED DESIGN

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	29.09.2020	ISSUED FOR 15% DETAIL DESIGN - DRAFT	DP	DP	NB	JPD
A1	18.08.2020	IDD - FOR REVIEW BY EBA	DP	DP	NB	JPD

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REFERENCE DRGS

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BAYSWATER STATION & TURNBACK (BST)

BAYSWATER STATION AND PRECINCT
LANDSCAPE
GENERAL ARRANGMENT PLAN - SHEET 02

PTA Drawing No: 12-A-114-LA0042 REV : A

CAD DRAWING PATHNAME \\proj01\PER\014238-61A-P\2_Work\2-1_Models\3_AutoCAD\1_Work\LA\014238_GA.dwg

FOR CONTINUATION REFER 12-A-114-LA0042

FOR CONTINUATION REFER 12-A-114-LA0044

NEW LANDSCAPING WORKS TO TIE INTO EXISTING LEVELS AND SURFACES - RECTIFICATION WORKS REQUIRED TO ANY EXISTING PATHS, KERBS OR GARDEN BEDS

INTERFACE WITH EXISTING VERGE, RETAINING, FOOTPATHS REQUIRES DEVELOPMENT ON RECEIPT OF UPDATED SURVEY

ROSE AVENUE

BUS ONLY

RAILWAY PARADE

NEW LANDSCAPING WORKS TO TIE INTO EXISTING LEVELS AND SURFACES - RECTIFICATION WORKS REQUIRED TO ANY EXISTING PATHS, KERBS OR GARDEN BEDS

ARKING TO BE
TH CIVIL

FOOTPATH AND PARKING TO BE RESOLVED - TO BE COORDINATED WITH CIVIL CONSULTANTS

BUS LANE

MOUNTABLE KERBS TO THIS LOCATION TO ALLOW MAINTENANCE VEHICLE ACCESS

CROSS HATCH INDICATES EXTENT OF TREE CELLS - REFER MATERIAL SCHEDULE

BUS LANE

VOID OVER

BRIDGE 4 (OVER)

BRIDGE 3 (OVER)

BRIDGE 2 (OVER)

VOID OVER

BRIDGE 1 (OVER)

PSHP BRIDGE (OVER)

EASTERN BRIDGE ABUTMENT

NEW PSP OVER - REFER CIVIL DOCUMENTATION

WHATLEY CRES

STAIRS AND RAMPS TO MEET AS 1428 REQUIREMENTS - INCLUDING NOSINGS, TACTILES AND HANDRAILS - REFER MATERIAL SPECIFICATIONS FOR PROPOSED ELEMENTS

EXISTING BUS STANDS TO BE RELOCATED - TO BE COORDINATED WITH PTA

WHATLEY CRES

EXISTING BUS STANDS TO BE RELOCATED - TO BE COORDINATED WITH PTA

NEW LANDSCAPING WORKS TO TIE INTO EXISTING LEVELS AND SURFACES - RECTIFICATION WORKS REQUIRED TO ANY EXISTING PATHS, KERBS OR GARDEN BEDS

NOTE: ALL RETAINING WALLS AND BARRIERS, RAILS AND FENCES AND LEVELS FOR PRELIMINARY DESIGN PURPOSES ONLY - TO BE REVIEWED BY CIVIL AND STRUCTURAL ENGINEERS

DETAILED DESIGN

REV	DATE	AMENDMENT	DSN	DRN	CHKD	APP
A	29.09.2020	ISSUED FOR 15% DETAIL DESIGN - DRAFT	DP	DP	NB	JPD
A1	29.09.2020	IDD - FOR REVIEW BY EBA	DP	DP	NB	JPD

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REFERENCE DRGS

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DATUM :
HORIZONTAL: PCG94
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EXECUTIVE DIRECTOR
PTA Division / External Company

DATE

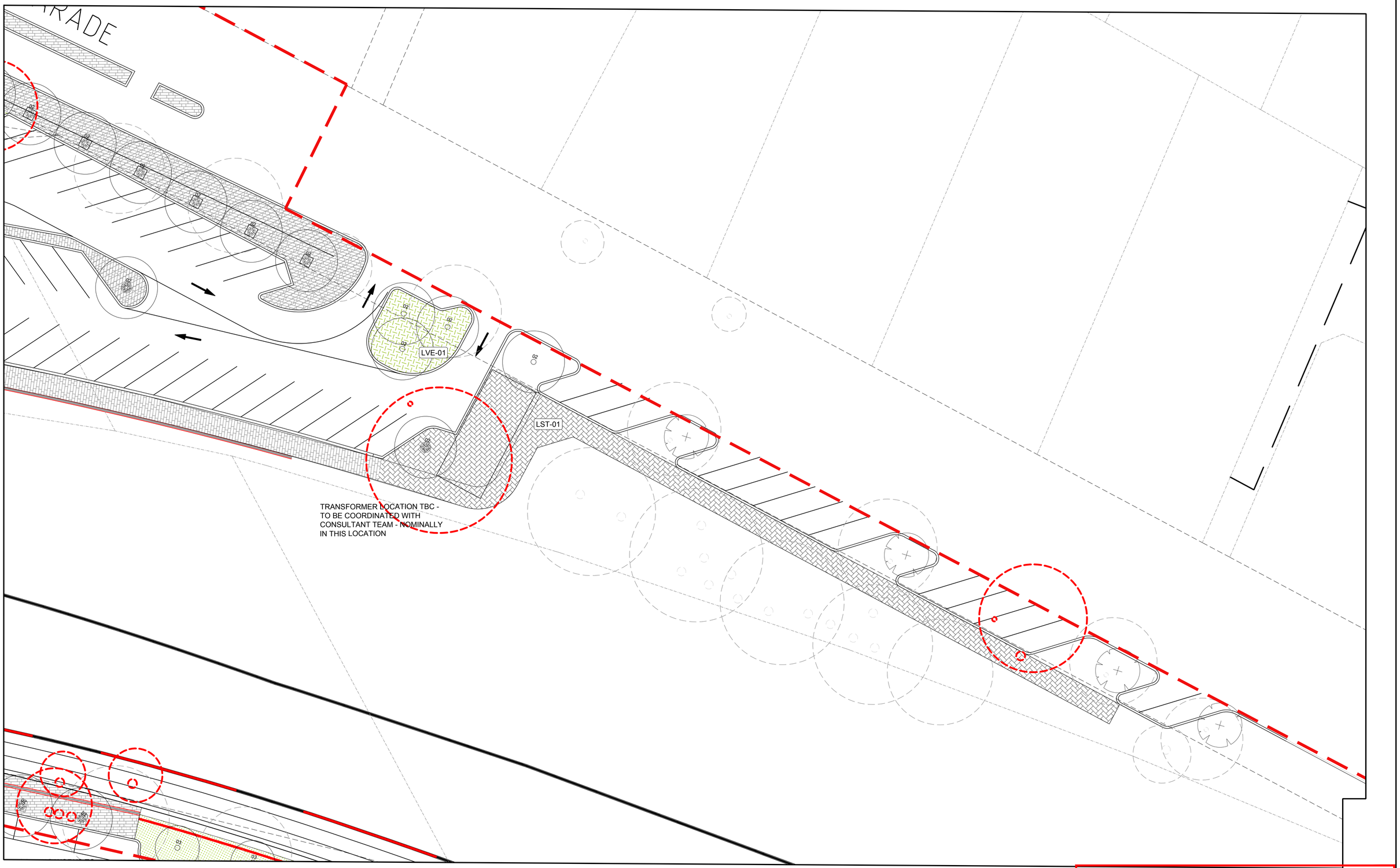
BAYSWATER STATION & TURNBACK (BST)

BAYSWATER STATION AND PRECINCT
LANDSCAPE
GENERAL ARRANGMENT PLAN - SHEET 03

PTA Drawing No: 12-A-114-LA0043 REV : A

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FOR CONTINUATION REFER 12-A-114-LA0043



DETAILED DESIGN

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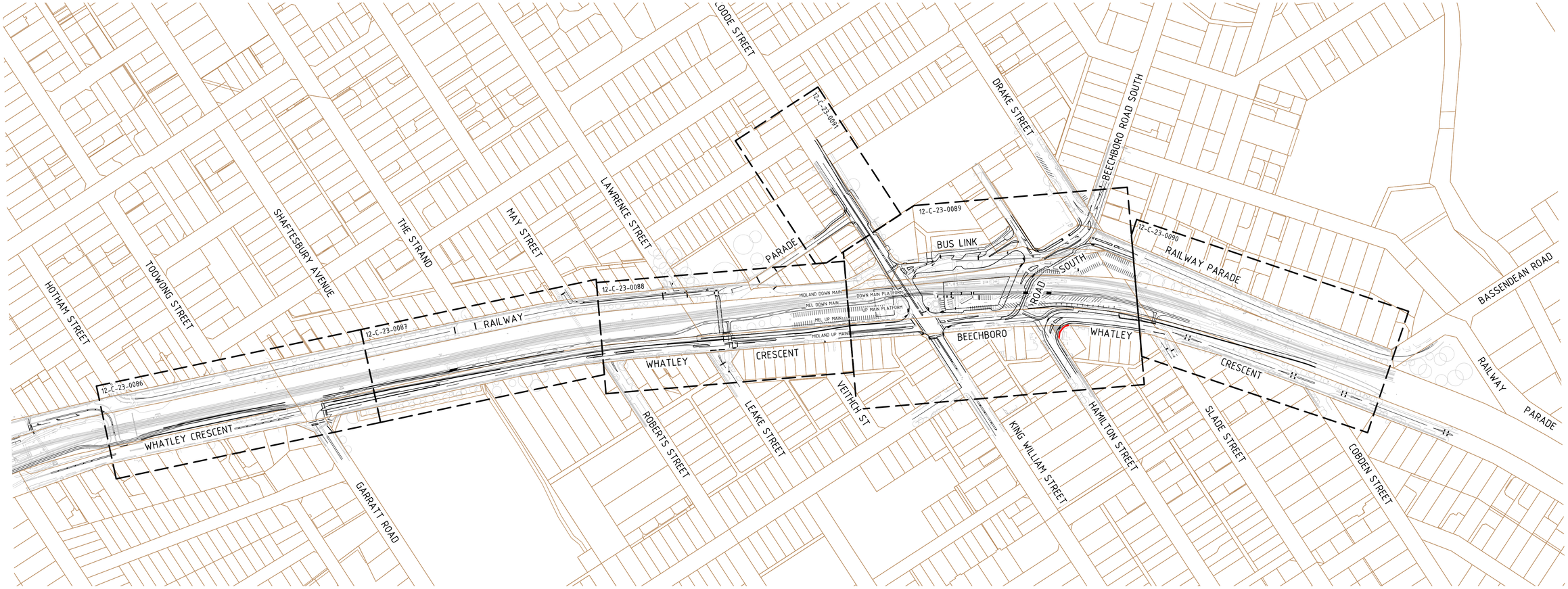
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DRAWN DP
CHECKED NB
APPROVED FOR ISSUE
EXECUTIVE DIRECTOR
PTA Division / External Company
DATE

BAYSWATER STATION & TURNBACK (BST)
BAYSWATER STATION AND PRECINCT
LANDSCAPE
GENERAL ARRANGMENT PLAN - SHEET 04
PTA Drawing No: 12-A-114-LA0044 REV : A

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Appendix D3

Drainage Plans prepared by Evolve Bayswater



PLAN
NTS

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	EC	SP		

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REFERENCES

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DATUM
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VERTICAL: AHD71

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DATE

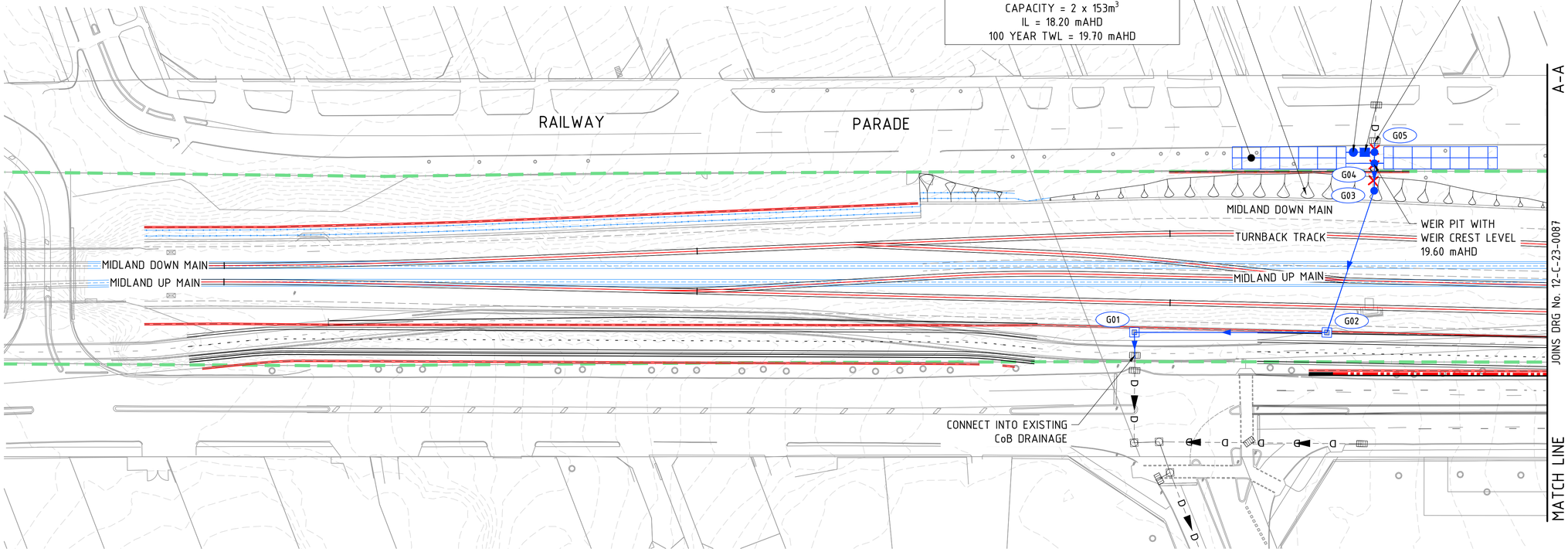
Government of Western Australia
Public Transport Authority

BAYSWATER STATION

BAYSWATER STATION PRECINCT
DRAINAGE - KEY PLAN

PTA Drawing No: 12-C-23-0085 Rev: A

CAD DRAWING PATHNAME C:\users\cdeyzel\appdata\local\projectwise\jacobs anz ie\d0389893\PTA A1 EVOLVE.dwg



NOTES

1. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.
2. ALL ELEVATIONS ARE IN mAHD UNLESS NOTED OTHERWISE.

LEGEND

- SITE BOUNDARY
- RAIL RESERVE BOUNDARY
- RETAINING WALL
- MAJOR CONTOURS (0.5m INTERVALS)
- MINOR CONTOURS (0.1m INTERVALS)
- EXISTING CONTOURS (0.5m INTERVALS)
- DRAINAGE PIPE AND FLOW DIRECTION
- MANHOLE
- GRATED GULLY
- CATCHPIT
- ACO DRAIN
- DA06 STRUCTURE NUMBER
- D EXISTING DRAINAGE PIPE
- D EXISTING DRAINAGE PIPE / STRUCTURE TO BE REMOVED
- EXISTING MANHOLE
- EXISTING SIDE ENTRY PIT
- EXISTING GRATED GULLY
- D KING WILLIAM STREET BRANCH DRAIN (WATER CORPORATION ASSET)

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
C	01.10.20	ISSUED FOR DA	CW	SP		
B	29.09.20	ISSUED FOR TURNBACK INITIAL DETAILED DESIGN	CW	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	EC	SP		

ORIG SIZE A1

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BAYSWATER STATION

BAYSWATER STATION PRECINCT
DRAINAGE PLAN
SHEET 1

PTA Drawing No: 12-C-23-0086 Rev: C

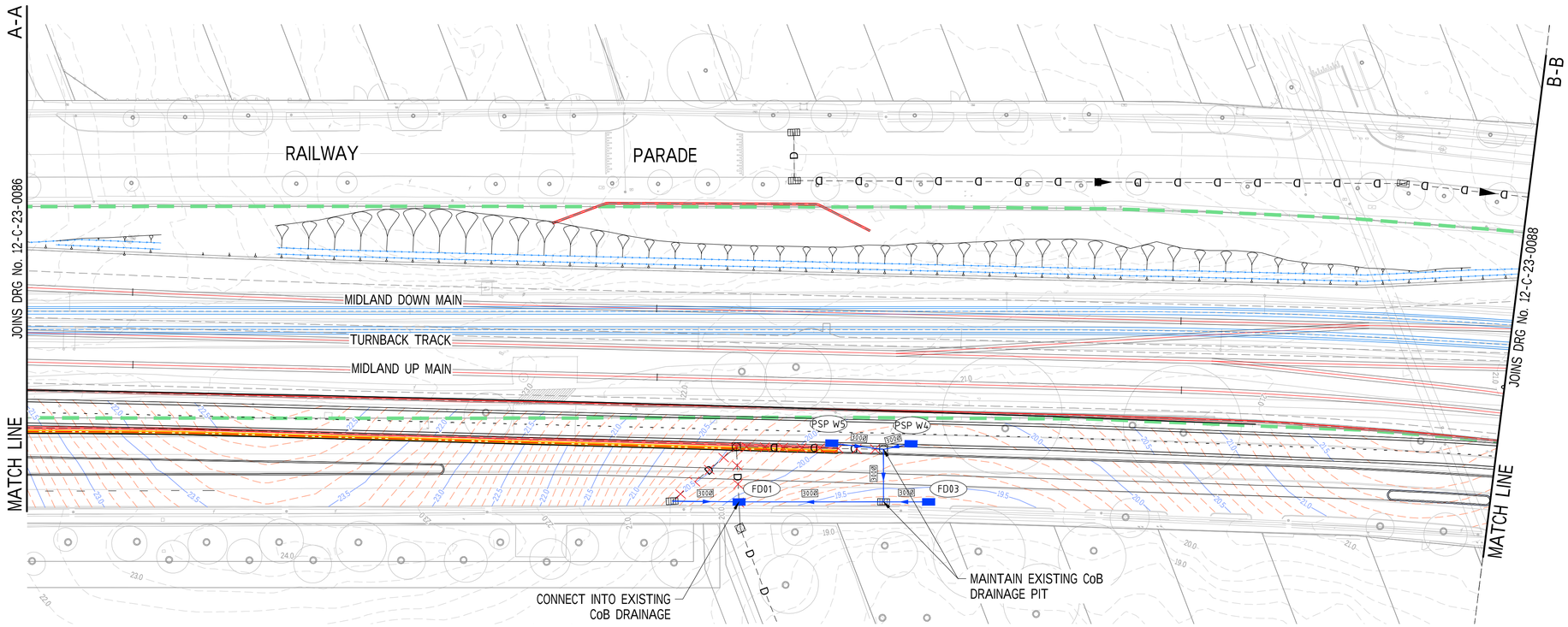
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NOTES

1. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.
2. ALL ELEVATIONS ARE IN mAHD UNLESS NOTED OTHERWISE.

LEGEND

- SITE BOUNDARY
- RAIL RESERVE BOUNDARY
- RETAINING WALL
- MAJOR CONTOURS (0.5m INTERVALS)
- MINOR CONTOURS (0.1m INTERVALS)
- EXISTING CONTOURS (0.5m INTERVALS)
- DRAINAGE PIPE AND FLOW DIRECTION
- MANHOLE
- GRATED GULLY
- CATCHPIT
- ACO DRAIN
- DA06 STRUCTURE NUMBER
- D EXISTING DRAINAGE PIPE
- EXISTING DRAINAGE PIPE / STRUCTURE TO BE REMOVED
- EXISTING MANHOLE
- EXISTING SIDE ENTRY PIT
- EXISTING GRATED GULLY
- D KING WILLIAM STREET BRANCH DRAIN (WATER CORPORATION ASSET)



REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	29.09.20	ISSUED FOR TURNBACK INITIAL DETAILED DESIGN	EC	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	EC	SP		

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

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BAYSWATER STATION

BAYSWATER STATION PRECINCT
DRAINAGE PLAN
SHEET 2

PTA Drawing No: 12-C-23-0087 Rev: B

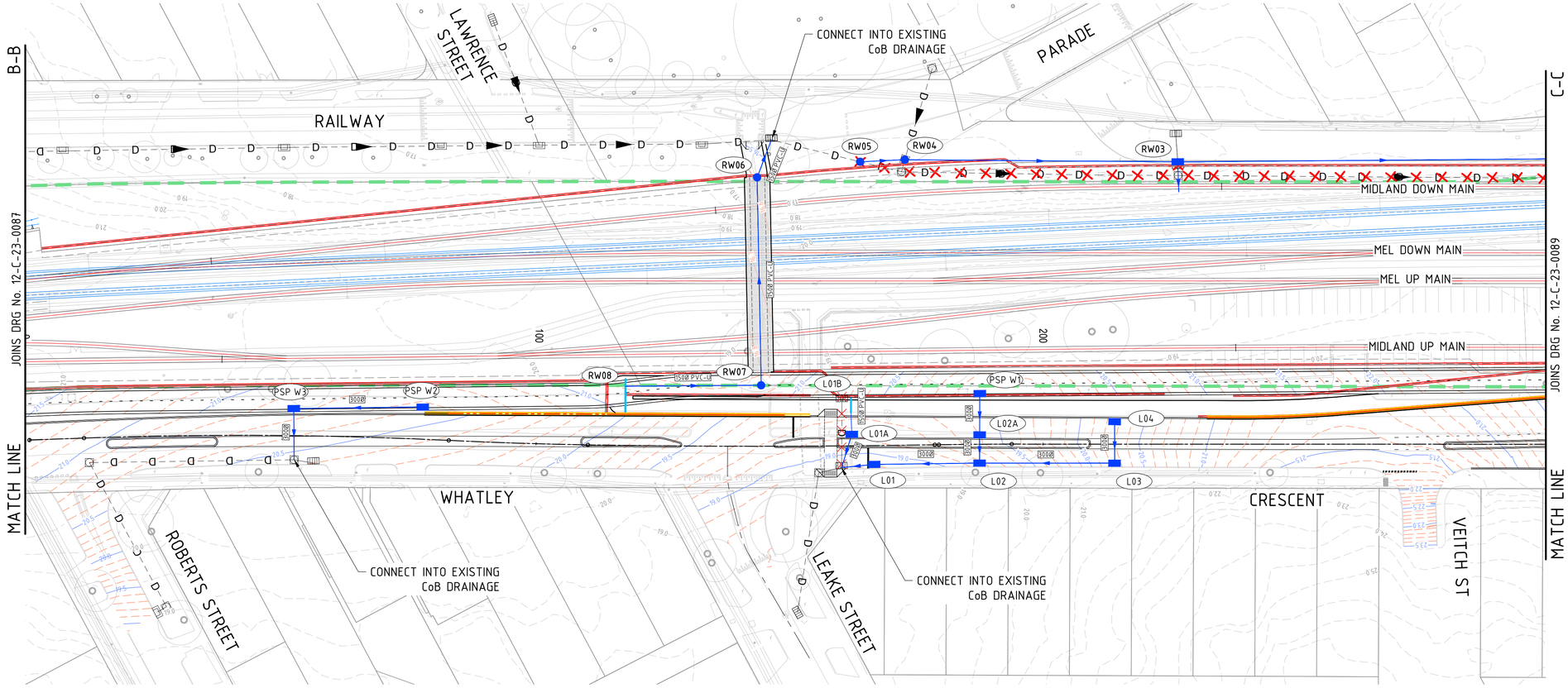
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NOTES

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LEGEND

- SITE BOUNDARY
- RAIL RESERVE BOUNDARY
- RETAINING WALL
- MAJOR CONTOURS (0.5m INTERVALS)
- MINOR CONTOURS (0.1m INTERVALS)
- EXISTING CONTOURS (0.5m INTERVALS)
- DRAINAGE PIPE AND FLOW DIRECTION
- MANHOLE
- GRATED GULLY
- CATCHPIT
- ACO DRAIN
- DA06 STRUCTURE NUMBER
- EXISTING DRAINAGE PIPE
- EXISTING DRAINAGE PIPE / STRUCTURE TO BE REMOVED
- EXISTING MANHOLE
- EXISTING SIDE ENTRY PIT
- EXISTING GRATED GULLY
- KING WILLIAM STREET BRANCH DRAIN (WATER CORPORATION ASSET)



REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	29.09.20	ISSUED FOR TURNBACK INITIAL DETAILED DESIGN	EC	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	EC	SP		

ORIG SIZE A1

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AT ORIGINAL PLOT SIZE

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VERTICAL: AHD71

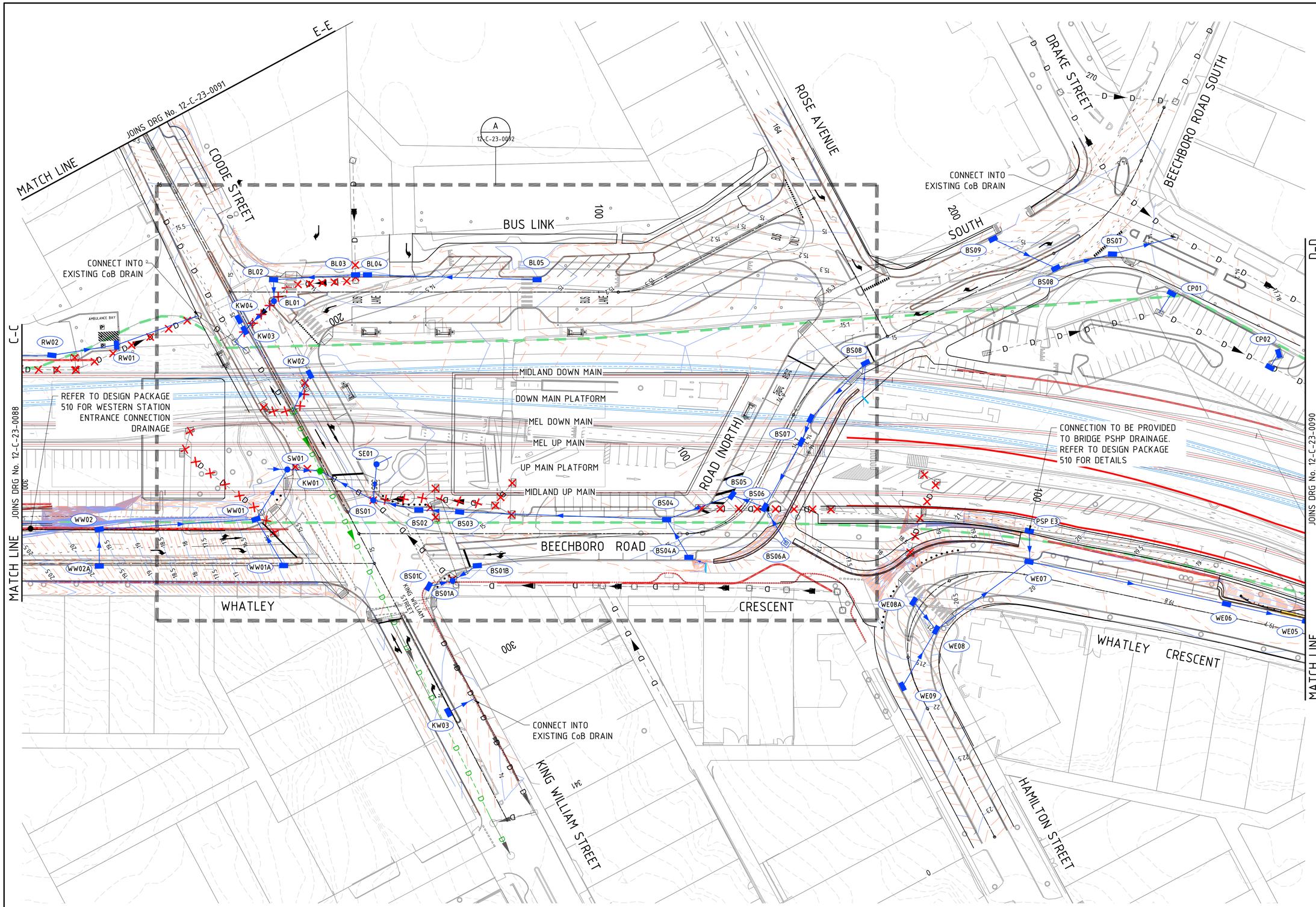
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BAYSWATER STATION
BAYSWATER STATION PRECINCT
DRAINAGE PLAN
SHEET 3

PTA Drawing No: 12-C-23-0088 Rev: B

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NOTES

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2. ALL ELEVATIONS ARE IN mAHD UNLESS NOTED OTHERWISE.

LEGEND

- SITE BOUNDARY
- RAIL RESERVE BOUNDARY
- RETAINING WALL
- MAJOR CONTOURS (0.5m INTERVALS)
- MINOR CONTOURS (0.1m INTERVALS)
- EXISTING CONTOURS (0.5m INTERVALS)
- DRAINAGE PIPE AND FLOW DIRECTION
- MANHOLE
- GRATED GULLY
- CATCHPIT
- ACO DRAIN
- DA06 STRUCTURE NUMBER
- EXISTING DRAINAGE PIPE
- EXISTING DRAINAGE PIPE / STRUCTURE TO BE REMOVED
- EXISTING MANHOLE
- EXISTING SIDE ENTRY PIT
- EXISTING GRATED GULLY
- KING WILLIAM STREET BRANCH DRAIN (WATER CORPORATION ASSET)

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B	30.09.20	ISSUED FOR DA	CW	SP		
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ORIG SIZE A1

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AT ORIGINAL PLOT SIZE

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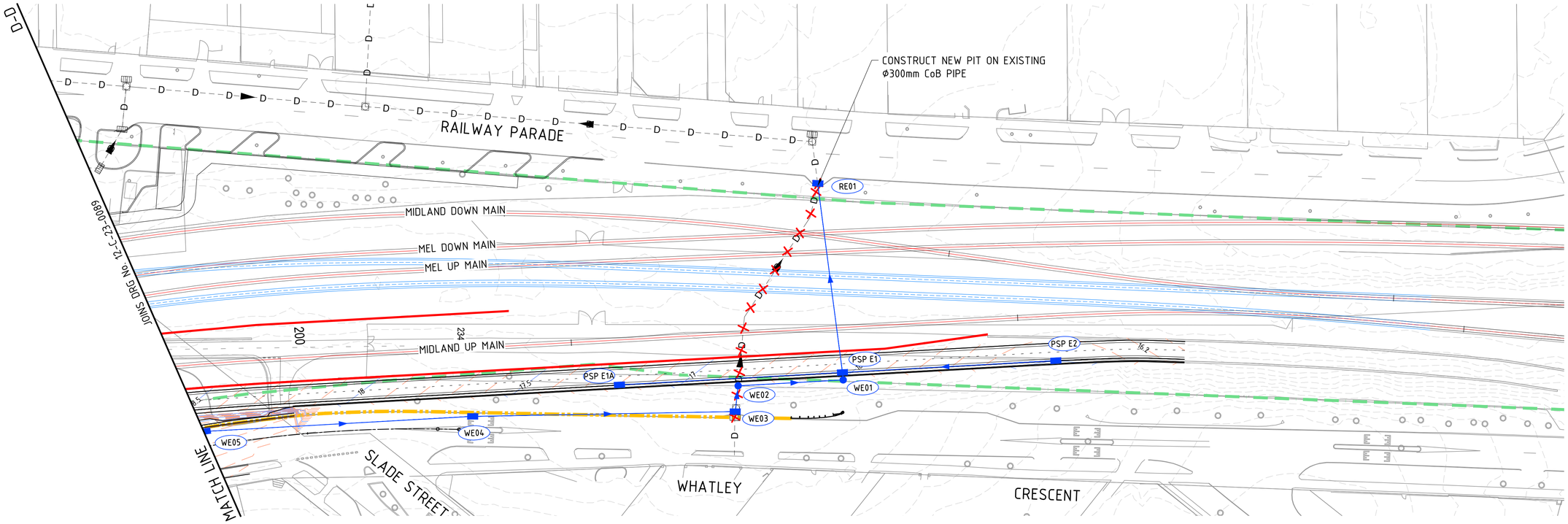
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BAYSWATER STATION

BAYSWATER STATION PRECINCT
DRAINAGE PLAN
SHEET 4

PTA Drawing No: 12-C-23-0089 Rev: B

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LEGEND

- SITE BOUNDARY
- RAIL RESERVE BOUNDARY
- RETAINING WALL
- MAJOR CONTOURS (0.5m INTERVALS)
- MINOR CONTOURS (0.1m INTERVALS)
- EXISTING CONTOURS (0.5m INTERVALS)
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- MANHOLE
- GRATED GULLY
- CATCHPIT
- ACO DRAIN
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- EXISTING GRATED GULLY
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B	30.09.20	ISSUED FOR DA	CW	SP		
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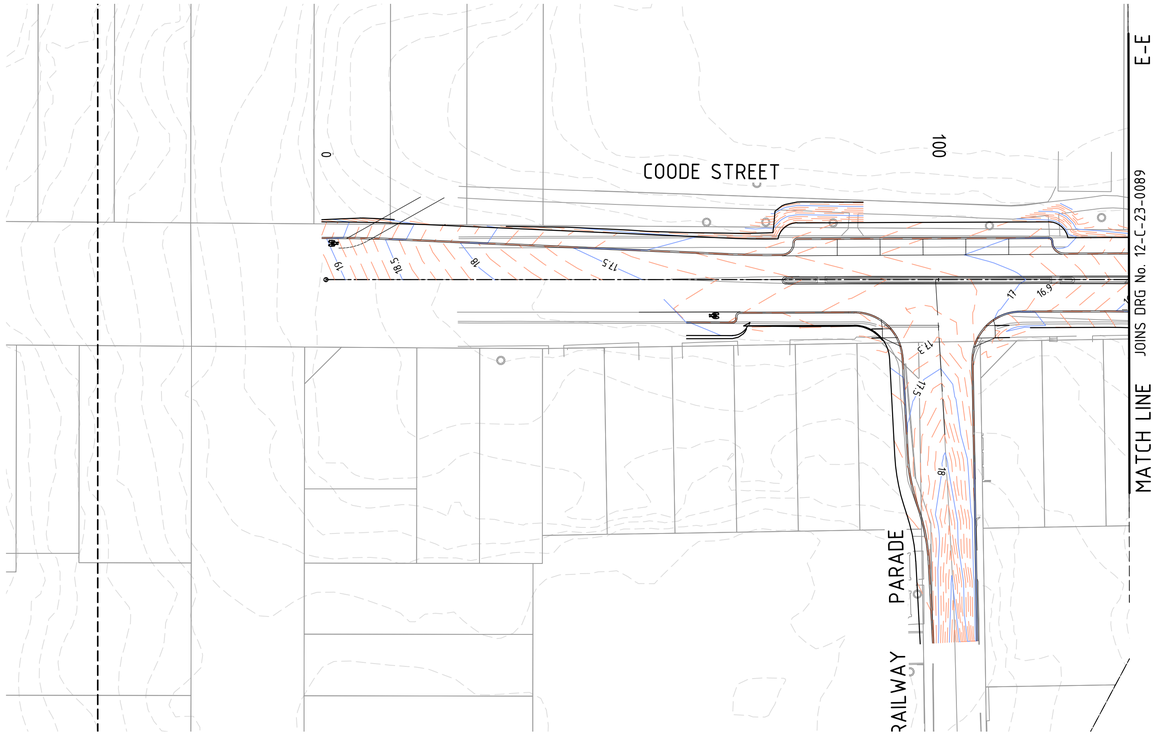
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BAYSWATER STATION

BAYSWATER STATION PRECINCT
DRAINAGE PLAN
SHEET 5

PTA Drawing No: 12-C-23-0090 Rev: B

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LEGEND

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- RAIL RESERVE BOUNDARY
- RETAINING WALL
- 30.0 MAJOR CONTOURS (0.5m INTERVALS)
- MINOR CONTOURS (0.1m INTERVALS)
- 30.0 EXISTING CONTOURS (0.5m INTERVALS)
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- MANHOLE
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- CATCHPIT
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- EXISTING GRATED GULLY
- D KING WILLIAM STREET BRANCH DRAIN (WATER CORPORATION ASSET)

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	30.09.20	ISSUED FOR DA	CW	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	EC	SP		

ORIG SIZE A1

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AT ORIGINAL PLOT SIZE

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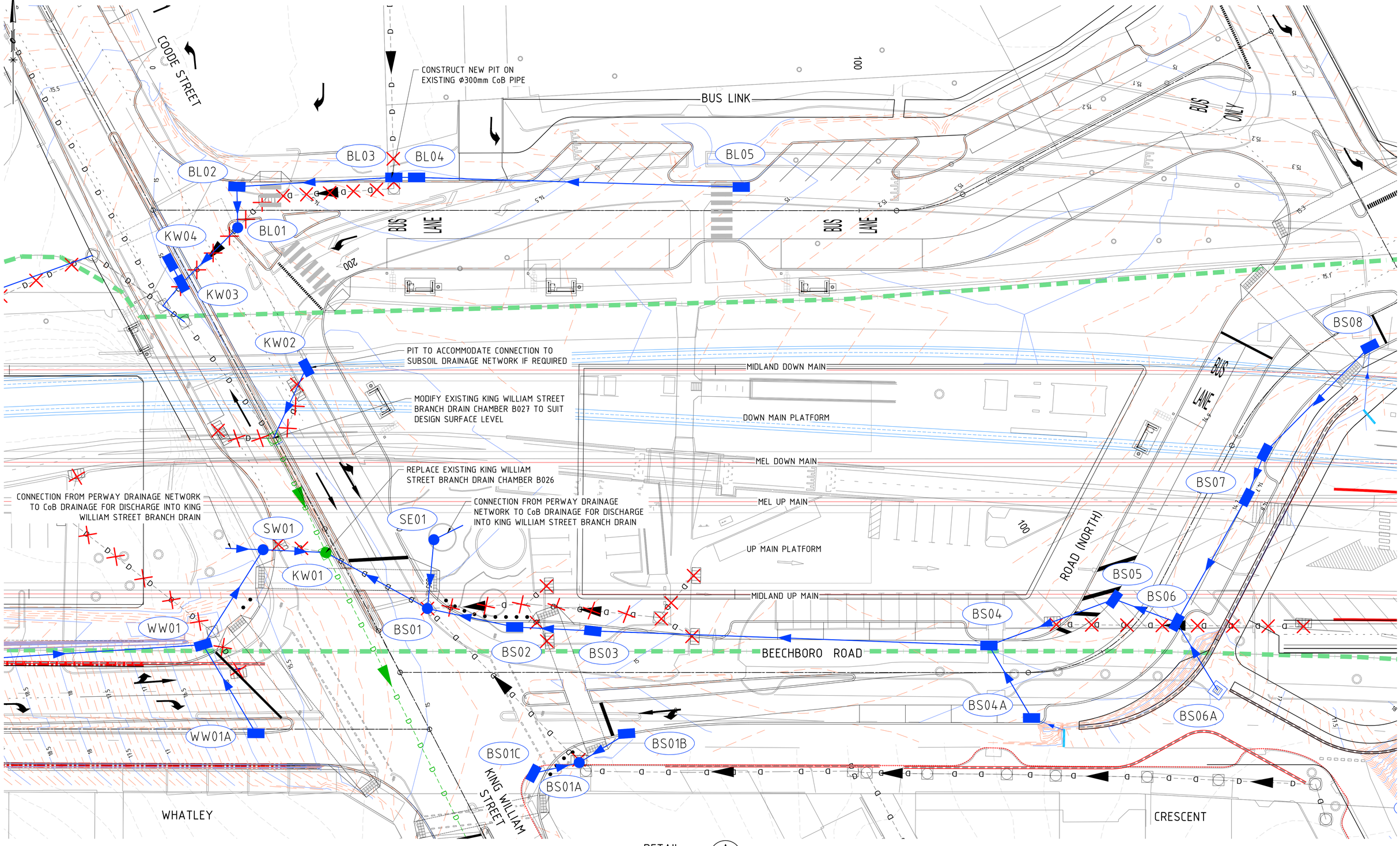
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BAYSWATER STATION

BAYSWATER STATION PRECINCT
DRAINAGE PLAN
SHEET 6

PTA Drawing No: 12-C-23-0091 Rev: B

CAD DRAWING PATHNAME C:\users\cdeyzel\appdata\local\projectwise\jacobs_anz_ie\d0389893\PTA_A1_EVOLVE.dwg



DETAIL A
SCALE 1:250 12-C-23-0089

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	30.09.20	ISSUED FOR DA	CW	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	EC	SP		

ORIG SIZE A1 — 0 10 20 30 40 50 100mm — AT ORIGINAL PLOT SIZE

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REFERENCES

SCALE 1:250

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED CW
DRAWN SP
CHECKED
APPROVED
DATE

Government of Western Australia Public Transport Authority

BAYSWATER STATION

BAYSWATER STATION PRECINCT
DETAIL PLAN

PTA Drawing No: 12-C-23-0092 Rev: B

drg 3

CAD DRAWING PATHNAME C:\users\cdeyzel\appdata\local\projectwise\jacobs_anz_ie\d0389893\PTA_A1_EVOLVE.dwg

Appendix D4

Lighting and Electrical Services Plans prepared by Evolve Bayswater

GENERAL NOTES

1. ALL DIMENSION IN mm UNLESS OTHERWISE INDICATED

2. DRAWINGS SHALL NOT BE SCALED. EXACT LOCATION OF ALL ELECTRICAL EQUIPMENT SHALL BE CO-ORDINATED AND BE DETERMINED ON SITE

3. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE ELECTRICAL SPECIFICATION, SCOPE OF WORKS & SCHEDULES, AS WELL AS ALL ARCHITECTURAL, OTHER SERVICES, CONSULTANTS DRAWINGS, SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT.

4. IF ANY DISCREPANCY OCCURS ON THE ENGINEERS DRAWINGS OR BETWEEN DRAWINGS AND SPECIFICATIONS. REFER TO THE ENGINEERS BEFORE PROCESSING WITH THE WORK

5. ALL MATERIALS AND WORKMANSHIPS SHALL BE IN ACCORDANCE WITH THE REQUIREMENT OF PTA, CURRENT S.A.A. CODES AND THE BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITY EXCEPT WHERE VARIED BY THE PROJECT SPECIFICATION, AUSTRALIAN STANDARDS AND SAA REFERENCES SHALL INCLUDE AS/NZS STANDARDS AS APPROPRIATE

6. ELECTRICAL INSTALLATION SHALL COMPLY WITH THE CURRENT WIRING REGULATIONS AS3000 AND ALL AMENDMENTS, AND THE REQUIREMENT OF THE WESTERN AUSTRALIA SERVICE AND INSTALLATION RULES

7. ALL CABLES USED SHALL BE COPPER AND ALL CONDUCTORS SHALL BE MULTISTRANDED

8. THE ELECTRICAL INSTALLATION SHALL BE EARTHED IN ACCORDANCE WITH THE WIRING REGULATION AS/NZS 3000

9. ALL WIRING, UNLESS OTHERWISE NOTED SHALL BE CONCEALLED THROUGHOUT THE ENTIRE INSTALLATION

10. THE FOLLOWING MINIMUM CABLE SIZES SHALL BE USED FOR FINAL SUB-CIRCUITS THROUGHOUT THE ENTIRE INSTALLATION, UNLESS NOTED OTHERWISE
LIGHTING 2.5mm STRANDED COPPER

11. LIGHTING SHALL COMPLY WITH THE ILLUMINATION LEVELS AS STATED IN THE 8803-900-003 PUBLIC TRANSPORT AUTHORITY SPECIFICATION: LIGHTING DESIGN, INSTALLATION AND MAINTENANCE REQUIREMENTS.

12. EXACT POSITION OF LIGHT SWITCHES AND OUTLETS SHALL BE DETERMINED ON SITE IN RELATION TO CEILING, ARCHITECTURAL AND OTHER DETAILS. PARTICULAR ATTENTION SHOULD BE GIVEN TO LIGHT SWITCHES IN RELATION TO DOOR SWINGS.

13. UNLESS OTHERWISE SPECIFIED, LIGHT SWITCH PANELS ARE TO BE MOUNTED AT 1000 AFFL,

14. ALL DIMENSIONS RELEVANT TO SETTING OUT SHALL BE CONFIRMED AND VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION IS COMMENCED. THE CONTRACTOR SHALL REPORT AND IDENTIFY ANY DISCREPANCIES TO THE MANAGING CONTRACTOR.

15. THE PROVISION OF THE LIGHT POLES AND ASSOCIATED PITS AND CONDUITS SHALL BE IN ACCORDANCE WITH PTA

16. THE LOCATION OF THE EXISTING AND NEW LIGHT POLES, ASSOCIATED PITS AND CONDUITS ARE ONLY INDICATIVE. EXACT LOCATION TO BE DETERMINED ON SITE

LEGEND

- SURFACE MOUNTED LUMINAIRES
- LINEAR STRIP LUMINAIRE
- WALL BRACKET LUMINAIRE
- DOWNLIGHT
- WALL MOUNTED FLOODLIGHT
- POLE MOUNTED LUMINAIRE
- MOVEMENT DETECTOR
- PHOTOELECTRIC CELL SENSOR
- LIGHTING SWITCH 1 WAY
- LIGHTING SWITCH 2 WAY
- LIGHTING SWITCH MULTI WAY

LIGHTING CONTROL SCHEDULE

TYPE	MANUFACTURER	MODEL NAME	DESCRIPTION
S1	Steinel	HF360	SURFACE MOUNT, HIGH FREQUENCY PRESENCE DETECTOR WITH 360 DEG DETECTION ANGLE, DAYLIGHT SWITCHING CAPABLE, 12M DETECTOR RANGE, ORGANIC MATERIAL PENETRATION CAPABILITY, DYNAMIC TIME DELAY, IP54 AND SINGLE CHANNEL COM1 (240V RELAY) / DALI PROTOCOL
S2	Steinel	IS3360	SURFACE MOUNT, PIR MOTION DETECTOR WITH 360 DEG DETECTION ANGLE,DAYLIGHT SWITCHING CAPABLE, 40M DETECTOR RANGE, IP54 AND SINGLE CHANNEL COM1 (240V RELAY) / DALI PROTOCOL
S3	Steinel	HF Dual	SURFACE MOUNT, HIGH FREQUENCY PRESENCE DETECTOR WITH 360 DEG (140 DEG APERTURE) DETECTION ANGLE, DAYLIGHT SWITCHING CAPABLE, 10Mx3M DETECTOR RANGE EACH DIRECTION, ORGANIC MATERIAL PENETRATION CAPABILITY, DYNAMIC TIME DELAY, IP54 AND SINGLE CHANNEL COM1 (240V RELAY) / DALI PROTOCOL
S4	Steinel	IS-345-MX	SURFACE MOUNT, HIGH PRECISION INFRA RED CORRIDOR SENSOR (9 DEG APERTURE), DAYLIGHT SWITCHING CAPABLE, 15Mx2M DETECTOR RANGE EACH DIRECTION, ORGANIC MATERIAL PENETRATION CAPABILITY, DYNAMIC TIME DELAY, IP54 AND SINGLE CHANNEL COM1 (240V RELAY) / DALI PROTOCOL
S5	Steinel	Nightmatic 3000	WALL MOUNT, DAYLIGHT SWITCHING PHOTOELECTRIC LIGHTING CONTROLLER (DAWN/DUSK) 2-1000 LUX WITH IP54 AND SINGLE CHANNEL COM1 (240V RELAY) / DALI PROTOCOL



LUMINAIRE SCHEDULE

TYPE	MANUFACTURER	MODEL NAME	DESCRIPTION
A	WE-EF	134-1753 + 134-1761	55W 24-LED WALL WASH (A20) DOWNLIGHT LUMINAIRE, 4000K CCT, 700mA DRIVER, 5903lm (NOMINAL), CRI 80, IP66 IKO7, MARINE-GRADE DIE-CAST ALUMINIUM ALLOY BODY. LUMINAIRE TO BE MOUNTED RECESSED ON CEILING. DIRECT LUMINAIRE TO MINIMISE GLARE TO INCOMING TRAIN
B	KOPAGLOBAL	FR100-60-CG-4K-13W	13W DOWNLIGHT LUMINAIRE, 4000K CCT, 350mA DRIVER, 1144lm , CRI 80, IP65, IK10, SOLID ALUMINIUM ALLOY BODY. 60 DEG REFLECTOR, CLEAR GLASS LENS. LUMINAIRE TO BE MOUNTED RECESSED ON CEILING.
C	WE-EF	FLA740 (147-0682)	72W 24-LED POLE MOUNTED LUMINAIRE, 4000K CCT, 1050mA DRIVER, 10800lm (NOMINAL), CRI 80, IP66 IKO8, DIE-CAST ALUMINIUM ALLOY BODY, RECTANGULAR FORWARD THROW DISTRIBUTION (R65). LUMINAIRE TO BE MOUNTED ON POLE AT 4m AFL. SUPPLY AND INSTALL A 0.3m SINGLE OUTREACH ARM PAINTED TO MATCH POLE AND TO SUIT LUMINAIRE SPIGOT SIZE
D	Eagle Lighting	Densus LED	38W LED SURFACE MOUNTED LUMINAIRE, 4000K CCT, 700mA DRIVER, 3874lm, CRI 80, IP65 IK10, ALUMINIUM ALLOY WITH POLYCARBONATE DIFFUSER. SYMMETRICAL DISTRIBUTION
E	Eagle Lighting	Flexitroffer LED	28W LED LINEAR CEILING RECESSED T-BAR LUMINAIRE, 4000K CCT, 3266lm, CRI 80, IP44 ALUMINIUM ALLOY WITH DIFFUSER. SYMMETRICAL DISTRIBUTION
G	Laser Lighting	VL26P-14W-4K-1000mm	14W/m SURFACE MOUNTED RGBW LED STRIP LUMINAIRE, CCT, 700mA DRIVER, 3874lm, CRI 80, IP66 IKO9, DIE-CAST ALUMINIUM ALLOY BODY WITH FROST LENS. SYMMETRICAL DISTRIBUTION. MAXIMUM LENGTH 1m. PROVIDE CONTINOUS CONNECTION ADAPTORS WHERE REQUIRED FOR CONTINOUS RUNS.
H	WE-EF	OLV344 LED (132-0559)	48W 24-LED WALL MOUNTED LUMINAIRE, 4000K CCT, 700mA DRIVER, 5903lm (NOMINAL), CRI 80, IP65 IKO7, DIE-CAST ALUMINIUM ALLOY BODY. RECTANGULAR, FORWARD THROW BEAM DISTRIBUTION (R65). LUMINAIRE TO BE MOUNTED ON WALLS AT 2.7m AFL. PAINT TO MATCH WALL
I	WE-EF	DAC240 LED (134-1436)	48W 24-LED LOW BAY SYMMETRIC WIDE BEAM (B) DOWNLIGHT LUMINAIRE, 4000K CCT, 700mA DRIVER, 5903lm (NOMINAL), CRI 80, IP65 IKO7, MARINE-GRADE DIE-CAST ALUMINIUM ALLOY BODY. LUMINAIRE TO BE MOUNTED ON THE UNDERSIDE OF BRIDGE STRUCTURE (APPROX 4.4m AFL) BETWEEN HEAD STOCKS.
J	WE-EF	PLS430 LED (131-9668)	36W 12-LED WALL MOUNTED LUMINAIRE, 4000K CCT, 1050mA DRIVER, 5400lm (NOMINAL), CRI 80, IP66 IKO8, MARINE GRADEDIE-CAST ALUMINIUM ALLOY BODY. ASYMMETRIC FORWARD THROW BEAM DISTRIBUTION (A60).LUMINAIRE TO BE MOUNTED ON WALL AT 3.5m AFL. MATCH PAINT TO WALL COLOUR
K	WE-EF	FLA730 (147-0690)	24W 12-LED COLUMN / WALL MOUNTED LUMINAIRE, 4000K CCT, 700mA DRIVER, 2951lm (NOMINAL), CRI 80, IP66 IKO8, DIE-CAST ALUMINIUM ALLOY BODY, ASYMMETRIC FORWARD THROW BEAM (A60). LUMINAIRE TO BE MOUNTED ON WALL AT 3m AFL. SUPPLY AND INSTALL A 0.3m SINGLE OUTREACH ARM PAINTED TO MATCH POLE AND TO SUIT LUMINAIRE SPIGOT SIZE
L	XERO LIGHTING	XTI/2.0 SERIES	SUSPENDED OR SURFACE-MOUNTED LED PROFILE, IP66, IK10



NOTE:

LUMINAIRE SHEDULE SHOWN ARE PRELIMINARY ONLY. FINAL LUMINAIRE SCHEDULE TO BE CONFIRMED AT 85% DETAILED DESIGN

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
A	28.09.20	RE-ISSUED FOR 15% INITIAL DETAILED DESIGN – INCLUSION OF ESCALATORS	C.R.	C.R.	R.H.	J.D.V.

ORIG SIZE A1 — 0 10 20 30 40 50 100mm AT ORIGINAL PLOT SIZE

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IW237200-DP400-DRG-EG0050

REFERENCES
XRPTA_A1_EVOLVE

SCALE N.T.S.

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED	C.REYES
DRAWN	C.REYES
CHECKED	R.HORN
APPROVED	J.D.VILLIERS
DATE	17.08.20

Government of Western Australia Public Transport Authority

BAYSWATER STATION

LUMINAIRE SCHEDULE
ELECTRICAL SERVICES
SHEET 01 OF 02

PTA Drawing No: 12-A-114-EG0050 Rev: A

CAD DRAWING PATHNAME: J:\IE\Projects\06_Central_West\IW237200\21_Deliverables\Drawings\Electrical\12-A-114-EG0050.dwg

GENERAL NOTES

1. THIS PACKAGE OF WORKS HAVE BEEN PRODUCED TO ASSIST IN THE PRICING AND TENDERING OF THE BAYSWATER STATION PROJECT.
2. LIGHTING DESIGNED IN ACCORDANCE WITH AS/NZS 1158 - LIGHTING FOR ROAS AND PUBLIC SPACES AND MRWA / WESTERN POWER / CITY OF BAYSWATER REQUIREMENTS.
3. LIGHTING DESIGN SUBCATEGORIES
   UNDERPASS LIGHTING : P10
   ROAD LIGHTING : V3
   PRINCIPAL SHARED PATH : P2
4. LOCATION OF EXISTING SERVICES SHOWN IS INDICATIVE ONLY AND IS NO INTENDED TO PURPORT THE FULL EXTENT AND EXACT LOCATIONS OF SERVICES.
5. CONTRACTOR TO VERIFY ALL INFORMATION OBTAINED FROM AS-BUILT DRAWINGS DURING THE CONSTRUCTION WORK.
6. REFER TO COMMUNICATION SERVICES DRAWINGS FOR LOCATION OF COMBINED CCTV / LIGHTING POLES.
7. INSTALLATION TO BE IN ACCORDANCE WITH THE MRWA / WESTERN POWER GUIDELINES, STANDARD DRAWINGS AND SPECIFICATIONS.
8. EARTHING AND BONDING OF LIGHTING CIRCUITS BENEATH OVER BRIDGES MUST COMPLY WITH THE REQUIREMENTS OF PTA DOC NO. 8880-900-677 "SPECIFICATION FOR EARTHING AND BONDING IN THE 25kV AC ELECTRIFIED AREA". A MINIMUM DISTANCE OF 2.5M MUST BE MAINTAINED BETWEEN ANY LIGHTING EQUIPMENT AND TRACTION EARTHED EQUIPMENT. ISOLATION PANELS MUST BE INSTALLED WHERE REQUIRED IN ACCORDANCE WITH PTA DOC NO. 8880-900-677.

PROJECT RISKS - LIGHTING

SCOPE DOCUMENT BST-PTAWA-PM-RPT-00013 SECTION 16.7.4 STATES THAT CATEGORY P10 SHALL BE USED FOR UNDERPASS LIGHTING. HOWEVER, WHEN APPLYING A AS1158.5 ASSESSMENT TO THIS UNDERPASS, THE RESULT IS THAT CATEGORY P10 IS INSUFFICIENT. PROVIDING LIGHTING TO MEET AS1158.5 WOULD INVOLVE SIGNIFICANT COST.

ELECTRICAL SERVICES INSTALLATIONS TO BE PROVIDED WITH EARTHING AND BONDING IN ACCORDANCE WITH THE DRAWINGS AND RELEVANT SECTIONS OF THE "TECHNICAL INSTRUCTIONS 8880-900-677 PARTS 1-4 GUIDELINES FOR EARTHING AND BONDING IN 25kV AC ELECTRIFIED AREAS".

DELIVERABLES LIST

IW222300-EE-SKT-3000 LEGEND, GENERAL NOTES AND DELIVERABLES LIST
IW222300-EE-SKT-3001 LIGHTING LAYOUT 1 OF 2
IW222300-EE-SKT-3002 OVERBRIDGE PSP LIGHTING LAYOUT
IW222300-EE-SKT-3003 UNDERPASS LIGHTING LAYOUT
IW222300-EE-SKT-3004 PSP LIGHTING LAYOUT - POLE SCHEME
IW222300-EE-SKT-3005 POWER RETICULATION LAYOUT
IW222300-EE-SKT-3006 LIGHTING LAYOUT 2 OF 2

IW222300-EE-SCH-3000 REFERENCE DOCUMENTS SCHEDULE

LIGHTING SUBCATEGORIES APPLIED

AREA DESCRIPTION	LIGHTING STANDARD APPLIED	LIGHTING LEVEL TARGET	UNIFORMITY
EXTERNAL AREAS			
Underpass	AS/NZS 1158.3.1 P10	Horizontal Avg: 35 lux Horizontal Min: 17.5 Lux Vertical Min: 17.5 lux Verticals measured at 1.5m AFFL	<10 (Max/Avg)
Principal Shared Paths	AS/NZS 1158.3.1 P2	Horizontal Avg: 3.5 lux Horizontal Min: 0.7 Lux Vertical Min: 0.7 lux Verticals measured at 1.5m AFFL	<10 (Max/Avg)
Roads	AS/NZS 1158.1.1 V3	Carriageway luminance: 0.75 cd/m2 Intersections & other locations: 7.5 lux	Overall uniformity: 0.33 Longitudinal uniformity: 0.50

Notes:
1 The above lighting subcategories where specfied in the document BST-PTAWA-PM-RPT-00013 section 16.7.4

LUMINAIRE SCHEDULE CONTINUED

TYPE	DESCRIPTION	MANUFACTURER & CATALOGUE NO.	PHOTO
A	DUAL OUTREACH DECORATIVE POLE. NON-STANDARD TYPE.		
B	WESTERN POWER - STREET LIGHT FEED ARTERIAL ROAD WOOD POLE WITHOUT CROSS ARM (REFER SCH2 - REFERENCE A)		
C	SINGLE OUTREACH DECORATIVE POLE. NON-STANDARD TYPE.		
D	NON STANDARD SHORT POLE (TO BE RETAINED OUTSIDE SCOPE)		
E	WESTERN POWER - STREET LIGHT FEED ARTERIAL ROAD WOOD POLE WITHOUT CROSS ARM (REFER SCH2 - REFERENCE B)		
AR	TYPE A POLE THAT HAS BEEN REMOVED, REFURBISED AND REINSTALLED WITH NEW LED LUMINAIRES.	WEEF ASP500 (PAINTED TO MATCH EXISTING POLES) EXISTING DECORATIVE POLE REFURBISHED AND REUSED.	
CR	TYPE C POLE THAT HAS BEEN REMOVED, REFURBISED AND REINSTALLED WITH NEW LED LUMINAIRES.	WEEF ASP500 (PAINTED TO MATCH EXISTING POLES) EXISTING DECORATIVE POLE REFURBISHED AND REUSED.	
P1	WESTERN POWER - SINGLE OUTREACH STEEL STANDARD - 10.5M (REFER SCH2 - REFERENCE C)	PHILLIPS ROAD FLAIR 160W LED WESTERN POWER STOCK CODE: HL6312	
P2	WESTERN POWER - DOUBLE OUTREACH STEEL STANDARD - 10.5M	2 OFF PHILLIPS ROAD FLAIR 160W LED WESTERN POWER STOCK CODE: HL6312	
P3	WESTERN POWER - SINGLE OUTREACH STEEL STANDARD - 6.5M	PHILLIPS ROAD FLAIR 53W LED WESTERN POWER STOCK CODE: HL6303	
W1	19W WALL MOUNTED LED, IP66, ALUMINIUM HOUSING, PATHWAY OPTIC, 2490 LUMENS, 4000K, CRI70, PAINTED BLACK, MOUNTED ON HANDRAIL STRUCTURE 3.1m AFFL.	ADVANCED LIGHTING XSPW-B-WM-2ME-2L-40K-UL_BK	
U1	WESTERN POWER - STANDARD LUMINAIRE MOUNTED TO UNDERSIDE OF BRIDGE VIA SUITABLE BRACKET	PHILLIPS ROAD FLAIR 160W LED WESTERN POWER STOCK CODE: HL6312	
A1	34W IP66 LED BATTEN, ALUMINIUM BODY, POLYCARBONATE DIFFUSER, 4150 LUMENS, 4000K, CRI80, IK10, L70@50,000HRS, DALI DIMMABLE DRIVER, 735 X 180 X 95mm, INSTALLED ON SUSPENDED UNISTRUT MOUNTED AT 2.7m	THORN FORCELED 4000 HFI L840 96242079	

REV	DATE	AMENDMENT				
A	28.09.20	RE-ISSUED FOR 15% INITIAL DETAILED DESIGN – INCLUSION OF ESCALATORS	C.R.	C.R.	R.H.	J.D.V.

ORIG SIZE A1 — 0 10 20 30 40 50 100mm — AT ORIGINAL PLOT SIZE

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IW237200-DP400-DRG-EG0051

REFERENCES
XRPTA_A1_EVOLVE

SCALE N.T.S.

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED	C.REYES
DRAWN	C.REYES
CHECKED	R.HORN
APPROVED	J.D.VILLIERS
DATE	17.08.20

Government of Western Australia
Public Transport Authority

BAYSWATER STATION
LUMINAIRE SCHEDULE
ELECTRICAL SERVICES
SHEET 02 OF 02

PTA Drawing No: 12-A-114-EG0051 Rev: A

CAD DRAWING PATHNAME: J:\IE\Projects\06_Central_West\IW237200\21_Deliverables\Drawings\Electrical\12-A-114-EG0051.dwg

NOTES

1. ALL UNDERGROUND CABLE RETICULATION SHALL BE LAID IN ACCORDANCE WITH SWTC REQUIREMENT, PTA STANDARD SPECIFICATIONS, AS3000 AND S009.

2. FINAL LOCATION OF ELECTRICAL ENERGY BUILDING (WESTERN POWER SOLE-USED SUBSTATION & ISOLATION TRANSFORMER TO BE CONFIRMED.

EXISTING WESTERN POWER POLE & POLE MOUNTED TRANSFORMER

EXISTING OVERHEAD WESTERN POWER HV LINE

EXISTING WESTERN POWER POLE

WESTERN POWER EARTHING

PTA TRACTION EARTHING

PTA TRACTION EARTHING

STATITION ESSENTIAL SWITCHBOARD

1.5m (W) x 1m (DEEP) TRENCH

STATION NON-ESSENTIAL MAIN SWITCHBOARD

ISOLATION TRANSFORMER ROOM (NOTE 2)

2.5m EARTH EXCLUSION ZONE EXTENDS VERTICALLY

NEW PROPOSED ROAD CROSSING (BY WESTERN POWER)

PROPOSED NEW WESTERN SOLE USE 1000kVA SUBSTATION (NOTE 2)

4P150 (FROM ISOLATION TRANSFORMER)
4P150 (FROM GENERATOR INPUT PANEL)

4P150 (FROM ISOLATION TRANSFORMER)
4P150 (FROM GENERATOR INPUT PANEL)

SITE MAIN SWITCHBOARD

INDICATIVE LOCATION PAD-MOUNTED ESSENTIAL SUPPLY TRANSFORMER (BY OTHERS)

COMMS CONDUITS (QTY, SIZE & ROUTING TO BE CONFIRMED BY COMMS CONSULTANT)

2.5m EARTH EXCLUSION ZONE EXTENDS VERTICALLY

1P150 (ESSENTIAL SUPPLY TRANSFORMER CONDUIT)

CODE STREET

RAILWAY PARADE

WHATLEY CRES

HAMILTON STREET

PITS
MAJOR, 1200MM DIA CONCRETE LINER 880-700-640 CLAUSE 3.4.1
INTERMEDIATE ACCESS PIT 900MM CONCRETE LINER 880-700-640 CLAUSE 3.4.2
MINOR ACCESS PIT 600MM CONCRETE LINER 880-700-640 CLAUSE 3.4.3

3.4.1. MAJOR ACCESS PITS
MAJOR ACCESS PITS SHALL COMPRISE 1200 MM DIAMETER, ROUND PREFABRICATED CONCRETE LINERS. THE BASE OF THE PIT SHALL BE CONCRETE WITH A DRAIN HOLE IN THE CENTRE.
STANDARD MAJOR ACCESS PITS SHALL NOT EXCEED 1200 MM (ONE LINER) DEEP. IN SITUATIONS WHERE DEEPER PITS ARE REQUIRED, E.G. ON OR NEAR PLATFORMS AND TO ACHIEVE REQUIRED DEPTHS FOR UNDER-TRACK CROSSINGS PRIOR PTA APPROVAL MUST BE OBTAINED PRIOR TO INSTALLATION.

3.4.2 INTERMEDIATE ACCESS PITS
INTERMEDIATE ACCESS PITS SHALL COMPRISE 900 MM DIAMETER ROUND PREFABRICATED CONCRETE LINERS SIMILAR IN DESIGN TO THE MAJOR ACCESS PITS, OR SHALL BE CONSTRUCTED ON SITE FROM BRICK OR CONCRETE WITH A SIMILAR INTERNAL DIMENSION. THE BASE OF THE PIT SHALL BE CONCRETE WITH A DRAIN HOLE IN THE CENTRE.
INTERMEDIATE ACCESS PITS SHALL NOT EXCEED 1200 MM IN DEPTH. IF A DEEPER PIT IS REQUIRED A MAJOR ACCESS SHALL BE INSTALLED IN ACCORDANCE WITH THE PREVIOUS SECTION.

3.4.3. MINOR ACCESS PITS
MINOR ACCESS PITS MAY, WITH PTA APPROVAL, BE A SMALLER SIZE APPROPRIATE TO THEIR FUNCTION AND LOCATION, E.G. A 600 MM DIAMETER ROUND CONCRETE LINER, OR ONE OF SEVERAL COMMERCIALLY AVAILABLE RECTANGULAR PITS IN FIBRE-CEMENT, FIBREGLASS OR PLASTIC.
MINOR ACCESS PITS SHALL NOT EXCEED 1200 MM IN DEPTH AND SHALL NOT BE LESS THAN 600 MM IN DEPTH.

PIT DEPTH AS PER THE PTA SPECIFICATION 8880-700-640

ELECTRICAL LEGEND

C — ELECTRICAL OR COMMUNICATIONS PIT TO PTA STANDARDS.
E — MAJ = MAJOR PIT
INT = INTERMEDIATE PIT
ALL PITS ARE MINOR PITS UNLESS OTHERWISE INDICATED.
CLASS B MINIMUM.

C — UNDERGROUND COMMUNICATIONS CONDUIT (SIZE AND QTY AS SHOWN)

P — UNDERGROUND POWER CONDUIT (SIZE AND QTY AS SHOWN)

NOTES
1. ALL CONDUITS 1P50 UNLESS OTHERWISE SHOWN.
2. EEZ POSITION TO BE CONFIRMED (BY OTHERS).
3. LAND BOUNDARIES TO BE CONFIRMED (BY OTHERS).

ELECTRICAL SERVICES INSTALLATIONS TO BE PROVIDED WITH EARTHING AND BONDING IN ACCORDANCE WITH THE DRAWINGS AND RELEVANT SECTIONS OF THE "TECHNICAL INSTRUCTIONS 8880-900-677 PARTS 1-4 GUIDELINES FOR EARTHING AND BONDING IN 25kV AC ELECTRIFIED AREAS".

N

SITE PLAN
SCALE 1:500

REV	DATE	AMENDMENT	C.R.	DRN	CHK	APP
A	28.09.20	RE-ISSUED FOR 15% INITIAL DETAILED DESIGN – INCLUSION OF ESCALATORS	C.R.	DRN	R.H.	J.D.V.

ORIG SIZE A1 — 0 10 20 30 40 50 100mm — AT ORIGINAL PLOT SIZE

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IW237200-DP400-DRG-EG0052

REFERENCES
8584_landgate_scdb
RAIL_MEL_OPTIMUM_GEOM
civil_roads
HSL_CONCOURSE_PLAN
STRUCTURE_PIERS_ALT_OPT
XRPTA_A1_EVOLVE

SCALE 1 : 500

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED	C.REYES
DRAWN	C.REYES
CHECKED	R.HORN
APPROVED	J.D.VILLIERS
DATE	17.08.20

Government of Western Australia
Public Transport Authority

BAYSWATER STATION
CAR PARK SITE PLAN
ELECTRICAL & COMMUNICATIONS SERVICES
SHEET 01 OF 02

PTA Drawing No: 12-A-114-EG0052 | Rev: A

CAD DRAWING PATHNAME: J:\EVProjects\06_Central_West\IW237200\21_Deliverables\Drawings\Electrical\12-A-114-EG0052.dwg

NOTES:

1. PShP LIGHTING AND STREET LIGHTING LAYOUT SHOWN ARE INDICATIVE ONLY. FINAL LOCATION, QUANTITY & TYPE OF LUMINAIRES TO BE CONFIMRED AT 85% DETAILED DESIGN.

2. ALL LIGHTING IN AREAS MANAGED BY PTA SHALL BE SUPPLIED FROM PTA DISTRIBUTION BOARD.

3. ALL LIGHTING IN AREAS UNDER CITY OF BAYSWATER SHALL UNMETERED SHALL BE SUPPLIED FROM WESTERN POWER SERVICE PILLAR.

4. ALL LIGHTING POLES MANAGED BY PTA SHALL BE BREAK-BACK TYPE IN ACCORDANCE WITH PTA SPECIFICATIONS 8803-900-003.

5. REFER DRAWING 12-A-114-EG0051 FOR PROPOSED STREET LIGHTING LUMINAIRE SCHEDULE.

NEW SINGLE OUTREACH LED LUMINAIRE

NEW DOUBLE OUTREACH LED LUMINAIRE

EXISTING SINGLE OUTREACH LUMINAIRE, TO BE RETAINED

EXISTING DOUBLE OUTREACH LUMINAIRE, TO BE RETAINED

LIMIT OF WORKS

REFER DRAWING FOR LEAKE STREET UNDERPASS LIGHTING

RELOCATE AS SHOWN

REFER DRAWING FOR OVER BRIDGE LIGHTING LAYOUT

MILLS AVE

WHATLEY CRES

ROBERTS ST

LEAKE ST

VERDUN ST

RAILWAY PDE

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
A	28.09.20	RE-ISSUED FOR 15% INITIAL DETAILED DESIGN - INCLUSION OF ESCALATORS	C.R.	C.R.	R.H.	J.D.V.

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

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evolve bayswater

connecting people + places

IW237200-DP400-DRG-EG0056

REFERENCES

XR_R_004 DESIGN RAIL ALIGNMENT ULTIMATE
XR_COMMON_0003_P18097-X-CADASTRAL
XR_COMMON_0001_858401 AERIAL PHOTO
XR_MCR_001 PROPOSED COMMS
XR_C_0001_CAD DESIGN
XR_INCOMING_Evolve_X-bridge des
XR_INCOMING_Evolve_X-SER-DESIGN
XR_C_0007_FENCING-RWALLS-NWALLS
XR_R_005 DESIGN RAIL EARTHWORKS
XR_COMMON_0005_ROAD NAMES
XR_COMMON_0004_P18097-X-SURV
XRPTA_A1_EVOLVE
XR12C-CARPARK_20200921

SCALE 1 : 1000

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED	C.REYES
DRAWN	C.REYES
CHECKED	R.HORN
APPROVED	J.D.VILLIERS
DATE	17.08.20

Government of Western Australia Public Transport Authority

BAYSWATER STATION

LOCAL GOVERNMENT EXTERNAL LIGHTING

ELECTRICAL SERVICES - LIGHTING LAYOUT

SHEET 01 OF 02

PTA Drawing No: 12-A-114-EG0056 Rev: A

CAD DRAWING PATHNAME I:\IE\Projects\06_Central_West\IW237200\21 Deliverables\Drawings\Electrical\12-A-114-EG0056.dwg

NOTES:

1. PShP LIGHTING AND STREET LIGHTING LAYOUT SHOWN ARE INDICATIVE ONLY. FINAL LOCATION, QUANTITY & TYPE OF LUMINAIRES TO BE CONFIMRED AT 85% DETAILED DESIGN.

2. ALL LIGHTING IN AREAS MANAGED BY PTA SHALL BE SUPPLIED FROM PTA DISTRIBUTION BOARD.

3. ALL LIGHTING IN AREAS UNDER CITY OF BAYSWATER SHALL UNMETERED SHALL BE SUPPLIED FROM WESTERN POWER SERVICE PILLAR.

4. ALL LIGHTING POLES MANAGED BY PTA SHALL BE BREAK-BACK TYPE IN ACCORDANCE WITH PTA SPECIFICATIONS 8803-900-003.

5. REFER DRAWING 12-A-114-EG0051 FOR PROPOSED STREET LIGHTING LUMINAIRE SCHEDULE.

NEW SINGLE OUTREACH LED LUMINAIRE

NEW DOUBLE OUTREACH LED LUMINAIRE

EXISTING SINGLE OUTREACH LUMINAIRE, TO BE RETAINED

EXISTING DOUBLE OUTREACH LUMINAIRE, TO BE RETAINED



N

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
A	28.09.20	RE-ISSUED FOR 15% INITIAL DETAILED DESIGN – INCLUSION OF ESCALATORS	C.R.	C.R.	R.H.	J.D.V.

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

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connecting people + places

IW237200-DP400-DRG-EG0057

REFERENCES

XR_R_004 DESIGN RAIL ALIGNMENT ULTIMATE
XR_COMMON_0003_P18097-X-CADASTRAL
XR_COMMON_0001_858401 AERIAL PHOTO
XR_MCR_001 PROPOSED COMMS
XR_C_0001_CAD DESIGN
XR_INCOMING_Evolve_X-bridge des
XR_INCOMING_Evolve_X-SER-DESIGN
XR_C_0007_FENCING-RWALLS-NWALLS
XR_R_005 DESIGN RAIL EARTHWORKS
XR_COMMON_0005_ROAD NAMES
XR_COMMON_0004_P18097-X-SURV
XRPTA_A1_EVOLVE
XR12C-CARPARK_20200921

SCALE 1 : 1000

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED	C.REYES
DRAWN	C.REYES
CHECKED	R.HORN
APPROVED	J.D.VILLIERS
DATE	17.08.20

Government of Western Australia
Public Transport Authority

BAYSWATER STATION

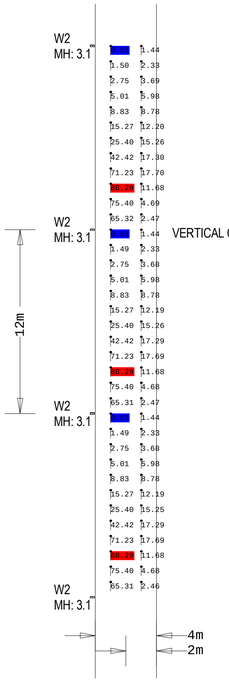
LOCAL GOVERNMENT EXTERNAL LIGHTING
ELECTRICAL SERVICES - LIGHTING LAYOUT
SHEET 02 OF 02

PTA Drawing No: 12-A-114-EG0057 Rev: A

CAD DRAWING PATHNAME: J:\IE\Projects\06_Central_West\IW237200\21_Deliverables\Drawings\Electrical\12-A-114-EG0057.dwg

NOTE:

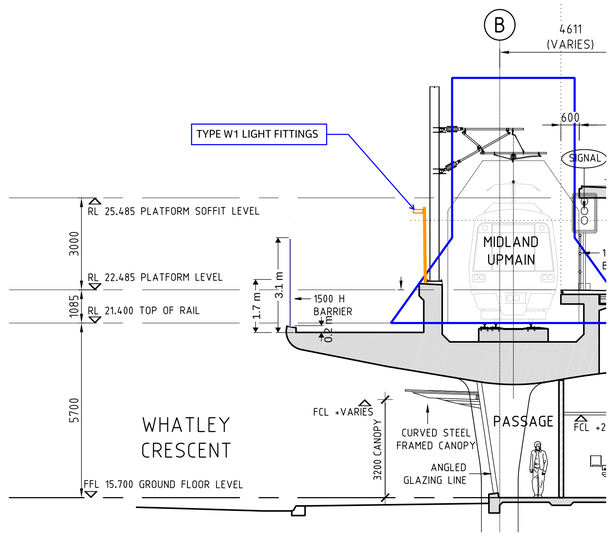
CALCULATION SHOWN ARE PRELIMINARY ONLY. DETAILED CALCULATION TO BE UNDERTAKEN AT 85% DETAILED DESIGN.



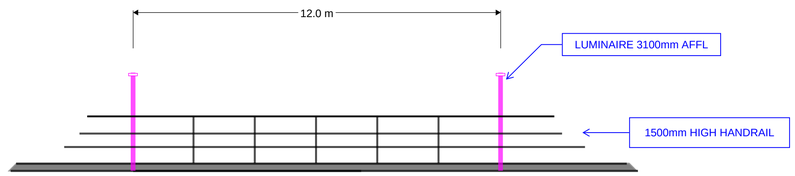
VERTICAL CALCULATION POINTS SHOWN

Calculation Summary									
Label	CalcType	Units	Avg	Max	Min	Min. Required.	Max/Avg	Uniformity Required	Comply
H_SUP	Illuminance	Lux	26.36	45.70	18.38	0.7	1.73	<10	YES
V_SUP	Illuminance	Lux	21.07	88.29	0.81	0.7	4.19	<10	YES

PSP TYPICAL LIGHTING LAYOUT & CALCULATION
SCALE 1:200



PSP LIGHTING LIGHTING SECTION
SCALE 1:100



PSP LIGHTING LIGHTING SECTION
SCALE 1:100

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
A	28.09.20	RE-ISSUED FOR 15% INITIAL DETAILED DESIGN - INCLUSION OF ESCALATORS	C.R.	C.R.	R.H.	J.D.V.

ORIG SIZE A1 — 0 10 20 30 40 50 100mm — AT ORIGINAL PLOT SIZE

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evolve bayswater
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IW237200-DP400-DRG-EG0058

REFERENCES
XRPTA_A1_EVOLVE

SCALE: AS SHOWN

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED C.REYES
DRAWN C.REYES
CHECKED R.HORN
APPROVED J.D.VILLIERS
DATE 17.08.20

Government of Western Australia Public Transport Authority

BAYSWATER STATION

LOCAL GOVERNMENT EXTERNAL LIGHTING
ELECTRICAL SERVICES - PSB BRIDGE CALCULATION
SHEET 01 OF 01

PTA Drawing No: 12-A-114-EG0058 Rev: A

CAD DRAWING PATHNAME: J:\IE\Projects\06_Central_West\IW237200\21_Deliverables\Drawings\Electrical\12-A-114-EG0058.dwg

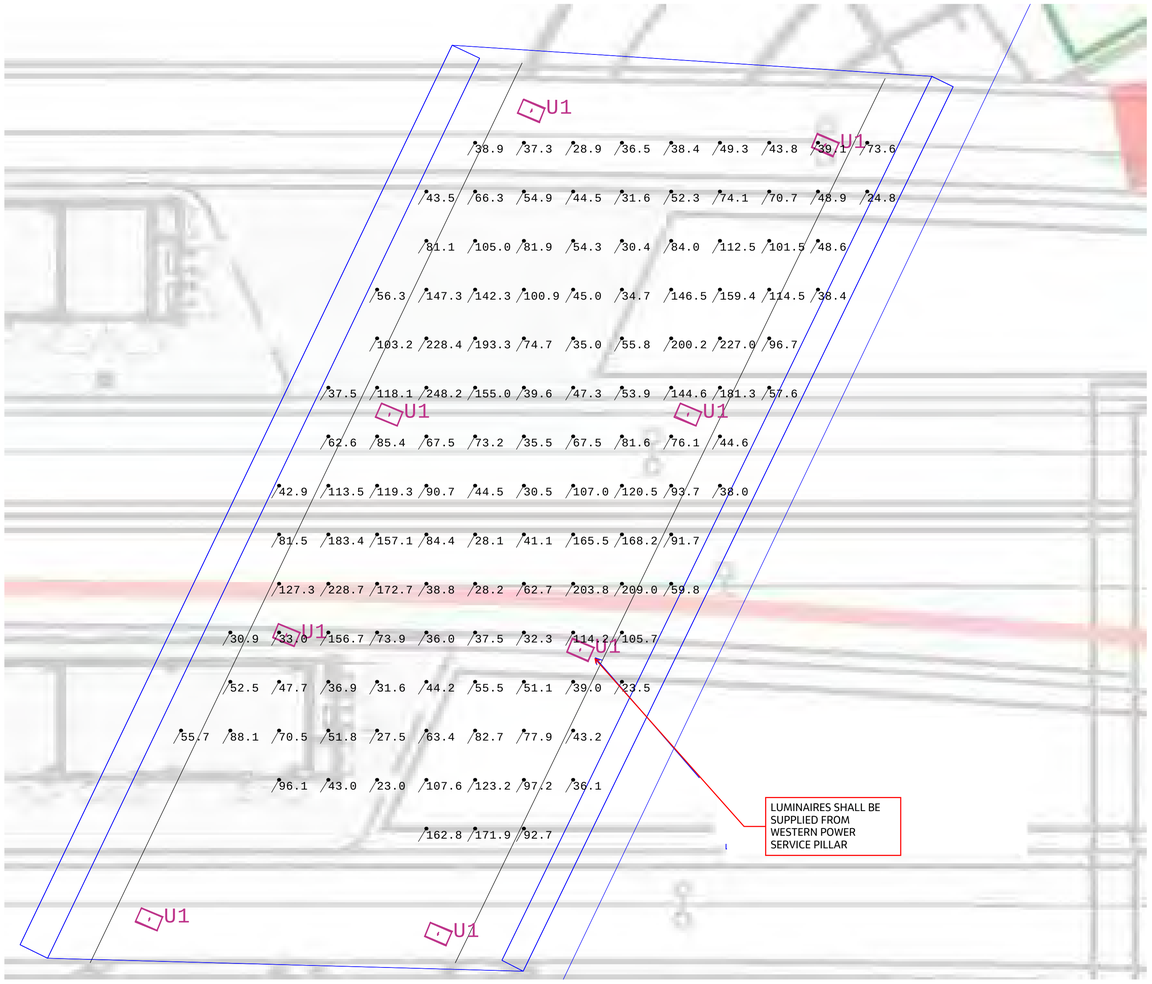
DRAWING NOTES

1. EARTHING AND BONDING OF LIGHTING CIRCUITS BENEATH OVER BRIDGES MUST COMPLY WITH THE REQUIREMENTS OF PTA DOC NO. 8880-900-677 "SPECIFICATION FOR EARTHING AND BONDING IN THE 25kV AC ELECTRIFIED AREA". A MINIMUM DISTANCE OF 2.5M MUST BE MAINTAINED BETWEEN ANY LIGHTING EQUIPMENT AND TRACTION EARTHED EQUIPMENT.

2. AN IDENTICAL LIGHTING APPROACH CAN BE TAKEN TO LIGHTING THE WESTERN UNDERPASS

LUMINAIRE SCHEDULE

U1	WESTERN POWER - STANDARD LUMINAIRE MOUNTED TO UNDERSIDE OF BRIDGE VIA SUITABLE BRACKET	PHILLIPS ROAD FLAIR 160W LED WESTERN POWER STOCK CODE: HL6312	



UNDERPASS LIGHTING TYPICAL LAYOUT & CALCULATION

SCALE 1:100
NOTE VERTICAL CALCULATION POINTS ARE SHOWN ABOVE

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Min/Avg	Min/Max
Underpass	Illuminance	Lux	138.95	280.6	60.7	0.44	0.22
V_Underpass	Illuminance	Lux	83.38	248.2	23.0	0.28	0.09

UNDERPASS LIGHTING CALCULATION RESULTS

NOTE:

CALCULATION SHOWN ARE PRELIMINARY ONLY. DETAILED CALCULATION TO BE UNDERTAKEN AT 85% DETAILED DESIGN.

REV	DATE	AMENDMENT				
A	28.09.20	RE-ISSUED FOR 15% INITIAL DETAILED DESIGN - INCLUSION OF ESCALATORS	C.R.	C.R.	R.H.	J.D.V.

ORIG SIZE A1 — 0 10 20 30 40 50 100mm AT ORIGINAL PLOT SIZE

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CAD DRAWING PATHNAME J:\IE\Projects\06_Central_West\IW237200\21_Deliverables\Drawings\Electrical\12-A-114-EG0059.dwg

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connecting people + places

IW237200-DP400-DRG-EG0059

REFERENCES
XRPTA_A1_EVOLVE

SCALE 1 : 100

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED	C.REYES
DRAWN	C.REYES
CHECKED	R.HORN
APPROVED	J.D.VILLIERS
DATE	17.08.20

Government of Western Australia Public Transport Authority

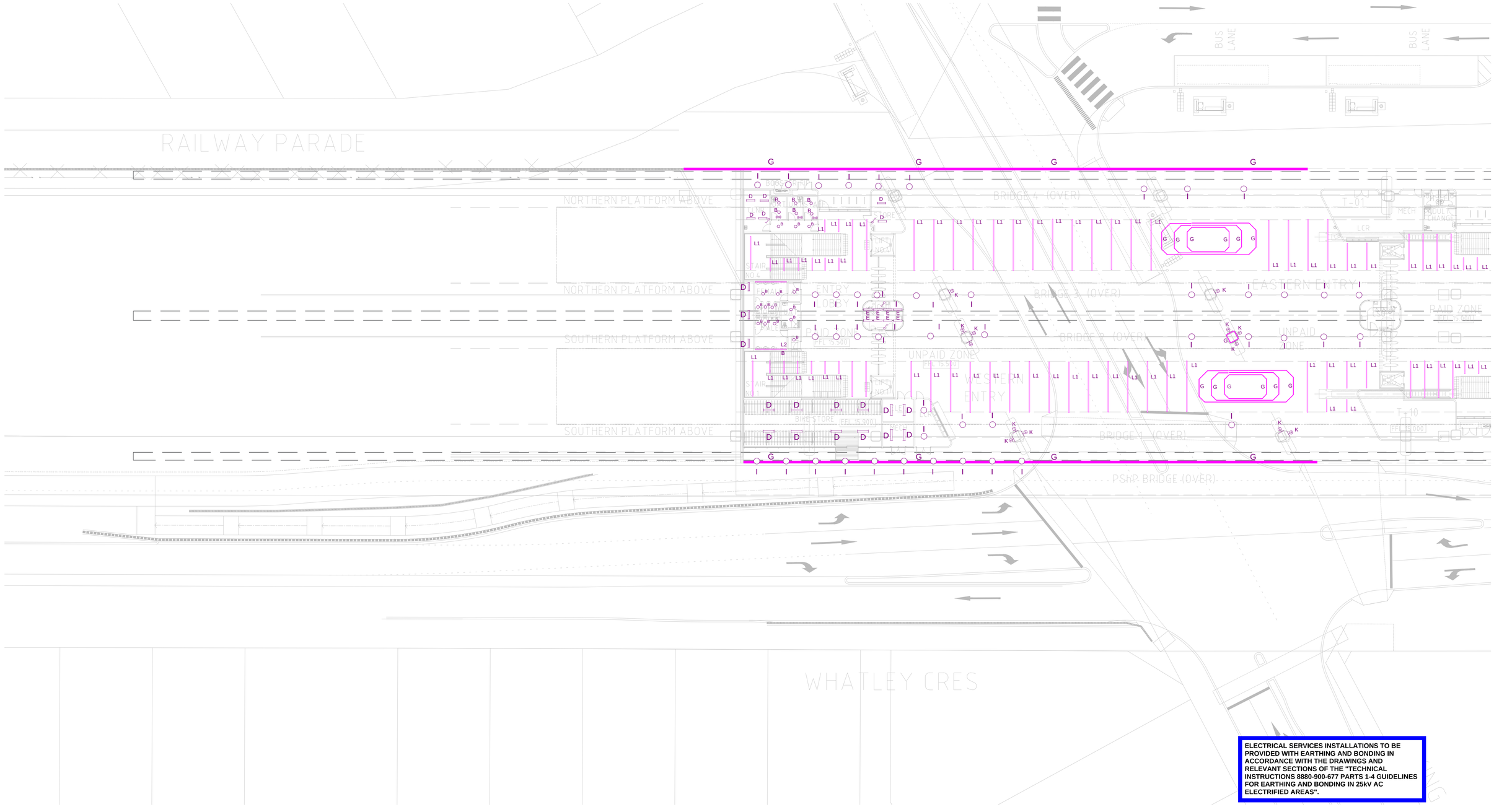
BAYSWATER STATION
LOCAL GOVERNMENT EXTERNAL LIGHTING
ELECTRICAL SERVICES - UNDERPASS CALCULATION
SHEET 01 OF 01

PTA Drawing No: 12-A-114-EG0059 Rev: A

NOTE:

QUANTITY & TYPE OF LUMINAIRES SHOWN ARE INDICATIVE ONLY. FINAL QUANTITY & SELECTION OF LUMINAIRES TO BE CONFIRMED AT 85% DETAILED DESIGN.

REFER DRAWING 12-A-114-EG0050 FOR DESCRIPTION OF EACH LUMINAIRE TYPE.



ELECTRICAL SERVICES INSTALLATIONS TO BE PROVIDED WITH EARTHING AND BONDING IN ACCORDANCE WITH THE DRAWINGS AND RELEVANT SECTIONS OF THE "TECHNICAL INSTRUCTIONS 8880-900-677 PARTS 1-4 GUIDELINES FOR EARTHING AND BONDING IN 25kV AC ELECTRIFIED AREAS".

N

SITE PLAN
SCALE 1:250

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
A	28.09.20	RE-ISSUED FOR 15% INITIAL DETAILED DESIGN – INCLUSION OF ESCALATORS	C.R.	C.R.	R.H.	J.D.V.

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

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CAD DRAWING PATHNAME: J:\IE\Projects\06_Central_West\IW237200\21_Deliverables\Drawings\Electrical\12-A-114-EG0091.dwn

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IW237200-DP400-DRG-EG0091

REFERENCES
8584_landgate_scdb
RAIL_MEL_OPTIMUM_GEOM
civil_roads
HSL_CONCOURSE_PLAN
STRUCTURE_PIERS_ALT_OPT
HSL_GRID
XRPTA_A1_EVOLVE

SCALE 1 : 250

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED	C.REYES
DRAWN	C.REYES
CHECKED	R.HORN
APPROVED	J.D.VILLIERS
DATE	17.08.20

Government of Western Australia
Public Transport Authority

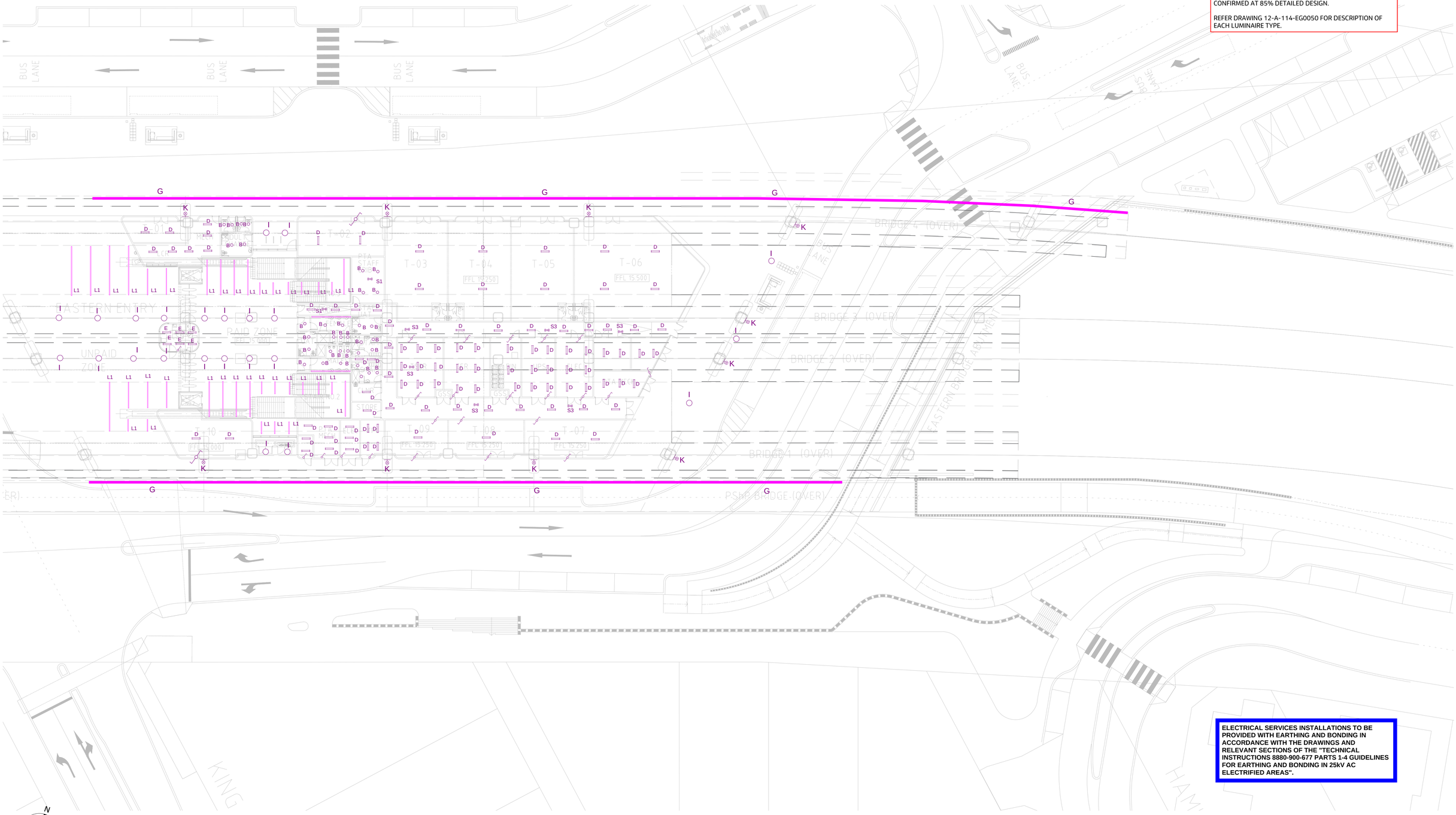
BAYSWATER STATION
WESTERN ENTRY BUILDING CONCOURSE
ELECTRICAL SERVICES - LIGHTING
SHEET 01 OF 01

PTA Drawing No: 12-A-114-EG0091 Rev: A

NOTE:

QUANTITY & TYPE OF LUMINAIRES SHOWN ARE INDICATIVE ONLY. FINAL QUANTITY & SELECTION OF LUMINAIRES TO BE CONFIRMED AT 85% DETAILED DESIGN.

REFER DRAWING 12-A-114-EG0050 FOR DESCRIPTION OF EACH LUMINAIRE TYPE.



SITE PLAN
SCALE 1:250

ELECTRICAL SERVICES INSTALLATIONS TO BE PROVIDED WITH EARTHING AND BONDING IN ACCORDANCE WITH THE DRAWINGS AND RELEVANT SECTIONS OF THE "TECHNICAL INSTRUCTIONS 8880-900-677 PARTS 1-4 GUIDELINES FOR EARTHING AND BONDING IN 25kV AC ELECTRIFIED AREAS".

REV	DATE	AMENDMENT				
A	28.09.20	RE-ISSUED FOR 15% INITIAL DETAILED DESIGN – INCLUSION OF ESCALATORS	C.R.	C.R.	R.H.	J.D.V.
			DSN	DRN	CHK	APP

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

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IW237200-DP400-DRG-EG0093

REFERENCES

8584 landgate scdb
RAIL_MEL_OPTIMUM_GEOM
civil_roads
8584_01 BAYSWATER FEATURE 2D
HSL_CONCOURSE_PLAN
STRUCTURE_PIERS_ALT_OPT
XRPTA_A1_EVOLVE

SCALE 1 : 250

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED	C.REYES
DRAWN	C.REYES
CHECKED	R.HORN
APPROVED	J.D.VILLIERS
DATE	17.08.20

Government of Western Australia
Public Transport Authority

BAYSWATER STATION
EASTERN ENTRY BUILDING CONCOURSE
ELECTRICAL SERVICES - LIGHTING
SHEET 01 OF 01

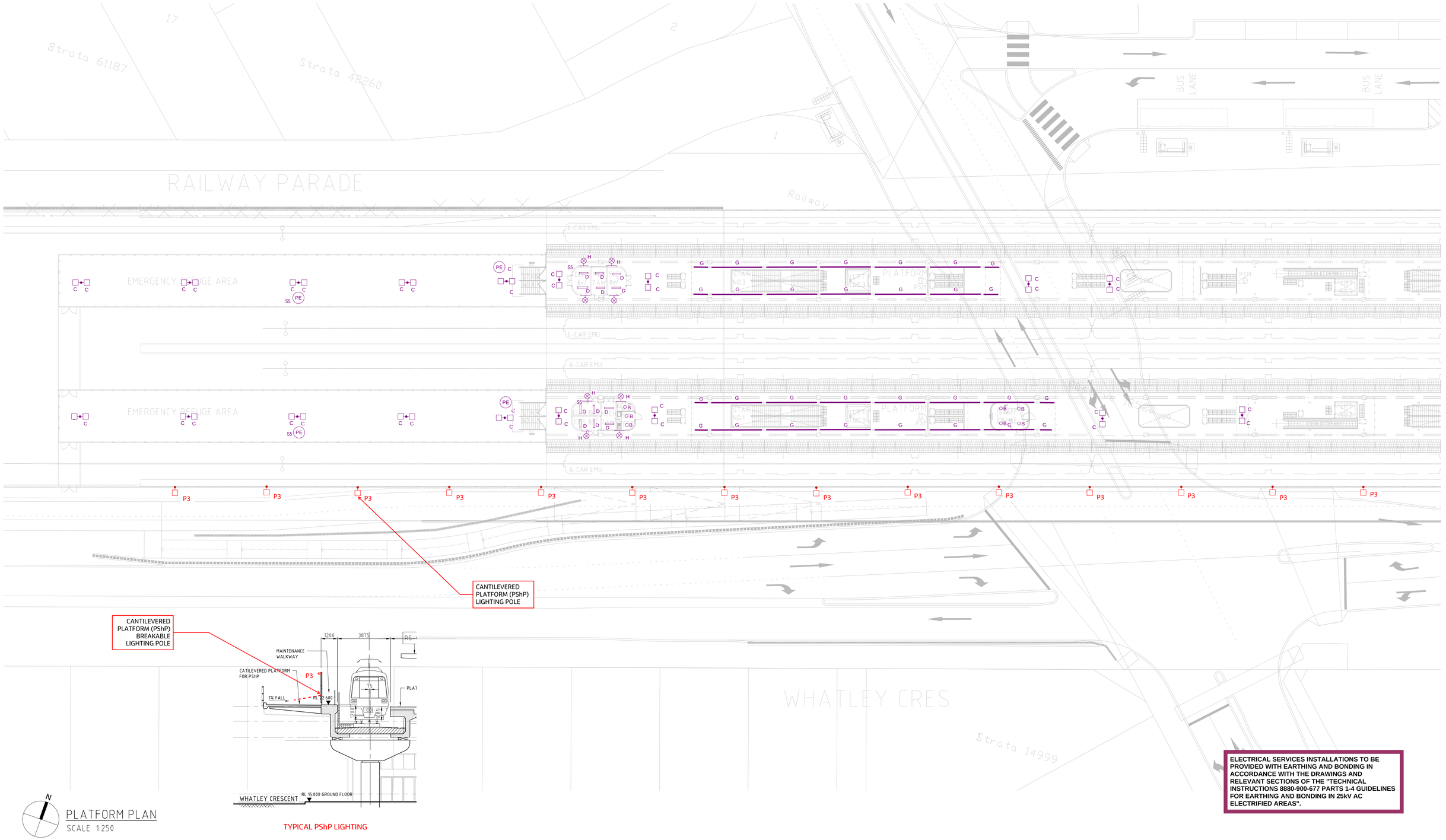
PTA Drawing No: 12-A-114-EG0093 Rev: A

CAD DRAWING PATHNAME: I:\IE\Projects\06_Central_West\IW237200\21_Deliverables\Drawings\Electrical\12-A-114-EG0093.dwg

NOTE:

QUANTITY & TYPE OF LUMINAIRES SHOWN ARE INDICATIVE ONLY. FINAL QUANTITY & SELECTION OF LUMINAIRES TO BE CONFIRMED AT 85% DETAILED DESIGN.

REFER DRAWING 12-A-114-EG0050 FOR DESCRIPTION OF EACH LUMINAIRE TYPE.



PLATFORM PLAN
SCALE 1:250

TYPICAL PShP LIGHTING

ELECTRICAL SERVICES INSTALLATIONS TO BE PROVIDED WITH EARTHING AND BONDING IN ACCORDANCE WITH THE DRAWINGS AND RELEVANT SECTIONS OF THE "TECHNICAL INSTRUCTIONS 8880-900-677 PARTS 1-4 GUIDELINES FOR EARTHING AND BONDING IN 25kV AC ELECTRIFIED AREAS".

FOR CONTINUATION REFER TO IW237200-EE-SKT-4004

REV	DATE	AMENDMENT	C.R. DSN	C.R. DRN	R.H. CHK	J.D.V. APP
A	28.09.20	RE-ISSUED FOR 15% INITIAL DETAILED DESIGN – INCLUSION OF ESCALATORS				

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

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CAD DRAWING PATHNAME J:\IE\Projects\06_Central_West\IW237200\21 Deliverables\Drawings\Electrical\12-A-114-EG0095.dwn

evolve bayswater
connecting people + places

IW237200-DP400-DRG-EG0095

REFERENCES
HSL_PLATFORM_PLAN
8584 landgate scdb
858401 BAYSWATER FEATURE 2D
RAIL_MEL_OPTIMUM_GEOM
civil_roads
XRPTA_A1_EVOLVE

SCALE 1 : 250

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED C.REYES
DRAWN C.REYES
CHECKED R.HORN
APPROVED J.D.VILLIERS
DATE 17.08.20

Government of Western Australia Public Transport Authority

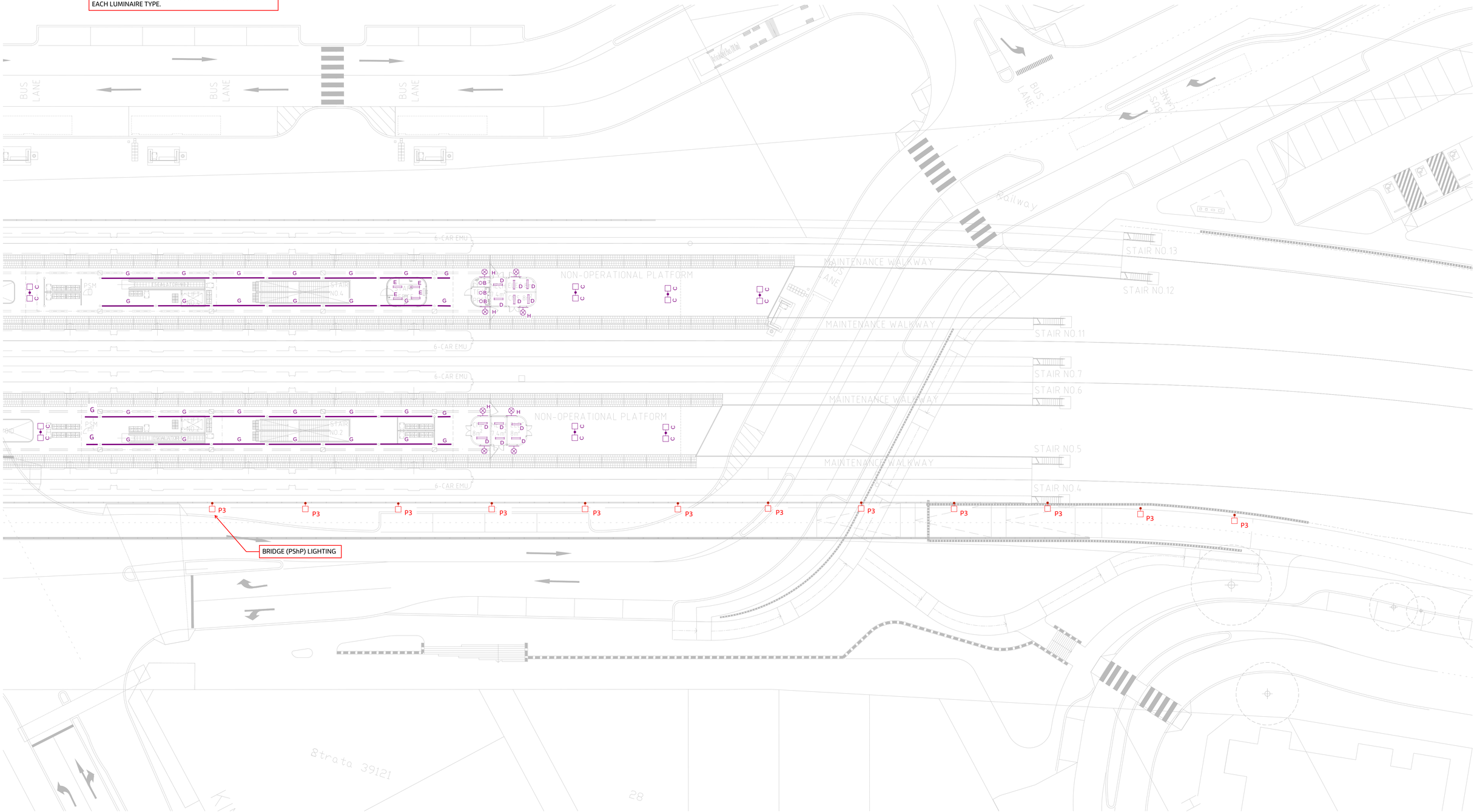
BAYSWATER STATION
WESTERN PLATFORMS & EMERGENCY REFUGE AREA
ELECTRICAL SERVICES - LIGHTING
SHEET 01 OF 02

PTA Drawing No: 12-A-114-EG0095 Rev: A

NOTE:

QUANTITY & TYPE OF LUMINAIRES SHOWN ARE INDICATIVE ONLY. FINAL QUANTITY & SELECTION OF LUMINAIRES TO BE CONFIRMED AT 85% DETAILED DESIGN.

REFER DRAWING 12-A-114-EG0050 FOR DESCRIPTION OF EACH LUMINAIRE TYPE.



N

PLATFORM PLAN
SCALE 1:250

REV	DATE	AMENDMENT				
A	28.09.20	RE-ISSUED FOR 15% INITIAL DETAILED DESIGN - INCLUSION OF ESCALATORS	C.R.	C.R.	R.H.	J.D.V.

ORIG SIZE A1 — 0 10 20 30 40 50 100mm — AT ORIGINAL PLOT SIZE

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IW237200-DP400-DRG-EG0097

REFERENCES
HSL_PLATFORM_PLAN
RSB4_landgate.sdb
RAIL_MEL_OPTIMUM_GEOM
civil_roads
XRPTA_A1_EVOLVE

SCALE 1 : 250

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED C.REYES
DRAWN C.REYES
CHECKED R.HORN
APPROVED J.D.VILLIERS
DATE 17.08.20

Government of Western Australia
Public Transport Authority

BAYSWATER STATION
EASTERN PLATFORMS & BRIDGE ABUTMENT
ELECTRICAL SERVICES - LIGHTING
SHEET 01 OF 02

PTA Drawing No: 12-A-114-EG0097 Rev: A

CAD DRAWING PATHNAME: J:\IE\Projects\06_Central_West\IW237200\21_Deliverables\Drawings\Electrical\12-A-114-EG0097.dwg

NOTE:

QUANTITY & TYPE OF LUMINAIRES SHOWN ARE INDICATIVE ONLY. FINAL QUANTITY & SELECTION OF LUMINAIRES TO BE CONFIRMED AT 85% DETAILED DESIGN.

REFER DRAWING 12-A-114-EG0050 FOR DESCRIPTION OF EACH LUMINAIRE TYPE.



ELECTRICAL SERVICES INSTALLATIONS TO BE PROVIDED WITH EARTHING AND BONDING IN ACCORDANCE WITH THE DRAWINGS AND RELEVANT SECTIONS OF THE "TECHNICAL INSTRUCTIONS 8880-900-677 PARTS 1-4 GUIDELINES FOR EARTHING AND BONDING IN 25kV AC ELECTRIFIED AREAS".

N

SITE PLAN
SCALE 1:250

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
A	28.09.20	RE-ISSUED FOR 15% INITIAL DETAILED DESIGN - INCLUSION OF ESCALATORS	C.R.	C.R.	R.H.	J.D.V.

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

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evolve bayswater
connecting people + places

IW237200-DP400-DRG-EG0099

REFERENCES
8584 landgate scdb
RAIL_MEL_OPTIMUM_GEOM
civil_roads
HSL_CONCOURSE_PLAN
STRUCTURE_PIERS_ALT_OPT
HSL_GRID
XRPTA_A1_EVOLVE

SCALE 1 : 250

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED C.REYES
DRAWN C.REYES
CHECKED R.HORN
APPROVED J.D.VILLIERS
DATE 17.08.20

Government of Western Australia Public Transport Authority

BAYSWATER STATION
WESTERN ENTRY BUILDING CONCOURSE
ELECTRICAL SERVICES - EMERGENCY LIGHTING
SHEET 01 OF 01

PTA Drawing No: 12-A-114-EG0099 Rev: A

NOTE:

QUANTITY & TYPE OF LUMINAIRES SHOWN ARE INDICATIVE ONLY. FINAL QUANTITY & SELECTION OF LUMINAIRES TO BE CONFIRMED AT 85% DETAILED DESIGN.

REFER DRAWING 12-A-114-EG0050 FOR DESCRIPTION OF EACH LUMINAIRE TYPE.



ELECTRICAL SERVICES INSTALLATIONS TO BE PROVIDED WITH EARTHING AND BONDING IN ACCORDANCE WITH THE DRAWINGS AND RELEVANT SECTIONS OF THE "TECHNICAL INSTRUCTIONS 8880-900-677 PARTS 1-4 GUIDELINES FOR EARTHING AND BONDING IN 25kV AC ELECTRIFIED AREAS".

N

SITE PLAN
SCALE 1:250

REV	DATE	AMENDMENT	C.R.	C.R.	R.H.	J.D.V.
A	28.09.20	RE-ISSUED FOR 15% INITIAL DETAILED DESIGN - INCLUSION OF ESCALATORS	DSN	DRN	CHK	APP

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

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CAD DRAWING PATHNAME: J:\IE\Projects\06_Central_West\IW237200\21 Deliverables\Drawings\Electrical\12-A-114-EG0101.dwg

evolve bayswater
connecting people + places

IW237200-DP400-DRG-EG0101

REFERENCES

8584 landgate scdb
RAIL_MEL_OPTIMUM_GEOM
civil_roads
858401 BAYSWATER FEATURE 2D_NO_RASTERS_ISOCP2_NO_LEVELS
HSL_CONCOURSE_PLAN
STRUCTURE_PIERS_ALT_OPT
HSL_GRID
XRPTA_A1_EVOLVE

SCALE 1 : 250

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED	C.REYES
DRAWN	C.REYES
CHECKED	R.HORN
APPROVED	J.D.VILLIERS
DATE	17.08.20

Government of Western Australia
Public Transport Authority

BAYSWATER STATION

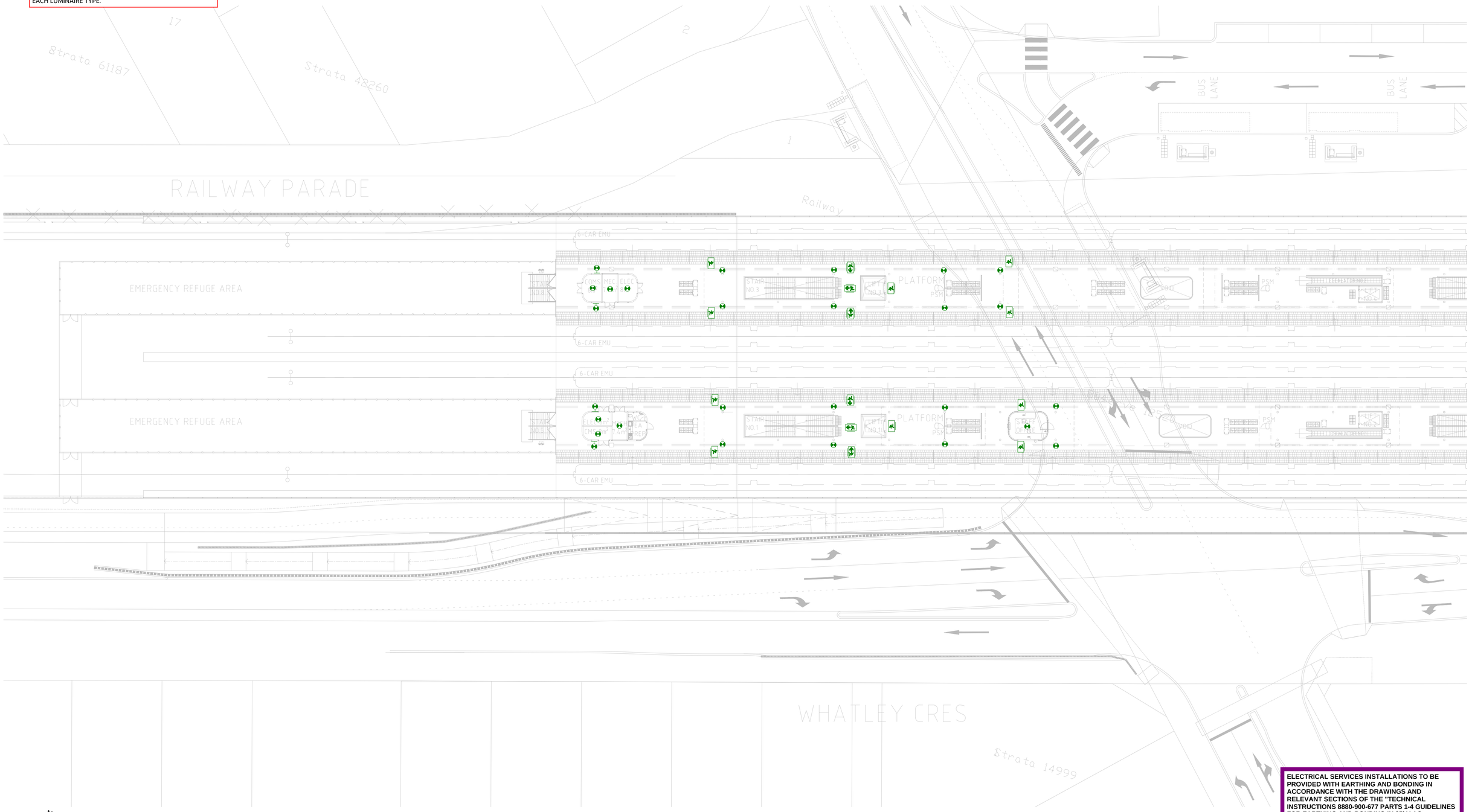
EASTERN ENTRY BUILDING CONCOURSE
ELECTRICAL SERVICES - EMERGENCY LIGHTING
SHEET 01 OF 01

PTA Drawing No: 12-A-114-EG0101 Rev: A

NOTE:

QUANTITY & TYPE OF LUMINAIRES SHOWN ARE INDICATIVE ONLY. FINAL QUANTITY & SELECTION OF LUMINAIRES TO BE CONFIRMED AT 85% DETAILED DESIGN.

REFER DRAWING 12-A-114-EG0050 FOR DESCRIPTION OF EACH LUMINAIRE TYPE.



N

PLATFORM PLAN

SCALE 1:250

ELECTRICAL SERVICES INSTALLATIONS TO BE PROVIDED WITH EARTHING AND BONDING IN ACCORDANCE WITH THE DRAWINGS AND RELEVANT SECTIONS OF THE "TECHNICAL INSTRUCTIONS 8880-900-677 PARTS 1-4 GUIDELINES FOR EARTHING AND BONDING IN 25kV AC ELECTRIFIED AREAS".

REV	DATE	AMENDMENT				
A	28.09.20	RE-ISSUED FOR 15% INITIAL DETAILED DESIGN – INCLUSION OF ESCALATORS	C.R.	C.R.	R.H.	J.D.V.

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

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evolve bayswater

connecting people + places

IW237200-DP400-DRG-EG0103

REFERENCES

HSL_PLATFORM_PLAN
8584 landgate scdb
858401BAYSWATER FEATURE 2D
RAIL_MEL_OPTIMUM_GEOM
civil_roads
XRPTA_A1_EVOLVE

SCALE 1 : 250

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED C.REYES
DRAWN C.REYES
CHECKED R.HORN
APPROVED J.D.VILLIERS
DATE 17.08.20

Government of Western Australia Public Transport Authority

BAYSWATER STATION

WESTERN PLATFORMS & EMERGENCY REFUGE AREA
ELECTRICAL SERVICES - EMERGENCY LIGHTING
SHEET 01 OF 02

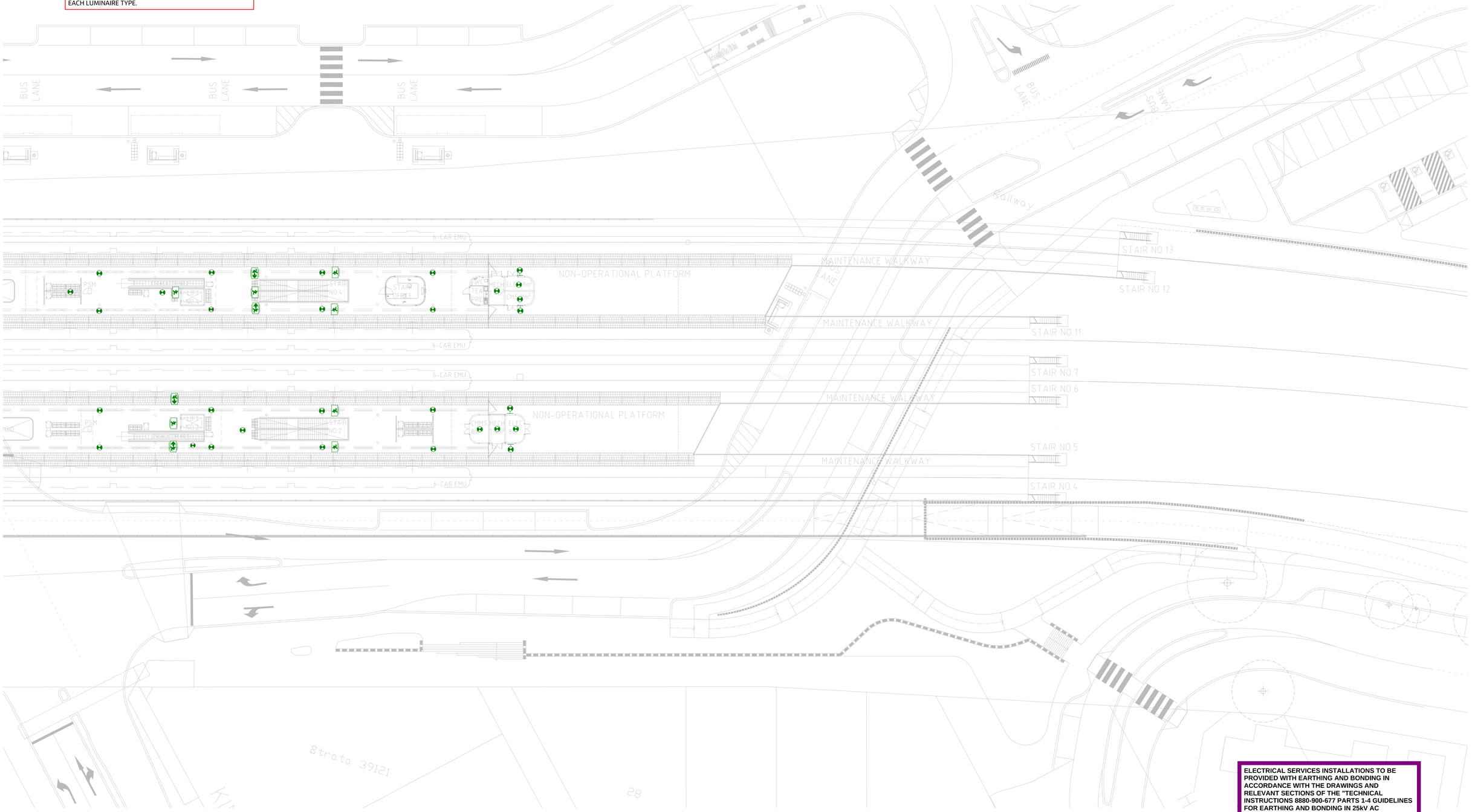
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NOTE:

QUANTITY & TYPE OF LUMINAIRES SHOWN ARE INDICATIVE ONLY. FINAL QUANTITY & SELECTION OF LUMINAIRES TO BE CONFIRMED AT 85% DETAILED DESIGN.

REFER DRAWING 12-A-114-EG0050 FOR DESCRIPTION OF EACH LUMINAIRE TYPE.



N

PLATFORM PLAN

SCALE 1:250

ELECTRICAL SERVICES INSTALLATIONS TO BE PROVIDED WITH EARTHING AND BONDING IN ACCORDANCE WITH THE DRAWINGS AND RELEVANT SECTIONS OF THE "TECHNICAL INSTRUCTIONS 8880-900-677 PARTS 1-4 GUIDELINES FOR EARTHING AND BONDING IN 25kV AC ELECTRIFIED AREAS".

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
A	28.09.20	RE-ISSUED FOR 15% INITIAL DETAILED DESIGN - INCLUSION OF ESCALATORS	C.R.	C.R.	R.H.	J.D.V.

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

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CAD DRAWING PATHNAME J:\IE\Projects\06_Central_West\IW237200\21_Deliverables\Drawings\Electrical\12-A-114-EG0105.dwg

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IW237200-DP400-DRG-EG0105

REFERENCES

HSL_PLATFORM_PLAN
8584landgate.sdb
RAIL_MEL_OPTIMUM_GEOM
civil_roads
XRPTA_A1_EVOLVE

SCALE 1 : 250

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED	C.REYES
DRAWN	C.REYES
CHECKED	R.HORN
APPROVED	J.D.VILLIERS
DATE	17.08.20

Government of Western Australia Public Transport Authority

BAYSWATER STATION

EASTERN PLATFORMS & BRIDGE ABUTMENT

ELECTRICAL SERVICES - EMERGENCY LIGHTING

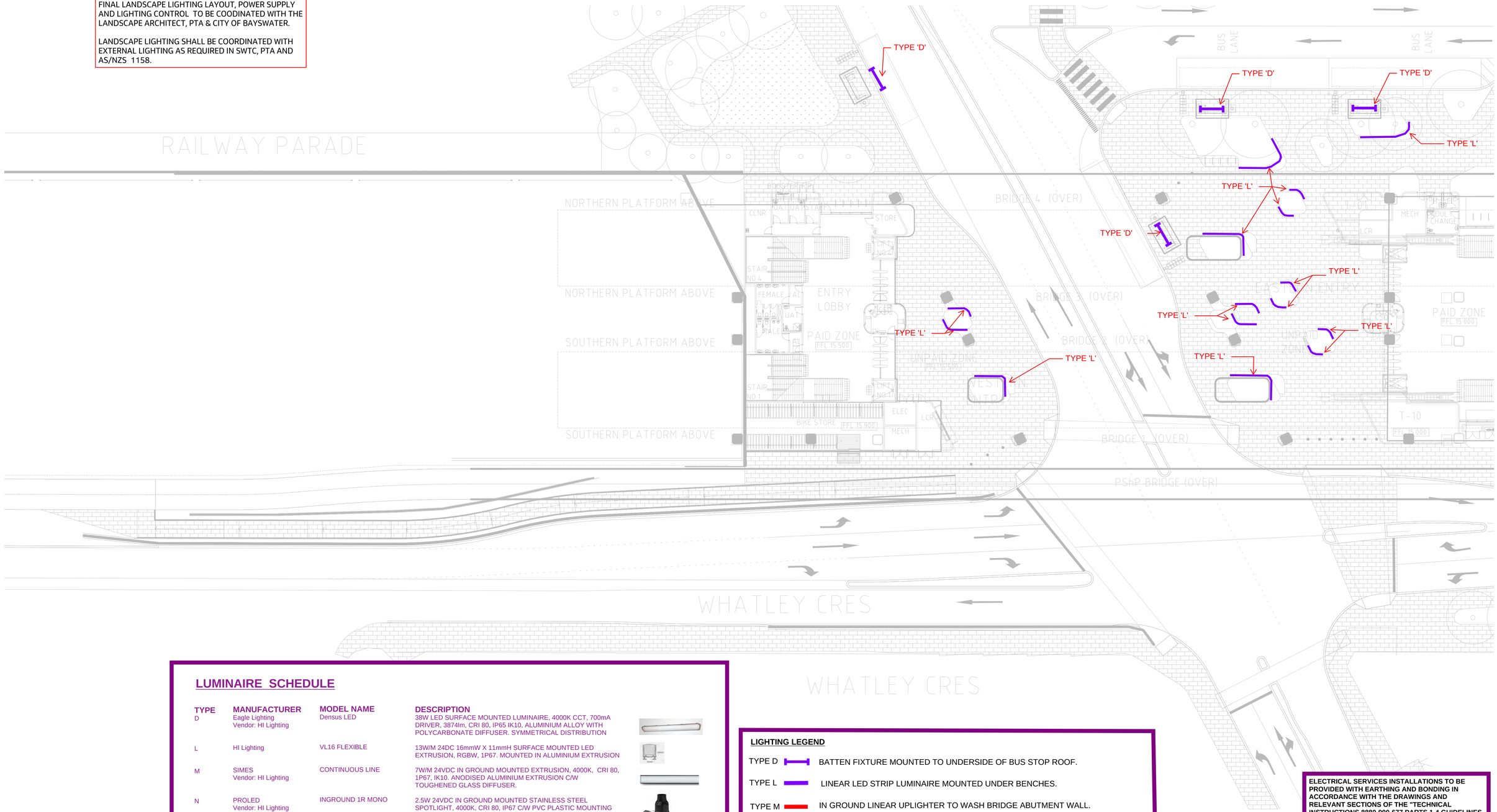
SHEET 02 OF 02

PTA Drawing No: 12-A-114-EG0105 Rev: A

NOTES:

FINAL LANDSCAPE LIGHTING LAYOUT, POWER SUPPLY AND LIGHTING CONTROL TO BE COODINATED WITH THE LANDSCAPE ARCHITECT, PTA & CITY OF BAYSWATER.

LANDSCAPE LIGHTING SHALL BE COORDINATED WITH EXTERNAL LIGHTING AS REQUIRED IN SWTC, PTA AND AS/NZS 1158.



N

SITE PLAN
SCALE 1:250

LUMINAIRE SCHEDULE

TYPE	MANUFACTURER	MODEL NAME	DESCRIPTION
D	Eagle Lighting Vendor: HI Lighting	Densus LED	38W LED SURFACE MOUNTED LUMINAIRE, 4000K CCT, 700mA DRIVER, 3874lm, CRI 80, IP65 IK10, ALUMINIUM ALLOY WITH POLYCARBONATE DIFFUSER. SYMMETRICAL DISTRIBUTION
L	HI Lighting	VL16 FLEXIBLE	13W/M 24DC 16mmW X 11mmH SURFACE MOUNTED LED EXTRUSION, RGBW, 1P67. MOUNTED IN ALUMINIUM EXTRUSION
M	SIMES Vendor: HI Lighting	CONTINUOUS LINE	7W/M 24VDC IN GROUND MOUNTED EXTRUSION, 4000K, CRI 80, 1P67, IK10. ANODISED ALUMINIUM EXTRUSION C/W TOUGHENED GLASS DIFFUSER.
N	PROLED Vendor: HI Lighting	INGROUND 1R MONO	2.5W 24VDC IN GROUND MOUNTED STAINLESS STEEL SPOTLIGHT, 4000K, CRI 80, IP67 C/W PVC PLASTIC MOUNTING SLEEVE.

LIGHTING LEGEND

TYPE D — BATTEN FIXTURE MOUNTED TO UNDERSIDE OF BUS STOP ROOF.

TYPE L — LINEAR LED STRIP LUMINAIRE MOUNTED UNDER BENCHES.

TYPE M — IN GROUND LINEAR UPLIGHTER TO WASH BRIDGE ABUTMENT WALL.

TYPE N — IN GROUND UPLIGHTER MOUNTED AT 0.5M CENTRES TO LIGHT LOW HEIGHT RETAINING WALLS.

ELECTRICAL SERVICES INSTALLATIONS TO BE PROVIDED WITH EARTHING AND BONDING IN ACCORDANCE WITH THE DRAWINGS AND RELEVANT SECTIONS OF THE "TECHNICAL INSTRUCTIONS 8880-900-677 PARTS 1-4 GUIDELINES FOR EARTHING AND BONDING IN 25kV AC ELECTRIFIED AREAS".

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
A	28.09.20	RE-ISSUED FOR 15% INITIAL DETAILED DESIGN - INCLUSION OF ESCALATORS	C.R.	C.R.	R.H.	J.D.V.

ORIG SIZE A1 — 0 10 20 30 40 50 100mm — AT ORIGINAL PLOT SIZE

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IW237200-DP400-DRG-EG0107

REFERENCES

civil_roads
HSL_CONCOURSE_PLAN
BST-HAS-BME-B002-CAD-LA-0001_A_General Arrangment
XRPTA_A1_EVOLVE

SCALE 1 : 250

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED	C.REYES
DRAWN	C.REYES
CHECKED	R.HORN
APPROVED	J.D.VILLIERS
DATE	17.08.20

Government of Western Australia
Public Transport Authority

BAYSWATER STATION

WESTERN ENTRY BUILDING CONCOURSE
ELECTRICAL SERVICES - LANDSCAPE LIGHTING
SHEET 01 OF 01

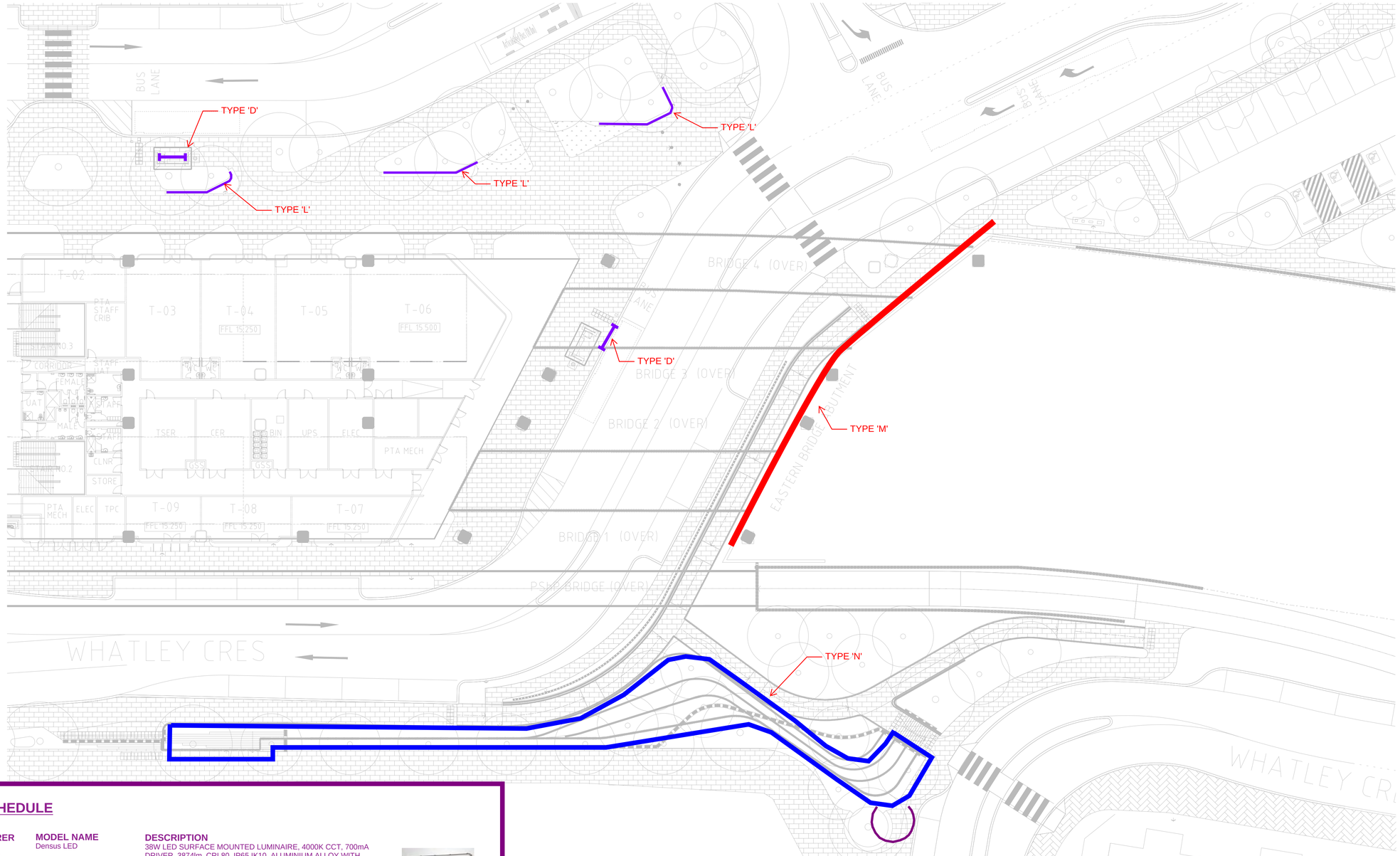
PTA Drawing No: 12-A-114-EG0107 Rev: A

CAD DRAWING PATHNAME: J:\IE\Projects\06_Central_West\IW237200\21_Deliverables\Drawings\Electrical\12-A-114-EG0107.dwg

NOTES:

FINAL LANDSCAPE LIGHTING LAYOUT, POWER SUPPLY AND LIGHTING CONTROL TO BE COODINATED WITH THE LANDSCAPE ARCHITECT, PTA & CITY OF BAYSWATER.

LANDSCAPE LIGHTING SHALL BE COORDINATED WITH EXTERNAL LIGHTING AS REQUIRED IN SWTC, PTA AND AS/NZS 1158.



SITE PLAN
SCALE 1:250

LUMINAIRE SCHEDULE

TYPE	MANUFACTURER	MODEL NAME	DESCRIPTION	
D	Eagle Lighting Vendor: HI Lighting	Densus LED	38W LED SURFACE MOUNTED LUMINAIRE, 4000K CCT, 700mA DRIVER, 3874lm, CRI 80, IP65 IK10, ALUMINIUM ALLOY WITH POLYCARBONATE DIFFUSER. SYMMETRICAL DISTRIBUTION	
L	HI Lighting	VL16 FLEXIBLE	13W/M 24DC 16mmW X 11mmH SURFACE MOUNTED LED EXTRUSION, RGBW, 1P67. MOUNTED IN ALUMINIUM EXTRUSION	
M	SIMES Vendor: HI Lighting	CONTINUOUS LINE	7W/M 24VDC IN GROUND MOUNTED EXTRUSION, 4000K, CRI 80, 1P67, IK10, ANODISED ALUMINIUM EXTRUSION C/W TOUGHENED GLASS DIFFUSER.	
N	PROLED Vendor: HI Lighting	INGROUND 1R MONO	2.5W 24VDC IN GROUND MOUNTED STAINLESS STEEL SPOTLIGHT, 4000K, CRI 80, IP67 C/W PVC PLASTIC MOUNTING SLEEVE.	

LIGHTING LEGEND

TYPE D	BATTEN FIXTURE MOUNTED TO UNDERSIDE OF BUS STOP ROOF.
TYPE L	LINEAR LED STRIP LUMINAIRE MOUNTED UNDER BENCHES.
TYPE M	IN GROUND LINEAR UPLIGHTER TO WASH BRIDGE ABUTMENT WALL.
TYPE N	IN GROUND UPLIGHTER MOUNTED AT 0.5M CENTRES TO LIGHT LOW HEIGHT RETAINING WALLS.

ELECTRICAL SERVICES INSTALLATIONS TO BE PROVIDED WITH EARTHING AND BONDING IN ACCORDANCE WITH THE DRAWINGS AND RELEVANT SECTIONS OF THE "TECHNICAL INSTRUCTIONS 8880-900-677 PARTS 1-4 GUIDELINES FOR EARTHING AND BONDING IN 25kV AC ELECTRIFIED AREAS".

REV	DATE	AMENDMENT				
A	28.09.20	RE-ISSUED FOR 15% INITIAL DETAILED DESIGN - INCLUSION OF ESCALATORS	C.R.	C.R.	R.H.	J.D.V.

ORIG SIZE A1 — 0 10 20 30 40 50 100mm — AT ORIGINAL PLOT SIZE

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IW237200-DP400-DRG-EG0109

REFERENCES
8584 landgate scdb
civil_roads
HSL_CONCOURSE_PLAN
STRUCTURE_PIERS_ALT_OPT
BST-HAS-BME-B002-CAD-LA-0001
XRPTA_A1_EVOLVE

SCALE 1 : 250

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED C.REYES
DRAWN C.REYES
CHECKED R.HORN
APPROVED J.D.VILLIERS
DATE 17.08.20

Government of Western Australia
Public Transport Authority

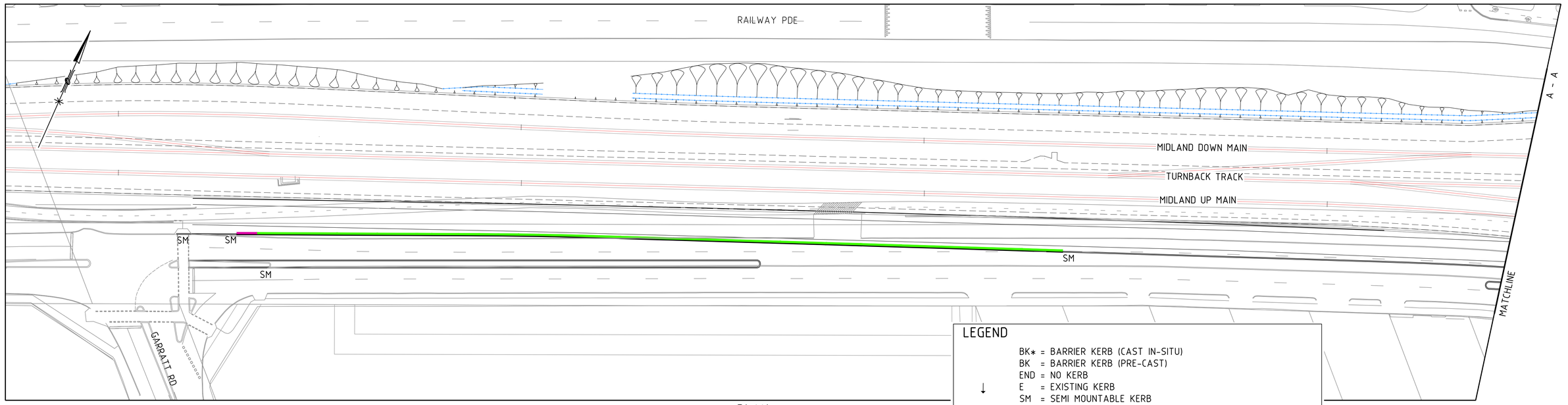
BAYSWATER STATION
EASTERN ENTRY BUILDING CONCOURSE
ELECTRICAL SERVICES - LANDSCAPE LIGHTING
SHEET 01 OF 01

PTA Drawing No: 12-A-114-EG0109 Rev: A

CAD DRAWING PATHNAME: J:\IE\Projects\06_Central_West\IW237200\21_Deliverables\Drawings\Electrical\12-A-114-EG0109.dwg

Appendix D5

Roadworks and Safety Barrier Plans prepared by Evolve Bayswater

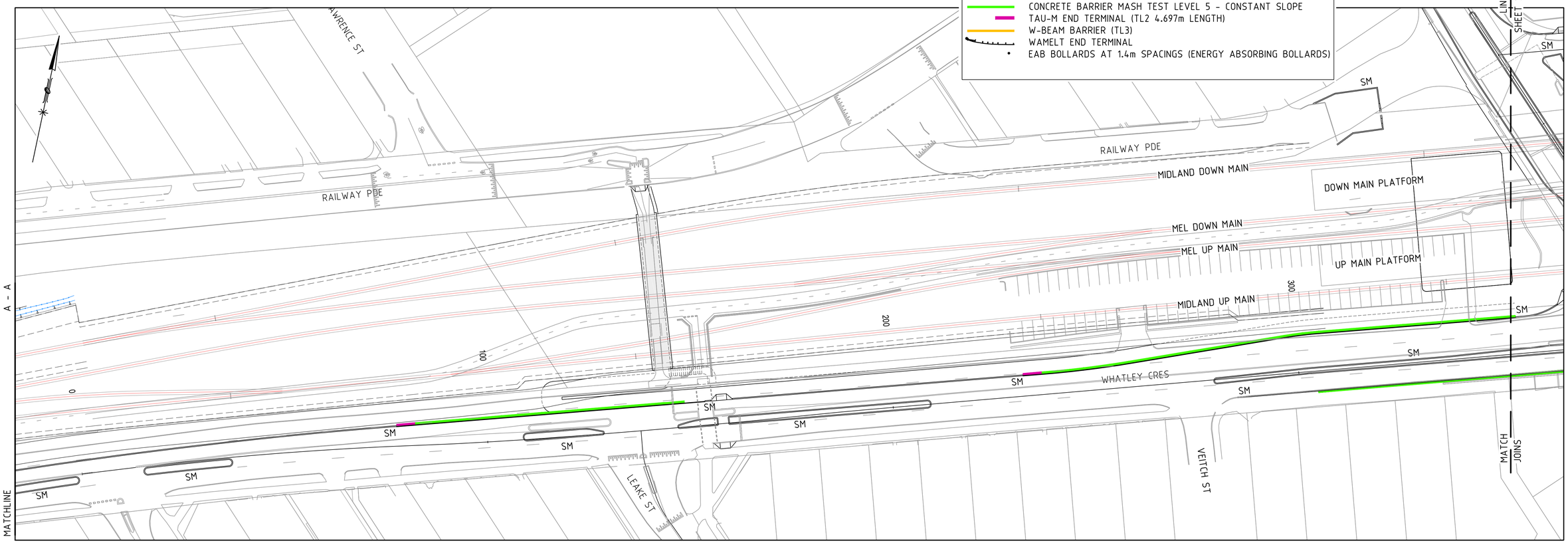


PLAN
SCALE 1 : 500

LEGEND

- BK* = BARRIER KERB (CAST IN-SITU)
- BK = BARRIER KERB (PRE-CAST)
- END = NO KERB
- E = EXISTING KERB
- SM = SEMI MOUNTABLE KERB
- K = KASSEL KERB
- A = MOUNTABLE KERB

- CONCRETE BARRIER MASH TEST LEVEL 5 - CONSTANT SLOPE
- TAU-M END TERMINAL (TL2 4.697m LENGTH)
- W-BEAM BARRIER (TL3)
- WAMELT END TERMINAL
- EAB BOLLARDS AT 1.4m SPACINGS (ENERGY ABSORBING BOLLARDS)



PLAN
SCALE 1 : 500

1:500 (A1) / 1:1000 (A3)

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
C	01.10.20	ISSUED FOR DA	CW	SP		
B	29.09.20	ISSUED FOR TURNBACK INITIAL DETAILED DESIGN	CW	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	CW	SP		

ORIG SIZE A1 — 0 10 20 30 40 50 100mm — AT ORIGINAL PLOT SIZE

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REFERENCES

SCALE 1:500

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED CW
DRAWN SP
CHECKED
APPROVED
DATE

Government of Western Australia
Public Transport Authority

BAYSWATER STATION

BAYSWATER STATION PRECINCT
SAFETY BARRIERS AND KERBING PLAN
SHEET 1

PTA Drawing No: 12-C-13-0081 Rev: C

CAD DRAWING PATHNAME P:\P17275.01 BAYSWATER STATION ALLIANCE DETAILED DESIGN\100 DRAWINGS\102 Civil & Water\AutoCAD\12-C-13-0081.dwg

LEGEND

BK* = BARRIER KERB (CAST IN-SITU)
BK = BARRIER KERB (PRE-CAST)
END = NO KERB
E = EXISTING KERB
SM = SEMI MOUNTABLE KERB
K = KASSEL KERB
A = MOUNTABLE KERB

CONCRETE BARRIER MASH TEST LEVEL 5 - CONSTANT SLOPE
TAU-M END TERMINAL (TL2 4.697m LENGTH)
W-BEAM BARRIER (TL3)
WAMELT END TERMINAL
EAB BOLLARDS AT 1.4m SPACINGS (ENERGY ABSORBING BOLLARDS)

ROSE AVE
DRAKE ST
BEECHBORO RD S
RAILWAY PDE
MIDLAND DOWN MAIN
DOWN MAIN PLATFORM
MEL DOWN MAIN
MEL UP MAIN
UP MAIN PLATFORM
MIDLAND UP MAIN
PROPOSED BOLLARDS
KING WILLIAM ST
HAMILTON ST
SLADE ST
MATCH LINE SHEET 1
MATCH LINE SHEET 3
MATCH JOINS

PLAN
SCALE 1 : 500

1:500 (A1) / 1:1000 (A3)

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	29.09.20	ISSUED FOR DA	CW	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	CW	SP		

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

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REFERENCES

SCALE 1:500

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED CW
DRAWN SP
CHECKED
APPROVED
DATE

Government of Western Australia Public Transport Authority

BAYSWATER STATION
BAYSWATER STATION PRECINCT
SAFETY BARRIERS AND KERBING PLAN
SHEET 2

PTA Drawing No: 12-C-13-0082 Rev: B

CAD DRAWING PATHNAME P:\P17275.01 BAYSWATER STATION ALLIANCE DETAILED DESIGN\100 DRAWINGS\102 Civil & Water\AutoCAD\12-C-13-0082.dwg



PLAN
SCALE 1 : 500

1:500 (A1) / 1:1000 (A3)
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REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	29.09.20	ISSUED FOR DA	CW	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	CW	SP		

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

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REFERENCES

SCALE 1:500

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED CW
DRAWN SP
CHECKED
APPROVED
DATE

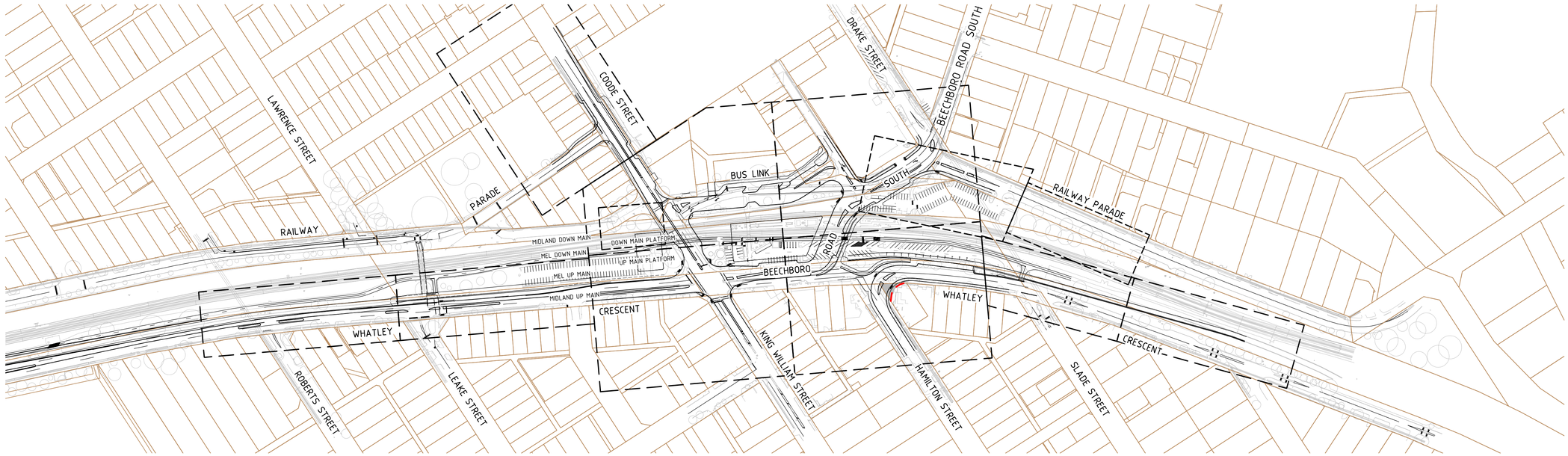
Government of Western Australia
Public Transport Authority

BAYSWATER STATION

BAYSWATER STATION PRECINCT
SAFETY BARRIERS AND KERBING PLAN
SHEET 3

PTA Drawing No: 12-C-13-0083 Rev: B

CAD DRAWING PATHNAME P:\P17275.01 BAYSWATER STATION ALLIANCE DETAILED DESIGN\100 DRAWINGS\102 Civil & Water\AutoCAD\12-C-13-0083.dwg



PLAN
NTS

PAVEMENT TYPES LEGEND

PT1
- 40mm INTERSECTION MIX ASPHALT (A15E, 14mm)
- TACK COAT
- SPRAYED SEAL (S35E, 10mm) OR 2 COAT BITUMEN EMULSION SEAL (CRS 170/60, 10/5mm)
- 50mm ASPHALT INTERMEDIATE COURSE (A15E, 14mm)
- TACK COAT
- 225mm ASPHALT INTERMEDIATE COURSE (C600, 20mm)
- PRIME COAT
- 150mm SUB-BASE
- TOTAL ASPHALT THICKNESS (NOT INCLUDING SEAL): 315mm

PT2
- 40mm INTERSECTION MIX ASPHALT (A15E, 14mm)
- TACK COAT
- DOUBLE/DOUBLE EMULSION SEAL (10/5mm)
- PRIME COAT
- 190mm BASECOURSE
- 130mm SUB-BASE
- TOTAL GRANULAR MATERIAL THICKNESS: 320mm

OR

PT2
- 40mm DENSE GRADED ASPHALT (A15E, 10mm)
- TACK COAT
- SPRAYED SEAL (S35E, 10mm) OR 2 COAT BITUMEN EMULSION SEAL (CRS 170/60, 10/5mm)
- 50mm ASPHALT INTERMEDIATE COURSE (A15E, 14mm)
- TACK COAT
- 170mm ASPHALT INTERMEDIATE COURSE (C600, 20mm)
- PRIME COAT
- 150mm SUB-BASE
- TOTAL ASPHALT THICKNESS (NOT INCLUDING SEAL): 260mm

PT3
- 30mm DENSE GRADED ASPHALT (A15E, 10mm)
- TACK COAT
- DOUBLE/DOUBLE EMULSION SEAL (10/5mm)
- PRIME COAT
- 190mm BASECOURSE
- 130mm SUB-BASE
- TOTAL GRANULAR MATERIAL THICKNESS: 320mm

OR

PT3
- 40mm DENSE GRADED ASPHALT (A15E, 10mm)
- TACK COAT
- SPRAYED SEAL (S35E, 10mm) OR 2 COAT BITUMEN EMULSION SEAL (CRS 170/60, 10/5mm)
- 50mm ASPHALT INTERMEDIATE COURSE (A15E, 14mm)
- TACK COAT
- 170mm ASPHALT INTERMEDIATE COURSE (C600, 20mm)
- PRIME COAT
- 150mm SUB-BASE
- TOTAL ASPHALT THICKNESS (NOT INCLUDING SEAL): 260mm

PT4
- 40mm DENSE GRADED RED LATERITE ASPHALT (A15E, 10mm)
- TACK COAT
- DOUBLE/DOUBLE EMULSION SEAL (10/5mm)
- PRIME COAT
- 180mm BASECOURSE
- 120mm SUB-BASE
- TOTAL GRANULAR MATERIAL THICKNESS: 300mm

OR

PT4
- 40mm DENSE GRADED ASPHALT (A15E, 10mm)
- TACK COAT
- SPRAYED SEAL (S35E, 10mm) OR 2 COAT BITUMEN EMULSION SEAL (CRS 170/60, 10/5mm)
- 50mm ASPHALT INTERMEDIATE COURSE (A15E, 14mm)
- TACK COAT
- 165mm ASPHALT INTERMEDIATE COURSE (C600, 20mm)
- PRIME COAT
- 150mm SUB-BASE
- TOTAL ASPHALT THICKNESS (NOT INCLUDING SEAL): 255mm

PT5
- 30mm OR 40mm DENSE GRADED ASPHALT (A15E, 10mm)
- TACK COAT
- DOUBLE/DOUBLE EMULSION SEAL (10/5mm)
- PRIME COAT
- 180mm BASECOURSE
- 120mm SUB-BASE
- TOTAL GRANULAR MATERIAL THICKNESS: 300mm

OR

PT5
- 40mm DENSE GRADED ASPHALT (A15E, 10mm)
- TACK COAT
- SPRAYED SEAL (S35E, 10mm) OR 2 COAT BITUMEN EMULSION SEAL (CRS 170/60, 10/5mm)
- 50mm ASPHALT INTERMEDIATE COURSE (A15E, 14mm)
- TACK COAT
- 165mm ASPHALT INTERMEDIATE COURSE (C600, 20mm)
- PRIME COAT
- 150mm SUB-BASE
- TOTAL ASPHALT THICKNESS (NOT INCLUDING SEAL): 255mm

PT6
- 30mm DENSE GRADED ASPHALT (C170, 10mm)
- TACK COAT
- DOUBLE/DOUBLE EMULSION SEAL (10/5mm)
- PRIME COAT
- 100mm BASECOURSE
- 100mm SUB-BASE
- TOTAL GRANULAR MATERIAL THICKNESS: 190mm

PShP
- 25mm DENSE GRADED RED LATERITE ASPHALT (C170, 5/7mm)
- PRIME COAT
- 150mm GRANULAR SUB-BASE
- TOTAL GRANULAR MATERIAL THICKNESS: 175mm

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	30.09.20	ISSUED FOR DA	CW	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	CW	SP		

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

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REFERENCES

SCALE NTS

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED CW
DRAWN SP
CHECKED
APPROVED
DATE

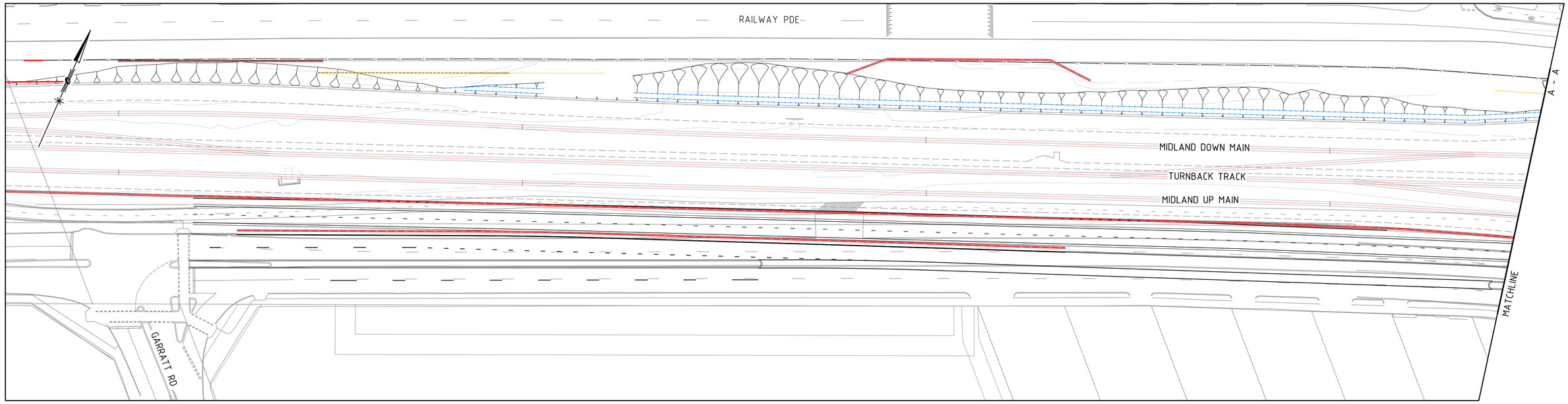
Government of Western Australia Public Transport Authority

BAYSWATER STATION

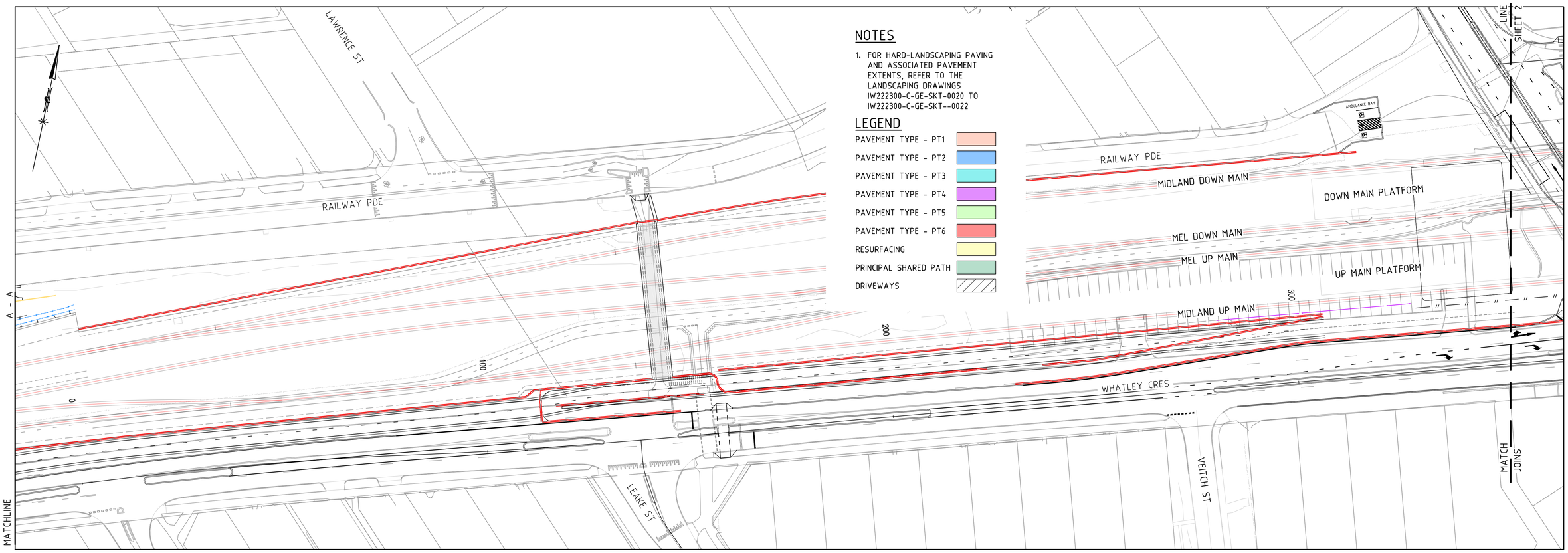
BAYSWATER STATION PRECINCT
PAVEMENT - KEY PLAN
SHEET 1

PTA Drawing No: 12-C-13-0091 Rev: B

CAD DRAWING PATHNAME C:\users\cdeyzel\appdata\local\projectwise\jacobs anz ie\d0389893\PTA A1 EVOLVE.dwg



PLAN
SCALE 1 : 500



NOTES

1. FOR HARD-LANDSCAPING PAVING AND ASSOCIATED PAVEMENT EXTENTS, REFER TO THE LANDSCAPING DRAWINGS IW222300-C-GE-SKT-0020 TO IW222300-C-GE-SKT--0022

LEGEND

- PAVEMENT TYPE - PT1
- PAVEMENT TYPE - PT2
- PAVEMENT TYPE - PT3
- PAVEMENT TYPE - PT4
- PAVEMENT TYPE - PT5
- PAVEMENT TYPE - PT6
- RESURFACING
- PRINCIPAL SHARED PATH
- DRIVEWAYS

PLAN
SCALE 1 : 500

1:500 (A1) / 1:1000 (A3)
0 5m 10 15 20 25 30 35 40 45 50 55 60 65 70 75

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
C	01.10.20	ISSUED FOR DA	CW	SP		
B	29.09.20	ISSUED FOR TURNBACK INITIAL DETAILED DESIGN	CW	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	CW	SP		

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

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REFERENCES

SCALE 1:500

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED CW
DRAWN SP
CHECKED
APPROVED
DATE

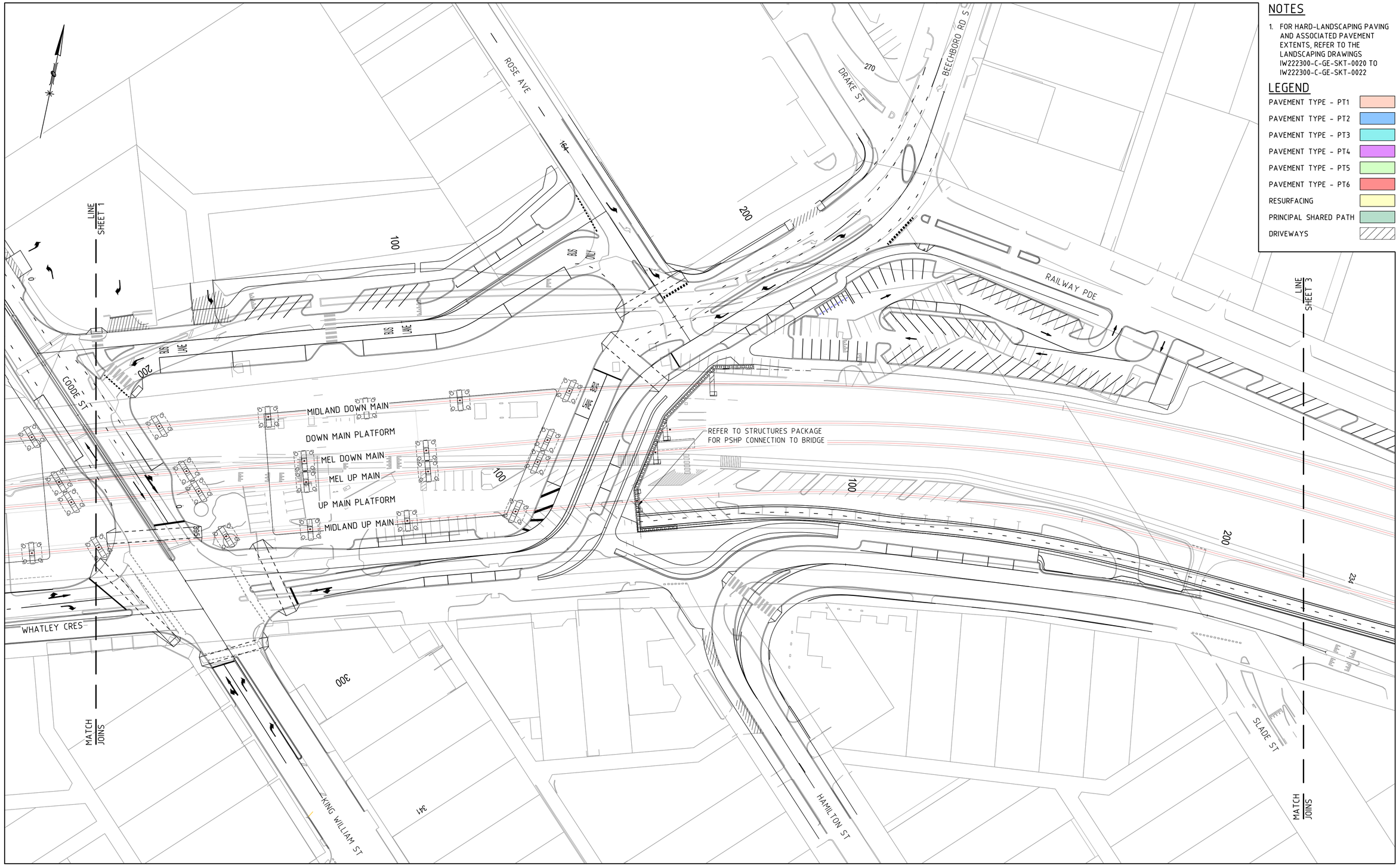
Government of Western Australia
Public Transport Authority

BAYSWATER STATION

BAYSWATER STATION PRECINCT
PAVEMENT PLAN
SHEET 1

PTA Drawing No: 12-C-13-0092 Rev: C

CAD DRAWING PATHNAME P:\P17275.01 BAYSWATER STATION ALLIANCE DETAILED DESIGN\100 DRAWINGS\102 Civil & Water\AutoCAD\12-C-13-0092.dwg



NOTES

1. FOR HARD-LANDSCAPING PAVING AND ASSOCIATED PAVEMENT EXTENTS, REFER TO THE LANDSCAPING DRAWINGS IW222300-C-GE-SKT-0020 TO IW222300-C-GE-SKT-0022

LEGEND

- PAVEMENT TYPE - PT1
- PAVEMENT TYPE - PT2
- PAVEMENT TYPE - PT3
- PAVEMENT TYPE - PT4
- PAVEMENT TYPE - PT5
- PAVEMENT TYPE - PT6
- RESURFACING
- PRINCIPAL SHARED PATH
- DRIVEWAYS

PLAN

SCALE 1 : 500

1:500 (A1) / 1:1000 (A3)

0 5m 10 15 20 25 30 35 40 45 50 55 60 65 70 75

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	30.09.20	ISSUED FOR DA	CW	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	CW	SP		

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

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REFERENCES

SCALE 1:500

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED CW

DRAWN SP

CHECKED

APPROVED

DATE

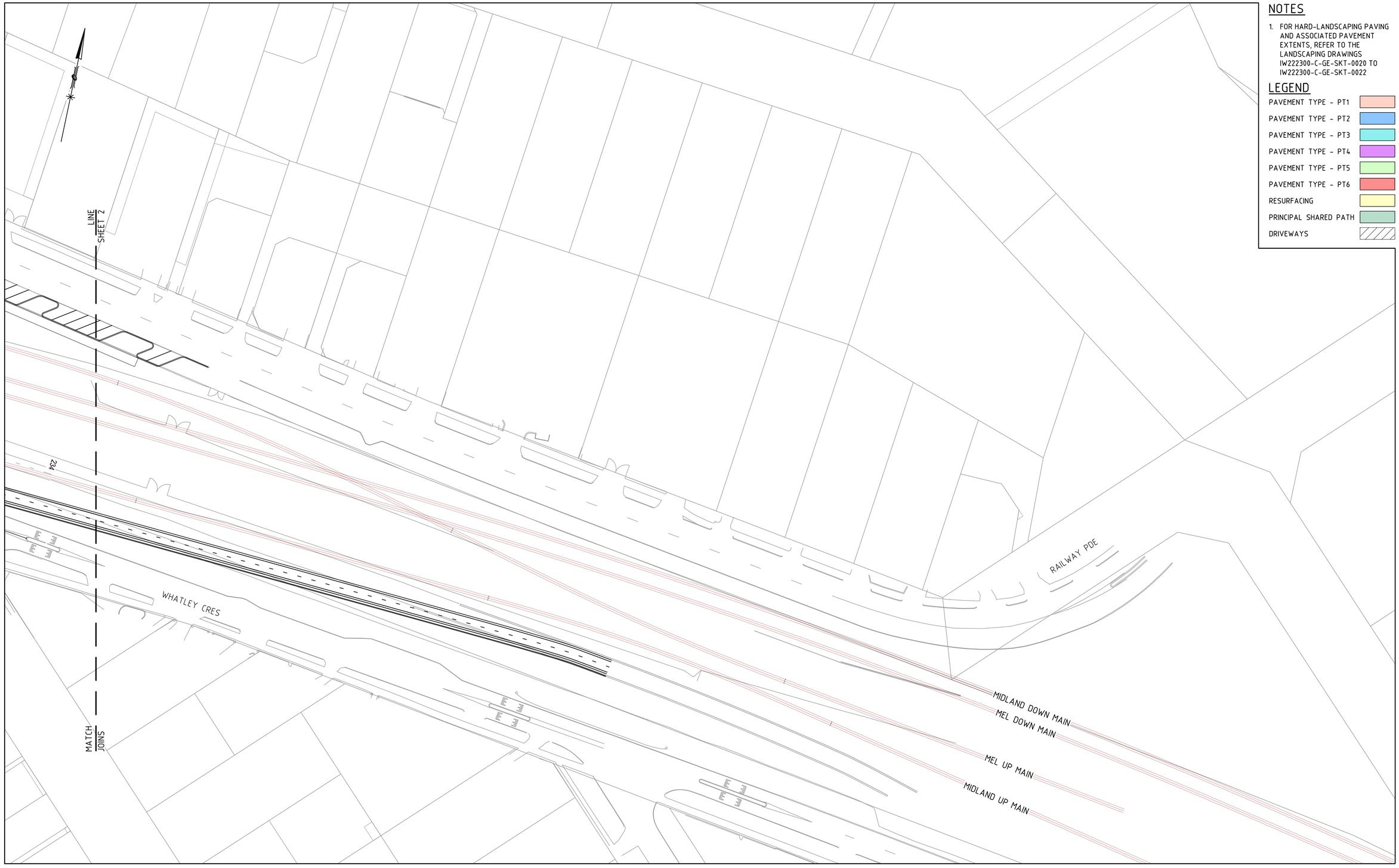
Government of Western Australia Public Transport Authority

BAYSWATER STATION

BAYSWATER STATION PRECINCT
PAVEMENT PLAN
SHEET 2

PTA Drawing No: 12-C-13-0093 Rev: B

CAD DRAWING PATHNAME P:\P17275.01 BAYSWATER STATION ALLIANCE DETAILED DESIGN\100 DRAWINGS\102 Civil & Water\AutoCAD\12-C-13-0093.dwg



NOTES

1. FOR HARD-LANDSCAPING PAVING AND ASSOCIATED PAVEMENT EXTENTS, REFER TO THE LANDSCAPING DRAWINGS IW222300-C-GE-SKT-0020 TO IW222300-C-GE-SKT-0022

LEGEND

- PAVEMENT TYPE - PT1
- PAVEMENT TYPE - PT2
- PAVEMENT TYPE - PT3
- PAVEMENT TYPE - PT4
- PAVEMENT TYPE - PT5
- PAVEMENT TYPE - PT6
- RESURFACING
- PRINCIPAL SHARED PATH
- DRIVEWAYS

PLAN

SCALE 1 : 500

1:500 (A1) / 1:1000 (A3)

0 5m 10 15 20 25 30 35 40 45 50 55 60 65 70 75

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	30.09.20	ISSUED FOR DA	CW	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	CW	SP		

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

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REFERENCES

SCALE 1:500

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED CW

DRAWN SP

CHECKED

APPROVED

DATE

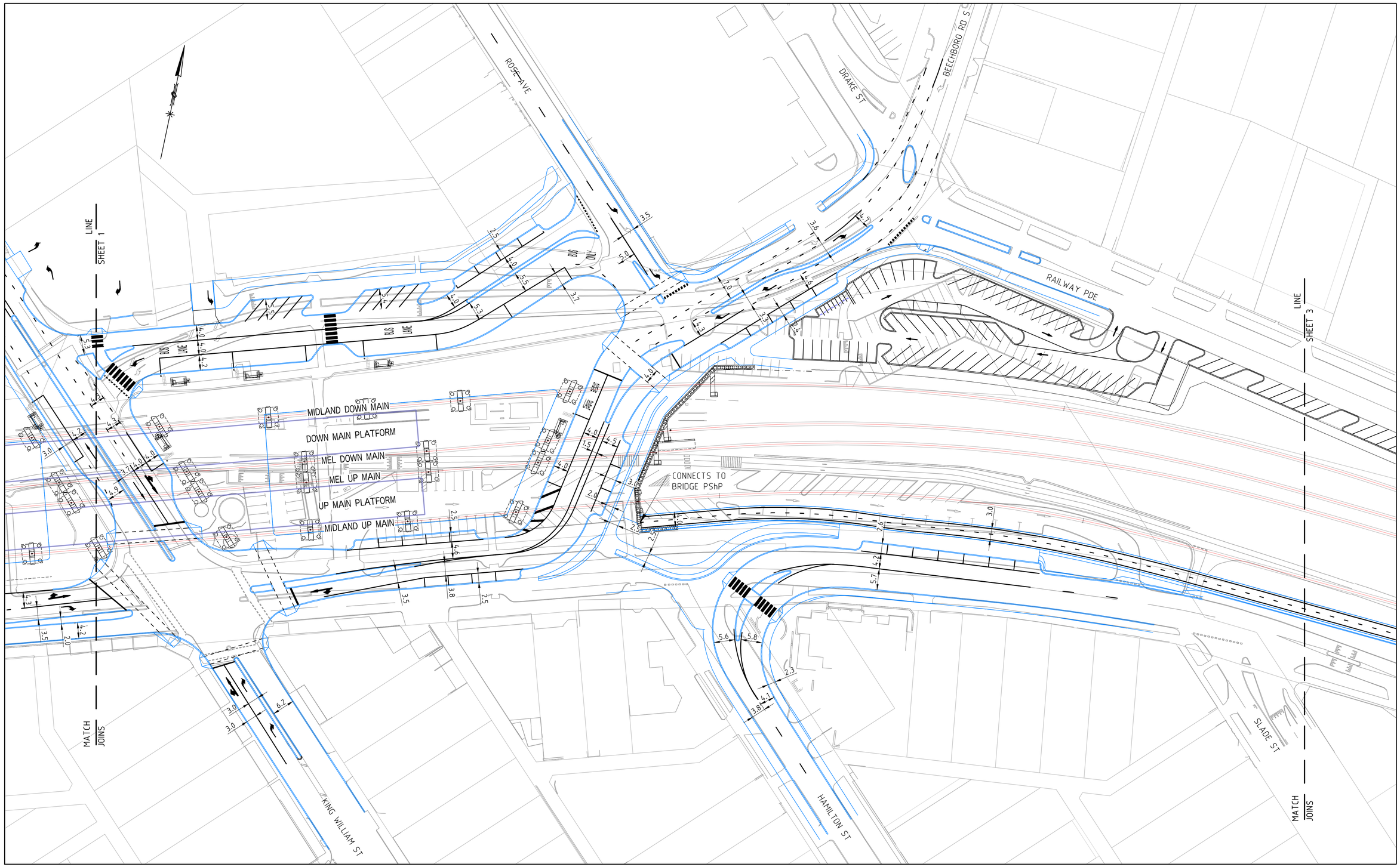
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Public Transport Authority

BAYSWATER STATION

BAYSWATER STATION PRECINCT
PAVEMENT PLAN
SHEET 3

PTA Drawing No: 12-C-13-0094 Rev: B

CAD DRAWING PATHNAME P:\P17275.01 BAYSWATER STATION ALLIANCE DETAILED DESIGN\100 DRAWINGS\102 Civil & Water\AutoCAD\12-C-13-0094.dwg



PLAN
SCALE 1 : 500

1:500 (A1) / 1:1000 (A3)
0 5m 10 15 20 25 30 35 40 45 50 55 60 65 70 75

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	29.09.20	ISSUED FOR DA	CW	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	CW	SP		

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

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REFERENCES

SCALE 1:500

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED CW
DRAWN SP
CHECKED
APPROVED
DATE

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Public Transport Authority

BAYSWATER STATION

BAYSWATER STATION PRECINCT
PAVEMENT MARKING AND SIGNS PLAN
SHEET 2

PTA Drawing No: 12-C-13-0104 Rev: B

CAD DRAWING PATHNAME P:\P17275.01 BAYSWATER STATION ALLIANCE DETAILED DESIGN\100 DRAWINGS\102 Civil & Water\AutoCAD\12-C-13-0104.dwg

BAYSWATER STATION TURNBACK

(CH 3.6km TO 5.12 km)

PTA PASSENGER RAILWAY - DUAL AND NARROW GAUGE CONSTRUCTION

CIVIL

DRAWING INDEX	
DRAWING No.	DRAWING TITLE
12-C-18-0077	DRAWING INDEX
12-C-18-0083	PLAN AND PROFILE WHATLEY CRESCENT - SHEET 1
12-C-18-0084	PLAN AND PROFILE WHATLEY CRESCENT - SHEET 2
12-C-18-0085	PLAN AND PROFILE WHATLEY CRESCENT - SHEET 3
12-C-18-0086	PLAN AND PROFILE BEECHBORO ROAD SOUTH
12-C-18-0087	PLAN AND PROFILE HAMILTON STREET / WHATLEY CRESCENT
12-C-18-0089	PLAN AND PROFILE BUS LINK
12-C-18-0090	PLAN AND PROFILE COODE STREET / KING WILLIAM STREET - SHEET 1
12-C-18-0112	TYPICAL ROAD CROSS SECTIONS SHEET 1
12-C-18-0113	TYPICAL ROAD CROSS SECTIONS SHEET 2
12-C-18-0114	TYPICAL ROAD CROSS SECTIONS SHEET 3
12-C-18-0115	TYPICAL ROAD CROSS SECTIONS SHEET 4
12-C-13-0081	SAFETY BARRIERS AND KERBING PLAN SHEET 1
12-C-13-0082	SAFETY BARRIERS AND KERBING PLAN SHEET 2
12-C-13-0083	SAFETY BARRIERS AND KERBING PLAN SHEET 3
12-C-13-0092	PAVEMENT PLAN SHEET 1
12-C-13-0093	PAVEMENT PLAN SHEET 2
12-C-13-0094	PAVEMENT PLAN SHEET 3
12-C-13-0103	PAVEMENT MARKING AND SIGNS PLAN SHEET 1
12-C-13-0104	PAVEMENT MARKING AND SIGNS PLAN SHEET 2
12-C-13-0105	PAVEMENT MARKING AND SIGNS PLAN SHEET 3
12-C-17-0020	CROSS SECTIONS WHATLEY CRESCENT - SHEET 1
12-C-17-0021	CROSS SECTIONS WHATLEY CRESCENT - SHEET 2
12-C-17-0022	CROSS SECTIONS WHATLEY CRESCENT - SHEET 3
12-C-17-0023	CROSS SECTIONS WHATLEY CRESCENT - SHEET 4
12-C-17-0025	CROSS SECTIONS BEECHBORO ROAD SOUTH - SHEET 1
12-C-17-0026	CROSS SECTIONS BEECHBORO ROAD SOUTH - SHEET 2
12-C-17-0027	CROSS SECTIONS BEECHBORO ROAD SOUTH - SHEET 3
12-C-17-0028	CROSS SECTIONS BEECHBORO ROAD SOUTH - SHEET 4
12-C-17-0030	CROSS SECTIONS HAMILTON STREET / WHATLEY CRESCENT - SHEET 1
12-C-17-0031	CROSS SECTIONS HAMILTON STREET / WHATLEY CRESCENT - SHEET 2
12-C-17-0032	CROSS SECTIONS HAMILTON STREET / WHATLEY CRESCENT - SHEET 3
12-C-17-0034	CROSS SECTIONS ROSE AVENUE
12-C-17-0036	CROSS SECTIONS BUS LINK - SHEET 1
12-C-17-0037	CROSS SECTIONS BUS LINK - SHEET 2
12-C-17-0038	CROSS SECTIONS BUS LINK - SHEET 3
12-C-17-0040	CROSS SECTIONS COODE STREET / KING WILLIAM STREET - SHEET 1
12-C-17-0041	CROSS SECTIONS COODE STREET / KING WILLIAM STREET - SHEET 2
12-C-17-0042	CROSS SECTIONS COODE STREET / KING WILLIAM STREET - SHEET 3
12-C-17-0043	CROSS SECTIONS COODE STREET / KING WILLIAM STREET - SHEET 4

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DRAWING No.	DRAWING TITLE
12-C-26-0001	PLAN AND PROFILE PRINCIPLE SHARED PATH (PSHP) - SHEET 1
12-C-26-0002	PLAN AND PROFILE PRINCIPLE SHARED PATH (PSHP) - SHEET 2
12-C-26-0003	PLAN AND PROFILE PRINCIPLE SHARED PATH (PSHP) - SHEET 3
12-C-26-0004	PLAN AND PROFILE PRINCIPLE SHARED PATH (PSHP) - SHEET 4
12-C-26-0009	PLAN AND PROFILE UNDERPASS SHARED PATH - SHEET 1
12-C-13-0115	FENCING AND WALLS PLAN SHEET 1
12-C-13-0116	FENCING AND WALLS PLAN SHEET 2
12-C-23-0085	DRAINAGE - KEY PLAN
12-C-23-0086	DRAINAGE PLAN SHEET 1
12-C-23-0087	DRAINAGE PLAN SHEET 2
12-C-23-0088	DRAINAGE PLAN SHEET 3
12-C-23-0089	DRAINAGE PLAN SHEET 4
12-C-23-0090	DRAINAGE PLAN SHEET 5
12-C-23-0091	DRAINAGE PLAN SHEET 6
12-C-23-0092	DETAIL PLAN



LOCALITY PLAN

N.T.S.

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	29.09.20	ISSUED FOR TURNBACK INITIAL DETAILED DESIGN	CW	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	CW	SP		

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

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REFERENCES

SCALE NTS

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED CW
DRAWN SP
CHECKED
APPROVED
DATE

Government of Western Australia Public Transport Authority

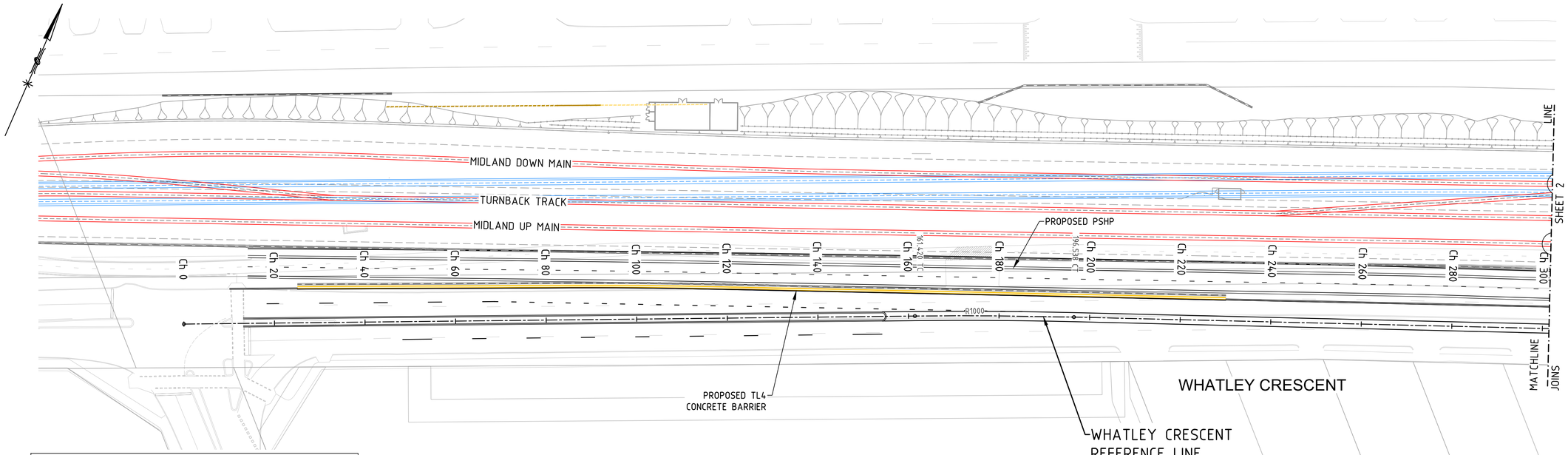
BAYSWATER STATION

BAYSWATER STATION PRECINCT

DRAWING INDEX

PTA Drawing No: 12-C-18-0077 Rev: B

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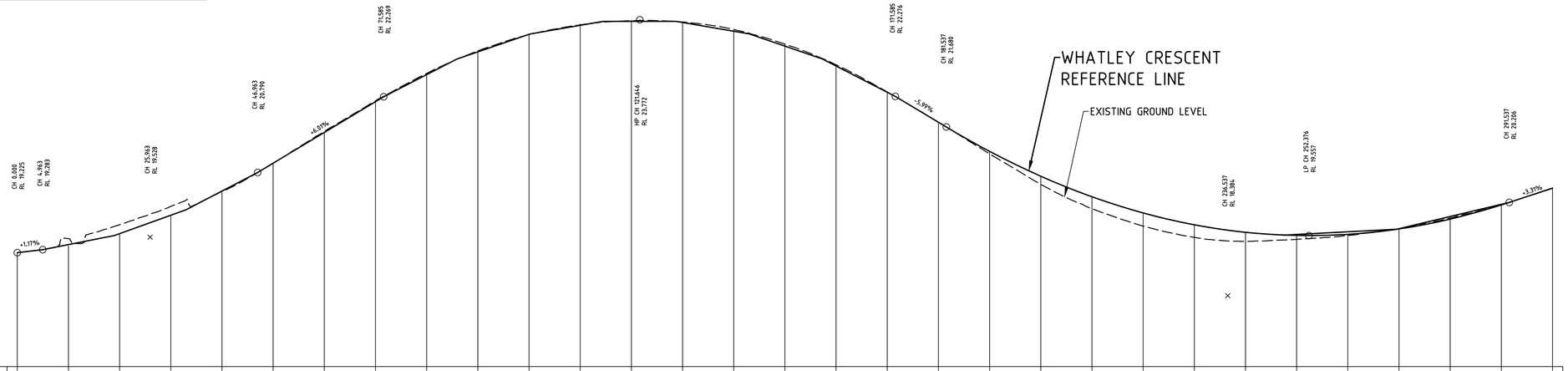


NOTES

1. ALL LEVELS AND DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. DRAWINGS TO BE PRINTED IN COLOUR.

PLAN

SCALE 1 : 500



DATUM RL 17

CHAINAGE	CUT / FILL	DESIGN SURFACE LEVELS	EXISTING SURFACE LEVELS
0	0.000	19.225	9.990
10	0.000	19.357	9.990
20	0.000	19.589	9.990
30	0.000	19.937	9.990
40	0.000	20.399	9.990
50	0.000	20.972	9.990
60	0.000	21.573	9.990
70	0.000	22.174	9.990
80	0.000	22.732	9.990
90	0.000	23.171	9.990
100	0.000	23.491	9.990
110	0.000	23.691	9.990
120	0.000	23.771	9.990
130	0.000	23.730	9.990
140	0.000	23.570	9.990
150	0.000	23.290	9.990
160	0.000	22.890	9.990
170	0.000	22.370	9.990
180	0.000	21.772	9.990
190	0.000	21.203	9.990
200	0.000	20.717	9.990
210	0.000	20.317	9.990
220	0.000	20.001	9.990
230	0.000	19.769	9.990
240	0.000	19.622	9.990
250	0.000	19.560	9.990
260	0.000	19.582	9.990
270	0.000	19.689	9.990
280	0.000	19.880	9.990
290	0.000	20.156	9.990
300	0.000	20.486	9.990

HORIZONTAL ALIGNMENT: L=161.420 | R=1000.000 L=35.118 | L=129.139

VERTICAL ALIGNMENT: G=1.17% L=4.963 | K=8.679 L=42.000 | G=6.01% L=24.622 | K=-8.334 L=100.000 | G=-5.99% L=9.952 | K=11.822 L=110.000 | K=11.822 L=110.000 | G=3.31% L=20.593

PROFILE

SCALE Horz. 1 : 500
Vert. 1 : 50

1:50 (A1) / 1:100 (A3) 0 0.5m 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5

1:500 (A1) / 1:1000 (A3) 0 5m 10 15 20 25 30 35 40 45 50 55 60 65 70 75

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	01.10.20	ISSUED FOR DA	CW	SP		
A	29.09.20	ISSUED FOR TURNBACK INITIAL DETAILED DESIGN	CW	SP		

ORIG SIZE A1 — 0 10 20 30 40 50 100mm AT ORIGINAL PLOT SIZE

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REFERENCES

SCALE

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED CW
DRAWN SP
CHECKED
APPROVED
DATE

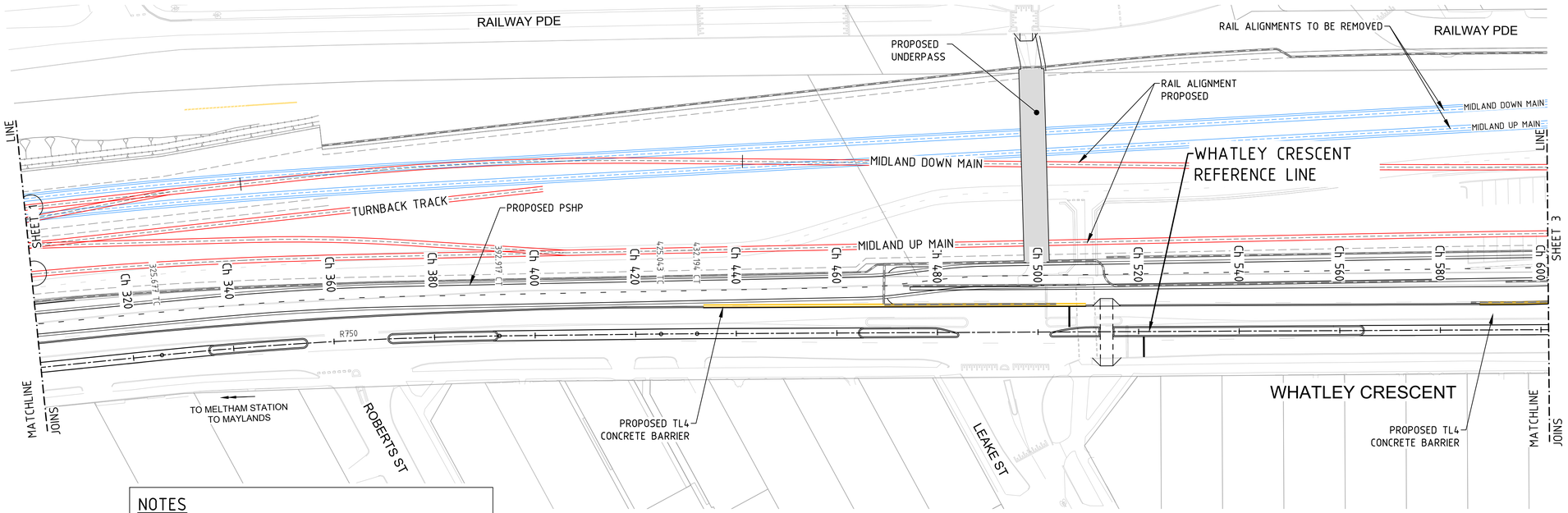
Government of Western Australia Public Transport Authority

BAYSWATER STATION

BAYSWATER STATION PRECINCT
PLAN AND PROFILE
WHATLEY CRESCENT - SHEET 1

PTA Drawing No: 12-C-18-0083 Rev: B

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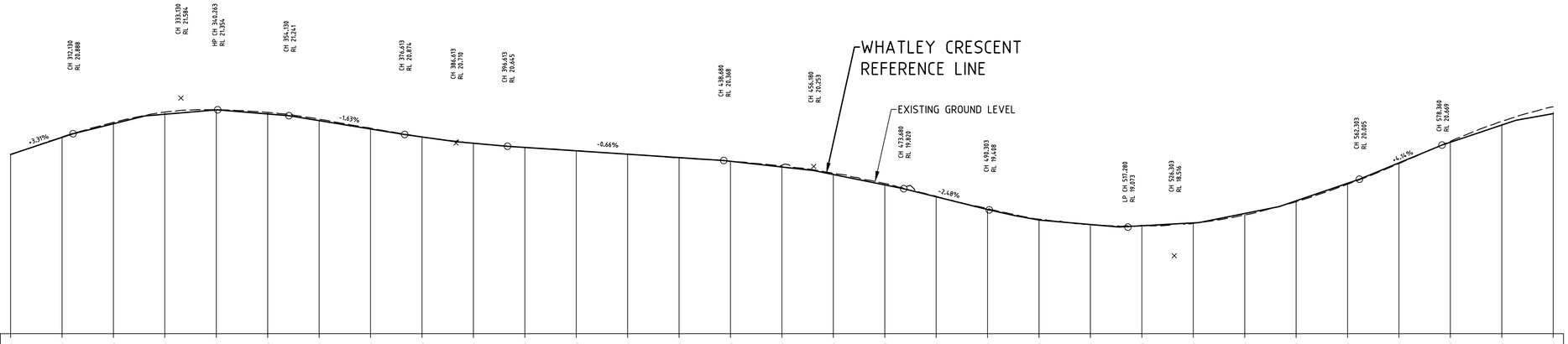


NOTES

1. ALL LEVELS AND DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. DRAWINGS TO BE PRINTED IN COLOUR.

PLAN

SCALE 1 : 500



CUT / FILL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
DESIGN SURFACE LEVELS	20.486	20.817	21.112	21.292	21.354	21.298	21.145	20.982	20.821	20.699	20.622	20.557	20.491	20.425	20.359	20.261	20.110	19.907	19.663	19.415	19.211	19.098	19.077	19.148	19.311	19.565	19.912	20.323	20.735	21.076	21.307
EXISTING SURFACE LEVELS	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990
CHAINAGE	300	310	320	330	340	350	360	370	380	390	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590	600
HORIZONTAL ALIGNMENT	L=129.139			R=750.000 L=67.239								L=32.127		R=1000.000 L=7.150				L=171.397													
VERTICAL ALIGNMENT	G=3.31% L=20.593			K=-8.492 L=42.000			G=-1.63% L=22.483		K=20.494 L=20.000			G=-0.66% L=42.067				K=-19.221 L=35.000		G=-2.48% L=16.623			K=10.886 L=72.000				G=4.14% L=16.057		K=-9.138 L=72.000		

PROFILE

SCALE Horz. 1 : 500
Vert. 1 : 50

1:50 (A1) / 1:100 (A3) 0 0.5m 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5

1:500 (A1) / 1:1000 (A3) 0 5m 10 15 20 25 30 35 40 45 50 55 60 65 70 75

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	29.09.20	ISSUED FOR TURNBACK INITIAL DETAILED DESIGN	CW	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	CW	SP		

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

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REFERENCES

SCALE: AS SHOWN

DATUM: HORIZONTAL: PCG94 VERTICAL: AHD71

DESIGNED CW
DRAWN SP
CHECKED
APPROVED
DATE

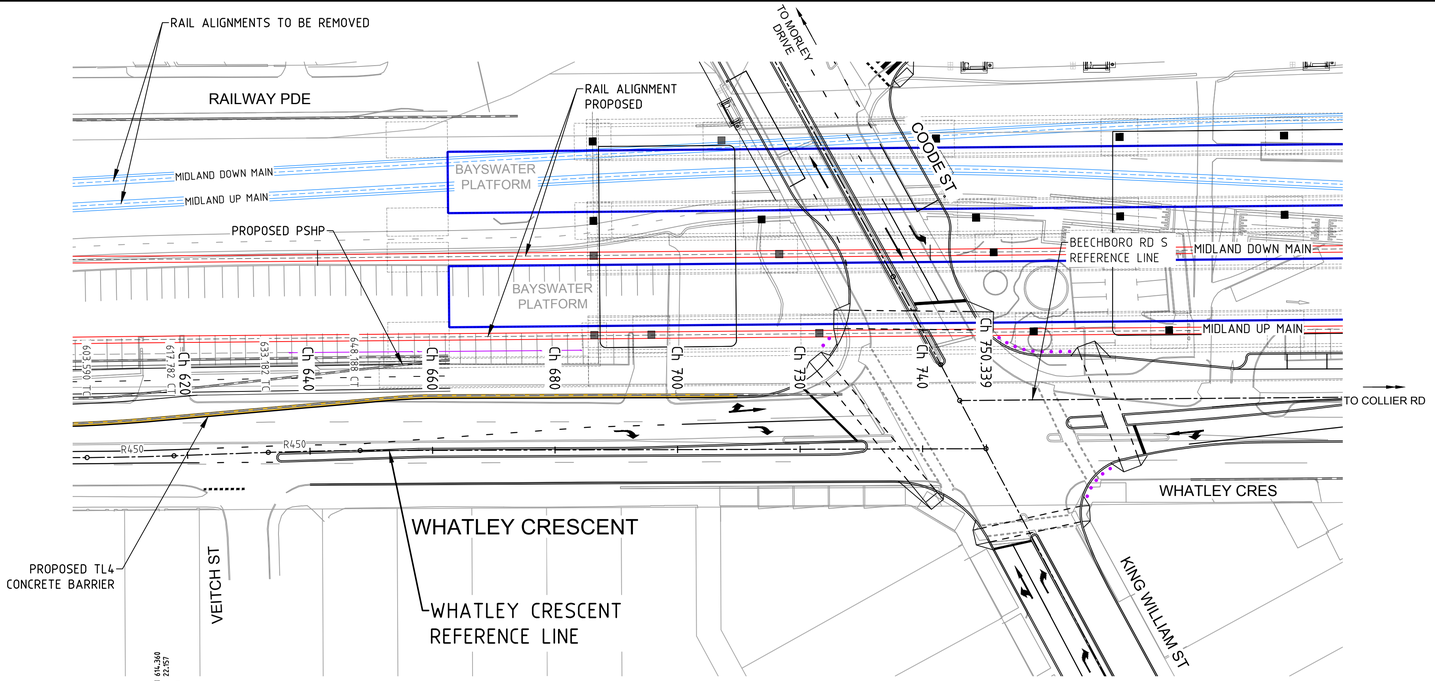
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BAYSWATER STATION

BAYSWATER STATION PRECINCT
PLAN AND PROFILE
WHATLEY CRESCENT - SHEET 2

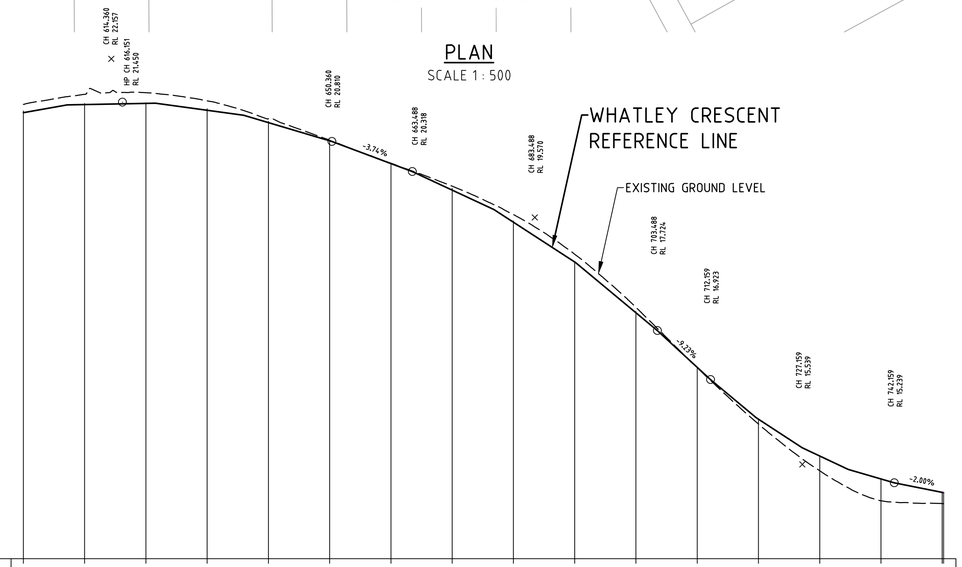
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PLAN

SCALE 1 : 500



DATUM RL 14

CHAINAGE	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750
EXISTING SURFACE LEVELS	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990	9.990
DESIGN SURFACE LEVELS	21.307	21.429	21.442	21.345	21.139	20.823	20.449	20.045	19.513	18.844	18.037	17.123	16.274	15.660	15.288	15.082
CUT / FILL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
HORIZONTAL ALIGNMENT	—	R=450.000 L=14.192		L=15.400	R=450.000 L=15.006						L=102.151					
VERTICAL ALIGNMENT		K=-9.138 L=72.000				G=-3.74% L=13.128		K=-7.291 L=40.000			G=-9.23% L=8.671	K=4.149 L=30.000		G=-2.00% L=8.074		

PROFILE

SCALE Horz. 1 : 500
Vert. 1 : 50

1:50 (A1) / 1:100 (A3) 0 0.5m 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5

1:500 (A1) / 1:1000 (A3) 0 5m 10 15 20 25 30 35 40 45 50 55 60 65 70 75

NOTES

1. ALL LEVELS AND DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. DRAWINGS TO BE PRINTED IN COLOUR.

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	29.09.20	ISSUED FOR TURNBACK INITIAL DETAILED DESIGN	CW	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	CW	SP		

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

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REFERENCES

SCALE: AS SHOWN

DATUM: HORIZONTAL: PCG94 VERTICAL: AHD71

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DRAWN SP
CHECKED
APPROVED
DATE

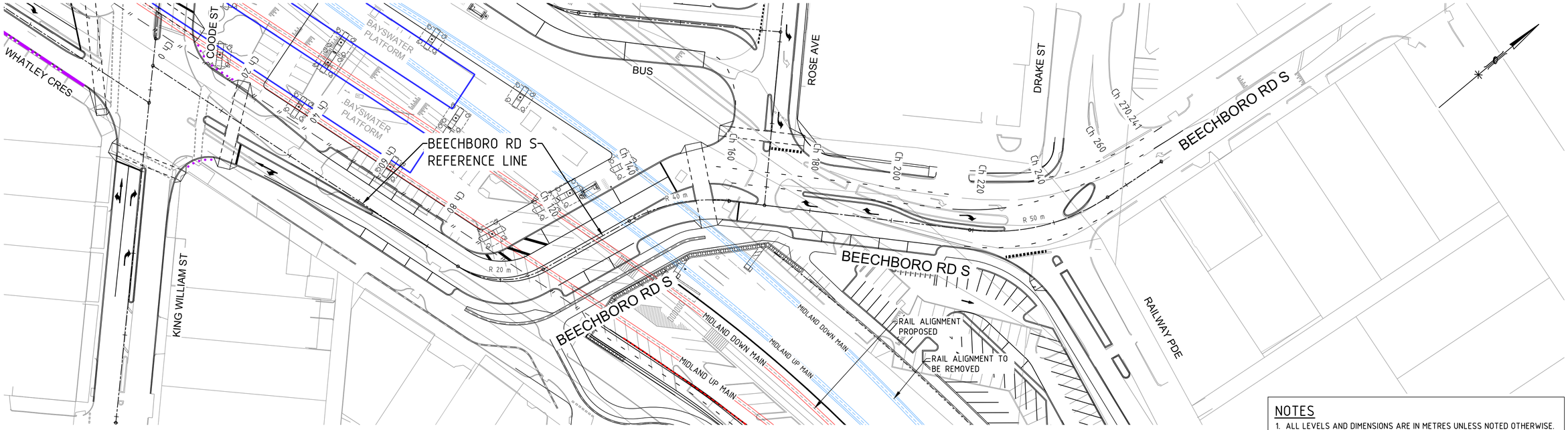
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BAYSWATER STATION

BAYSWATER STATION PRECINCT
PLAN AND PROFILE
WHATLEY CRESCENT - SHEET 3

PTA Drawing No: 12-C-18-0085 Rev: B

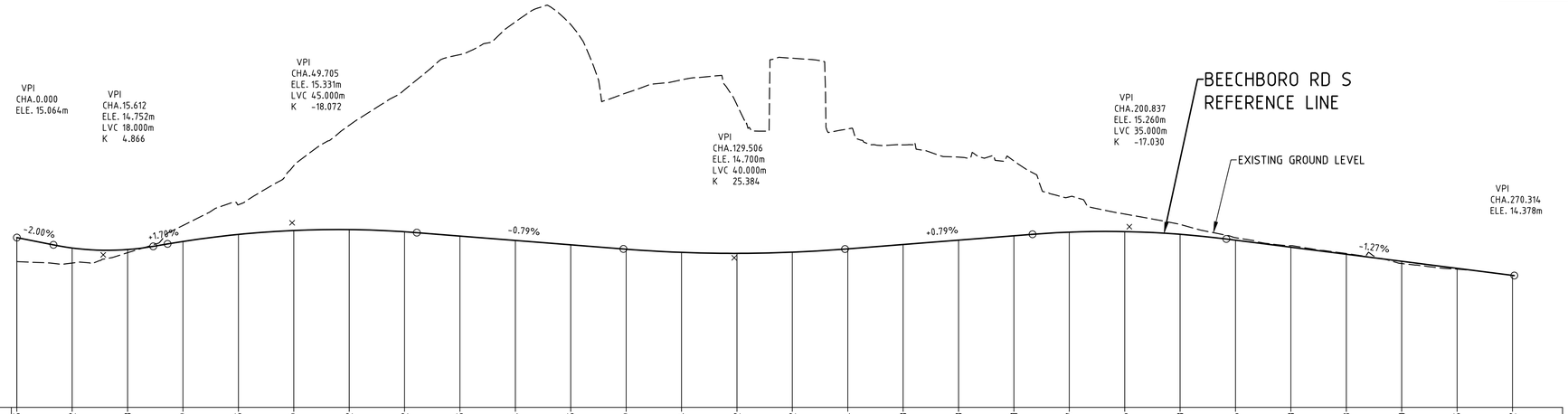
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PLAN
SCALE 1 : 500

NOTES

1. ALL LEVELS AND DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. DRAWINGS TO BE PRINTED IN COLOUR.



DATUM RL 12

CUT / FILL	-0.435	-0.272	-0.058	0.289	0.535	1.169	1.882	2.562	3.275	3.944	3.975	2.819	3.114	2.682	3.502	2.164	1.798	1.498	1.351	0.637	0.316	0.178	0.046	0.028	0.013	-0.040	-0.015	-14.382	
DESIGN SURFACE LEVELS	15.064	14.876	14.848	14.994	15.121	15.192	15.208	15.169	15.091	15.012	14.933	14.854	14.797	14.779	14.800	14.861	14.939	15.018	15.096	15.162	15.172	15.123	15.017	14.890	14.763	14.636	14.509	14.382	
EXISTING SURFACE LEVELS	14.629	14.604	14.790	15.283	15.656	16.362	17.090	17.731	18.366	18.957	18.909	17.673	17.911	17.461	18.302	17.025	16.737	16.516	16.448	15.799	15.488	15.301	15.062	14.917	14.775	14.596	14.493	0.000	
CHAINAGE	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	
HORIZONTAL ALIGNMENT	L=89.122									R=20.000 L=21.861		L=24.085		R=40.000 L=25.243		L=59.084							R=50.000 L=35.231			L=15.735			
VERTICAL ALIGNMENT	G=-2.00% L=6.611		K=4.866 L=18.000	G=1.79% L=2.583	K=-18.072 L=45.000				G=-0.79% L=37.301			K=25.384 L=40.000		G=0.79% L=33.831		K=-17.030 L=35.000			G=-1.27% L=51.978										

PROFILE
SCALE Horz. 1 : 1000
Vert. 1 : 50

1:50 (A1) / 1:100 (A3) 0 0.5m 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5

1:500 (A1) / 1:1000 (A3) 0 5m 10 15 20 25 30 35 40 45 50 55 60 65 70 75

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	29.09.20	ISSUED FOR DA	CW	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	CW	SP		

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

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REFERENCES

SCALE
AS SHOWN

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED CW
DRAWN SP
CHECKED
APPROVED
DATE

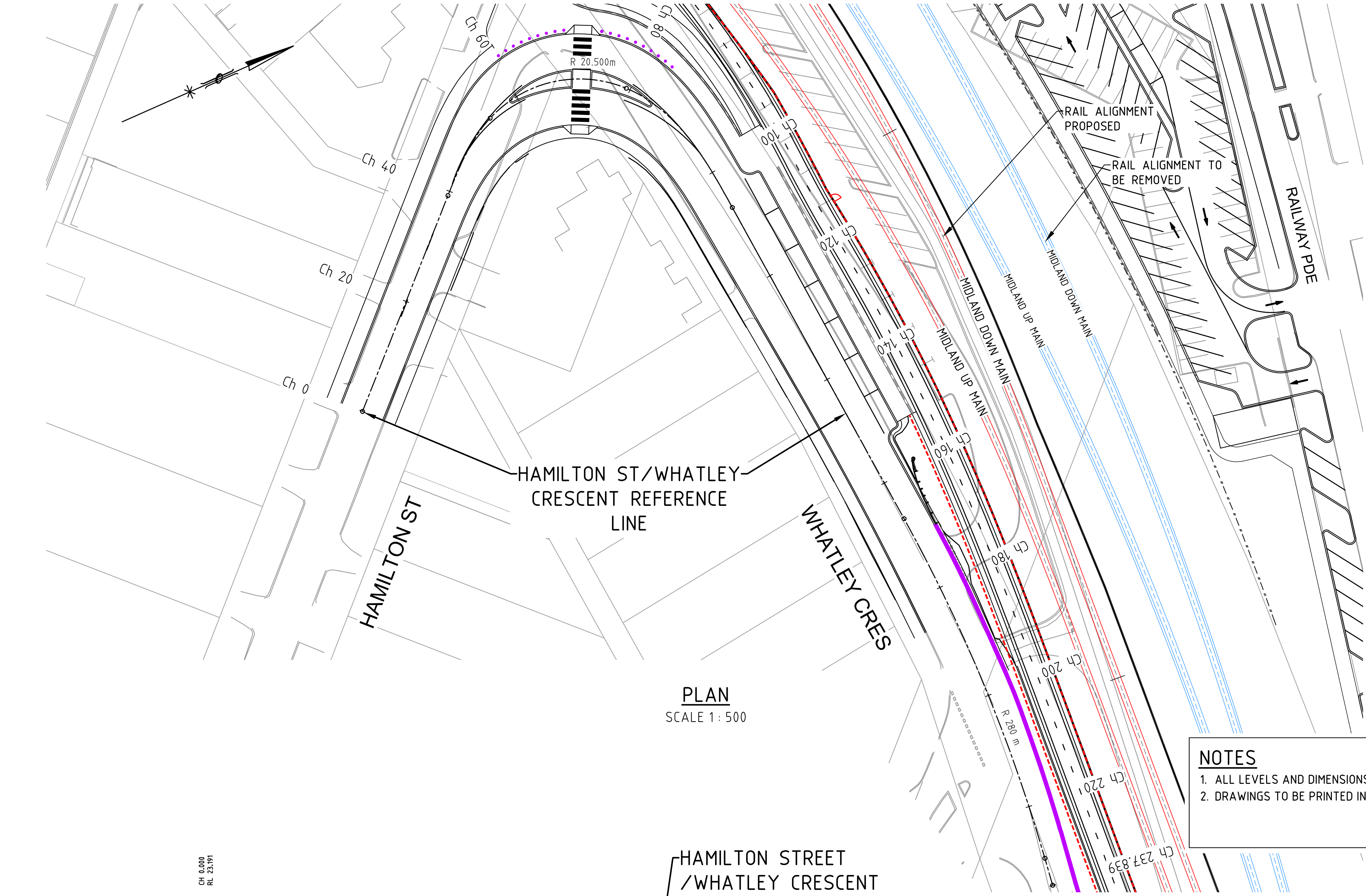
Government of Western Australia
Public Transport Authority

BAYSWATER STATION

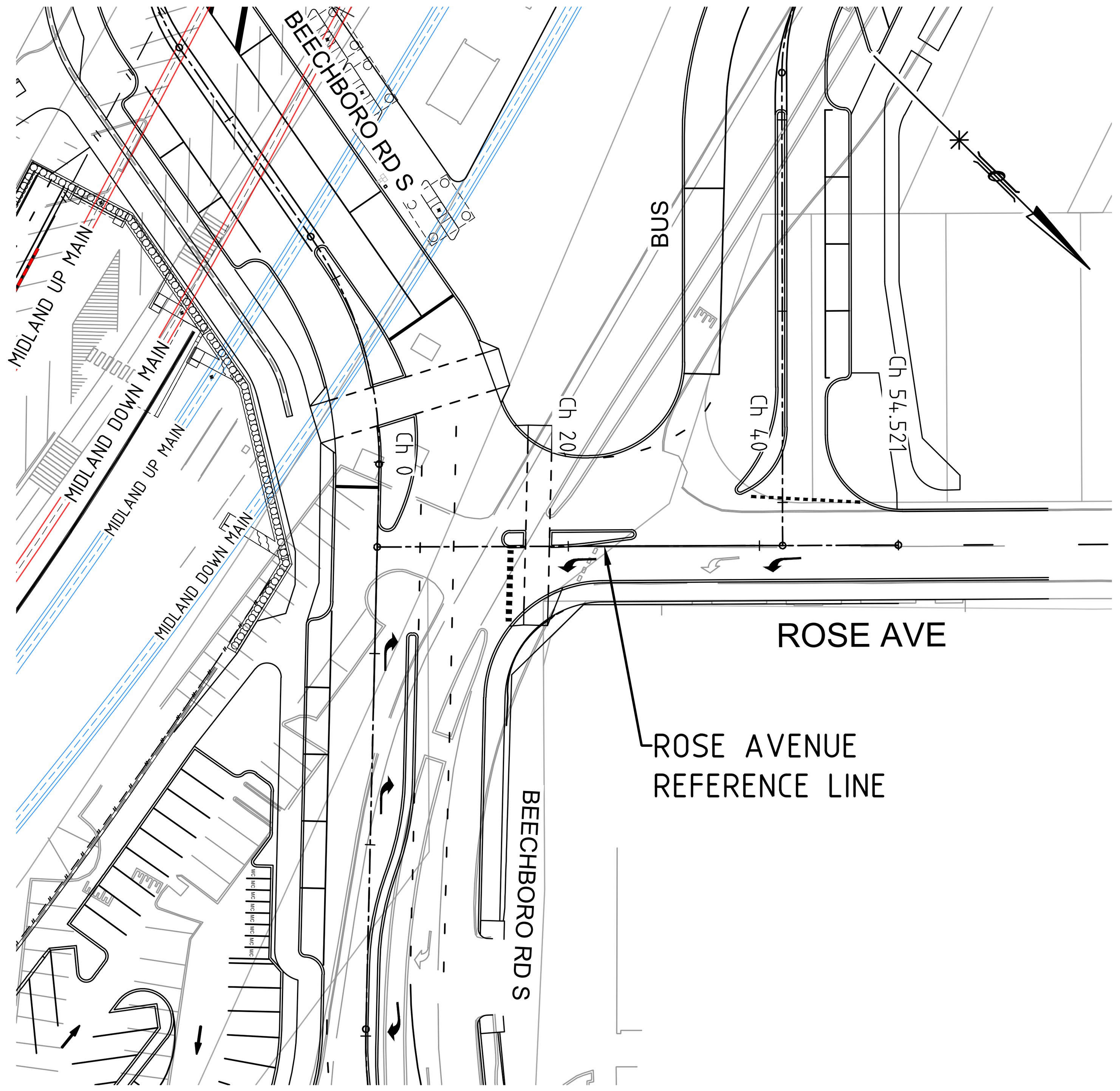
BAYSWATER STATION PRECINCT
PLAN AND PROFILE
BEECHBORO ROAD SOUTH

PTA Drawing No: 12-C-18-0086 Rev: B

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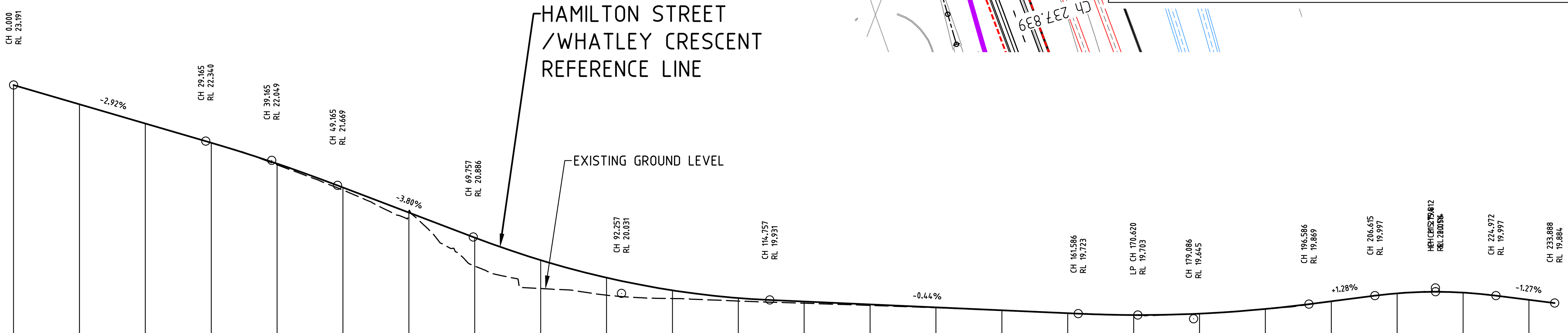


PLAN
SCALE 1 : 500



PLAN
SCALE 1 : 500

NOTES
1. ALL LEVELS AND DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. DRAWINGS TO BE PRINTED IN COLOUR.



DATUM RL 19

CUT / FILL	-23.191	-22.899	-22.608	-0.001	-0.017	-0.038	0.018	-0.431	-0.431	-0.264	-0.125	-0.045	-0.026	-0.014	-0.006	-0.002	0.003	-0.003	0.001	-0.003	-0.005	-0.003	-0.002	-0.000	0.000
DESIGN SURFACE LEVELS	23.191	22.899	22.608	22.316	21.998	21.637	21.257	20.877	20.536	20.270	20.078	19.961	19.908	19.863	19.819	19.774	19.730	19.703	19.725	19.795	19.912	20.032	20.043	19.933	0.000
EXISTING SURFACE LEVELS	0.000	0.000	0.000	22.315	21.981	21.598	21.275	20.446	20.105	20.005	19.953	19.916	19.882	19.850	19.813	19.772	19.733	19.699	19.726	19.793	19.908	20.029	20.041	19.933	0.000
CHAINAGE	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	250

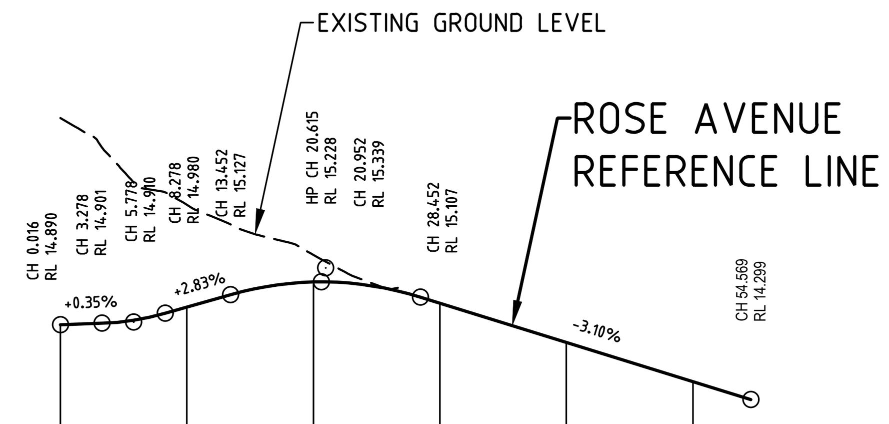
HORIZONTAL ALIGNMENT: L=39.223 | Ls = 15.000 | R=20.500 L=25.089 | Ls = 27.500 | L=60.073 | R=280.000 L=62.256 | L=4.746

VERTICAL ALIGNMENT: G=-2.92% L=29.165 | K=-22.664 L=20.000 | G=-3.80% L=20.592 | K=13.410 L=45.000 | G=-0.44% L=46.828 | K=20.327 L=35.000 | G=1.28% L=10.029 | K=-7.200 L=18.358 | G=-1.27% L=8.915

1:50 (A1) / 1:100 (A3) 0 0.5m 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5

PROFILE
SCALE Horz. 1 : 1000
Vert. 1 : 50

1:500 (A1) / 1:1000 (A3) 0 5m 10 15 20 25 30 35 40 45 50 55 60 65 70 75



DATUM RL 8

CUT / FILL	1.631	0.807	0.215	-15.059	-14.749	-14.440
DESIGN SURFACE LEVELS	14.890	15.029	15.227	15.059	14.749	14.440
EXISTING SURFACE LEVELS	16.521	15.836	15.442	0.000	0.000	0.000
CHAINAGE	0	10	20	30	40	50

HORIZONTAL ALIGNMENT: L=54.521

VERTICAL ALIGNMENT: G=0.35% | G=2.83% | K=-2.532 L=15.000 | G=-3.10% L=26.117

PROFILE
SCALE Horz. 1 : 1000
Vert. 2 : 200

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	29.09.20	ISSUED FOR DA	CW	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	CW	SP		

ORIG SIZE A1 — 0 10 20 30 40 50 100mm AT ORIGINAL PLOT SIZE

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REFERENCES

SCALE: AS SHOWN

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED CW
DRAWN SP
CHECKED
APPROVED
DATE

Government of Western Australia
Public Transport Authority

BAYSWATER STATION

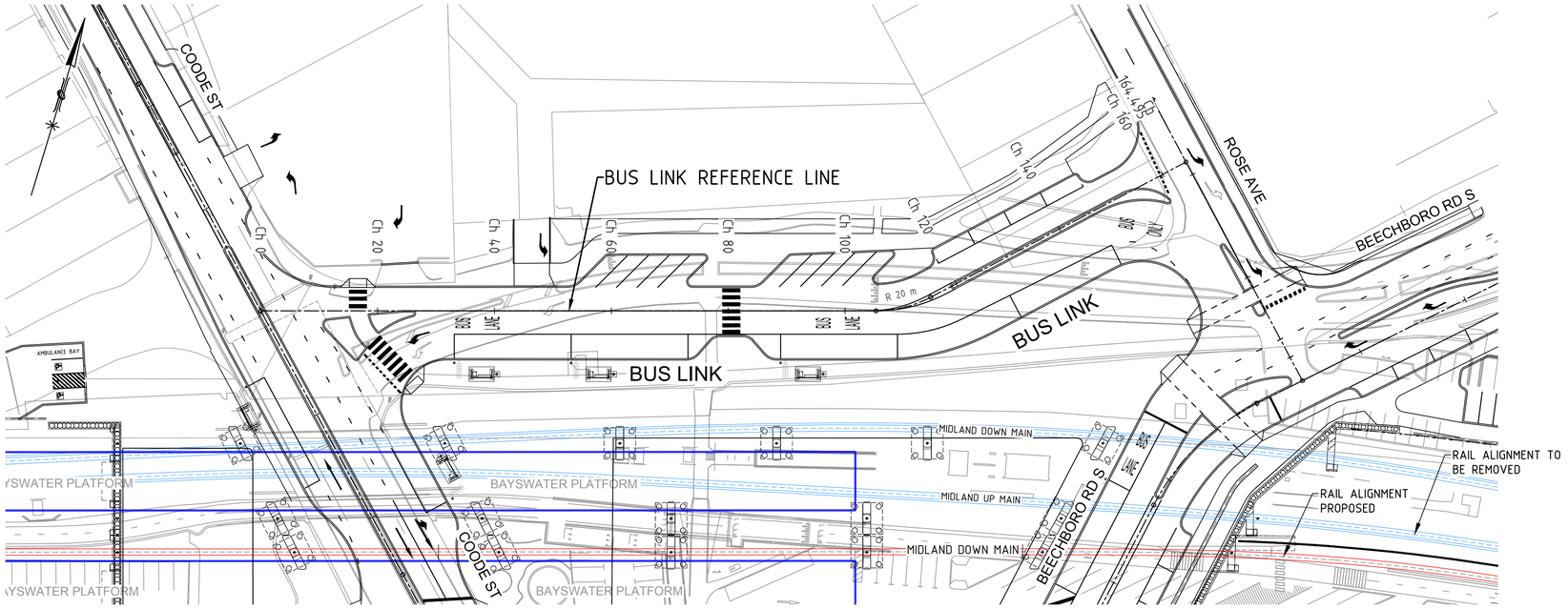
BAYSWATER STATION PRECINCT
PLAN AND PROFILE
HAMILTON STREET / WHATLEY CRESCENT

PTA Drawing No: 12-C-18-0087 Rev: B

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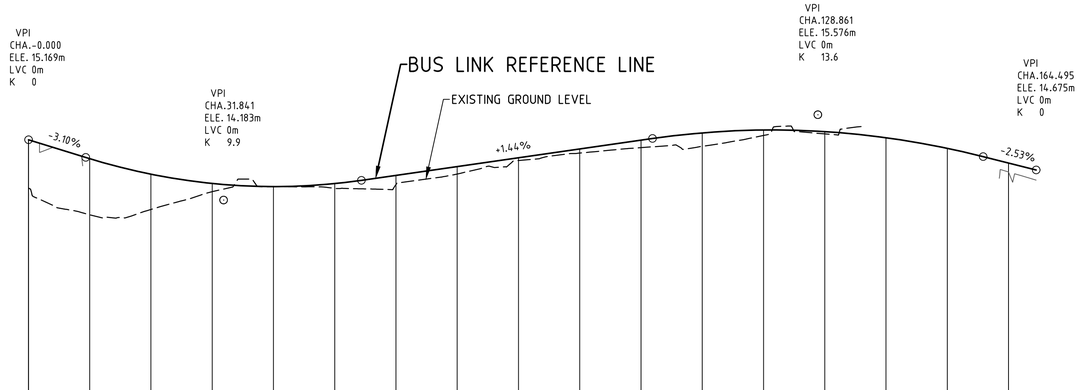
NOTES

1. ALL LEVELS AND DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. DRAWINGS TO BE PRINTED IN COLOUR.



PLAN

SCALE 1 : 500



DATUM RL 11

CUT / FILL	-0.788	-0.915	-0.576	-0.134	-0.004	-0.078	-0.150	-0.121	-0.045	-0.067	-0.122	-0.219	-0.090	-0.038	-15.202	-15.029	-14.788			0.000
DESIGN SURFACE LEVELS	15.169	14.860	14.607	14.455	14.404	14.454	14.588	14.731	14.875	15.018	15.162	15.281	15.328	15.302	15.202	15.029	14.788			0.000
EXISTING SURFACE LEVELS	14.381	13.945	14.032	14.321	14.400	14.376	14.438	14.610	14.829	14.951	15.040	15.062	15.239	15.264	0.000	0.000	0.000			0.000
CHAINAGE	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160			200
HORIZONTAL ALIGNMENT	L=105.314											R=20.000 L=9.744			L=49.438					
VERTICAL ALIGNMENT	G=-3.10% L=9.366	K=9.900 L=45.000						G=1.44% L=47.530				K=13.600 L=53.966					G=-2.53% L=8.855			

PROFILE

SCALE Horz. 1 : 1000
Vert. 1 : 50

1:500 (A1) / 1:1000 (A3) 0 5m 10 15 20 25 30 35 40 45 50 55 60 65 70 75

1:50 (A1) / 1:100 (A3) 0 0.5m 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	29.09.20	ISSUED FOR DA	CW	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	CW	SP		

ORIG SIZE A1 — 0 10 20 30 40 50 100mm — AT ORIGINAL PLOT SIZE

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REFERENCES

SCALE: AS SHOWN

DATUM: HORIZONTAL: PCG94 VERTICAL: AHD71

DESIGNED CW
DRAWN SP
CHECKED
APPROVED
DATE

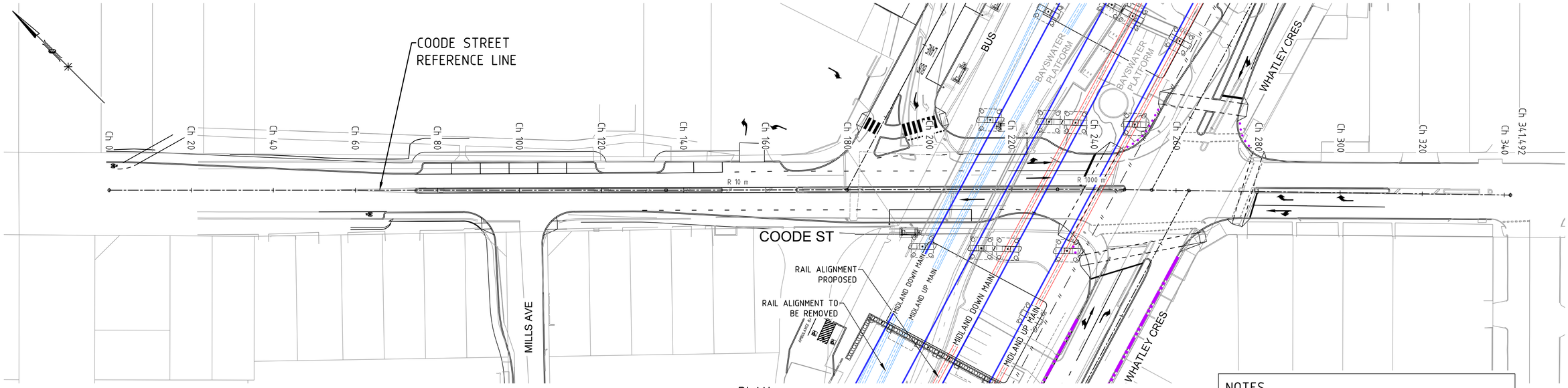
Government of Western Australia Public Transport Authority

BAYSWATER STATION

BAYSWATER STATION PRECINCT
PLAN AND PROFILE
BUS LINK

PTA Drawing No: 12-C-18-0089 Rev: B

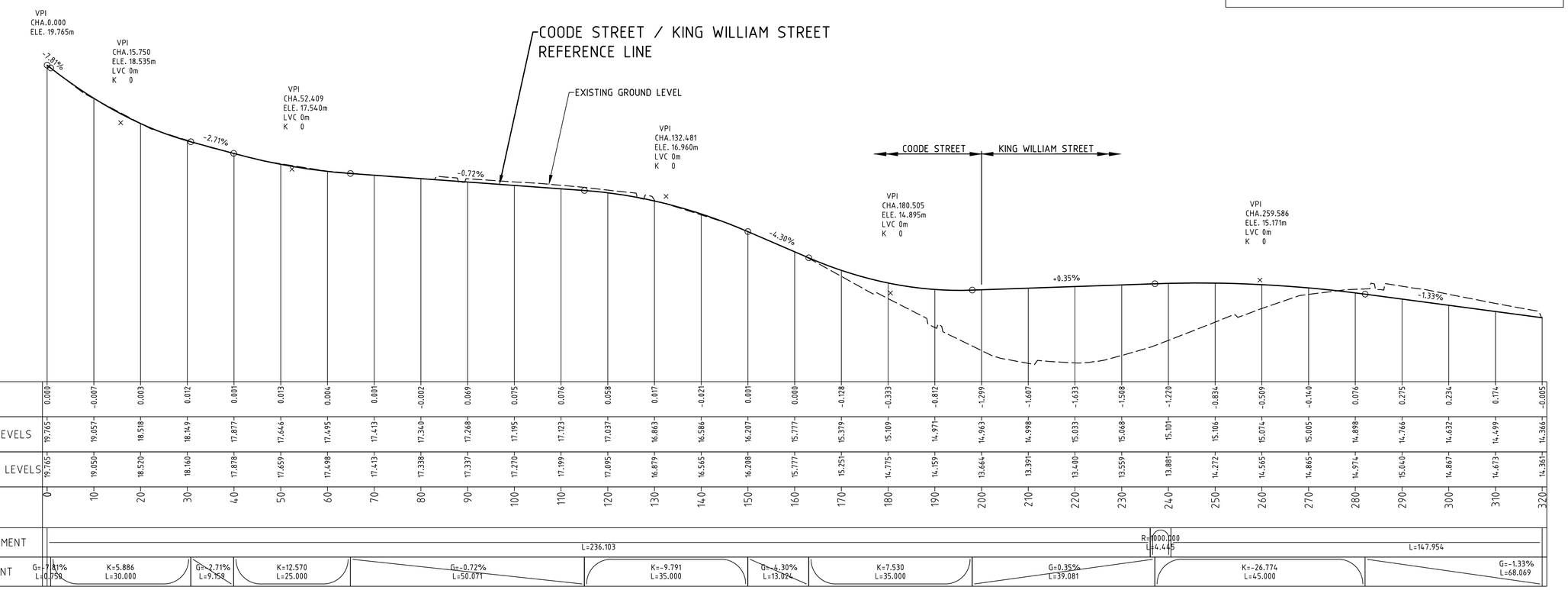
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PLAN
SCALE 1 : 500

NOTES

1. ALL LEVELS AND DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. DRAWINGS TO BE PRINTED IN COLOUR.



PROFILE
SCALE Horz. 1 : 1000
Vert. 1 : 50

1:50 (A1) / 1:100 (A3) 0 0.5m 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5

1:500 (A1) / 1:1000 (A3) 0 5m 10 15 20 25 30 35 40 45 50 55 60 65 70 75

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	29.09.20	ISSUED FOR DA		CW	SP	RH
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN		CW	SP	RH

ORIG SIZE A1 — 0 10 20 30 40 50 100mm AT ORIGINAL PLOT SIZE

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REFERENCES

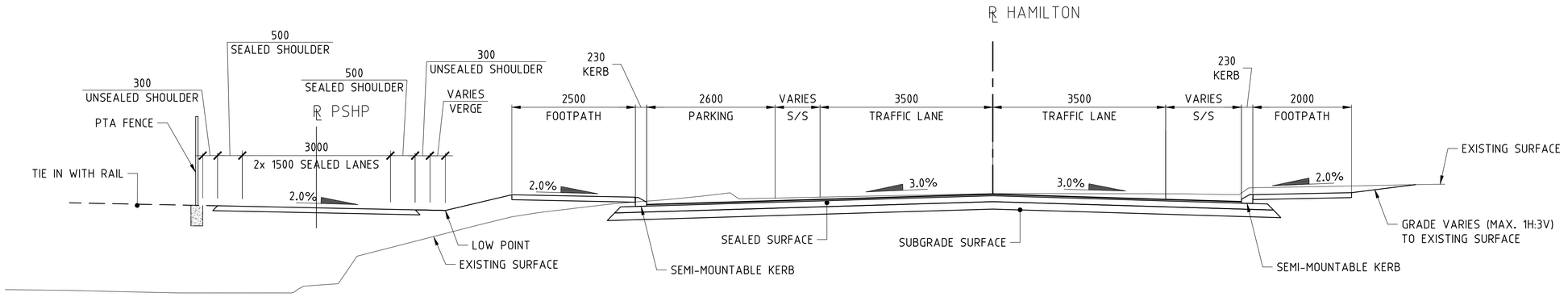
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DATUM PCG94 HORIZONTAL: AHD71 VERTICAL:

DESIGNED CW
DRAWN SP
CHECKED
APPROVED
DATE

Government of Western Australia Public Transport Authority

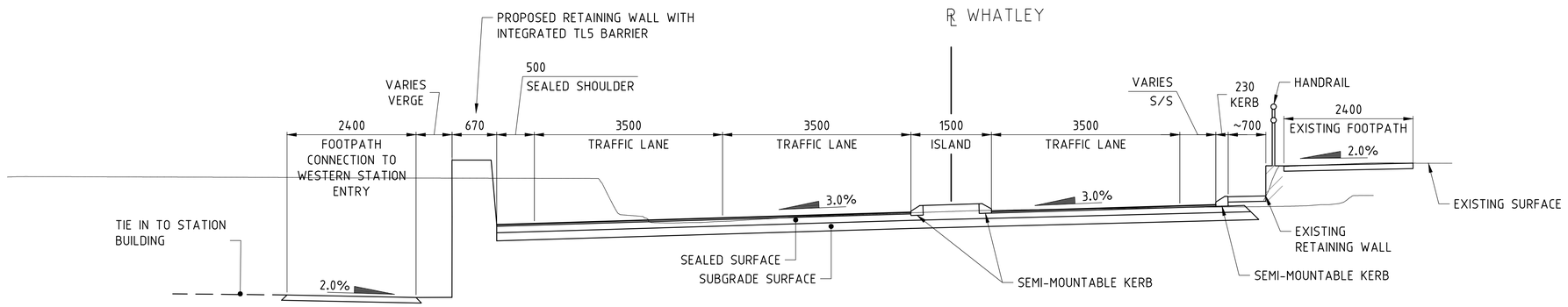
BAYSWATER STATION
BAYSWATER STATION PRECINCT
PLAN AND PROFILE
COODE STREET / KING WILLIAM STREET - SHEET 1
PTA Drawing No: 12-C-18-0090 Rev: B

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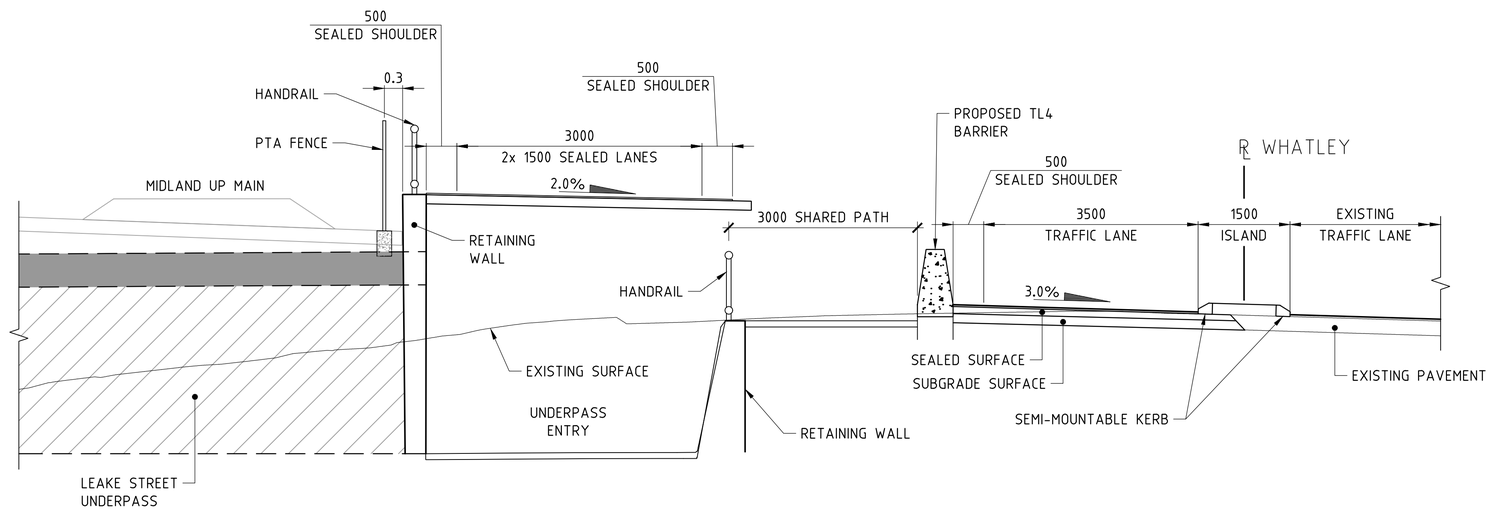
TYPICAL CROSS SECTION PSP - HAMILTON STREET / WHATLEY CRESCENT

SCALE 1 : 50



TYPICAL CROSS SECTION LINK PATH - WHATLEY CRESCENT

SCALE 1 : 50



TYPICAL CROSS SECTION PSP - UNDERPASS LINK PATH - WHATLEY CRESCENT

SCALE 1 : 50 1:50 (A1) / 1:100 (A3) 0 0.5m 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	29.09.20	ISSUED FOR TURNBACK INITIAL DETAILED DESIGN	CW	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	CW	SP		

ORIG SIZE A1

0 10 20 30 40 50 100mm

AT ORIGINAL PLOT SIZE

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REFERENCES

SCALE 1:50

DATUM
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VERTICAL: AHD71

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CHECKED
APPROVED
DATE

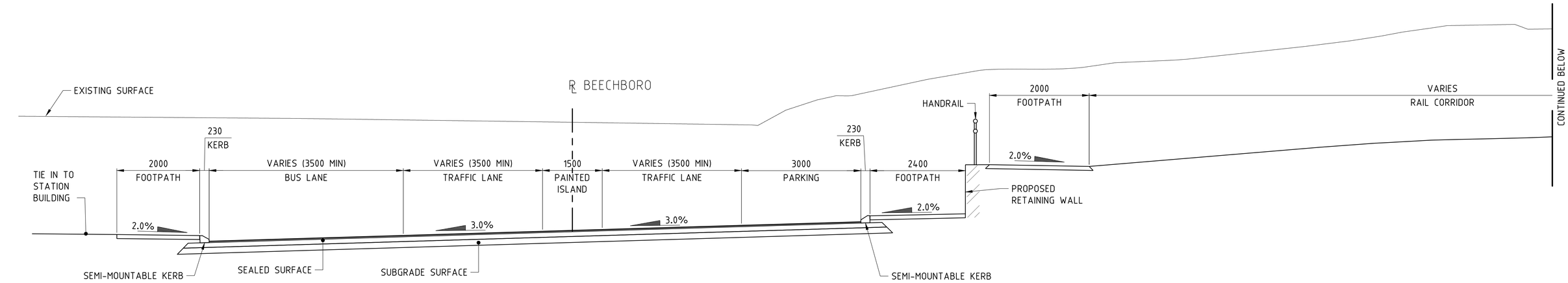
Government of Western Australia
Public Transport Authority

BAYSWATER STATION

BAYSWATER STATION PRECINCT
TYPICAL ROAD CROSS SECTIONS
SHEET 1

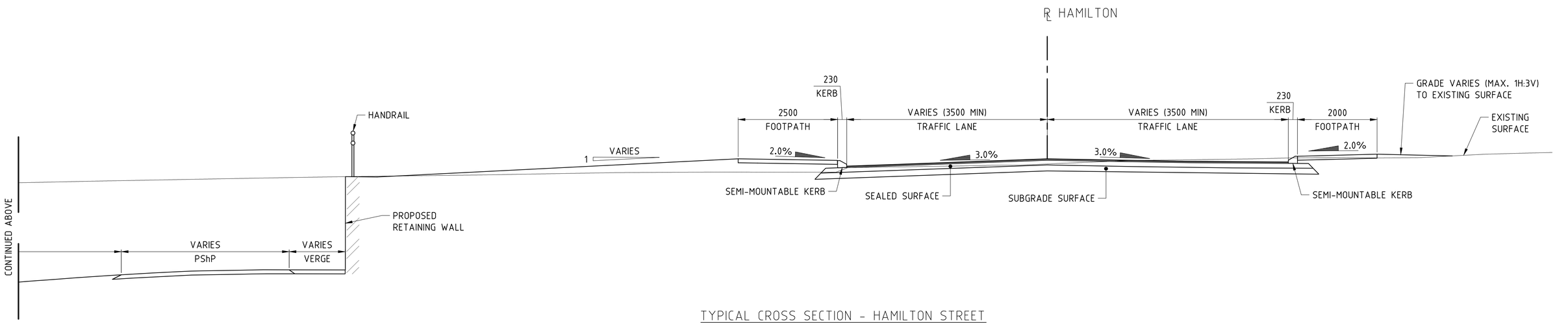
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TYPICAL CROSS SECTION BEECHBORO SOUTH

SCALE 1 : 50



TYPICAL CROSS SECTION - HAMILTON STREET

SCALE 1 : 50

1:50 (A1) / 1:100 (A3) 0 0.5m 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	29.09.20	ISSUED FOR DA	CW	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	CW	SP		

ORIG SIZE A1 — 0 10 20 30 40 50 100mm AT ORIGINAL PLOT SIZE

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REFERENCES

SCALE 1:50

DATUM
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VERTICAL: AHD71

DESIGNED CW
DRAWN SP
CHECKED
APPROVED
DATE

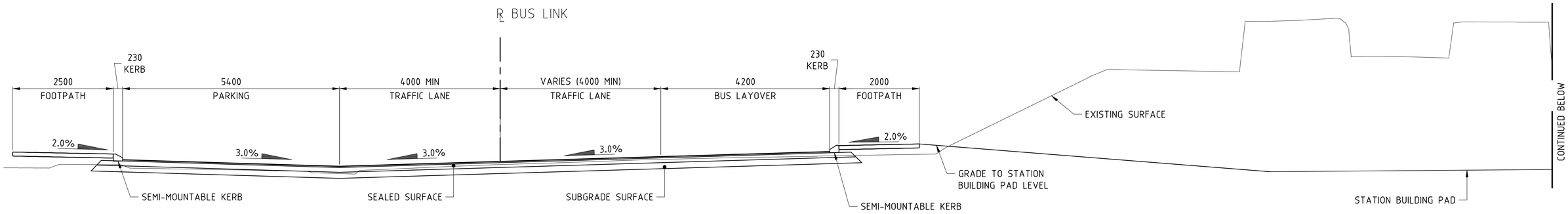
Government of Western Australia
Public Transport Authority

BAYSWATER STATION

BAYSWATER STATION PRECINCT
TYPICAL ROAD CROSS SECTIONS
SHEET 2

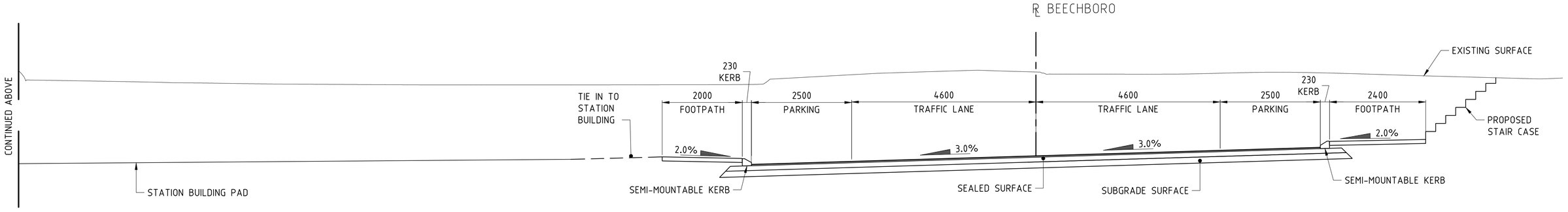
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TYPICAL CROSS SECTION BUS LINK - STATION BUILDING - BEECHBORO SOUTH

SCALE 1 : 50



TYPICAL CROSS SECTION BUS LINK - STATION BUILDING - BEECHBORO SOUTH

SCALE 1 : 50

1:50 (A1) / 1:100 (A3) 0 0.5m 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	29.09.20	ISSUED FOR DA	CW	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	CW	SP		

ORIG SIZE A1 — 0 10 20 30 40 50 100mm AT ORIGINAL PLOT SIZE

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REFERENCES

SCALE 1:50

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED CW
DRAWN SP
CHECKED
APPROVED
DATE

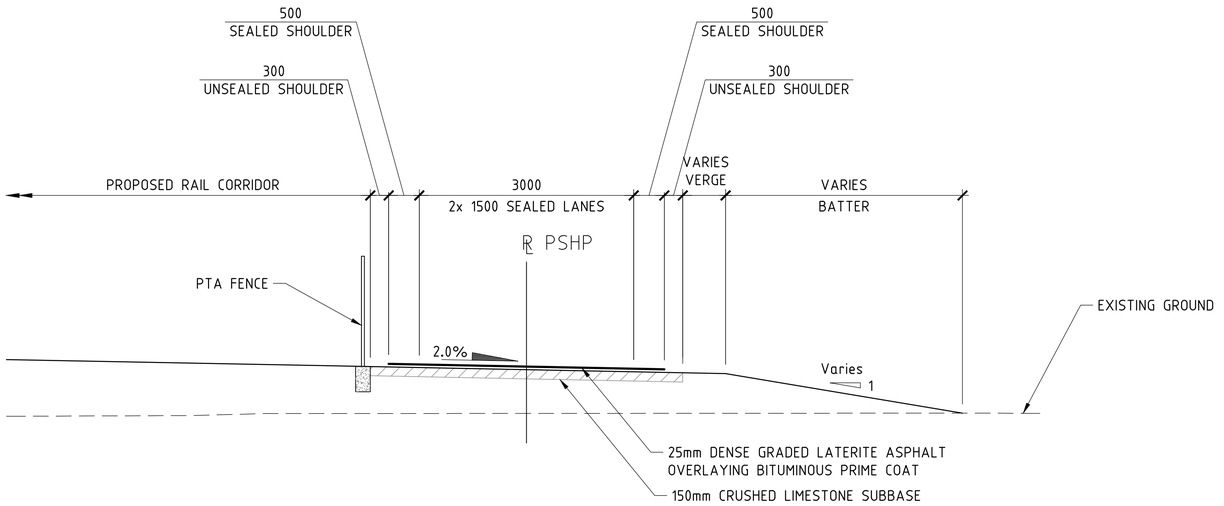
Government of Western Australia Public Transport Authority

BAYSWATER STATION

BAYSWATER STATION PRECINCT
TYPICAL ROAD CROSS SECTIONS
SHEET 3

PTA Drawing No: 12-C-18-0114 Rev: B

CAD DRAWING PATHNAME P:\P17275.01 BAYSWATER STATION ALLIANCE DETAILED DESIGN\100 DRAWINGS\102 Civil & Water\AutoCAD\12-C-18-0114.dwg



TYPICAL CROSS SECTION - PRINCIPAL SHARED PATH (PSHP)

SCALE 1 : 50

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REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	29.09.20	ISSUED FOR DA	CW	SP		
A	19.08.20	ISSUED FOR INITIAL DETAILED DESIGN	CW	SP		

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

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REFERENCES

SCALE 1:50

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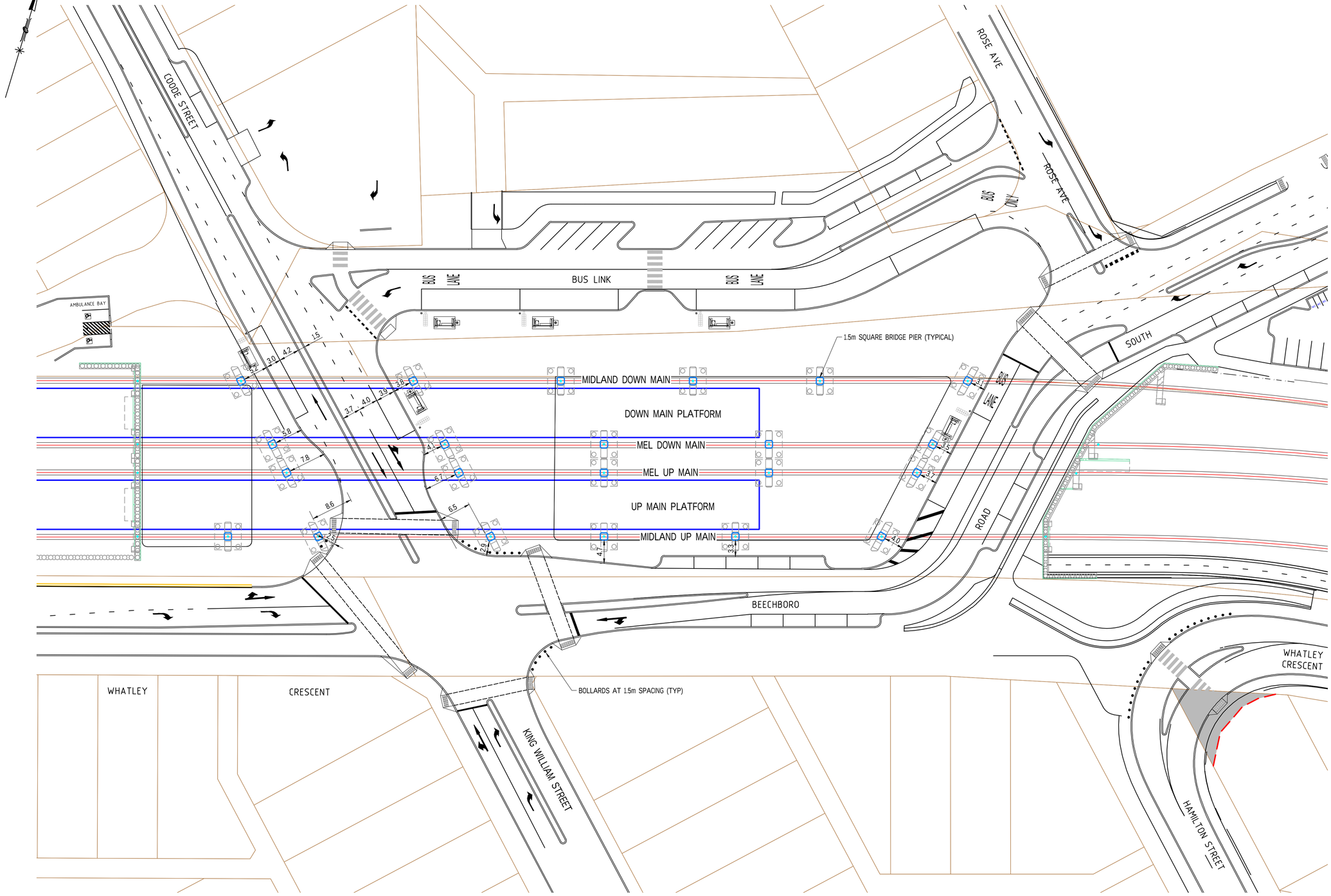
Government of Western Australia
Public Transport Authority

BAYSWATER STATION

BAYSWATER STATION PRECINCT
TYPICAL ROAD CROSS SECTIONS
SHEET 4

PTA Drawing No: 12-C-18-0115 Rev: B

CAD DRAWING PATHNAME P:\P17275.01 BAYSWATER STATION ALLIANCE DETAILED DESIGN\100 DRAWINGS\102 Civil & Water\AutoCAD\12-C-18-0115.dwg



PLAN
1:400

NOTES

1. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.
2. CLEAR ZONE FOR 40km/h POSTED SPEED LIMIT IS 5.0m WHERE ADT > 600, AS PER AGRD PART 6.
3. CLEAR ZONE FOR 40km/h POSTED SPEED LIMIT IS 3.0m WHERE ADT < 750, AS PER AGRD PART 6.

LEGEND

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B	01.10.20	ISSUED FOR INFORMATION	CW	SP		
A	17.09.20	ISSUED FOR INFORMATION	CW	SP		

ORIG SIZE A1

0 10 20 30 40 50 100mm
AT ORIGINAL PLOT SIZE

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REFERENCES

SCALE 1:400

DATUM
HORIZONTAL: PCG94
VERTICAL: AHD71

DESIGNED CW
DRAWN SP
CHECKED
APPROVED
DATE

Government of Western Australia
Public Transport Authority

BAYSWATER STATION

PLAN
BRIDGE PIER CLEARANCE

PTA Drawing No: DP200-SKT-0003 Rev: B

CAD DRAWING PATHNAME C:\users\cdeyzel\appdata\local\projectwise\jacobs_anz_ie\d0389893\PTA_A1_EVOLVE.dwg

Appendix E

Sustainability Management Plan prepared by Evolve Bayswater

Sustainability Management Plan

BST-EVO-EN-PLN-00004 (PTA DOCUMENT NUMBER)

Contractor Name	evolve bayswater *connecting people + places*				
Contractor Document No.	BST-EVO-EN-PLN-00004				
Contractor Revision	0	**No. of Pages**	36	**Contract No.**	PTA190037

PTA Revision	Submission Date	Description	Evolve Representative Approval	PTA Representative Approval
0	20/08/2020	Issued for Approval	Travis Tremain	

Status Information		
Approval Status	**TeamBinder Code**	**Description**
☐ **APPROVED**	**APP**	Work may proceed and no additional changes required
☐ **CONDITIONALLY APPROVED**	**CAPP**	Work may proceed for the portions not subjected to conditions or comments specified in the Review Comment Sheet. The document shall be revised and resubmitted for final approval within the timeframe specified by the Principal in the Review Comment Sheet.
☐ **ACCEPTED**	**ACC**	The design may proceed for the related design works and no additional changes required.
☐ **ACCEPTED WITH AMENDMENTS**	**ACC-AMD**	The design may proceed for the related design works. The design deliverable shall be amended and resubmitted for final acceptance within the time frame specified by the Principal in the Review Comment Sheet.
☐ **REJECTED, REVISE AND RESUBMIT**	**REJ-RSB**	The document contains significant gaps, errors and/or departures compared with the Contract requirements. The document shall be revised and resubmitted for approval before work may proceed.
☐ **REJECTED**	**REJECTED**	The document contains significant gaps, errors and/or departures compared with the Contract requirements. For quality reasons, PTA have declined to conduct a formal review of this submission.

NB: AUTHORISATION TO PROCEED DOES NOT RELIEVE THE CONTRACTOR OF ANY RESPONSIBILITY OR LIABILITY UNDER THE CONTRACT/PO

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BAYSWATER STATION AND TURNBACK

PTA190037

SUSTAINABILITY MANAGEMENT PLAN

BST-EVO-EN-PLN-00004

AUTHORISED TO USE: _____ (ALLIANCE MANAGER), DATE: 20/08/20

Submit to Client for Review and Approval where required in the Contract (Client to complete one box only):			
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Rev	Date	Reason for Issue	Prepared	Checked	Approval
0	20/08/2020	Issued for Approval	K.O'Mara	T.Dunsire	T.Tremain
C	05/08/2020	Revised in response to comments	K.O'Mara	T.Tremain	J.Flowerdew
B	14/07/2020	Draft – for Review	K.O'Mara	T.Tremain	J.Flowerdew
A	04/12/2019	Draft - Issued for Comment	K.O'Mara	T.Tremain	J.Flowerdew

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Compliance and Obligations Register

SWTC Reference	Description	Section in this Plan
Book 2: Management Plan Requirements (BST-PTAWA-PM-RPT-00010)		
Section 8.7.1 i E)	Annual third party environmental compliance and sustainability management system (this plan) audits commissioned by the PTA's representative.	Section 9.2
Section 24.1.1	The Alliance must implement the Works in a way which considers social, environmental and economic aspects across the whole of the Assets life. The Alliance must prepare, implement and maintain a SuMP that identifies how the Alliance will manage sustainability for all phases of the Project including design, approvals, construction, Commissioning and Handover. The SuMP must be prepared in consultation with all relevant Stakeholders; and relevant feedback must be incorporated into the plan. The SuMP will provide a framework for management of sustainability objectives and initiatives.	Section 6.0
Section 24.1.2	The SuMP must identify and detail specific actions the Alliance will undertake to: i. fulfil the objectives of the sustainability management plan; ii. maintain and verify compliance to legislation standards and guidelines relevant to sustainable design and delivery; iii. implement and maintain the use of a central database (system of tracking) for records associated with sustainability pans and sub plans; and iv. review and update the SuMP (and any sub-plans) at key Project Milestones (i.e. design delivery milestones and construction commencement).	i. Section 4.0, Section 2.0 and Section 3.0 ii. Section 3.0 and Section 3.1 iii. Section 6.1 and Section 8.1 iv. Section 10.0
Section 24.2	The Alliance must outline in the SuMP how the Alliance will achieve the Green Star rating requirements.	Section 2.2.1
Section 24.3	The Alliance must outline in the SuMP how the Alliance will adopt and work towards achieving the METRONET Sustainability Objectives as outlined in the METRONET Sustainability Strategy (BST-MET-PM-RPT-00001)	Section 3.1
Section 24.4	The Alliance must coordinate a sustainability alignment workshop at Project commencement (within 30 days of contract award) with relevant PTA Stakeholders and members of the Alliance team.	Section 6.2.1
Section 24.5.1	The Alliance must outline in the SuMP a procedure to be followed for the assessment and ongoing management of environmental, social and economic opportunities. The procedure must provide for the initial assessment of opportunities at commencement of the Project along with a decision process for the definition of associated sustainability initiatives for implementation. The procedure must provide for the input of relevant PTA Stakeholders through the assessment process, including approval of any identified sustainability initiatives for implementation.	Section 6.1.1 and Section 6.1.2
Section 24.6.1	The Alliance must ensure that a full-time sustainability manager with a minimum of five years relevant experience is appointed	Section 5.1 and Section 5.2

	from the Date of this Agreement for the full duration of the Project and reports directly to the Alliance Manager. The relevant person is to be approved by the PTA.	
Section 24.6.2	Relevant Sustainability accountabilities are also to be documented for other Alliance leaders including: i. Alliance Manager; ii. Procurement Lead; iii. Design Lead; iv. Construction Lead; v. Environmental Lead; vi. Community Lead; vii. Stakeholder Engagement Lead; viii. Workforce Development and Training Lead or similar; and ix. Industry Participation Lead.	Section 5.0
Section 24.6.3	These leaders must also participate in a Sustainability Leadership Committee which must be held every two months in conjunction with the PTA.	Section 8.3
Section 24.7.1	The Alliance must prepare a Whole of Life Improvement Strategy as a sub-plan of the SuMP, to document its strategy to achieve whole of life cost savings, a reduced environmental footprint from materials used and overall resource efficiency improvement through Asset design.	Section 2.2.2
Section 24.7.2	The whole of life improvement strategy must include: i. high impact materials to be procured to deliver the Asset design; ii. design response opportunities to reduce high impact materials use; iii. key components of the Asset system resulting in operational costs and resource use (ie. energy usage, water use and maintenance needs); iv. design response opportunities to improve operational efficiency (in particular for energy, water and materials); v. clear definition of costs v. and benefits (including economic, social, environmental) associated with the identified design response opportunities; and vi. vi. a process for ongoing tracking and decision making during design for initiatives with resultant whole of life benefits.	Section 2.2.2
Section 24.8	The Alliance must prepare within three months (90 days) of contract award a Construction Resource Efficiency and Waste Management Plan, as a sub plan of the SuMP, which must include: i. an estimate of resource consumption during the construction phase, including energy use, water and materials; ii. predicted waste generation, including quantified by waste stream and materials where possible; iii. high impact procurement and suppliers associated with resource use; iv. targets for resource efficiency in delivery (covering energy, water, materials and waste), noting specific initiatives to deliver reduced resource use; and v. a management plan to achieve waste diversion and recovery targets aligned to the Waste Avoidance and	Section 2.2.3

	Resource Recovery Strategy 2030 (Western Australian Waste Authority 2019)..	
Section 24.9	The Alliance must utilise information provided by the PTA, and work with the PTA to finalise the following items during Reference Design to the PTA's satisfaction: i. resilience risk assessment and action plan, considering the broader Station Precinct and future proofing for changing transport modes and technologies; ii. climate and natural hazards risk assessment and adaptation plan; iii. landscape design objectives and targets, with specific consideration for amenity, tree canopy cover, environmental values, maintenance and security; and iv. water management strategy options assessment, including considering options for water sensitive urban design, water efficiency and reduced potable water use.	i. Section 2.2.5 ii. Section 2.2.6 iii. Section 4.0 iv. Section 2.2.4
Section 24.10.1	The Alliance must review with the PTA the key risks and opportunities for maximising sustainable outcomes through procurement as part of developing the Sustainability Plan and sub-plans, including: i. resource efficiency and whole of life improvements for use of energy, water and materials; ii. waste avoidance, recovering and management; iii. use of environmentally labelled products and suppliers; and iv. local content (workforce and businesses).	Section 2.2.7
Section 24.10.2	The assessment of sustainable procurement opportunities and defined management measures (i.e. initiatives) must be captured through the process defined for in this Book 2 - section 24.5.	Section 2.2.7
Section 24.10.3	The Alliance must consult with the PTA on any procurement mechanisms and management measures to be implemented to help maximise sustainable outcomes and the realisation of the METRONET Sustainability Commitment Statement Objectives.	Section 2.2.7
Section 24.10.4	The Alliance must document the sustainable procurement management measures to be implemented in the SuMP, or relevant sub-plan as suitable.	Section 2.2.7
Section 24.11.1	The Alliance must coordinate quarterly sustainability progress meetings with the PTA to review the Alliance's performance against activities set out in the SuMP. The progress meeting must also include a review of progress against the METRONET Sustainability Commitment Statement Objectives and any relevant sustainability opportunities and defined sustainability initiatives.	Section 8.5
Section 24.11.2	The Alliance must capture the progress meeting discussion and any agreed actions via the provision of meeting minutes to the PTA.	Section 8.5 and Section 7.0
Section 24.11.3	The Alliance sustainability manager must coordinate quarterly sustainability audits against the agreed SuMP. Outcomes from the audit must be captured in a formal Audit Report and provided to the PTA ahead of the sustainability progress meetings.	Section 9.1
Section 24.12	The Alliance must propose and agree with PTA, and report on, quarterly sustainability performance measures. As a minimum, performance measures must include:	Section 8.48.2

	i. significant design decisions, highlighting associated environmental, social and economic benefits or disadvantage; ii. identified sustainability opportunities and the status of any progressed sustainability initiatives; iii. construction resource consumption (aligned to estimates/predictions) and management: a. energy use and carbon emissions (including total metrics and disaggregated into key end uses aligned with the greenhouse gas b. protocol corporate accounting and reporting standard); c. water use and quality (including total metric and disaggregated by each source); d. materials quantities (disaggregated into key material types); e. generated waste quantities (disaggregated into key waste streams); and f. waste recovery (landfill diversion total % and any % on-site reuse).	
Section 24.12.2	The Alliance must prepare an Annual Sustainability Report for the Project to support PTA and METRONET program reporting. The Annual sustainability Report format must align with the METRONET Sustainability Strategy ~~(in draft)~~.	Section 8.6
Book 3: Part A – Scope of Works (BST-PTAWA-PM-RPT-00013)		
Section 1.3 Table 2, Page 39	Lifecycle assessment model assessment Initial model with Reference Design. Model review at Initial Detailed Design, Public Realm Detailed Design and Developed Detailed Design	Section 6.4
Section 1.3 Table 2, Page 39	Design Decision Register Initial register with Reference Design. Relevant design decisions impacting LCA captured in decision register at Initial, Public Realm and Developed detailed design. Final decision register presented at Final Detailed Design.	Section 6.1.3
Section 1.3 Table 2, Page 39	Green Star Assessment Strategy Prepared with Reference Design	Section 2.2.1
Section 1.3 Table 2, Page 39	Whole-of Project Sustainability Performance Report (Design) Final Detailed Design	Section 6.4
Section 1.3 Table 2, Page 39	Whole-of Project Sustainability Performance Report (Construction and Asset Completion) As Constructed	Section 6.4
Section 1.4 Table 3, page 43	Requirement for a Sustainability Management Plan (SuMP) Final Plan within 30 days of contract award	This Plan
Section 1.4 Table 3, page 43	Sustainability Alignment Workshop Held within 30 days of contract award.	Section 6.2.1
Section 1.4 Table 3, page 43	Definition and approval of sustainability initiatives for implementation.	Section 6.1.1
Section 1.4 Table 3, page 43	Whole of life improvement strategy.	Section 2.2.2
Section 1.4 Table 3, page 43	Construction Resource Efficiency and Waste Management Plan Required Finalised sub-plan within 90 days of contract award.	Section 2.2.3
Section 1.4 Table 3, page 43	Resilience risk assessment and action plan. Required with Reference Design.	Section 2.2.5
Section 1.4 Table 3, page 43	Climate and natural hazards risk assessment and adaptation plan.	Section 2.2.6

Section 1.4 Table 3, page 44	Landscape	Section 4.0
Section 1.4 Table 3, page 44	Water Management Strategy Options Assessment. Required with Reference Design.	Section 2.2.4 Section 6.1.1
Section 24.1.1.1	The Alliance must achieve as a minimum a formal 4-star Green Star certification	Section 2.2.1
Section 24.1.1.2	The Alliance must outline the additional costs and benefits associated with targeting a formal 5-star Green Star certification for PTA consideration in Reference Design delivery stage.	Section 2.2.1
Section 24.2.1.1	The Alliance must propose a design approach and outline the additional costs for an energy and water sub metering and monitoring system at Bayswater Station for PTA consideration.	Included in Design and Engineering Plan
Section 24.3.1.1	The Alliance must develop a LCA model of the Project as part of developing the Reference Design.	Section 6.4
Section 24.3.1.2	The Alliance must review the LCA model at each subsequent design milestone (Initial, Public Realm and Developed).	Section 6.4
Section 24.3.1.3	The Alliance must present a final LCA design decision register at Final Design.	Section 6.4
Section 24.4.1.1	The Alliance must prepare a whole-of-project Sustainability Performance Report (Design) alongside finalising the Project Final Detailed Design.	Section 6.4
Section 24.4.1.2	The Alliance must prepare a whole-of-project Sustainability Performance Report (Construction and Asset Completion) as part of the As Constructed Reports for the Project.	Section 6.4
Book 4: Technical Criteria (BST-PTAWA-PM-RPT-00013)		
Section 24.1.1.1	The formal 4-star Green Star certification for ‘Design’ and ‘As Built’ stages of the Bayswater Station using the Green Star – Railway Stations rating tool	Section 2.2.1
Section 24.1.1.2	The Alliance must review the Green Star – Railway Stations rating tool with PTA and agree the strategy to achieve the rating target to deliver best value outcomes, including identifying any specific priority credits within the rating tool.	Section 2.2.1
Section 24.1.1.3	The Alliance must ensure that a GSAP is appointed to the Alliance team to coordinate the preparation and submission of the deliverables to the GBCA for the Green Star certification for Bayswater Station	Section 2.2.1 and
Section 24.2	The Alliance must propose a design approach and outline the additional costs for an energy and water sub metering and monitoring system at Bayswater Station for PTA consideration, to support ongoing operational assessment and management of energy and water use.	Included in Design and Engineering Plan
Section 24.3.1.1	The Alliance must develop a LCA model (such as with software ETool or similar) for the Project as part of developing the Reference Design	Section 2.2.2
Section 24.3.1.1	Facilitate workshop to identify strategies to improve the performance of the design considering whole of life costs and the LCA	Section 6.2.3
Section 24.3.1.2	Reviews of the LCA model must inform design decision making and continuous improvement with respect to whole-of-life costs and environmental footprints of materials used.	Section 2.2.2
Section 24.3.1.3	Key decisions must be captured in a LCA design decision register, demonstrating key decisions made across the design delivery phase that have resulted in improved whole-of-life costs and environmental performance.	Section 6.1.3
Section 24.4.1	The Sustainability Performance Report (Design) must outline project sustainability performance against the METRONET	Section 6.4

	Sustainability Objectives and any project specific objectives and targetsagreed with PTA and as set out in Sustainability Plan and sub-plans.	
Section 24.4.2	The Sustainability Performance Report (Construction and Asset Completion) must outline project sustainability performance against the METRONET Sustainability Objectives and any project specific objectives and targets agreed with PTA and as set out in Sustainability Plan and sub-plans.	Section 6.4
Development Approval		
Condition Number 18	Prior to the commencement of drainage works, a Water Management plan, including compliance with water sensitive urban design principles, must be submitted and approved to the satisfaction of the Western Australian Planning Commission, on the advice of the City of Bayswater and the Department of Water and Environmental Regulation. Once approved, the plan is to be implemented in its entirety thereafter.	Section 2.2.4
Condition Number 23	Green Star Report to be submitted confirming achievement of a minimum 4 Star Green Start (Design and As-Built) ratings to Operations	Section 2.2.1

Abbreviations and Acronyms

Term	Definition
AMT	Alliance Management Team
BST	Bayswater Station and Turnout
EnvMgr	Environment Manager
FTE	Full time equivalent
GBCA	Green Building Council of Australia
GSAP	Green Star Accredited Professional
LGA / WALGA	Local Government Authority / WA Local Government Association
MO	METRONET Office
Mgr	Manager
PTA	Public Transport Authority
SuMgr	Sustainability Manager
SuMP	Sustainability Management Plan
UD Lead	Urban Design Lead

1.0 Background

1.1 Introduction

METRONET is the State's vision to integrate transport and land use planning in the State and provide a framework to support sustainable growth of greater metropolitan Perth over the next 50 to 100 years.

Aligned with Commonwealth planning and infrastructure policies and the State's metropolitan growth strategies, *Perth and Peel @ 3.5 million* and *Transport @ 3.5 million*, METRONET Initiatives will deliver around 70 kilometres of new passenger rail and up to 18 new stations.

More than just rail infrastructure works, METRONET recognises the potential for urban intensification in more than 5,000 hectares of land. Planning goes beyond the station forecourts to shape and support development of communities within a walkable distance of 400 metres from a public transport hub.

METRONET Initiatives include approximately 70 kilometres of new heavy passenger rail and 16 new rail stations, which represents the single largest investment in public transport in Perth's history.

The State has prioritised the following METRONET Initiatives:

- Forrestfield – Airport Link;
- Thornlie – Cockburn Link;
- Yanchep Rail Extension;
- Morley – Ellenbrook Line;
- Extension of the Armadale Line to Byford;
- Bayswater Station Upgrade
- New station at Bellevue
- Station upgrade and relocation of Midland Station to Cale Street;
- Extension of the Midland Line to Bellevue; and
- Level crossing removal program.

1.2 Bayswater Station and Turnback Project

The Bayswater Station and Turnback Project as incorporated in the PAA for the Project includes:

- Stage One: The Turnback Works;
- Stage Two: The Bayswater Station Southern Section;
- Stage Three: The Bayswater Station Northern Section;

1.2.1 Stage One: Turnback Works

Stage One: Turnback Works comprises the following:

- New turnback siding between Bayswater and Meltham stations (configured to provide accommodation for 1 x 6 car sets);
- A shunters path (walkway) and a new driver's washroom;
- Relocation of the Leake Street underpass;

- Maintenance of the principle shared path along the southern side of the railway reserve;
- Other Project works including standard station systems, signaling, overhead line electrifications, communications, utility relocations and noise mitigation;

1.2.2 Stage Two: The Bayswater Station Southern Section

Stage Two: The Bayswater Station Southern Section, comprises the following:

- Two new rail bridges over King William Street, immediately south of the existing railway;
- New station island platform (150m long and 10m wide) complete with associated infrastructure and supported by the railway bridges;
- Provision for the principle shared path on the southern side of the southern railway bridge;
- The first stage of western and eastern entry buildings complete with fare gates, commuter access to the platforms (lifts and stairs) and equipment rooms to service railway operations;
- Integrated pedestrian, cyclist, bus and vehicle access into the station and future Bayswater town centre;
- Relocation of the dual gauge tracks and all associated track infrastructure to align with the new platform faces;
- New bus bays and vehicle parking bays;
- Other Project works including standard station systems, signaling, overhead line electrifications, communications, utility relocations and noise mitigation; and
- Landscaping and urban design features within the station precinct.

1.2.3 Stage Three: The Bayswater Station Northern Section

Stage Three: The Bayswater Station Northern Section comprises the following:

- Demolition of the existing Bayswater station and associated infrastructure.
- A second set of two new rail bridges over King William Street, located immediately north of the first new set of railway bridges delivered as part of Stage One;
- A second island platform (150m long and 10m wide) complete with station infrastructure again supported by the northern pair of railway bridges;
- The second stage of the western and eastern entry buildings complete with fare gates, commuter access to the platforms (lifts and stairs) and retail tenancies:
- Additional station infrastructure to meet the needs of the expanded (4 line, 4 platform face) station;
- Landscaping and urban design features within the station precinct;
- Other Project works including standard station systems, signaling, overhead line electrifications, communications, utility relocations and noise mitigation;
- Completion of new bus bays and vehicle parking bays; and
- Landscaping and urban design features within the station precinct.

1.2.4 Optional Works Packages

The METRONET Initiatives include for other additional Project Works beyond the scope listed in 1.2.1, 1.2.2 and 1.2.3 above and these may be included during the Delivery Phase.

2.0 Purpose of the Sustainability Management Plan

The purpose of this plan is to detail the management of sustainability during the design, construction, commissioning and handover phases of the BST. It should be read in conjunction with plans, strategies and documentation referenced in this Plan, including specific subplans and strategies to be developed to meet SWTC requirements.

2.1 Relationship with the Evolve Bayswater Management Plans

This plan works in collaboration with the Management Plans which collectively form the Alliance Management Plan as shown in **Figure 1**.

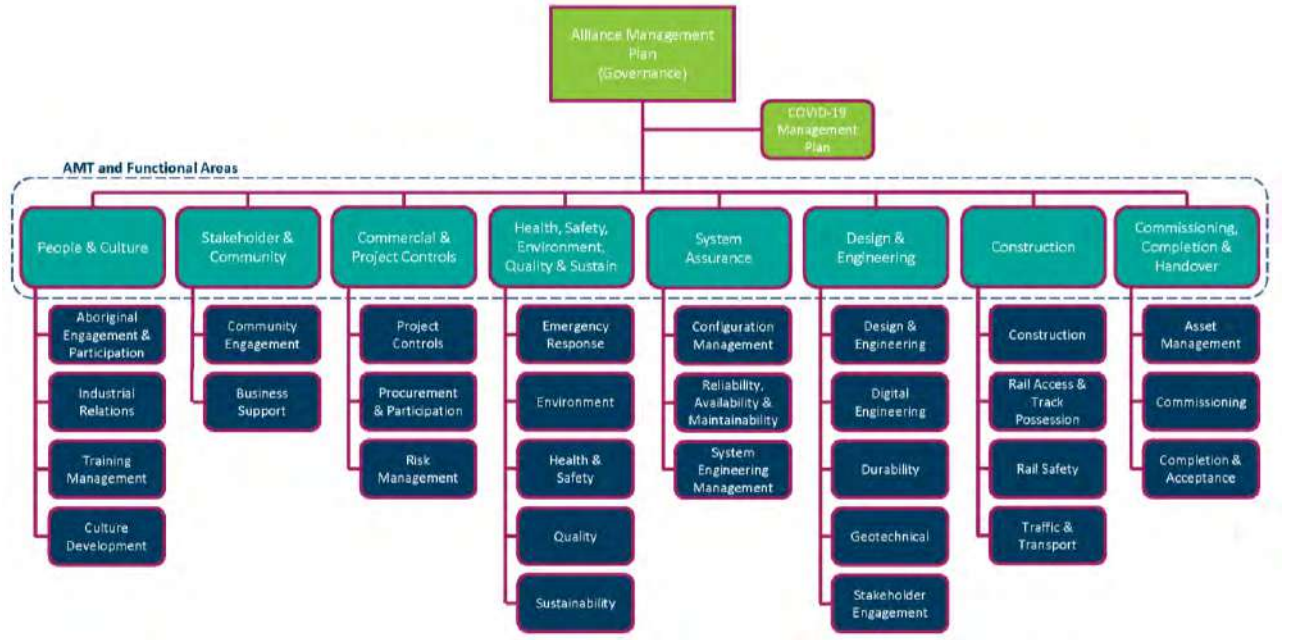


Figure 1 Evolve Bayswater Management Plan structure

2.2 Subplans and Strategies

The Evolve Bayswater management system is described in the ***'Alliance Management Plan BST-EVO-PM-PLN-00004'***. The Sustainability Management Plan will have interface with the following project management plans:

- Aboriginal Engagement and Participation Plan *BST-EVO-PM-PLN-00006*
- Commissioning Plan *BST-EVO-TC-PLN-00005*
- Community Engagement Plan BST-*EVO-SM-PLN-00003*
- Completion and Acceptance Plan *BST-EVO-TC-PLN-00006*
- Construction Environmental Management Plan *BST-EVO-EN-PLN-00003*
- Construction Plan *BST-EVO-PM-PLN-00001*
- Design and Engineering Management Plan *BST-EVO-EA-PLN-00004*

- Procurement and Participation Plan *BST-EVO-PR-PLN-00002*
- Quality Plan *BST-EVO-QA-PLN-00004*
- Risk Management Plan *BST-EVO-RI-PLN-00002*
- Stakeholder Interface Management Plan *BST-EVO-SM-PLN-00004*
- Systems Engineering Management Plan *BST-EVO-EA-PLN-00006*
- Traffic and Transport Management Plan *BST-EVO-PM-PLN-00007*
- Training Management Plan *BST-EVO-TM-PLN-00002*

Supporting this SuMP, there are a number of Subplans and strategies which address focused aspects of sustainability activities and deliverables. These are represented in **Figure 2**.



Figure 2 SuMP and its subplans and strategies

2.2.1 Green Star Strategy

Supporting the development of this SuMP a Green Star Assessment and Strategy will be prepared to guide the implementation of the rating as part of a Volume Certification Approach Green Star – Railway Stations V1.1 being sought by METRONET.

2.2.2 Whole of Life Improvement Strategy

A Whole of Life Improvement Strategy is to be developed for the project as part of the Establishment Period as defined in Section 6.4. The strategy will be focused on the high impact materials to be procured to deliver the BST project.

High impact materials are those which meet one or more of the following criteria:

- Defined by the 23B Prescriptive Pathway for the Life Cycle Impacts credit in the Railways Stations Submission Guideline (Green Building Council of Australia, 2020). The following high impact materials have been identified for BST:
  - Concrete
  - Steel
  - Aggregates
  - Low maintenance design elements
- When assessed as part of the project's risk assessment process as having a high risk as a result of environmental, social, economic, governance or other factor.

The Strategy will identify:

- opportunities to reduce high impact materials use during design development;
- identify, consider and seek opportunities to reduce operational and maintenance costs for energy, water and materials;
- opportunities to improve operational efficiency of the station and turnouts which have measurable reductions in energy, water and materials across the whole of life of the asset;
- The method and approach for assessing decisions which considers sustainability impact as well as a costs and benefits assessment for design, construction and operation initiatives identified;
- Process for monitoring, reporting and tracking performance of initiatives which are implemented;
- high impact materials to be procured to deliver the Asset design; and
- a process implemented for ongoing tracking and decision-making during design for initiatives with resultant whole of life benefits.

2.2.3 Construction Resource Efficiency and Waste Management Plan

A Construction Resource Efficiency and Waste Management Plan will be developed to guide and manage the selection, procurement and monitoring of energy, water and materials to be used during construction. The Plan will be integrated with the construction waste to promote opportunities for reuse, repurpose, reduce and recycle construction and demolition wastes on the project.

The Plan will include:

- Estimates of energy, water, materials to be used during the construction phase;
- Predicted waste quantities, by waste stream and materials aligned to encourage reuse, reduction and recycling of waste streams;
- Targets for reducing energy, water and materials consumption as well as waste diversion and resource recovery measures aligned to the Waste Avoidance and Resource Recovery Strategy 2030 (Western Australian Waste Authority, 2019);
- Approach for assessing decisions which considers sustainability impact as well as a costs and benefits assessment associated with resource efficiency and waste initiatives identified;
- Process for monitoring, reporting and tracking performance of initiatives which are implemented; and
- Cross referencing to the high impact procurement and assessment processes in other subplans and strategies.

Specific initiatives are outlined in the Construction Resource Efficiency and Waste Management Plan,

2.2.4 Water Management Strategy

Complementing the construction water management initiatives identified in the Construction Resource Efficiency and Waste Management Plan, a Water Management Strategy will be prepared in collaboration with key stakeholders and the PTA for the operational phase of the BST.

The Strategy will include:

- Estimates of business as usual operational water consumption by source for scheme, other potable, groundwater and other non-potable water;
- Targets for reducing the annual operational water consumption and for promoting the use of non-potable water beyond business as usual;

- Approach for assessing water management decisions which considers sustainability impact as well as a costs and benefits assessment associated with resource efficiency and waste initiatives identified;
- Process for monitoring, reporting and tracking performance of initiatives which are implemented during operation; and
- Cross referencing to the high impact procurement and assessment processes in other subplans and strategies, where applicable.

Prior to the commencement of drainage works, a water management plan, including compliance with water sensitive urban design principles, must be submitted and approved to the satisfaction of the Western Australian Planning Commission, on the advice of the City of Bayswater and the Department of Water and Environmental Regulation. Once approved, the plan is to be implemented in its entirety thereafter.

2.2.5 Resilience Risk Assessment and Action Plan

A resilience risk assessment and action plan based on the Station Precinct Resilience Assessment Framework will be prepared in collaboration with key stakeholders and the PTA. The plan will be based on the Station Precincts Assessment Framework and the Rockefeller Foundation's 100 Resilient City (2013) approach, or its replacement following the closure of the 100RC program in July 2019 if agreed with the MO.

Irrespective of the approach, the plan will identify the acute shocks and chronic stresses which pose risks to the Station Precinct and BST infrastructure as well identifying the opportunities and actions to mitigate risks associated with the Station Precinct and the BST plays in managing potential changes to the future transport modes, technologies and infrastructure beyond the risks associated with a changing climate.

2.2.6 Climate Change and Green Infrastructure Strategy

A strategy for identifying, managing, assessing and implementing opportunities to future proof the BST will be prepared in collaboration with key stakeholders and the PTA. The purpose of the plan will be to promote adaptation to climate change and the implementation of green (ecological) and blue (water) infrastructure to improve environmental and social values. The Strategy will include:

- Identification, assessment and implementation of opportunities to enable BST and the Bayswater Station precinct to be responsive to natural hazards, a changing climate, transport modes and technologies;
- Identification of the purpose, approach, objectives and outcomes for a Climate and Natural Hazards Risk Assessment and Adaptation Plan;
- Objectives and targets associated with climate change and social values influenced by landscape and urban design including amenity, tree canopy cover, environmental values, maintenance as well as personal and property security;
- Approach for assessing decisions associated with adaptation options, urban heat island, green and blue infrastructure which considers sustainability impact as well as a costs and benefits assessment associated initiatives identified;
- Process for monitoring, reporting and tracking performance of initiatives which are implemented; and
- Addressing of Green Star requirements in accordance with the Green Star Assessment Strategy.

2.2.7 Sustainable Procurement Strategy

In collaboration with the PTA and Alliance Procurement Team, a Sustainable Procurement Strategy will be prepared to guide the consideration of sustainable procurement, aligned to ISO20400, during the procurement process.

The Strategy will include:

- Define Sustainable Procurement guided by State, WALGA and Commonwealth guidelines as well as ISO20400;
- Identify key internal stakeholders associated with sustainable procurement, including discipline leads with procurement responsibilities ;
- Identify and define the high impact supply chain providers as well as key influences who could impact the effectiveness of sustainable procurement initiatives;
- Process for the assessment of risks and opportunities associated with the Green Star credit requirements, and objectives and targets of the SuMP, sub-plans of the SuMP, Local Industry Participation, Aboriginal Engagement Plan and Evolve Bayswater documents which maximise the sustainability outcomes in support of the METRONET Sustainability Commitment Statement Objectives;
- Cross referencing to the high impact procurement and assessment processes in accordance with Section 6.1 for opportunities identified in other subplans and strategies;
- Identification of priority areas considering the seven core subjects of ISO20400 as well as Evolve Bayswater plans and strategies to address local and Aboriginal participation;
- Approach for assessing decisions associated with adaptation options, urban heat island, green and blue infrastructure which considers sustainability impact as well as a costs and benefits assessment associated initiatives identified; and
- Process for monitoring, reporting and tracking performance of initiatives which are implemented.

Further details are outlined in the Procurement and Participation Plan *BST-EVO-PR-PLN-00002*

3.0 Legal, Regulatory and Program Context

Sustainability in the Australian regulatory context at Commonwealth, State and Local Government is commonly underpinned by ecological and intergenerational equity aspects in line with the original Brundtland definition where sustainable development 'meets the needs of the present without compromising the ability of future generations to meet their own needs' (World Commission on Environment and Development, 1987)

For example, sustainability is considered in legislation at both the Commonwealth and the State level includes:

- Commonwealth *Environment Protection and Biodiversity Act 1999* (EPBC Act) which includes consideration of ecologically sustainable development, with a focus on the protection on plant and animal species and ecosystems as well as heritage places; and
- WA's *Environmental Protection Act 1986* which includes consideration of ecological sustainable development, the precautionary principle, intergenerational equity, waste minimisation and polluter pays principles.
- The *National Strategy for Ecologically Sustainable Development* (Council of Australian Governments 1992) definition of ecologically sustainable development is also aligned with the Brundltand definition, and although 18 years old is still referenced in relation to Section 516A reporting under the EPBC Act.
- *State Planning Policy 7.0 Design of the Built Environment* which includes consideration of sustainability.

In WA, a strategy is currently under development, with the intention that it would replace the WA State Sustainability Strategy (Western Australian Waste Authority, 2019). The 2003 strategy also adopts the ecological and intergenerational aspects as well as including social and economic advancement and is generally considered to be a triple bottom line (environmental, social and economic) definition.

Sustainability is also considered by the WA Planning Commission (WAPC) during as part of Development Approvals. The BST has a specific condition in relation to achievement of a 4 Star Green Star rating, including preparation of a Green Star Achievement Report as discussed in the Compliance Matrix (page 3).

Sustainability considerations are also integrated into the requirements for other conditions, in particular where they interface with the sub-plans, strategies and deliverables included in this Plan.

3.1 METRONET's Commitment to Sustainability

Evolve Bayswater has adopted the METRONET Program's commitments to sustainability and the objectives for Transport Infrastructure for BST.

The METRONET Program has made strong commitments to sustainability, demonstrated by the METRONET Sustainability Strategy and through the integration of sustainability requirements into the Scope of Work and Technical Criteria (SWTC) for all projects within the Program. The METRONET commitments, represented in **Figure 3**, reflect the opportunities that city shaping programs have on the community, the economy and the environment. Underpinning these commitments are objectives (**Figure 4**) and are cascaded down to targets for the Program (Government of Western Australia, 2019, p. 17).

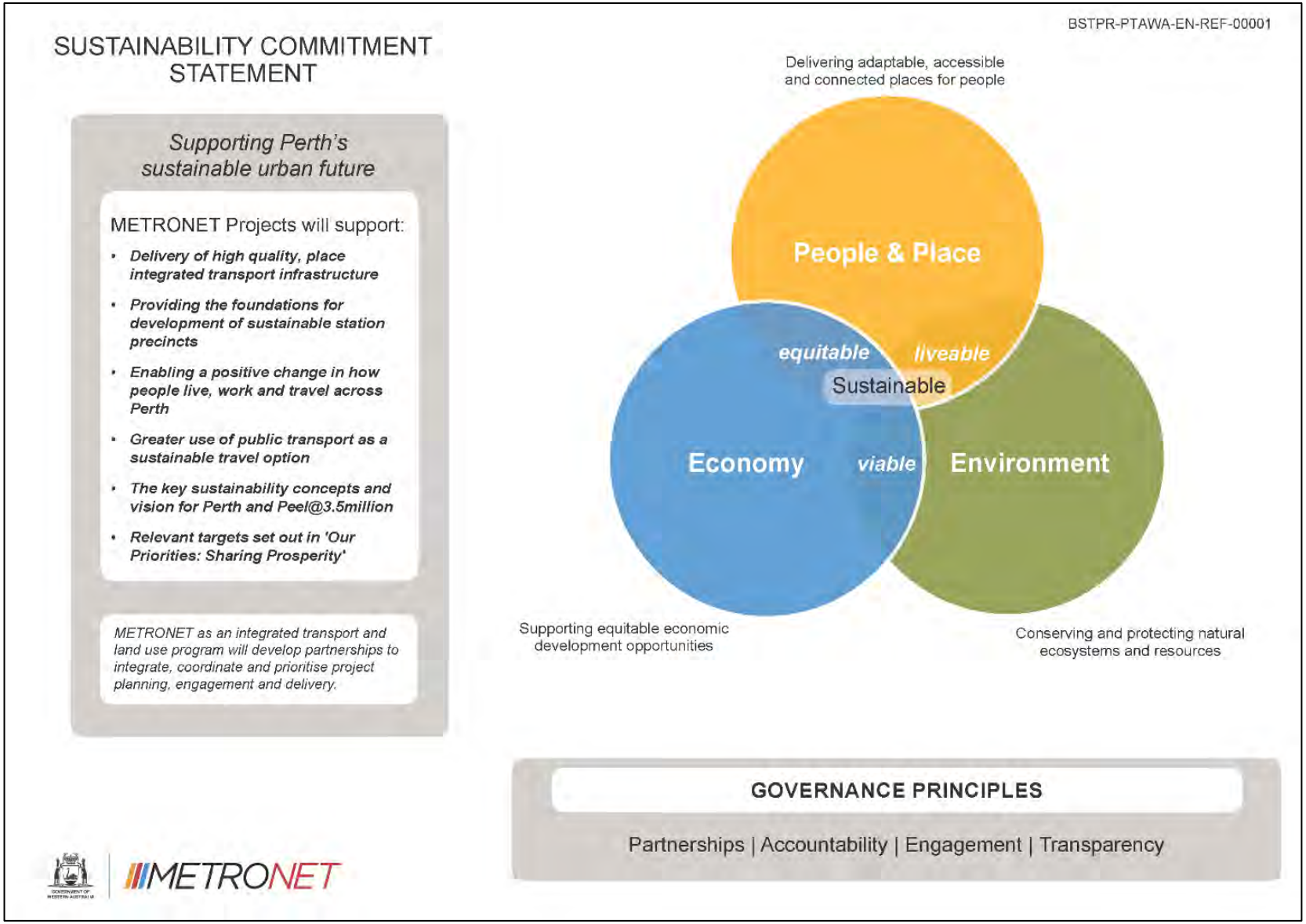


Figure 3 METRONET Sustainability Commitment

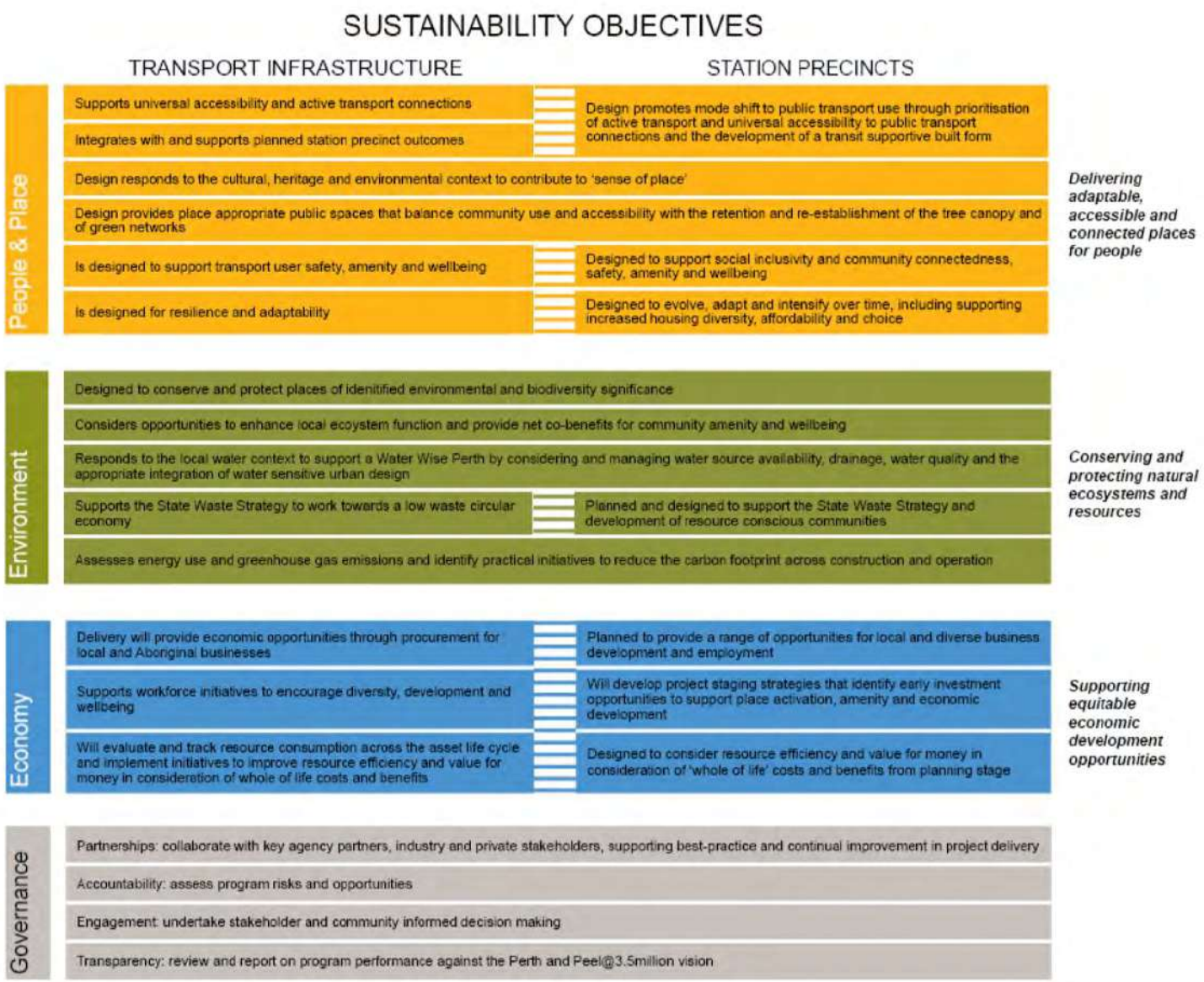


Figure 4 METRONET Sustainability Objectives

3.2 Guidance Documents

The METRONET Program have developed or adopted a number of guidance documents which are associated with the delivery of sustainability on the BST project. These include:

- Green Star Volume Certification Agreement (Green Building Council of Australia, 2020)
- Green Star – Railway Stations V1.2 (Green Building Council of Australia, 2020)
- Bayswater Station and Turnback Owners Project Requirements (PTA, 2020)
- State Design Review Panel METRONET Implementation Strategy (State Design Review Panel, 2020)
- METRONET Program Climate Change Network Vulnerability and Risk Assessment (METRONET Program, 2020)
- Scope of Work – Water Management Plan for METRONET Transport Infrastructure and Stations (PTA, 2020)

4.0 Evolve Bayswater Sustainability Objectives and Targets

Drawing on the METRONET commitments and Objectives, Evolve Bayswater has set the following sustainability targets for the Alliance

- Governance
  - Achieve a four star rating against the Green Star Railway Stations rating framework.
  - Publicly report on the sustainability performance of the project annually.
- People and Place
  - Implement at least one initiative which enhanced the cultural and environmental values of the station precinct.
  - Implement adaptation options for all high and extreme climate changes risks where treatment involves design responses.
- Environment
  - Achieve tree canopy and urban forest targets developed for the project.
  - Implement solutions to achieve net zero potable water use for irrigation in operation.
  - Achieve the water, waste diversion, recycling and resource recovery targets set as part of the Construction Resource Efficiency and Construction Waste Management Plan.
- Energy and Carbon
  - Achieve the energy and greenhouse gas emission targets set as part of the Construction Resource Efficiency and Construction Waste Management Plan.
  - Implement all operational energy efficiency opportunities identified with a payback period of less than five years, subject to approval in accordance with Section 6.1.2.
- Economy
  - Assess high impact goods and services in accordance with the Sustainable Procurement Strategy identified in Section 2.2.7.
  - Meet targets for local content and Aboriginal Engagement set for the project.
  - Implement all low maintenance through design opportunities identified with a payback period of less than five years, subject to approval in accordance with Section 6.1.2.

5.0 Roles, Responsibilities and Resourcing

As an Alliance, the delivery of sustainability is expected to be a shared responsibility throughout the project. This includes key internal (alliance) stakeholders as well as MO and other PTA representatives, including the Sustainability Reference Group. Sustainability is integrated into the responsibilities and accountabilities for all members of the Alliance Management Team.

5.1 Leadership and Resourcing

Evolve Bayswater's nominated Sustainability Manager is Katrina O'Mara. Kat is committed to the project in a 0.5 FTE capacity for the duration of the project. Sustainability is represented on the Alliance Management Team by Tamara Dunsire, the Health, Safety, Environment, Quality and Sustainability Manager. The Design Interface Manager supports the AMT Sustainability Champion, with specific focus on sustainability in design and engineering considerations.

5.2 Sustainability Manager

The core Sustainability Team consists of the Sustainability Manager (SusMgr) who is supported by Alliance team members to deliver the objectives, targets and expected outcomes for BST. The primary responsibilities for the SusMgr include:

- Managing and providing sustainability advice and guidance in relation to sustainability on the project.
- Developing, reviewing and updating of the Sustainability Management Plan, which sets the sustainability objectives and targets for the project, including the desired performance level for the rating and achievement of performance targets aligned to Green Star credits and the METRONET Sustainability Commitments
- Proactively support the project team to identify and realise sustainability opportunities, including those that are outside the scope of the Green Star rating, but align with the METRONET Sustainability Commitments
- Work with the Project Team to collate evidence and tell the 'story' of how sustainability has been integrated into the delivery of BST and captured as part of the Performance Assessment Reports for the project.
- Lead the development and implementation in collaboration with key stakeholders and the PTA of:
    - Whole of Life Improvement Strategy
    - Construction Resource Efficiency and Waste Management Plan
    - Water Management Strategy
    - Resilience Risk Assessment and Action Plan
    - Climate and Natural Hazards Risk Assessment and Adaptation Plan
    - Climate Change and Green Infrastructure Strategy
    - Sustainable Procurement Strategy
- Leading the Green Star rating process activities as described in the Green Star Rating Strategy (Section 2.2.1) ensuring that the credit requirements are met, including reviewing evidence, credit summary forms and documents associated with the sustainability aspects of the project.
- Preparing a Performance Assessment Reports for Design and at the end of Construction.
- Ensuring a Green Star Accredited Professional is appointed to the Alliance team if they are not one.
- Liaising with the MO, PTA and the GBCA in relation to sustainability on the project using agreed communication protocols.
- Coordinate the preparation and submission of the deliverables for the Green Star certification for Bayswater Station

5.3 Key Internal and External Stakeholders

The roles and responsibilities of the disciplines and roles that collaborate to achieve the Sustainability outcomes are presented in **Table 1**. The Lead may delegate tasks and activities but remains responsible for the delivery of the primary responsibilities.

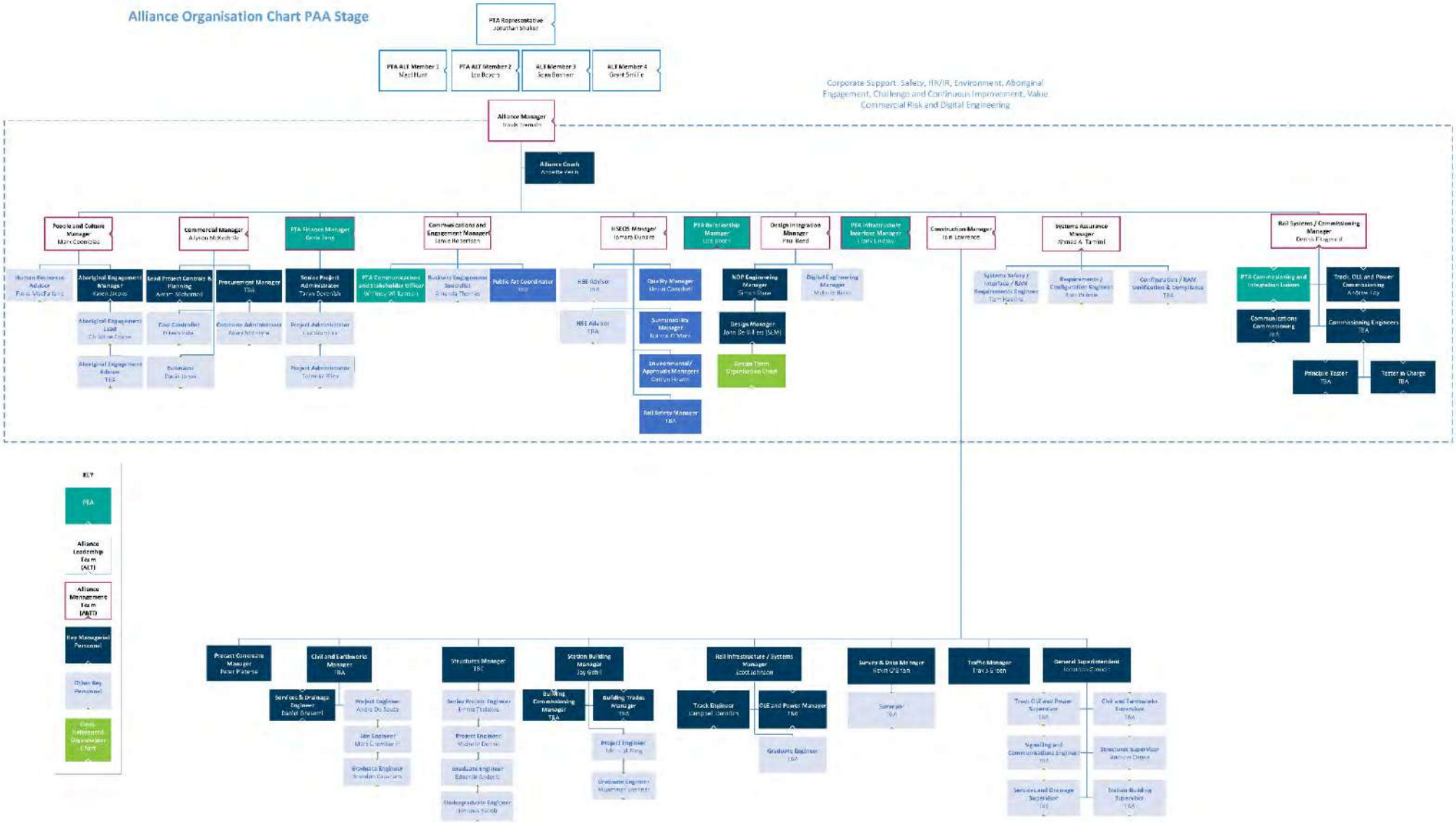
Role	Responsibility
Alliance Manager	• Provide visible leadership of the Project's commitment to sustainability • Ensure appropriate resourcing for the sustainability discipline to meet contract requirements in sustainability and relevant disciplines • Endorse and authorise Sustainability Management Plan and supporting documentation • Review Sustainability Performance Reporting • Actively participate in multidisciplinary engagement activities associated with sustainability
Sustainability Leadership Committee, consisting of: • Alliance Manager • Deputy Director • Design Manager • Station Lead • HSEQS Manager • Alliance Leadership Team Representative (PTA) • Nominated PTA Representatives • People and Culture Manager	• Review Sustainability Performance of the project and provide advice to the Alliance Manager and the Alliance Leadership Team • Review and provide feedback on the outcomes of sustainability audits • Provide visible leadership of the Project's commitment to sustainability • Actively participate in multidisciplinary engagement activities associated with sustainability
AMT	• Champion sustainability • Provide direction and support for the delivery of sustainability requirements and credits owned by their team(s). • Implement sustainability considerations in processes, management plans for risk management and procurement activities • Collaborate and lead as appropriate, the subplans and strategies outlined in Section 2.2 • Collaborate with disciplines to implement sustainability during the project's life cycle • Review Sustainability Performance Reporting Monthly • Actively participate in multidisciplinary engagement activities associated with sustainability • Consider and incorporate sustainable procurement principles in accordance with the IS requirements and METRONET values
Commercial Manager Procurement Manager	• Support the Sustainability Manager to develop and implement the Sustainable Procurement Strategy
Quality Manager	• Support the management and delivery of internal sustainability audits quarterly
Station Lead	• Collaborate with the Sustainability Manger and the key stakeholders to develop: ○ Whole of Life Improvement Strategy ○ Resilience Risk Assessment and Action Plan ○ Climate and Natural Hazards Risk Assessment and Adaptation Plan ○ Climate Change and Green Infrastructure Strategy • Sustainable Procurement Strategy

Role	Responsibility
Discipline Lead – Architecture	• Collaborate with the Sustainability Manger, Drainage Lead and Building Services Lead to develop the Water Management Strategy • Participate in the development of the: ○ Whole of Life Improvement Strategy ○ Resilience Risk Assessment and Action Plan ○ Climate and Natural Hazards Risk Assessment and Adaptation Plan ○ Climate Change and Green Infrastructure Strategy ○ Sustainable Procurement Strategy
Discipline Lead – Building Services	• Collaborate with the Sustainability Manger, Drainage Lead and Architecture Lead to develop the Water Management Strategy • Participate in the development of the: ○ Whole of Life Improvement Strategy ○ Resilience Risk Assessment and Action Plan ○ Climate and Natural Hazards Risk Assessment and Adaptation Plan ○ Climate Change and Green Infrastructure Strategy ○ Sustainable Procurement Strategy
Construction Manager (Deputy Alliance Director)	• Collaborate with the Sustainability Manger to develop the Construction Resource Efficiency and Waste Management Plan and the Sustainable Procurement Strategy
METRONET Volume Certification Green Start Accredited Professional	• Provide of information regarding volume certification requirements to design team. • Act as first point of contact for Technical Clarifications and questions in relation to BST's contribution to the Volume Certification
METRONET Green Start Accredited Professional	• Lead the collation of evidentiary requirements and submission required from BST as part of the Volume Certification • Provide advice to the BST team in relation to Green Star matters. • Work with the BST team to identify opportunities to support a 5 Start Green Star rating
Green Star Credit Owners	• Deliver the requirements of the Green Star credits for which they have responsibility for delivering as outlined in the Green Star Assessment Strategy • Seek assistance from the lead GSAP where uncertainty exists, risks are identified or guidance is needed
METRONET / PTA	• Represent and communicate the views of the PTA / METRONET from the perspective of Owner/Operator of aspects of the developed facility. • Identify opportunities to innovate on the project • Actively participate in multidisciplinary engagement activities including workshops and those associated with sustainability, including the Sustainability Leadership Committee
METRONET Sustainability Coordinator	• Represent and communicate the METRONET Office's sustainability direction, initiatives and processes. • Work with the BST team to support opportunities to innovate on the project • Actively participate in multidisciplinary engagement activities including workshops and those associated with sustainability
Green Building Council of Australia	• Certification of the Volume Certification, including BST contributions.

Table 1 Sustainability support roles and responsibilities

All other stakeholders not listed are outlined in the Community Engagement Management Plan BST-*EVO-SM-PLN-00003.*

5.4 Evolve Bayswater Organizational Chart



6.0 Sustainability Management

6.1 Systems and Processes

Sustainability systems and processes will be managed in accordance with Acciona's Integrated Management System which is discussed in the Evolve Bayswater Quality Management Plan (BST-EVO-QA-PLN-00004). Where required, Acciona's IMS will be supplemented by systems and processes which are outlined in the following sub-sections.

6.1.1 Opportunity Identification

During the design development and construction planning process, a number of sustainability initiatives are expected to be identified by the project team, including through the value management workshops and during the development of the design.

Opportunities will be assessed based on a process and methodology discussed in Section 6.1.2.

6.1.2 Decision Making Process

In line with the Risk Management Plan (BSTPR-EVO-RI-PLN-00002), Evolve Bayswater's approach to decision making considers the complexity and scope of the decision. This process is 27ummarized in **Figure 5**, with the minimum decision-making documentation identified along the left hand side.

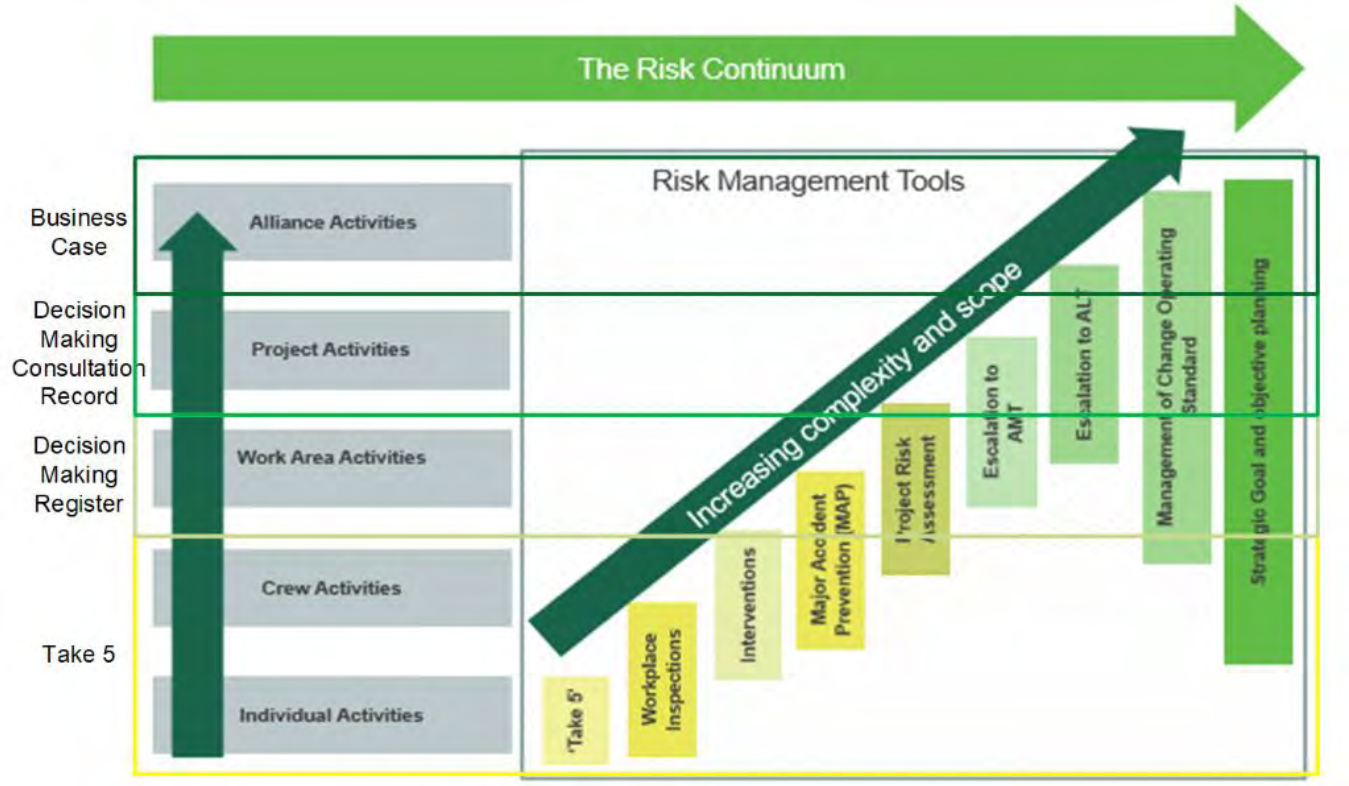


Figure 5 Decision making and risk management interaction

For simple decisions that do not require consultation beyond the crew activities, a Take 5 process can be used to record that safety, quality, environment, community and sustainability factors have been considered as part of the process.

Simple decisions which:

- can be approved by the work area lead must be documented in a Take 5, in correspondence or minutes of meetings.
- require consultation outside of the work area, must be recorded in the Decision-Making Register and need to include comments by the area(s) who need to be consulted with as part of the decision making process.

As the complexity of the decision involves increased complexity or scope or requires at least informing other disciplines then the minimum level of consultation, approval requirements and record keeping associated with the decision increases.

Key decisions which:

- informs the design must be recorded in the Key Decision Making Register and have completed the Decision Making Consultation Record as discussed in Section 6.1.3
- requires consultation across areas, or require approval of the AMT lead for the area or the PTA, must be recorded in the Key Decision Making Register and have completed the Decision Making Consultation Record
- requires ALT or PTA approval must be recorded in the Key Decision Making Register and either a Decision Making Consultation Record or a Business Case where there are budget, resourcing or schedule implications.

6.1.3 Design decisions

Design decisions which impact the lifecycle assessment for the project, including significant changes to the:

- quantity or type of high impact materials
- construction duration
- maintainability or service life
- operational consumption of energy
- water and materials

must be documented in the Design Decision Register and considered against the Reference Design using an MCA or similar process which assesses both financial and non-financial criteria across the whole of life of the asset.

Where the decision is associated with a sustainability opportunity or initiative, consultation with the relevant PTA Stakeholders, an MCA process must be undertaken which assesses both financial and non-financial criteria across the whole of life of the asset.

6.2 Collaboration

Collaboration across disciplines within the alliance and with key stakeholders, including the broader METRONET program is fundamental to the success of sustainability on Evolve Bayswater. To facilitate collaboration, three key workshops discussed in this section will be used to underpin the sustainability direction and opportunities for the Bayswater Station and Turnback Project.

6.2.1 Sustainability Alignment Workshop

The initiation of the sustainability activities is critical in ensuring that there is shared understanding and responsibility for the delivery of the sustainability aspects of the project, including the performance targets for the alliance. The workshop will focus on:

- discussing key sustainability priorities for the Project, including review of the METRONET Sustainability Objectives (refer to Book 5);
- establishing project specific sustainability objectives and targets;
- discussing high level sustainability risks and opportunities, including procurement opportunities;
- identifying any additional key sustainability Stakeholders for the Project; and
- reviewing contract expectations for deliverables, review and reporting.

Notes from the workshop will inform the finalization of SuMP and the implementation of sustainability across the alliance.

6.2.2 Green Star Strategy Workshop

Following the Sustainability Alignment Workshop, a Green Star Strategy Workshop will be held to:

- Come to mutual understanding of the volume certification model being used for METRONET projects
- Develop a mutual understanding of the project specific requirements as part of the volume certification are including preparation of both evidentiary and credit summaries for the project.
- Review the proposed performance levels identified by Evolve Bayswater in the ADA phase.
- Establishing communications protocol for Technical Questions
- Agree on the process for finalizing the Green Star Strategy

6.2.3 LCA Strategies Workshop

Supporting the value engineering activities discussed in Section 6.23 of the Design and Engineering Management Plan (BSTPR-EVO-EA-PLN-00004), the LCA Strategies Workshop will:

- Assess the potential Reference Design options and come to an agreement between Evolve Bayswater and the PTA on the Reference Design for the project for sustainability matters.
- Review ADA phase value engineering activities and decisions

Following the workshop, an LCA will be undertaken for the agreed Reference Design, the Initial Design and at the Developed Detailed Design for both the Station and the Public Realm.

6.3 Commissioning and Handover

Prior to the commencement of commissioning, handover documentation associated with sustainability will be provided to the PTA / METRONET.

Commissioning requirements associated with the Green Star rating will be identified in the Green Strategy discussed in Section 2.2.1.

6.4 Deliverables and Timeline

The following deliverables schedule has been prepared based on the Alliance Program, with a PAA Signing Date of 18 May 2020. For each of the deliverables, an accountable role

Deliverable	Date	SWTC Requirement	Accountable Role	Key Collaborations
Sustainability Assessment Workshop	17 June 2020	Book 3, Section 1.4, Table 3, Page 43 of 242 (Prior to 30 days post signing of ADA)	Sustainability Manager	Design Integration Manager, EB Discipline Leads, PTA, MO
Final Sustainability Management Plan (Approval)	10 August 2020	Book 3, Section 1.4, Table 3 Page 43 of 242 (30 days post signing of ADA)	Sustainability Manager	HSSEQ Manager
Green Star Assessment and Strategy	21 August 2020	Book 3, Section 1.4, Table 3 Page 43 of 242 (30 days post signing)	Sustainability Manager	Construction Management, Design Management, Discipline Leads, PTA, MO
Agreed Reference Design	29 June 2020	6 weeks post signing	Design Integration Manager	AD Design Team
Whole of Life Improvement Strategy	30 September 2020	3 months post signing	Sustainability Manager	Design Integration Manager, Design Discipline Leads, PTA, MO
Construction Resource Efficiency and Waste Management Plan	30 September 2020	3 months post signing	Sustainability Manager	Construction Manager
Water Management Strategy	31 October 2020	3 months post signing	Sustainability Manager	Drainage Lead, Landscape Lead, PTA, MO
Water Management Plan	31 October 2020	WAPC 14-50079-3 DA, Condition 18	Sustainability Manager	Drainage Lead, Landscape Lead, PTA, MO
Resilience Risk Assessment and Action Plan	30 September 2020	3 months post signing Workshops for these to be held in conjunction with each other due to the overlapping risks and treatments	Sustainability Manager	Construction Management, Design Management, Discipline Leads, PTA, MO
Climate and Natural Hazards Risk Assessment and Adaptation Plan	30 September 2020		Sustainability Manager	Construction Management, Design Management, Discipline Leads, PTA, MO
Climate Change and Green Infrastructure	30 September 2020		Sustainability Manager	Construction Management, Design Management, Discipline Leads, PTA, MO

Sustainable Procurement Strategy	18 August 2020	3 months post signing	Sustainability Manager	Commercial Manager, People and Culture Manager, Indigenous Engagement Manager, Construction Management
Definition and approval of sustainability initiatives for implementation	As identified	Book 3 Part A Scope of Works refers to Book 2, but not located in Book 2.	Design Integration Manager	Sustainability Manager
LCA on Reference Design	30 September 2020	Following agreement on Reference Design and LCA Strategies Workshop	Sustainability Manager	Design Management and Discipline Leads
LCA on Initial Design	15 October 2020	1 month following approval of Initial Design	Sustainability Manager	Design Management and Discipline Leads
LCA on Station Detailed Design	5 April 2021	1 month following approval of Station Detailed Design	Sustainability Manager	Design Management and Discipline Leads
LCA on Public Realm	30 September 2020	1 month following approval of Public Realm Design	Sustainability Manager	Design Management and Discipline Leads
Electricity and water sub-metering strategy	30 September 2020	Book 3 Section 24.2.1.1	Building Services Discipline Lead	Design Management and Discipline Leads, Sustainability Manager
Whole of Project Sustainability Performance Report (Design)	12 April 2021	Final Detailed Design	Sustainability Manager	Design Integration Manager, EB Discipline Leads
Design Decision Register	12 April 2021	Final Detailed Design	Design Integration Manager	Design Manager, Discipline Leads, Sustainability Manager
Whole of Project Sustainability Performance Report (Construction and Asset Completion)	8 March 2023	As constructed	Sustainability Manager	Design Integration Manager, EB Discipline Leads
Design Green Star Submission – Round 1	12 June 2021	60 days after Final DD	Sustainability Manager	EB GSAP, Volume Certification GSAP, Design Management and Discipline Leads
Design Green Star Achievement Report	30 September 2021	30 days after certification by GBCA	Sustainability Manager	EB GSAP, Volume Certification GSAP, Design Management and Discipline Leads
As-Built Green Star Submission – Round 1	23 Aril 2023	60 days after As-Built	Sustainability Manager	EB GSAP, Volume Certification GSAP, Design Management and Discipline Leads
As-Built Green Star Achievement Report	30 July 2023	30 days after certification by GBCA	Sustainability Manager	EB GSAP, Volume Certification GSAP, Design Management and Discipline Leads

7.0 Communications

Communications associated with this Plan will be in accordance with the Communication Protocols agreed for the alliance. This has been broadly illustrated in Table 2.

Communication Type	Purpose
Formal letters	Formal communications between Evolve Bayswater, the PTA and to orgaisations where formal correspondence is required.
Emails, meeting invitations and phone calls	To be used for informal discussions only or to schedule workshops/meetings
Meeting minutes	Records of meeting discussions, decisions and attendees
RFIs	Used for questions to the PTA and/or METRONET Office in relation to the SWTC
General Correspondence (GCOR)	Used for general correspondence between the alliance and PTA / METRONET Office and other recipients where required
Transmittals	To accompany submission of deliverables

Table 2 Communication protocol

8.0 Monitoring and Reporting

8.1 Progress Tracking

A Sustainability Tracking System will be developed to manage the day-to-day progress of sustainability during design and construction. The system will include the key reporting functions, including sustainability initiatives and key decisions register as well as progress against the Green Star credit requirements and other reporting requirements as discussed in Section 7.0

8.2 Performance Monitoring

The monitoring of the progress against the SuMP, subplans, strategies and performance against sustainability indicators will be tracked weekly and reported to the Alliance Management Team as part of the Monthly Reporting cycle using the template provided by the METRONET Office.

8.3 Sustainability Leadership Committee Meetings

The Sustainability Leadership Committee (described in Section 5.1) will include during the Alliance Management Team Meeting on the third week of every second month a Senior Leadership Committee to:

- Review Sustainability performance of the project, the monthly reports for the period, progress against deliverables and milestones;
- Provide advice to the Alliance Manager and the Alliance Leadership Team in relation to sustainability performance;
- Provide senior management review and feedback on the outcomes of sustainability audits;
- Confirm fulfilment the objectives of the sustainability management plan and results in monthly reports for the previous two months; and
- Maintain and verify compliance to legislation standards and guidelines relevant to sustainable design and delivery.

8.4 Quarterly Reporting

Quarterly reporting of sustainability performance will be prepared and submitted in accordance with the SWTC requirements. The format of the Report will include:

- Sustainability activities commenced, significantly progressed or closed out during the month;
- Progress against METRONET Commitment Statement Objectives;
- Progress and performance against the sustainability targets for the BST;
- Identification and assessment of key risks and opportunities to achievement of the Green Star rating;
- Progress of the completion of the Green Star rating against the targets identified for each credit in accordance with the Green Star Strategy (BST-EVO-SU-RPT-00001);
- Updated register of the status of sustainability initiatives which have been identified, including those identified as part of the subplans discussed in Section 2.2;
- Register of significant decisions which have been assessed in accordance with the decision making process established;
- During construction – the monitoring of energy, carbon, water, materials and waste quantities against the predictions and targets identified in the Construction Resource Efficiency and Waste Management Plan (Section 2.2.3) including:

- energy use and carbon emissions (including total metrics and disaggregated into key end uses aligned with the greenhouse gas protocol corporate accounting and reporting standard);
- water use and quality (including total metric and disaggregated by each source);
- materials quantities (disaggregated into key material types);
- generated waste quantities (disaggregated into key waste streams); and
- waste recovery (landfill diversion total % and any % on-site reuse).

8.5 Progress Meetings

Quarterly progress meetings will be scheduled to review the Quarterly Report (Refer to Section 8.3), actions from previous meetings and the actions undertaken to address the outcomes from audits.

The Alliance will capture the progress meeting discussions and any agreed actions via the provision of meeting minutes to the PTA.

8.6 Annual Reporting

An annual report will also be prepared addressing the requirements as outlined in the Sustainability Strategy (BST-MET-PM-RPT-00001) including consolidated reporting of progress against:

- Progress against METRONET Commitment Statement Objectives;
- Progress of the completion of the Green Star rating against the targets identified for each credit in accordance with the Green Star Strategy (BST-EVO-SU-RPT-00001);
- During construction – the monitoring of energy, carbon, water, materials and waste quantities against the predictions and targets identified in the Construction Resource Efficiency and Waste Management Plan (Section 2.2.3); and
- Updated register of the status of sustainability initiatives which have been identified, including those identified as part of the subplans discussed in Section 2.2.

9.0 Audit

9.1 Internal Audits

Quarterly internal audits of the sustainability management system will coordinated and managed by Evolve Bayswater as part of the Integrated Management System processes.

Evolve Bayswater will collaborate with the MO and the PTA to establish a formal audit report template and this template will be used to report on the outcomes of the reports. It is proposed that these audits will be undertaken in between quarterly progress meetings to allow for the report to be finalized and actions to address non-conformances and areas for improvement to be progressed.

9.2 External Audits

Evolve Bayswater will participate in annual third-party sustainability management system audits commissioned by the PTA's Representative.

10.0 Review and Update of the Sustainability Management Plan

This plan will be reviewed and updated annually and when required in response to:

- Contract Award
- Outcomes and opportunities for improvement, including update of quantifiable targets for Sustainability, based on internal and external audits.
- Following completion of key Project Milestones
- Changes to the project which may affect the scope
- Where opportunities for improvement are identified as an outcome of a formal review or by lessons learnt from other METRONET Projects

11.0 References

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Appendix F

Office of Government Architect Review Report Responses prepared by Evolve Bayswater and State Design Review Panel Report August 2020

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connecting people + places

OGA Design Review Report Responses

Principal	OGA Comment	EB Response	Impact on TOC
1.	**Context and Character** *Good design responds to and enhances the distinctive characteristics of a local area, contributing to a sense of place.*		
a)	Overall, the design does not adequately respond to the distinctive character and context of Bayswater town centre, as required by the SWTC.	The Bayswater Station design has given careful consideration to its context, its natural and built features, its Indigenous and European history, its environmental conditions and the current and future needs of the local community. The Design concept establish three principles; Garden, Rhythm and Infrastructure, which enhance the local character. These principles will underpin design development of the station and station precinct during the next design stage, when there will also be an opportunity to respond to the BST Placemaking Plan. The integrated design approach to Urban Design, Landscape and Architecture design seeks to create a positive sense of place within the Bayswater Town Centre, centred on the local community, underpinned by a vibrant transport interchange.	Nil as current design retained
b)	The ground floor arrangement is generally sound, and the row of small tenancies along the southern edge of the eastern building responds well to existing shopfronts across the street, helping to create a high street environment along Whatley Crescent. The provision of multiple small tenancies of various sizes is supported as it continues the pattern of development to the south and will enable the accommodation of a variety of small businesses rather than a large commercial entity, contributing to local character.	Agree, the design intent is to create a series of retail opportunities, consistent in scale to the existing Bayswater Town Centre. This approach will positively support a more community focussed retail outcome.	Nil
c)	Good sightlines between northern and southern areas are provided by setting back the built form off King William St	The functional requirements of the rail infrastructure does present a challenge in terms of enabling the penetration of direct light to the entry forecourt. By consolidating the	Nil

OGA Design Review Report Responses

	under the underpass. However, the quality of this undercroft space is likely to be compromised by the lack of daylight.	vertical circulation back from King William St it enables generous sightlines whilst also maximising the ability to provide penetrations within the Station platforms. The high quality of the undercroft space will be maintained through increased height, access to light and views up to platform and can also be reinforced with public art (subject to PTA agreement and funding) and well considered artificial lighting. Increasing the size of platform voids could be considered during the next design stage, however this would be subject to a detailed review and analysis of platform population densities and cross platform passenger movements/transfers.	
d)	The design elements are primarily pre-cast concrete bridge beams and columns, with a paint finish, which is a stripped back and non-descript approach that lacks distinctiveness and character. This will limit the ability of this piece of infrastructure to play a broader civic role in catalyzing regeneration.	The design sought a robust, honest approach to the station infrastructure which sits calmly within the Town Centre precinct. Opportunities exist for 'enhancements' to the design such as: • to provide provision of feature external cladding treatments to the structure; • alternative construction techniques that allow for profiling of the precast beams It is noted that – the incorporation of any of these enhancements will be subject to PTA approval and funding.	Nil subject to incorporation of 'enhancements' by PTA.
e)	'Feature architectural panelling' is noted to the side of the bridge beam facing Railway Parade but it is unclear as to what is specified here, and it is noted as an 'enhancement' on the elevation drawings so is unlikely to be included in the price.	The design intent was for the feature architectural panelling to be a concrete composite material with a uniform, cementitious coloured finish (such as GRC). As this feature is labelled as an 'enhancement' it has not been included in the current TOC.	Nil if 'enhancement' not included.
f)	Aboriginal history is acknowledged and outlined in the design report (Urban Design and Landscape section) however it is not	The Landscape design has been developed with consideration for the Cross Agency Wildflower Capital Initiative. Endemic	Nil subject to Public Art

OGA Design Review Report Responses

	clear how this has been considered in the station or landscape design.	species will be selected to strengthen the local character and sense of place. Furthermore, the overall design considered a range of opportunities for cultural interpretation and public art to be incorporated throughout the station. The opportunities are outlined within the Station Design Report and will be explored further in the next design stage with incorporation subject to PTA approval and funding.	requirements by PTA
2.	**Landscape quality** *Good design recognises that together landscape and buildings operate as an integrated and sustainable system, within a broader ecological context.*	Supported by OGA.	Nil
a)	The inclusion of a landscape architect on the design team is supported.		
b)	The concept of the 'Garden Station' as responding to the 'Garden City' character of Bayswater is supported, and the landscape provision indicated appears to deliver a good level of tree canopy and garden bed planting to areas north and south of the railway bridge. Detailed, annotated landscape and urban design plans have been provided along with specifications of hard and soft landscape and urban design elements (including tree sizes). This indicates proper consideration of the public realm design and provides a good level of clarity regarding what has been included in price.		
c)	The commitment to principles of water-sensitive urban design is unclear. Stormwater infiltration via landscaped areas was mentioned in the presentation however swales and/or permeable paving are not indicated on landscape drawings. Some trees appear to be located in small planter beds that will restrict their growth and limit the ability for stormwater		

OGA Design Review Report Responses

	capture. Trees should be planted in deep soil wherever possible.		
d)	The viability of landscaping indicated to the undercroft spaces will be limited, and restricted to species that can survive low natural light levels.		
e)	Existing significant trees to the northern edge of Whatley Cr have been removed. It is unclear as to whether efforts were made to retain these.		
3.	**Built form and scale** *Good design ensures that the massing and height of development is appropriate to its setting and successfully negotiates between existing built form and the intended future character of the local area.*	Supported by OGA.	Nil
a)	The overall height and massing appears sound in relation to surrounding building form.		
b)	Efforts could be made to reduce the depth of the eastern entry building in order to increase the public realm area available for the northern forecourt.		
4.	**Functionality and build quality** *Good design meets the needs of users efficiently and effectively, balancing functional requirements to perform well and deliver optimum benefit over the full life-cycle.*		
a)	The paint finish noted to the concrete beams and piers will require repainting at regular intervals. An integral concrete colour or an applied cladding should be considered in order to reduce this maintenance burden. Also, the paint finish to the bridge beams specified is an interior paint (PT-01), which needs correction.	Noted, finish type for CL-08 in the finishes schedule should be PT-16 (clear anti graffiti sealer) as noted on the architectural drawings.	Nil

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b)	Tenancies 1, 5 and 6 are quite narrow in depth – it is suggested that investigation into their commercial feasibility is carried out during the next stage, with adjustments made as needed.	During the next stage a retail strategy will be undertaken for Stakeholder review and approval. The size / proportion of the tenancies will then be finalised based on this outcome.	Nil if existing Tenancies are retained
c)	A number of mechanical and electrical service rooms are located to the external face of the western and eastern entry buildings. These should be brought inboard herever possible, to maximise active street frontage and allow for ingress of natural light – important for these undercroft buildings.	Careful consideration was given in amending the previous Concept Design to ensure the service rooms were located to minimise impact to the public realm. The key approach was to remove buildings from Platform level where they would visually impact the broader Town Centre. In the next design stage further consideration will be given to location and external treatments of all service areas. It is noted that these rooms require unconstrained maintenance access for PTA operational reasons and this places constraints on their locations and points of entry and egress.	Nil
5.	**Sustainability** *Good design optimises the sustainability of the built environment, delivering positive environmental, social and economic outcomes.*		
a)	The commitment to principles of water-sensitive urban design is unclear. (Refer comment above under Landscape Quality.)	Water Sensitive Urban Design will be primarily achieved through the careful design of planting areas to capture and treat water run off, and through the appropriate selection of planting species.	Nil
b)	A 4-star Green Star rating for the station building (as required by the SWTC) is noted as achievable with the priced design, and a list of initiatives is provided for achieving 5 stars during the next design stage. It is recommended that the option of pursuing 5 stars is progressed post contract award.	Noted.	Nil subject to PTA requirements to achieve 5 stars
6.	**Amenity** *Good design optimises internal and external amenity for occupants, visitors and neighbours, providing environments that are comfortable, productive and healthy.*		

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a)	Openings to allow natural light into the bridge undercroft area are provided to the western end as well as the eastern end of the station public realm, which is supported. The western end skylights are limited in size – efforts to increase these should be pursued during the next stage, to improve the pedestrian amenity to the undercroft and better facilitate the provision of planting.	The Station design seeks to maximise penetrations through the platforms to improve light levels to the public realm below. The structural approach was developed to enable the further reduction of platform slab extents during the next stage. Further pedestrian modelling will be undertaken to inform the space needed to facilitate efficient cross platform transfers for passengers.	Nil
b)	Particular design effort will be needed during the next stage to ensure that all undercroft areas provide attractive, healthy, safe and welcoming environments.	Agree, the quality of the public realm is critical to ensure a positive sense of place. The design provides an open volume, which is light-filled, and will be further developed during the design development phase.	Nil
c)	The provision of retail tenancies to the undercroft, in close proximity to the train station entrances, is supported as they will help activate this area and facilitate good levels of safety via passive surveillance.	Supported by OGA.	Nil
d)	Consideration should be given to relocating the fully internal PTA staff crib room so that it is provided with a window and outlook, for staff well-being.	The PTA staff crib room is positioned to have direct operational access and clear sight lines to the eastern entry paid zone. Stakeholder consultation will be undertaken during the next design stage to confirm whether external outlook to the plaza is required.	Nil
e)	Efforts should be made during the next stage of design to ensure that the stairs to the eastern building are clearly visible upon entry, to encourage their use and improve physical activity levels as well as reduce congestion in the entry lobby.	The Station design has been developed to ensure each stair is highly visible within the 'paid zone'.	Nil
7.	**Legibility** *Good design results in buildings and places that are legible, with clear connections and easily identifiable elements to help people find their way around.*		

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a)	The visibility of station entry points requires improvement. Both western and eastern entry points are significantly recessed, and partially concealed by bulky columns, indicating a lack of consideration of the commuter wayfinding experience on approach.	The Station 'gate lines' have been setback to enable the comfortable movement of people through and around the station, including from the adjacent bus stands, drop off areas and generally throughout the precinct. The columns have been placed to provide open visual wayfinding from the predominant approaches (along King William St). The Station entry will be provided with the typical Station signage elements, and through the considered placement of skylights / lighting will provide additional visual cues.	Nil
b)	Efforts should be made to ensure that entries are located so they are prominent and easily navigated to from northern and southern areas, without the need for excessive levels of signage.	Noted, refer above.	
8.	**Safety** *Good design optimises safety and security, minimising the risk of personal harm and supporting safe behaviour and use.*		
a)	Locating the bulk of the public realm space underneath the rail bridge, east of King William St may risk creating an environment that is unwelcoming and feels unsafe. Consideration will need to be given to how the design will mitigate this during the next stage, including investigation into how greater levels of passive surveillance and retail activation might be provided, and/or whether redistributing this public realm area within the site might be possible.	Noted, this will be impacted by the development of the Station Design brief and can be further discussed with Stakeholders during the next stage. It is, however, noted that there are considerable constraints to the extent of the public realm space and that has been further limited by the addition of the MEL project to the overall redevelopment of the Bayswater Station precinct.	Nil
b)	Similarly, care will need to be taken to ensure that the green space between Whatley Crescent and Hamilton Street addresses CPTED principles (particularly with regard to clear sightlines) as it is unlikely to be heavily trafficked.	The Landscape and Urban Design concept was developed with consideration to strengthen the connections throughout the precinct. The site levels were also developed to avoid significant vertical transitions and to improve visual connection along footpaths. Whilst it is anticipated that increased activity, both pedestrian and vehicle will occur	Nil

OGA Design Review Report Responses

		through the underpass, CPTED design principles will be further developed during the next design stage.	
9.	**Community** *Good design responds to local community needs as well as the wider social context, providing environments that support a diverse range of people and facilitate social interaction.*		
a)	The public realm design will offer a range of opportunities for facilitating social interaction.	Supported by OGA.	Nil
b)	The tenancy shopfronts along the southern face of the eastern entry building, together with the existing shopfronts on the other side of Whatley Crescent will help create more of a community high street environment.	Supported by OGA.	Nil
c)	Further responses that support the local community will require development during the next stage, once the BST Placemaking Plan is released and consultation held.	Agree, the architectural and landscape team would support this, awaiting receipt of the BST Placemaking Plan. The cost and time impacts of potential responses to the Placemaking Plan will be negotiated with PTA once Placemaking Plan is received and discussed with Stakeholders.	Nil depending on Placemaking Plan requirements.
10.	**Aesthetics** *Good design is the product of a skilled, judicious design process that results in attractive and inviting buildings and places that engage the senses.*		
a)	The overall visual aesthetic of the base cost design proposed is stripped back and non-descript, lacking distinctiveness and character.	Refer to Principle 1(d) above.	
b)	A public art consultant has not been appointed, which could indicate that it has not been adequately considered and/or priced.	Noted, a preliminary public art strategy as developed by the Evolve Bayswater team has been described and target areas illustrated within the Evolve Bayswater bid response. However, as instructed by PTA, no design or costing of public artworks has been incorporated into the bid at this stage.	Nil allowances for public art including in TOC.

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		The public art strategy is to be developed in the next design stage in consultation with Metronet and Community stakeholders, the architectural and landscape team supports an integrated approach to public art.	
c)	A number of public art opportunities are identified in the Design Report, which appear sound. The provision of artwork that is integrated with the station design is supported and should be pursued, as this will assist with creating a more distinctive and engaging design outcome. The public art strategy will also need to respond to the BST Placemaking Plan when released.	Supported by OGA, the architectural and landscape team would support engagement of public artist(s) at the earliest opportunity in the next design stage to ensure the public art strategy is developed to allow for integration into the station and public realm design.	As per above

GOVERNMENT OF WESTERN AUSTRALIA

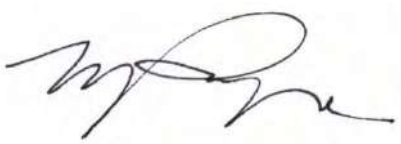
Department of **Planning Lands and Heritage**
Office of the Government Architect

State Design Review Panel Report

Bayswater Station DR2

For PTA

August 2020

State Design Review Panel Report		
Subject	**Bayswater Station – Design Review 2**	
Date	4 August 2020	
Time	9:00-12:00	
Location	140 William Street Perth and Video Conference via Zoom	
Design Reviewers	Melinda Payne Philip Gresley Shea Hatch Chris Maher Chris Melsom	Associate to Government Architect (Chair) Panel Member Panel Member Panel Member Panel Member
Proponent	Frank Lindsay Jonathan Shuker Karen Ho	PTA Project Manager, PTA Project Manager, PTA
Project Team	Paul Reed John-Paul Davies Doug Pott Jason Flowerdew Kat O'Mara	Design Integration Manager Architect Landscape Architect Alliance Manager Sustainability Manager
Stakeholders	Glen Finn Johanna Dowsett Brett Wood-Gush Ryan Keys Des Abel Helen Smith Alix Bray	Director, METRONET Planning Manager, METRONET Principal Urban Designer, METRONET Executive Director of Planning, DevelopmentWA Director Community and Development, City of Bayswater Manager Development Approvals, City of Bayswater Acting Manager Strategic Planning and Place, City of Bayswater
Observers	Diarmuid O'Connor	Senior Planning Officer, DPLH
Panel Support	Barbara Gdowski Pip Munckton Meagan Wells	Manager SDRP, Office of the Government Architect Coordinator SDRP, Office of the Government Architect Assistant SDRP, Office of the Government Architect
Declarations	Panel members have declared proximities to the project that have been deemed to not represent conflicts of interest.	
Briefings		
Relevant Authorities Project Team	PTA overview Design Presentation	Jonathan Shuker John-Paul Davies Doug Pott Kat O'Mara Paul Reed
Design Review Report endorsement		
Chair signature	 Melinda Payne, Associate to Government Architect	

Overall	The overall proposal is supported by the Panel.
Further Review	The SDRP recommends a future review of this project to further refine an integrated approach to the station and public realm design.

	Supported
	Pending further attention
	Not yet supported
	Yet to be addressed

	*DR1**	*OGA tender assessment*	*DR2*	*DR3*
Principle 1 - **Context and character**				
Principle 2 - **Landscape quality**				
Principle 3 - **Built form and scale**				
Principle 4 - **Functionality and build quality**				
Principle 5 - **Sustainability**				
Principle 6 - **Amenity**				
Principle 7 - **Legibility**				
Principle 8 - **Safety**				
Principle 9 - **Community**				
Principle 10 - **Aesthetics**				

*Note: 'Traffic light' colours were not provided in the Interim SDRP DR1 report in 2018



Report Summary

The Panel thanks the project team for engaging with the design review process. The Panel acknowledges the strategic importance of METRONET, the significance of the Bayswater Station works, the complexity of the engineering constraints and the challenges regarding the scope, timeframe, staging and budget.

The material provided was clear, comprehensive and appropriate for a design review at this stage and the Panel appreciated the opportunity to discuss the proposed areas of focus for design prioritisation identified by the team.

With an appropriately strong focus on infrastructure functionality, this project is also striving for integration with a considered focus on public realm, landscape and activation. The Panel supports the precinct-based approach taken.

The design response honestly presents the major infrastructure components and this approach should now facilitate a further simple, strong move to develop a signifying element to assist legibility, identify station entry points and underpin station identity within the Town Centre.

In considering the future context of the area, which will be undergoing significant change, the Bayswater Station will be an important catalyst for the future development.

Design quality evaluation

		Supported
		Pending further attention
		Not yet supported
		Yet to be addressed
Principle 1 **Context and character**		*Good design responds to and enhances the distinctive characteristics of a local area, contributing to a sense of place.*
		1. The site approach / key areas within the station precinct as whole is supported, as is the intent to provide high quality public realm. Continue to consider the broad implications regards existing and future character, of inserting significant new infrastructure into an existing Town Centre. 2. As a central point of activation, consider similar precedents: for example, the Goods Shed, Claremont. What has and hasn't worked with these other projects? 3. Note the fine grain of Whatley Crescent when considering 'rhythm', articulation and separation of tenancies as a potential counterpoint to the significant horizontality of the current built form (rail bridge edge).
Principle 2 **Landscape quality**		*Good design recognises that together landscape and buildings operate as an integrated and sustainable system, within a broader ecological context.*
		1. The proposed 130 mature trees as part of the greater masterplan is strongly supported, as acknowledgement of Bayswater as the garden suburb. 2. Continue to simplify design, including the reduction of retaining walls within the Whatley Crescent terraced area (where large level changes occur), with the intention of optimising mature tree numbers and ensuring their survival through adequate space and soil provision. 3. Plan for the successful activation of the public realm by providing adequate seating, shade and amenity for events and activity in these spaces. Combine intimate spaces with larger pockets for public realm flexibility. 4. Ensure services are appropriately provided for the range of activities that may occur in this space. 5. Draw site sections to demonstrate the landscape and public space response, particularly at key level changes and access points. These will be important for the approvals process and community consultation.

Principle 3 **Built form and scale**		*Good design ensures that the massing and height of development is appropriate to its setting and successfully negotiates between existing built form and the intended future character of the local area.*
		1. The bridge establishes a weighty horizontality while the rhythm of the existing streetscape and urban grain is more varied. Consider how the elegance of a singular bridge element at distance, progresses to detailed interest and varied grain at pedestrian scale. Consider the contribution of the of columns and piers in creating gaps and rhythms. 2. The project could be considered to have 3 layers, each with distinct function and form: • Canopy, platform and sky: arrival, openness and light • Bridge structure: strength, form and horizontality • Undercroft: activation, shelter and protection 3. The scale and design of the concrete columns, column heads and bridge structures are dominant. There are opportunities to further articulate and colour the large expanses of concrete / cladding to promote a more comfortable human scaled place.
Principle 4 **Functionality and build quality**		*Good design meets the needs of users efficiently and effectively, balancing functional requirements to perform well and deliver optimum benefit over the full life-cycle.*
		1. The Panel commends the project team for delivering a street-based bus port, which allows for a traditional forecourt to the station for activation and community benefit, fitting this Town Centre setting. 2. Confirm an approved Place Management Plan with City of Bayswater, which clarifies the requirements for markets, events and other for the various spaces, including the northern forecourt, while dealing with the functional PTA requirement. 3. The inclusion of smaller commercial / community tenancies is strongly supported. 4. Continue to develop a retail strategy, which identifies current deficiencies/requirements for Bayswater, along with recommendations for staging and interim uses. 5. The Panel supports the direction of the preferred option, being a combination of modified precast structural components and considered use of cladding. Success will require careful detailing of joints and capping. 6. Continue to balance affordability, future maintenance costs and constructability, whilst building on the unique context of the Bayswater project context.
Principle 5 **Sustainability**		*Good design optimises the sustainability of the built environment, delivering positive environmental, social and economic outcomes.*
		1. The Panel encourages the project team to go beyond the baseline of 4 Star Green Star rating and pursue a 5 Star rating. 2. Outline the sustainability initiatives for this project including at a precinct scale. Prioritise these in the public realm, landscape and urban design of the project, for community engagement.
Principle 6 **Amenity**		*Good design optimises internal and external amenity for occupants, visitors and neighbours, providing environments that are comfortable, productive and healthy.*
		1. Consider the pedestrian experience and prioritise the entry plaza undercroft as a significant design opportunity to soften, add drama, interest, materiality, point of difference to the project to improve the arrival/departure experience. 2. The oculus (openings to the platform) are a key contributor to the amenity of what is otherwise a large and potentially oppressive undercroft area. Optimise their size and proactively design/detail the opening for interest and delight. 3. The entry plaza is well placed to provide good amenity under West Australian conditions with shade, shelter and activation. Continue to design these areas as key public realm, which considers the human scale.

Principle 7 **Legibility**		*Good design results in buildings and places that are legible, with clear connections and easily identifiable elements to help people find their way around.*
		1. The current design lacks adequate legibility for station users on a number of scales. The significance of this station to the rail network within the higher density future context provides a compelling argument to create a landmark. 2. Whilst supporting the simplified platform canopy design, there remains an opportunity to deliver a signifying element for the station – a 'punctuation mark' within the strong horizontality of the current design and would provide an identifying element visible within the greater Town Centre. Could such an approach announce the station entries more powerfully? The simplified platform approach and honest reflection of structure would contrast successfully with a distinctive marker in the station forecourt zone and achieve a variety of legibility objectives. 3. The marker referred to above could be achieved by integrating an artwork with the platform canopies. Colour and or pattern could be applied to the underside of the bridge and might wrap around the horizontal bridge beam. The legibility for pedestrians approaching the station undercroft would be improved. 4. Station signage should be further considered and depicted indicatively in future renders. 5. Continue consideration of longer distance views from the greater precinct in order to consider the contrast in scale for the canopies, the bridge structure and the station. Consider improved alignment of the platform canopies with King William Street to assist with long views and legibility. 6. Map existing and future key pedestrian and movement networks to optimise wayfinding and legibility.
Principle 8 **Safety**		*Good design optimises safety and security, minimising the risk of personal harm and supporting safe behaviour and use.*
		1. The simple design approach allows for a powerful lighting strategy which could form part of an integrated design approach as well as ensuring night time safety. 2. Progress sections to include areas of large level changes and public realm to identify potential areas of difficulty for passive surveillance and accessibility.
Principle 9 **Community**		*Good design responds to local community needs as well as the wider social context, providing environments that support a diverse range of people and facilitate social interaction.*
		1. The Panel supports an integrated approach to the landscape, built form and art strategies. Utilise public art and lighting as additional means of delivering fine grain and a sense of place and identity. 2. The intent for a broad tenancy EOI is supported as is the potential to incentivise interim innovative uses. Consider engagement with the Aboriginal reference group as part of tenancy EOI process/procurement as well as consideration of a community art initiative as a potential tenant. 3. Consult with the Aboriginal Reference Group as part of the METRONET Aboriginal Engagement Strategy Gnarla Biddi. This engagement should deliver more than just an "applied" public art work.
Principle 10 **Aesthetics**		*Good design is the product of a skilled, judicious design process that results in attractive and inviting buildings and places that engage the senses.*
		1. Continue to progress an integrated approach to the design of the station, both in relation to the formal outcome and the surrounding context. A holistic design response that considers architecture, engineering, urban design, landscape, lighting and public art together, and provides a contextually responsive outcome, is essential.

		2. The Panel supports the simple and honest expression of structure as a design approach. A 'streamlined' aesthetic is considered suitable to transport uses: 'engineered simplicity'. Consider contextual precedents for a stripped back Bayswater language, such as the local Post Office. 3. As an exercise in form making, the Panel is not overly concerned by the strong horizontality of the bridge component as the opportunity for finer grain exists with shopfront and handrail design below and above this component. Look to the tenancy design as a point of difference, as found in with the exemplar projects in the report appendix.

Appendix: Design Exemplars



Donshan Train Bridge Taiwan



Buro Koray Duman New York Highway



Public Space Authority Mexico



Basurama Madrid Spain

Appendix G

Certificates of Title

WESTERN AUSTRALIA

REGISTER NUMBER	
3/D471	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
N/A	N/A

VOLUME 308 FOLIO 26

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

BGRoberts

REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 3 ON DIAGRAM 471

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

CITY OF BAYSWATER OF 61 BROUN AVENUE, MORLEY

(T T8954/1921) REGISTERED 26/10/1921

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	308-26 (3/D471)
PREVIOUS TITLE:	114-200
PROPERTY STREET ADDRESS:	3 COODE ST, BAYSWATER.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BAYSWATER

LANDGATE COPY OF ORIGINAL NOT TO SCALE 06/10/2020 12:26 PM Request number: 61099956

Landgate
www.landgate.wa.gov.au

Cancelled Transfer Vol. 262, Fol. 132. 19 of

ORIGINAL.

INDEXED.

REGISTER BOOK.

Vol. 1049 Fol. 324.

WESTERN AUSTRALIA.

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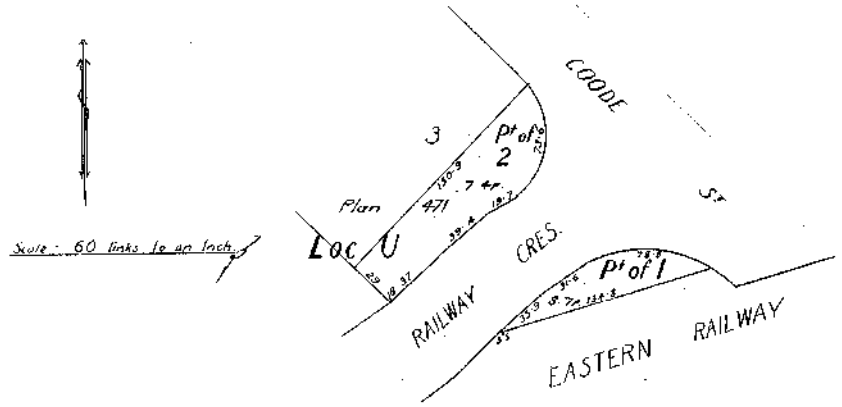
Certificate of Title

under "The Transfer of Land Act, 1893" (Sch. 5, 56 Vic., 14).

The Bayswater Road Board of the Town Hall, Slade Street, Bayswater

is now the sole proprietor

of an estate in fee simple in possession subject to the easements and encumbrances notified hereunder in ALL those pieces of land delineated and coloured green on the map hereon, containing together eleven acres one tenth perches or thereabouts, being portions of Swan Location U and being part of each of Lots 1 and 2 on diagram 471.



Dated the twenty-fifth day of June One thousand nine hundred and thirty-six.

Assistant Registrar of Titles.

Application H627387. The correct name and address of the proprietor is now City of Bayswater of 61 Broun Avenue Morley. Registered 19th December, 2000 at 13.12 hrs.

e 11210/30

For encumbrances and other matters affecting the land see back.

LANDGATE COPY OF ORIGINAL NOT TO SCALE 06/10/2020 12:26 PM Request number: 61099956

Landgate

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EASEMENTS AND ENCUMBRANCES REFERRED TO.

CT 1049 0324 B

CERTIFICATE OF TITLE.

Registered Vol.....Fol.....

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WESTERN AUSTRALIA

REGISTER NUMBER	
2/D8433	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
N/A	N/A

VOLUME 1658 FOLIO 634

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

BGRoberts

REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 2 ON DIAGRAM 8433

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

CITY OF BAYSWATER OF 61 BROUN AVENUE, MORLEY

(T F771681) REGISTERED 3/1/1995

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. THE LAND THE SUBJECT OF THIS CERTIFICATE OF TITLE EXCLUDES ALL PORTIONS OF THE LOT DESCRIBED ABOVE EXCEPT THAT PORTION SHOWN IN THE SKETCH OF THE SUPERSEDED PAPER VERSION OF THIS TITLE. VOL 1658 FOL 634.
2. F771682 RESTRICTIVE COVENANT BURDEN. REGISTERED 3/1/1995.
3. *O421104 MEMORIAL. CONTAMINATED SITES ACT 2003 REGISTERED 8/6/2020.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	1658-634 (2/D8433)
PREVIOUS TITLE:	203-130A, 203-131A, 1184-446
PROPERTY STREET ADDRESS:	92 RAILWAY PDE, BAYSWATER.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BAYSWATER

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Landgate
www.landgate.wa.gov.au

WESTERN AUSTRALIA

REGISTER NUMBER	
2630/P2052	
DUPLICATE EDITION **N/A**	DATE DUPLICATE ISSUED **N/A**

VOLUME **LR3024** FOLIO **45**

RECORD OF QUALIFIED CERTIFICATE OF CROWN LAND TITLE

UNDER THE TRANSFER OF LAND ACT 1893
AND THE LAND ADMINISTRATION ACT 1997

NO DUPLICATE CREATED

The undermentioned land is Crown land in the name of the STATE OF WESTERN AUSTRALIA, subject to the interests and Status Orders shown in the first schedule which are in turn subject to the limitations, interests, encumbrances and notifications shown in the second schedule.

BGRoberts
REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 2630 ON PLAN 2052

STATUS ORDER AND PRIMARY INTEREST HOLDER:
(FIRST SCHEDULE)

STATUS ORDER/INTEREST: RESERVE WITHOUT MANAGEMENT ORDER

PRIMARY INTEREST HOLDER: STATE OF WESTERN AUSTRALIA

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. RESERVE 12520 FOR THE PURPOSE OF RAILWAY

Warning: (1) A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.
(2) The land and interests etc. shown hereon may be affected by interests etc. that can be, but are not, shown on the register.
(3) The interests etc. shown hereon may have a different priority than shown.

----------END OF CERTIFICATE OF CROWN LAND TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	P2052
PREVIOUS TITLE:	LR3024-45
PROPERTY STREET ADDRESS:	NO STREET ADDRESS INFORMATION AVAILABLE.
LOCAL GOVERNMENT AUTHORITY:	TOWN OF BASSENDEAN, CITY OF BAYSWATER
RESPONSIBLE AGENCY:	PUBLIC TRANSPORT AUTHORITY OF WESTERN AUSTRALIA

NOTE 1: M371998 CORRESPONDENCE FILE 03199-1988-01RO

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WESTERN AUSTRALIA

REGISTER NUMBER	
9915/P2285	
DUPLICATE EDITION **N/A**	DATE DUPLICATE ISSUED **N/A**

VOLUME **LR3048** FOLIO **73**

RECORD OF QUALIFIED CERTIFICATE OF CROWN LAND TITLE

UNDER THE TRANSFER OF LAND ACT 1893
AND THE LAND ADMINISTRATION ACT 1997

NO DUPLICATE CREATED

The undermentioned land is Crown land in the name of the STATE OF WESTERN AUSTRALIA, subject to the interests and Status Orders shown in the first schedule which are in turn subject to the limitations, interests, encumbrances and notifications shown in the second schedule.

BGRoberts
REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 9915 ON PLAN 2285

STATUS ORDER AND PRIMARY INTEREST HOLDER:
(FIRST SCHEDULE)

STATUS ORDER/INTEREST: RESERVE UNDER MANAGEMENT ORDER

PRIMARY INTEREST HOLDER: MINISTER FOR POLICE AND EMERGENCY SERVICES OF CARE OF WA POLICE SERVICE, 2 ADELAIDE TERRACE, EAST PERTH

(XE K619061) REGISTERED 9/6/2008

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. E425749 RESERVE 35891 FOR THE PURPOSE OF POLICE PURPOSES REGISTERED 15/8/1990.
K619061 MANAGEMENT ORDER. CONTAINS CONDITIONS TO BE OBSERVED. REGISTERED 9/6/2008.

Warning: (1) A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.
(2) The land and interests etc. shown hereon may be affected by interests etc. that can be, but are not, shown on the register.
(3) The interests etc. shown hereon may have a different priority than shown.

----------END OF CERTIFICATE OF CROWN LAND TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	LR3048-73 (9915/P2285)
PREVIOUS TITLE:	LR3048-73
PROPERTY STREET ADDRESS:	77 WHATLEY CR, BAYSWATER.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BAYSWATER
RESPONSIBLE AGENCY:	WESTERN AUSTRALIA POLICE

END OF PAGE 1 - CONTINUED OVER

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NOTE 1:	A000001A	LAND PARCEL IDENTIFIER OF SWAN LOCATION 9915 ON SUPERSEDED PAPER CERTIFICATE OF CROWN LAND TITLE CHANGED TO LOT 9915 ON FREEHOLD TITLE PLAN 2285 ON 21-AUG-02 TO ENABLE ISSUE OF A DIGITAL CERTIFICATE OF TITLE.
NOTE 2:		THE ABOVE NOTE MAY NOT BE SHOWN ON THE SUPERSEDED PAPER CERTIFICATE OF TITLE.
NOTE 3:	K619060	CORRESPONDENCE FILE 03575-1978-02RO

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WESTERN AUSTRALIA

REGISTER NUMBER	
5269/P1321	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
N/A	**N/A**

VOLUME **LR3151** FOLIO **374**

RECORD OF QUALIFIED CERTIFICATE OF CROWN LAND TITLE

UNDER THE TRANSFER OF LAND ACT 1893
AND THE LAND ADMINISTRATION ACT 1997

NO DUPLICATE CREATED

The undermentioned land is Crown land in the name of the STATE OF WESTERN AUSTRALIA, subject to the interests and Status Orders shown in the first schedule which are in turn subject to the limitations, interests, encumbrances and notifications shown in the second schedule.

BGRoberts
REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 5269 ON PLAN 1321

STATUS ORDER AND PRIMARY INTEREST HOLDER:
(FIRST SCHEDULE)

STATUS ORDER/INTEREST: RESERVE UNDER MANAGEMENT ORDER

PRIMARY INTEREST HOLDER: SHIRE OF BAYSWATER

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. RESERVE 23080 FOR THE PURPOSE OF RECREATION
MANAGEMENT ORDER. CONTAINS CONDITIONS TO BE OBSERVED.

Warning:
(1) A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.
(2) The land and interests etc. shown hereon may be affected by interests etc. that can be, but are not, shown on the register.
(3) The interests etc. shown hereon may have a different priority than shown.

----------END OF CERTIFICATE OF CROWN LAND TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	P1321
PREVIOUS TITLE:	LR3151-374
PROPERTY STREET ADDRESS:	LOT 5269 ROSE AV, BAYSWATER.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BAYSWATER
RESPONSIBLE AGENCY:	DEPARTMENT OF PLANNING, LANDS AND HERITAGE (SLSD)

NOTE 1: K459082 CORRESPONDENCE FILE 01149-1916-02RO
NOTE 2: L608525 DEPOSITED PLAN 70958 LODGED

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WESTERN AUSTRALIA

REGISTER NUMBER	
5365/P1321	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
N/A	**N/A**

VOLUME **LR3151** FOLIO **375**

RECORD OF QUALIFIED CERTIFICATE OF CROWN LAND TITLE

UNDER THE TRANSFER OF LAND ACT 1893
AND THE LAND ADMINISTRATION ACT 1997

NO DUPLICATE CREATED

The undermentioned land is Crown land in the name of the STATE OF WESTERN AUSTRALIA, subject to the interests and Status Orders shown in the first schedule which are in turn subject to the limitations, interests, encumbrances and notifications shown in the second schedule.

BGRoberts
REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 5365 ON PLAN 1321

STATUS ORDER AND PRIMARY INTEREST HOLDER:
(FIRST SCHEDULE)

STATUS ORDER/INTEREST: RESERVE UNDER MANAGEMENT ORDER

PRIMARY INTEREST HOLDER: SHIRE OF BAYSWATER

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. RESERVE 23080 FOR THE PURPOSE OF RECREATION
MANAGEMENT ORDER. CONTAINS CONDITIONS TO BE OBSERVED.

Warning: (1) A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.
(2) The land and interests etc. shown hereon may be affected by interests etc. that can be, but are not, shown on the register.
(3) The interests etc. shown hereon may have a different priority than shown.

----------END OF CERTIFICATE OF CROWN LAND TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	P1321
PREVIOUS TITLE:	LR3151-375
PROPERTY STREET ADDRESS:	LOT 5365 ROSE AV, BAYSWATER.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BAYSWATER
RESPONSIBLE AGENCY:	DEPARTMENT OF PLANNING, LANDS AND HERITAGE (SLSD)

NOTE 1: K465548 CORRESPONDENCE FILE 01149-1916-02RO
NOTE 2: L608525 DEPOSITED PLAN 70958 LODGED

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WESTERN AUSTRALIA

REGISTER NUMBER	
504/P2052	
DUPLICATE EDITION **N/A**	DATE DUPLICATE ISSUED **N/A**

VOLUME **LR3156** FOLIO **229**

RECORD OF QUALIFIED CERTIFICATE OF CROWN LAND TITLE

UNDER THE TRANSFER OF LAND ACT 1893
AND THE LAND ADMINISTRATION ACT 1997

NO DUPLICATE CREATED

The undermentioned land is Crown land in the name of the STATE OF WESTERN AUSTRALIA, subject to the interests and Status Orders shown in the first schedule which are in turn subject to the limitations, interests, encumbrances and notifications shown in the second schedule.

BGRoberts
REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 504 ON PLAN 2052

STATUS ORDER AND PRIMARY INTEREST HOLDER:
(FIRST SCHEDULE)

STATUS ORDER/INTEREST: RESERVE WITHOUT MANAGEMENT ORDER

PRIMARY INTEREST HOLDER: STATE OF WESTERN AUSTRALIA

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. K809189 RESERVE 12520 FOR THE PURPOSE OF RAILWAY REGISTERED 22/12/2008.

Warning: (1) A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.
(2) The land and interests etc. shown hereon may be affected by interests etc. that can be, but are not, shown on the register.
(3) The interests etc. shown hereon may have a different priority than shown.

----------END OF CERTIFICATE OF CROWN LAND TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	P2052
PREVIOUS TITLE:	LR3156-229
PROPERTY STREET ADDRESS:	NO STREET ADDRESS INFORMATION AVAILABLE.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BAYSWATER
RESPONSIBLE AGENCY:	PUBLIC TRANSPORT AUTHORITY OF WESTERN AUSTRALIA

NOTE 1: K809188 CORRESPONDENCE FILE 03199-1988-01RO

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Transfer 5697/1904 Vol 114 Fol 200

INDEXED

REGISTER BOOK.

Vol. 308 Fol. 26

CT 0308 0026 F

WESTERN AUSTRALIA.

ORIGINAL

Certificate of Title

under "The Transfer of Land Act, 1893."

Sch. 6. 56 V., 10.

William Connaughton of De Gray Station Land

is now the sole proprietor

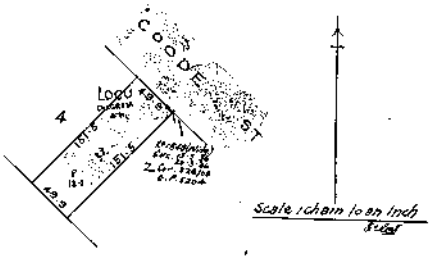
of an estate in fee simple in possession subject to the easements and encumbrances notified hereunder, in ALL that piece of land delineated and coloured green on the map hereon, containing twelve and one tenth perches, — or thereabouts, being portion of Swan Location V. and being Lot 3. on deposited diagram 471 —

Transfer 1019/06 Totally transferred by endorsement to Medical Corbett of Perth, Grazier. Registered 11.10 am 18th February 1905 Arthur G Harvey

Transfer 8994/1921 Transferred by endorsement to The Bayswater Road Board of the Town Hall Slade Street Bayswater. Registered 26th October 1921 at 11.10 am Arthur G Harvey

Application H627387. The correct name and address of the proprietor is now City of Bayswater of 61 Broun Avenue, Morley. Registered 19th December 2000 at 13:12 hrs.

RS



Dated the twenty-second day of June, One thousand nine hundred and four

Alf Glyde

Registrar of Titles.

Superseded - Copy for Sketch Only

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EASEMENTS AND ENCUMBRANCES REFERRED TO.

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308 - 26

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ORIGINAL – NOT TO BE REMOVED FROM OFFICE OF

CT 1658 0634 F

VOL. 1658 FOL. 634

Transfer C671632

Volume	Folio
203	130A
203	131A
1184	446

WESTERN AUSTRALIA

CERTIFICATE OF TITLE

UNDER THE "TRANSFER OF LAND ACT, 1893" AS AMENDED

Page 1 (of 2 pages) VOL. 1658 FOL. 634

I certify that the person described in the First Schedule hereto is the registered proprietor of the undermentioned estate in the undermentioned land subject to the easements and encumbrances shown in the Second Schedule hereto.

N.J. Smyth
REGISTRAR OF TITLES

Dated 9th December, 1983

ESTATE AND LAND REFERRED TO

Estate in fee simple in portion of Swan Location U and being part of Lot 2 on Diagram 8433, delineated and coloured green on the map in the Third Schedule hereto.

FIRST SCHEDULE (continued overleaf)

~~Lemones Pty. Ltd., of 103 Outram Street, West Perth.~~

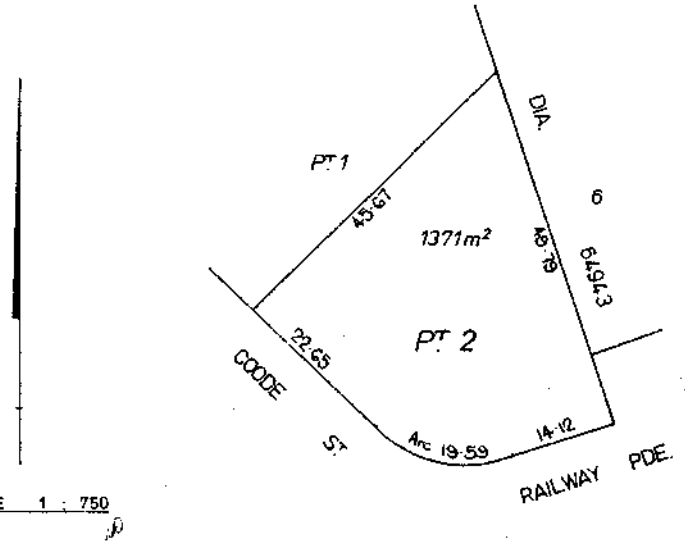
SECOND SCHEDULE (continued overleaf)

~~1. MORTGAGE C671635 to Commonwealth Trading Bank of Australia. Registered 9.12.83 at 9.10 o'c.~~ Discharged D255074 26.5.86

~~2.) W.T. C761730 lodged~~ by Commissioner's Instruction 1.2.84 at 3.12 o'c. Withdrawn D267584 17.6.86

N.J. Smyth
REGISTRAR OF TITLES

THIRD SCHEDULE



SCALE 1 : 750

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON

Superseded - Copy for Sketch Only

NOTE: RULING THROUGH AND SEALING WITH THE OFFICE SEAL INDICATES THAT AN ENTRY NO LONGER HAS EFFECT. ENTRIES NOT RULED THROUGH MAY BE AFFECTED BY SUBSEQUENT ENDORSEMENTS.

72009/12/77-45M-S/2850

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LT. 37

FIRST SCHEDULE (continued)

NOTE: RULING THROUGH AND SEALING WITH THE OFFICE SEAL INDICATES THAT AN ENTRY NO LONGER HAS EFFECT. ENTRIES NOT RULED THROUGH MAY BE AFFECTED BY SUBSEQUENT ENDORSEMENTS.

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	REGISTERED	TIME	SEAL	INITIALS
BP Australia Ltd., of 1 Mount Street, Perth.	Transfer	D255075	26.5.86	10.34		
City of Bayswater of 61 Broun Avenue, Morley.	Transfer	F771681	3.1.95	10.00		

SECOND SCHEDULE (continued)

NOTE: RULING THROUGH AND SEALING WITH THE OFFICE SEAL INDICATES THAT AN ENTRY NO LONGER HAS EFFECT. ENTRIES NOT RULED THROUGH MAY BE AFFECTED BY SUBSEQUENT ENDORSEMENTS.

INSTRUMENT NATURE	INSTRUMENT NUMBER	PARTICULARS	REGISTERED	TIME	SEAL	INITIALS	CANCELLATION	NUMBER	REGISTERED OR LODGED	SEAL	INITIALS
Transfer	F771682	contains a restrictive covenant.	3.1.95	10.01							

CERTIFICATE OF TITLE VOL. 1658 634

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NOT TO BE REMOVED FROM OFFICE OF TITLES

LT 158

NO DUPLICATE ISSUED

REGISTER VOL.	BOOK FOL.
3048	073

Sundry Document E425749

Corr. 3575/1978

WESTERN AUSTRALIA

LR 3048 0073 F

Crown Land Record

The undermentioned land shown on the sketch in the First Schedule hereto is land of the Crown subject to the interests, easements, encumbrances and notices shown in the Second Schedule hereto.

3048 VOL. 073 FOL.

Dated 15th August, 1990

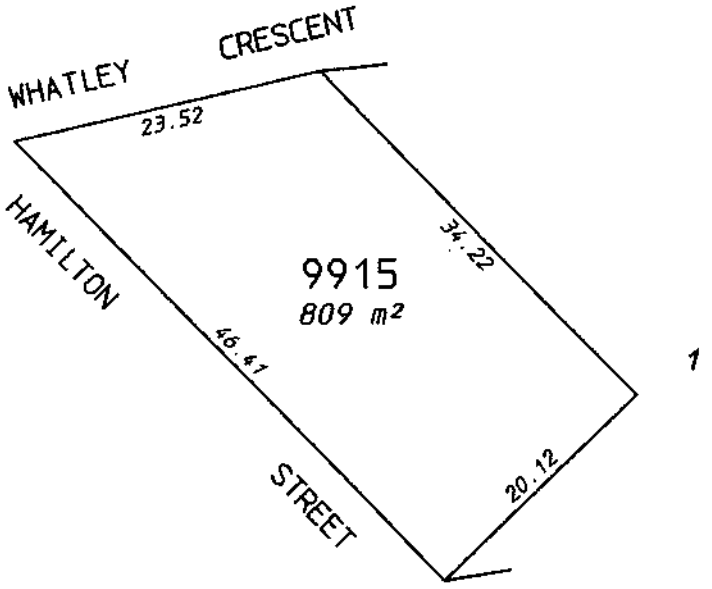
EXECUTIVE DIRECTOR

LAND REFERRED TO

Swan Location 9915 on Office of Titles Plan 2285

FIRST SCHEDULE

Page 1 (of 2 pages)



SCALE 1:500

P.P. PERTH 2000 16.28

City of Bayswater

FOR ENCUMBRANCES AND OTHER MATTERS AFFECTING THE LAND SEE SECOND SCHEDULE

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS RECORD OR ANY NOTIFICATION HEREON

E66377/4/89-4500-S/9499

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SECOND SCHEDULE NOTE: ENTRIES MAY BE AFFECTED BY SUBSEQUENT ENDORSEMENTS

PARTICULARS	INSTRUMENT NATURE	INSTRUMENT NUMBER	REGISTERED	TIME	SEAL	CERT. OFFICER
Reserve No. 35891 for the purpose of "Police Purposes".	Sundry Doc.	E425749				
Vested in Commissioner of Police. In G.G. 10/8/1990.	Sundry Doc.	E425749		15.30		

Appendix H1

Urban Design and Landscape Concept Report prepared by Hassell

BAYSWATER STATION URBAN DESIGN AND LANDSCAPE CONCEPT

evolve bayswater

connecting people + places

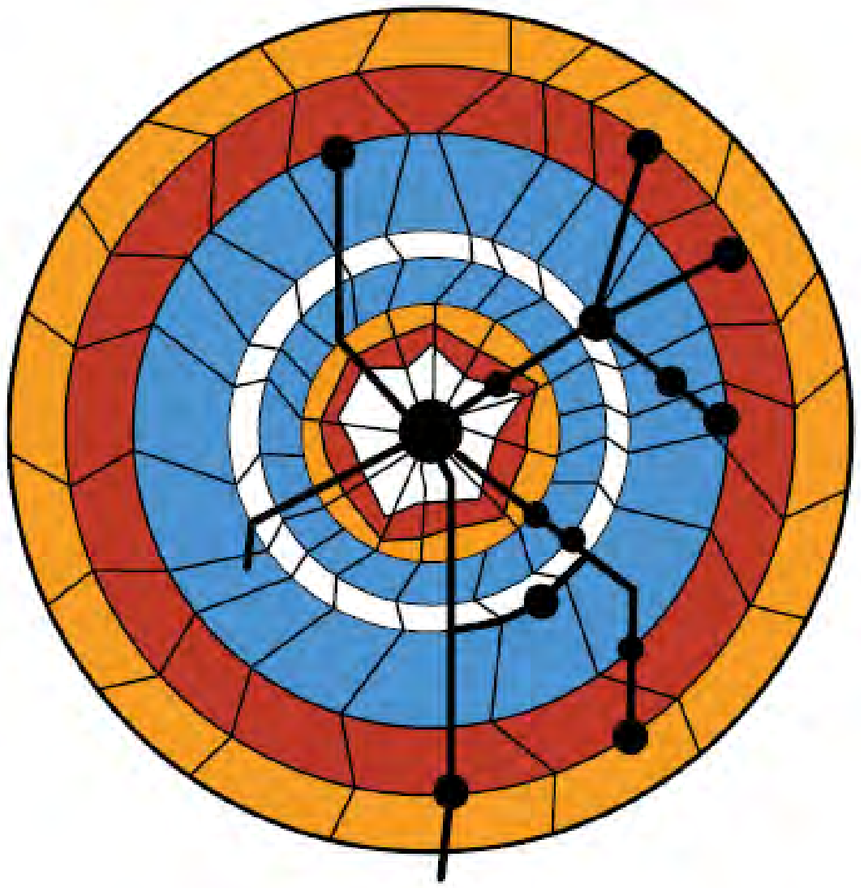


LANDSCAPE AND URBAN DESIGN
SEPTEMBER 2020

Acknowledgement of Country

"I would like to acknowledge the traditional custodians of the land on which we meet today, the Whadjuk people, and pay my respects to their Elders both past and present.

METRONET also acknowledges the people of the Noongar Nation as Traditional Custodians of the land and waters on which the program of projects is located"



LOCATION

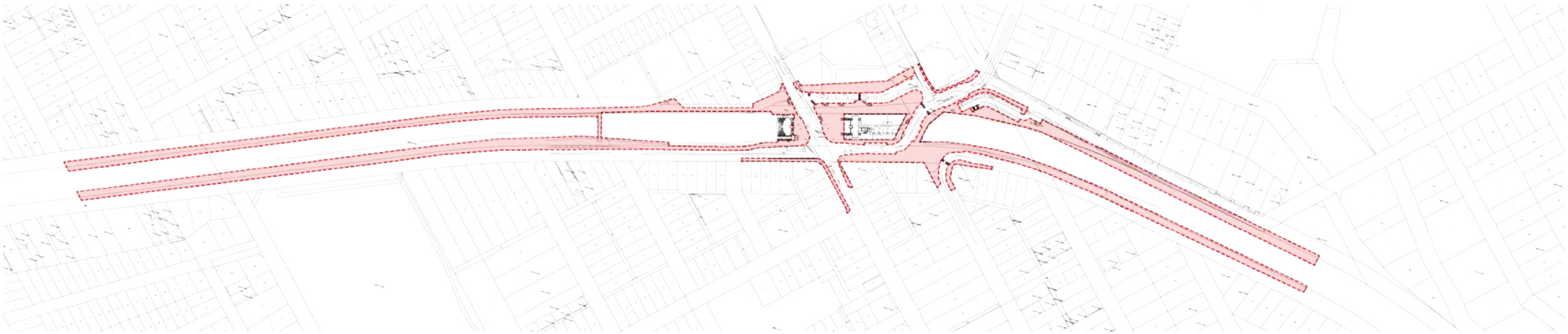
evolve bayswater

connecting people + places



PROJECT BOUNDARIES

evolve bayswater
connecting people + places



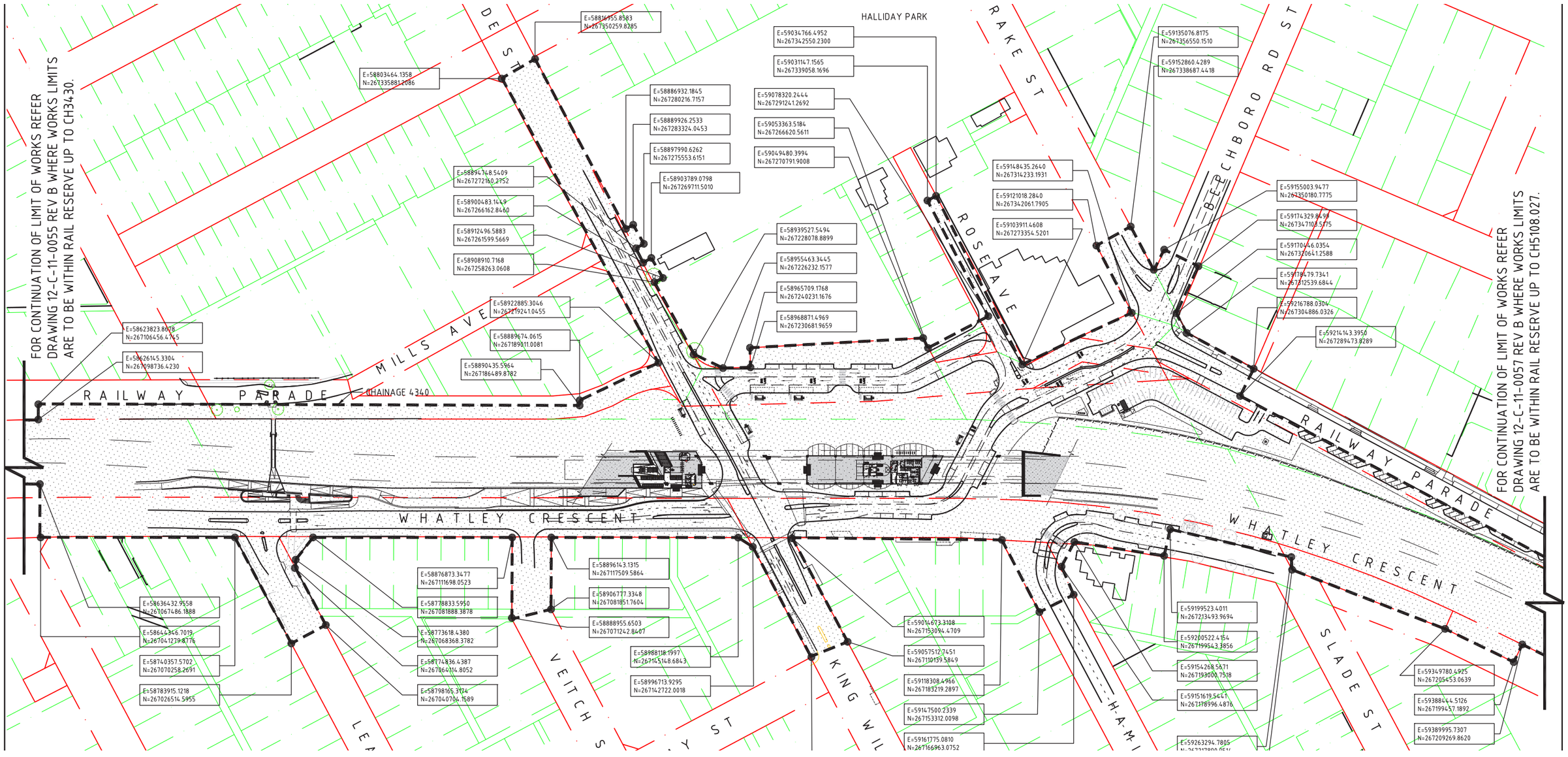
LEGEND

Extent of works

LIMIT OF WORKS

EXTENT OF WORKS TO STATION PRECINCT

evolve bayswater
connecting people + places



CULTURAL NARRATIVES

evolve bayswater
connecting people + places

Camp-site

“The Bayswater area has long been known to be a place where Noongar and guests to this Country would camp.”

“Its location was chosen due to its immediate proximity to an abundance of resources, including water and food, materials and tools.”

“Generally, family groups would come and go from this location, and light fires which were used as signals to let others know where they were.”

A place of Water

“The River is ancient. It has sustained life in Bayswater for millennia. Whadjuk families camped on the river foreshore hunting for food.”

“The river was a transportation and social hub for Colonists a well as being a place of heartbreak and tragedy.”

“The River is now an important place of recreation. Community activists are protecting the river and the wetlands for future generations.”

Waugyl

“Noongar people believe that the Waugyl dominates the earth and the sky and makes the koondarnangor (thunder), babanginy (lightning) and boroong (rain). The Waugyl created the boodja, he ensured that there was wirrin or spirits to look after the land and all that it encompassed.”

“When Noongar people visit a river or water body, a handful of sand is thrown into the water to let the Waugyl know of their presence”

Moity

“Whadjuk Noongar society is traditionally divided into two moieties or groups: the Manitj (White Cockatoo) and Wardung (Australian Raven).”

“This system of totems helps create a sustainable balance between consumption and conservation.”

“Totems also help define a person’s relationship to the world and to the Dreaming: past, present and future.”



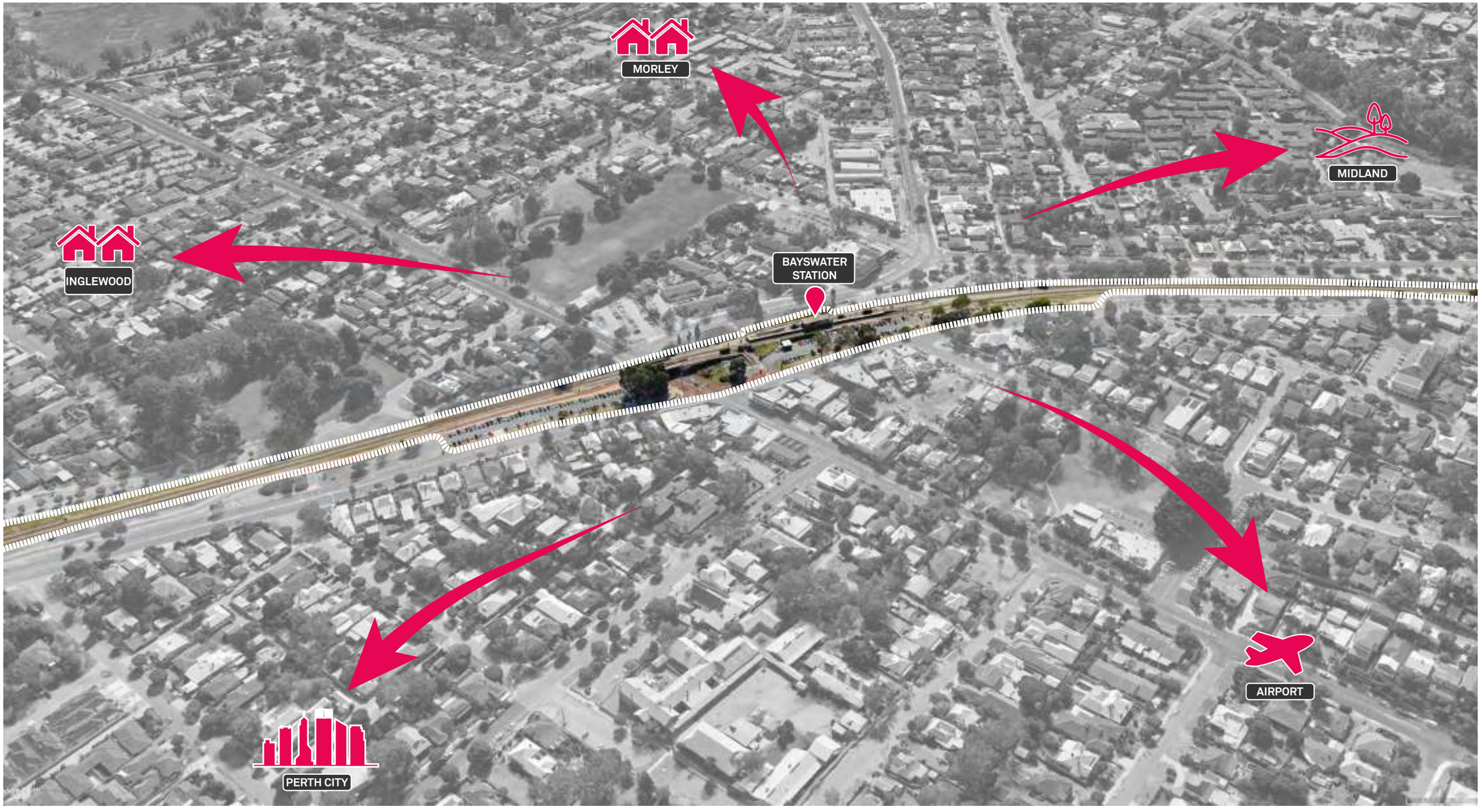






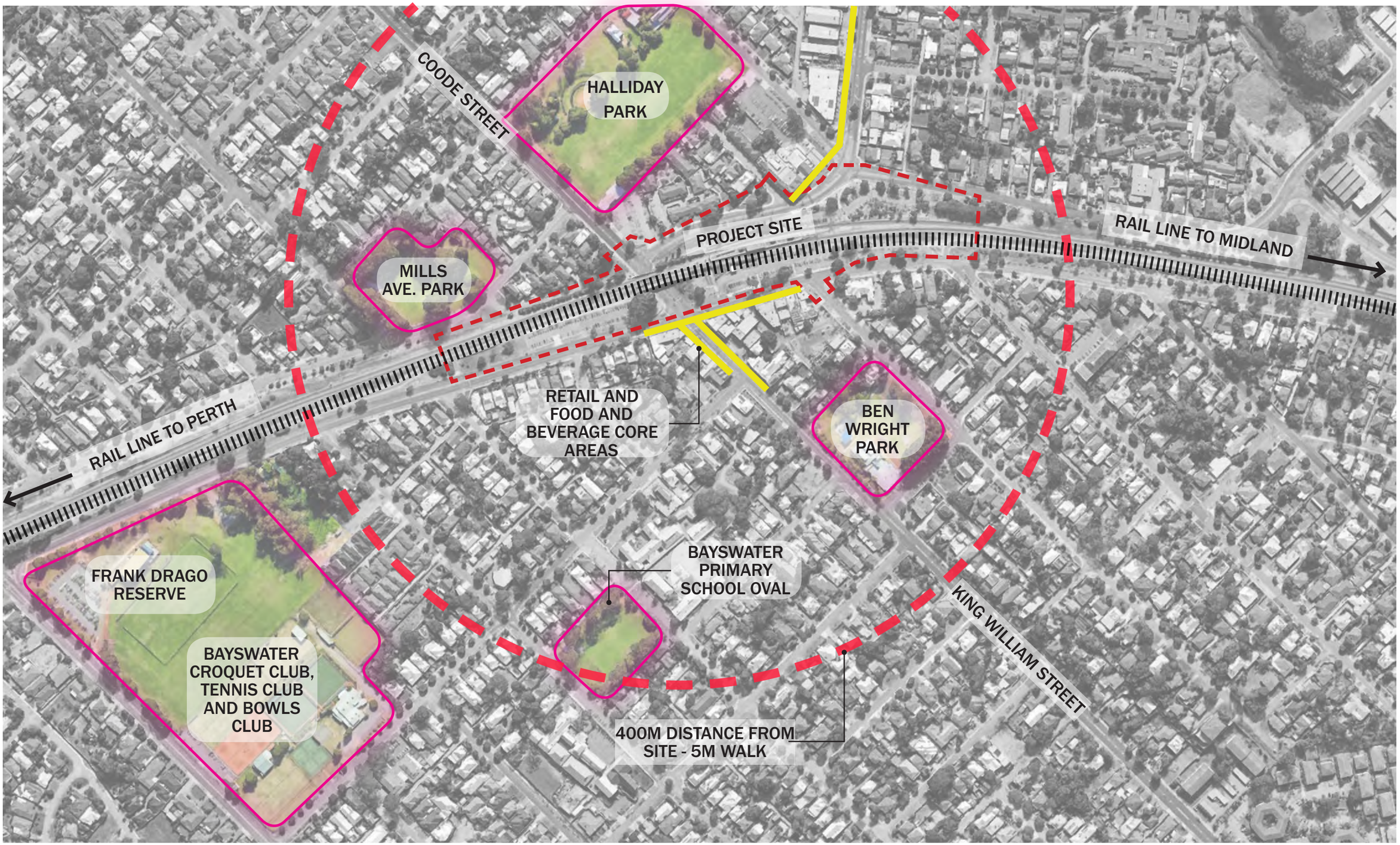
CONTEXT

evolve bayswater
connecting people + places



CONTEXT

evolve bayswater
connecting people + places

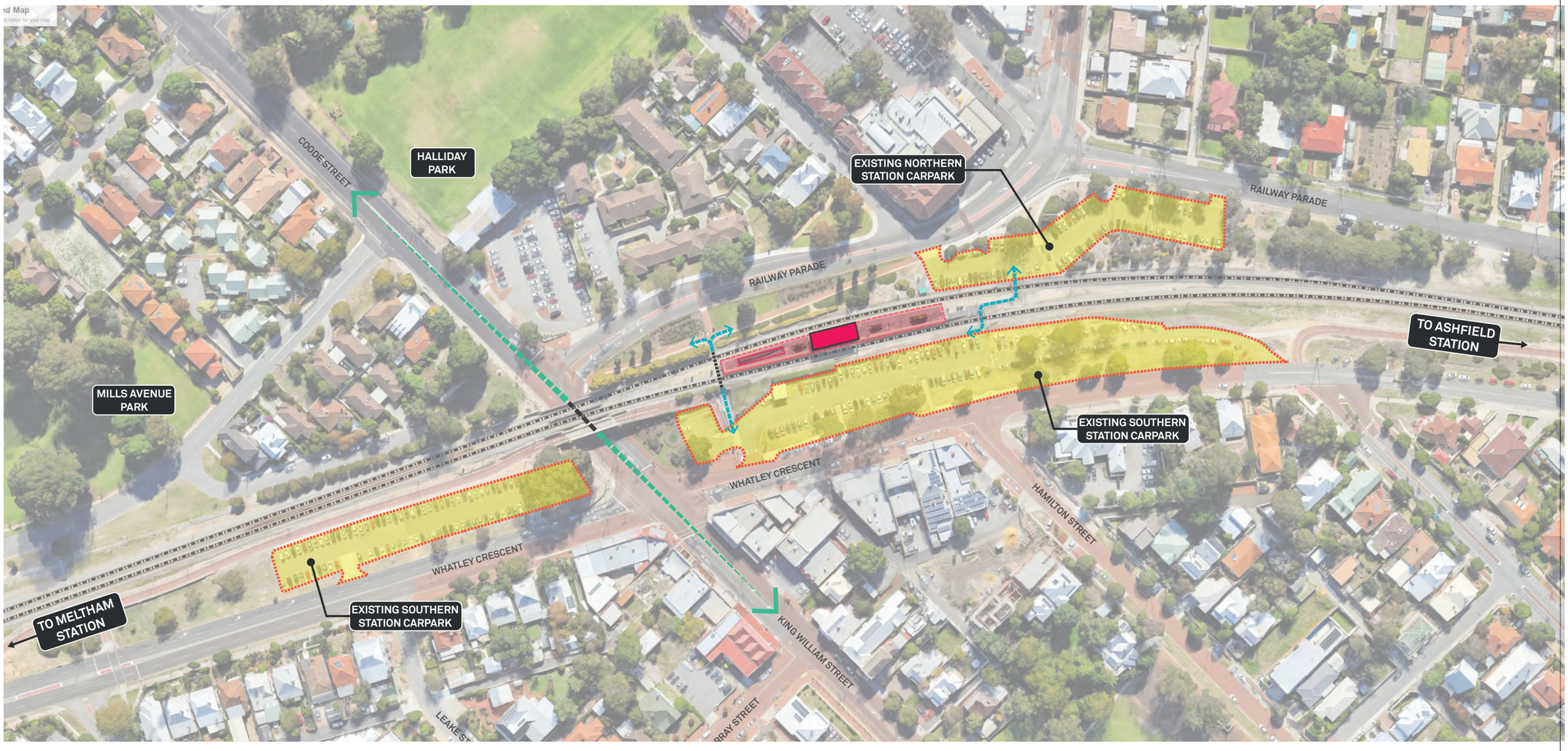


Hassell ©

EXISTING SITE

EXISTING STATION ANALYSIS

evolve bayswater
connecting people + places



Existing Site Context Plan

For diagrammatic purposes only - Not to Scale

LEGEND

- OVERPASS
- CANOPY EXTENT
- PLATFORM EXTENT
- BUILT FORM
- EXISTING CARPARK
- ENTRY POINT
- PLATFORM FENCING
- RAIL ALIGNMENT
- STATION BOUNDARY

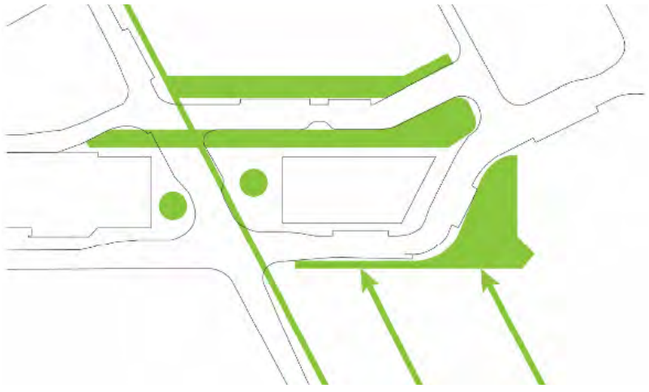
DESIGN PRINCIPLES

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connecting people + places

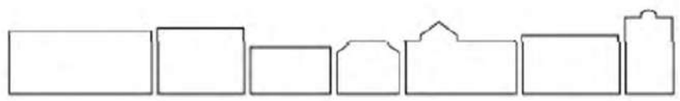
Garden



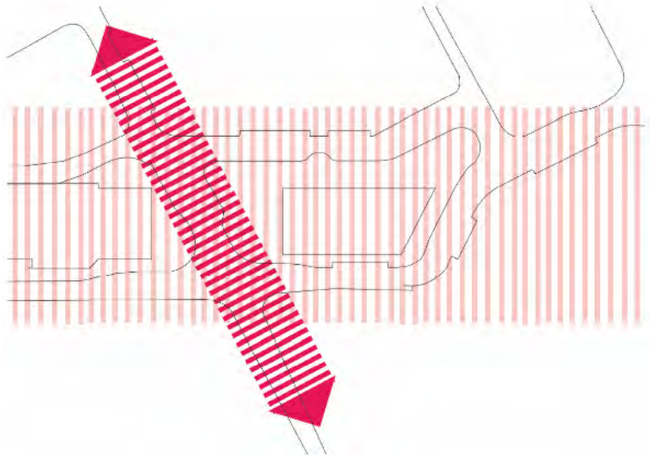
- Station plaza and surrounds to continue and enhance the suburbs green leafy ‘garden city’
- Maximise the planting while ensuring this doesn’t impede on circulation, ease of use, safety or infrastructure
- Gardens as amenity, creating shaded, human scale environments and places people are happy to spend time in
- Predominantly use low maintenance, endemic ground covers and low shrubs particular to the region
- Explore opportunities for community experiences such as community herb gardens and fruit trees



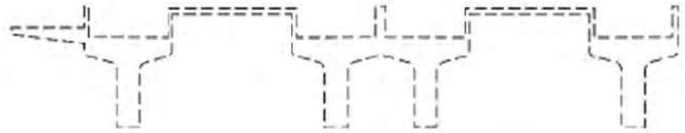
Rhythm



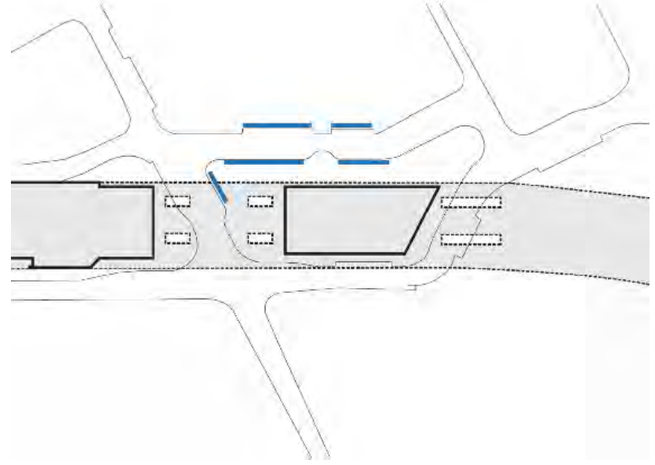
- The station and public spaces respond to the scale, texture and structure of the surrounding suburb – synchronising to the areas rhythm - ensuring the station and plaza feel intrinsically ‘of the place’
- Contributing and continuing to the streetscape
- Reinforcing and enhancing the main routes of travel
- Provide a seamlessly integrated, easy to navigate community space that stitches the fabric of the suburbs together
- Ensure the plaza and station functions with the ebbs and flows of commuter rhythms as well as quieter times – providing amenity for the variety of experiences



Infrastructure



- Contribute to the user experience while ensure ease of access and legibility
- Provide a completely integrated Urban design and landscape response with a highly functioning station as a key goal
- Ensure landscape responds to infrastructure operations requirements
- Provide a seamlessly integrated public space that allows for competing uses and travel modes in a high quality environment



CONCEPT: THE GARDEN STATION

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- The ‘Garden Station’ is the over-arching conceptual driver of the landscape design
- The design principles of ‘Ryhthym’ and ‘Infrastructure’ will be integrated within this larger concept
- The site has been divided into three garden typologies that each respond to specific site conditions: The Hillside Garden, The Water Garden and The Home Garden
- Each of these garden typologies will express a different character that will be created through planting, interpretation and spatial structure

The Hillside Garden



The Water Garden

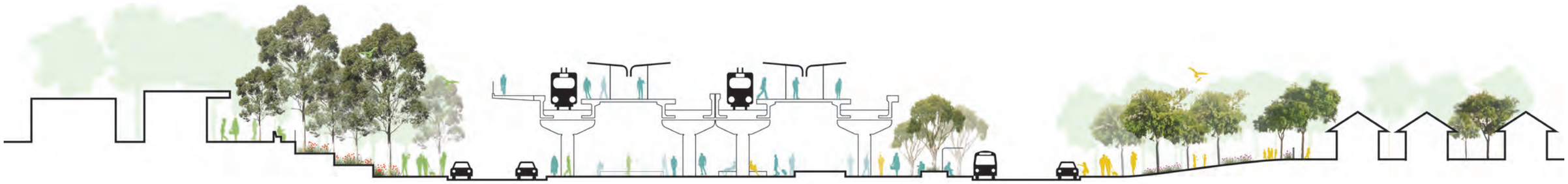


The Home Garden



THREE GARDEN TYPOLOGIES

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The Hillside Garden

- Minor events
- Social spaces
- Cafes
- Dog walkiung
- Jogging
- Shopping
- Shopping
- Cycling
- Market stalls

The Water Garden

- Waiting spaces
- Dog walking
- Shopping
- Performances
- Events
- Commuting
- Social spaces

The Home Garden

- Kiss ‘n’ ride
- Edible plants
- Jogging
- Parkour
- Skating
- Cycling
- Walking to school

THE HILLSIDE GARDEN

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DESIGN ASPIRATION

- Reflective of Perth Hills forests in response to site topography
- Large trees and low grassy understories create sightlines through gardens and allow for visual connectivity
- Celebrates the sites topography and natural connections

THE WATER GARDEN

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DESIGN ASPIRATION

- The water garden occurs at the lowest point in the site and is reflective of Swan River wetlands and the pooling of rainwater
- Rain gardens allow for wetland species such as Meleleucas
- Interpretive elements express the cultural significance of the site as an historical place of water

THE HOME GARDEN

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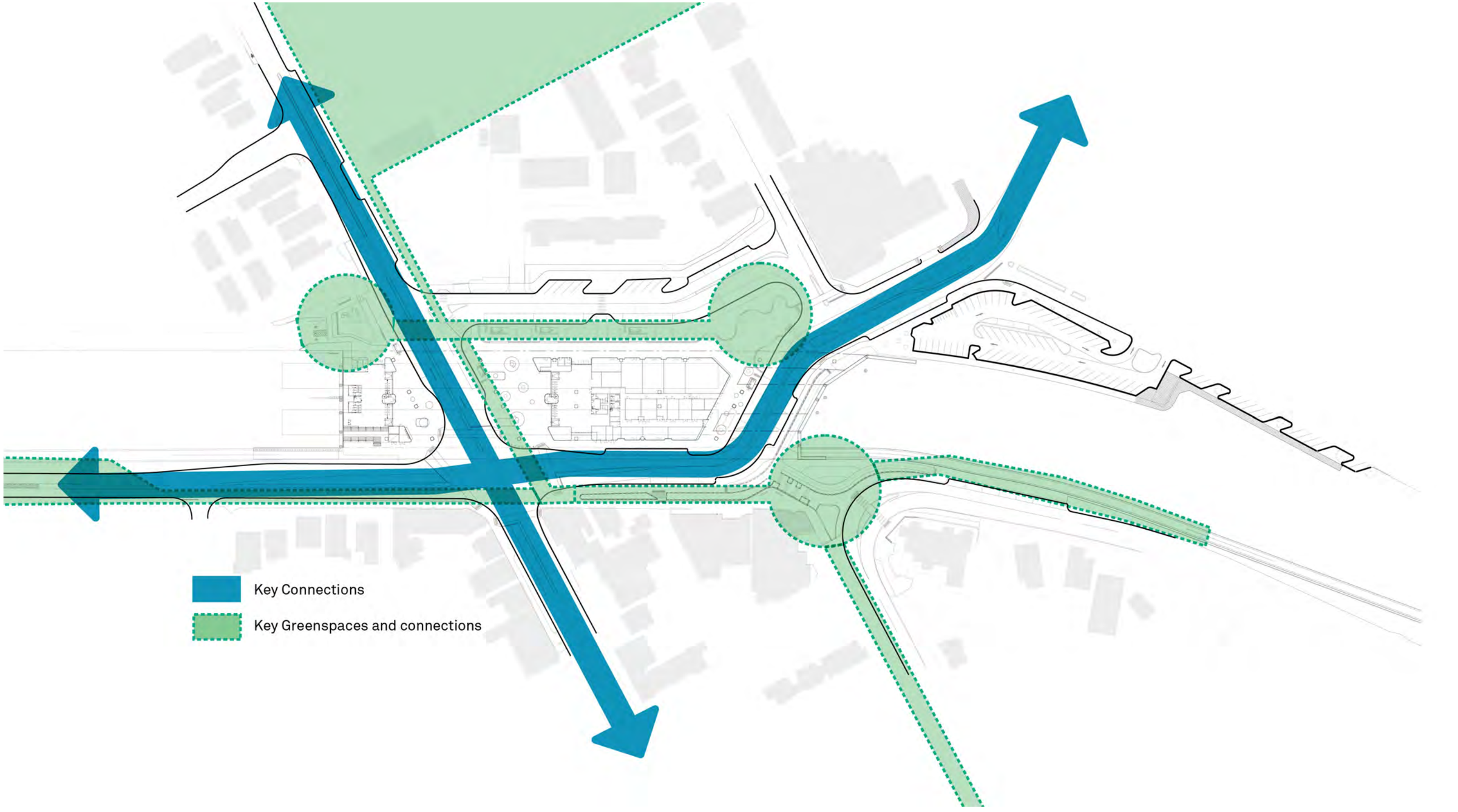


DESIGN ASPIRATION

- Occuring at the interface between the site and the surrounding suburb, the Home Garden celebrates residential life in Bayswater
- A mix of exotic and native plant species are reflective of the range of species found in the greater suburb
- Elements such as edible plants create community-focussed gardens

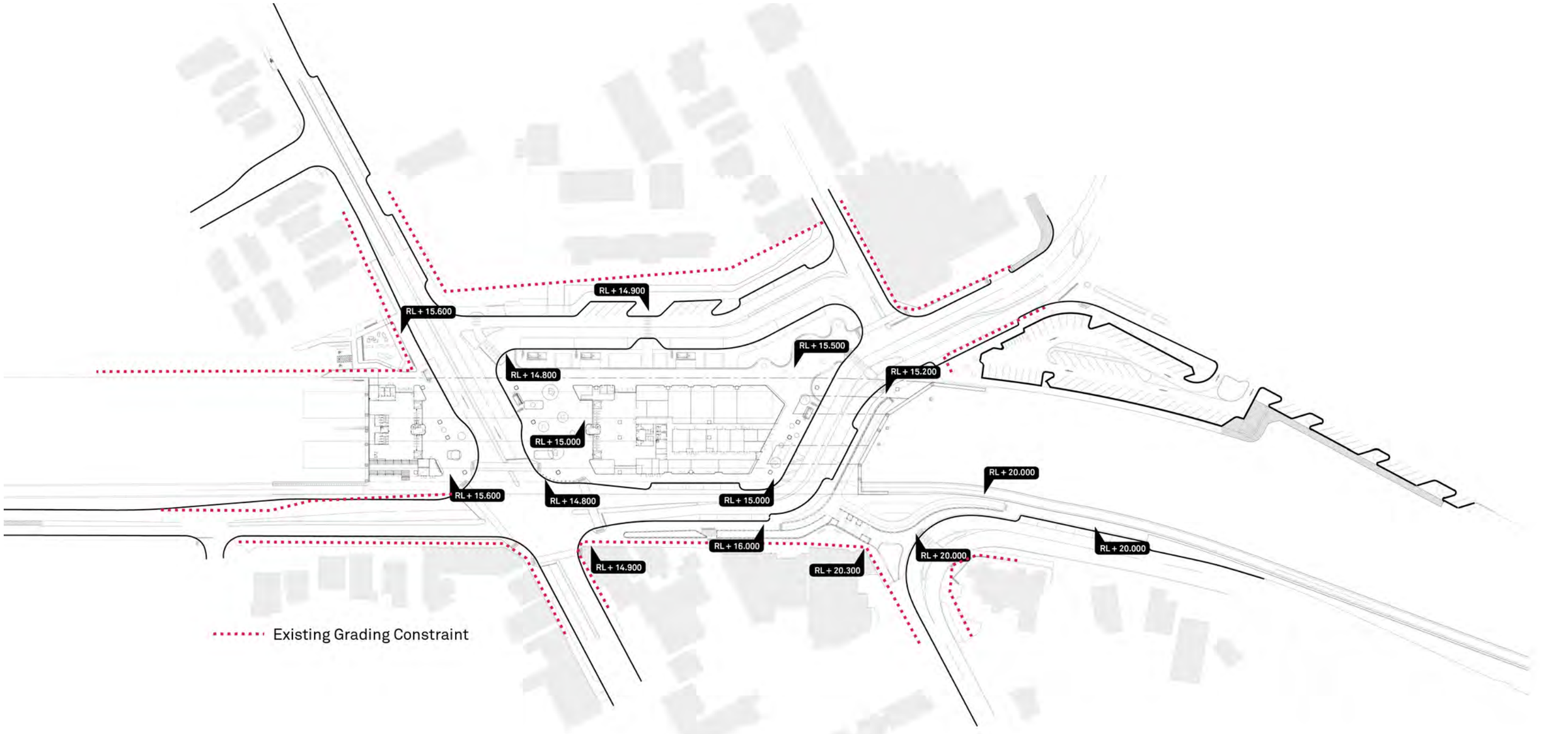
KEY CONNECTIONS

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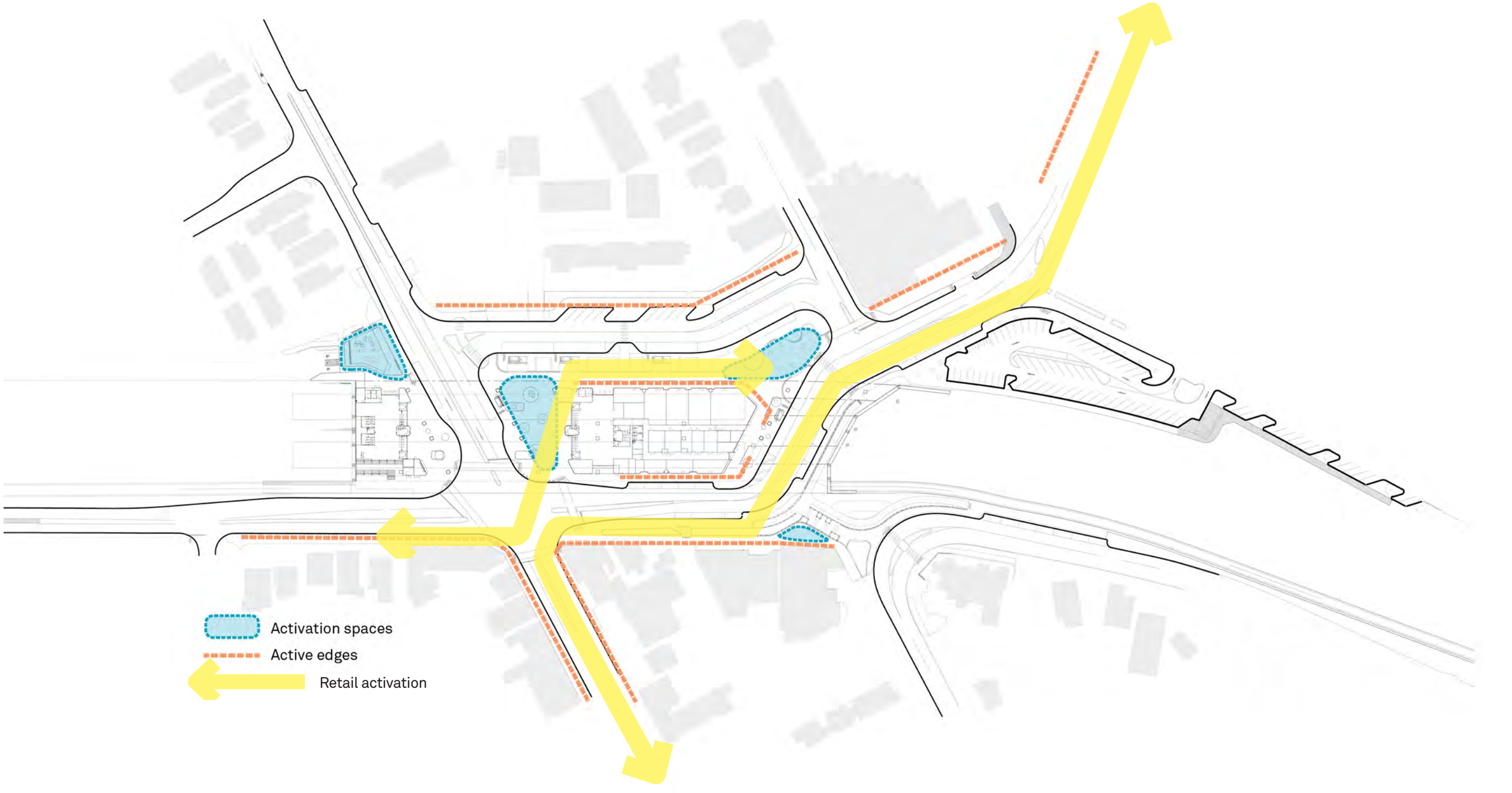
KEY LEVEL CONSTRAINTS

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RETAIL ACTIVATION

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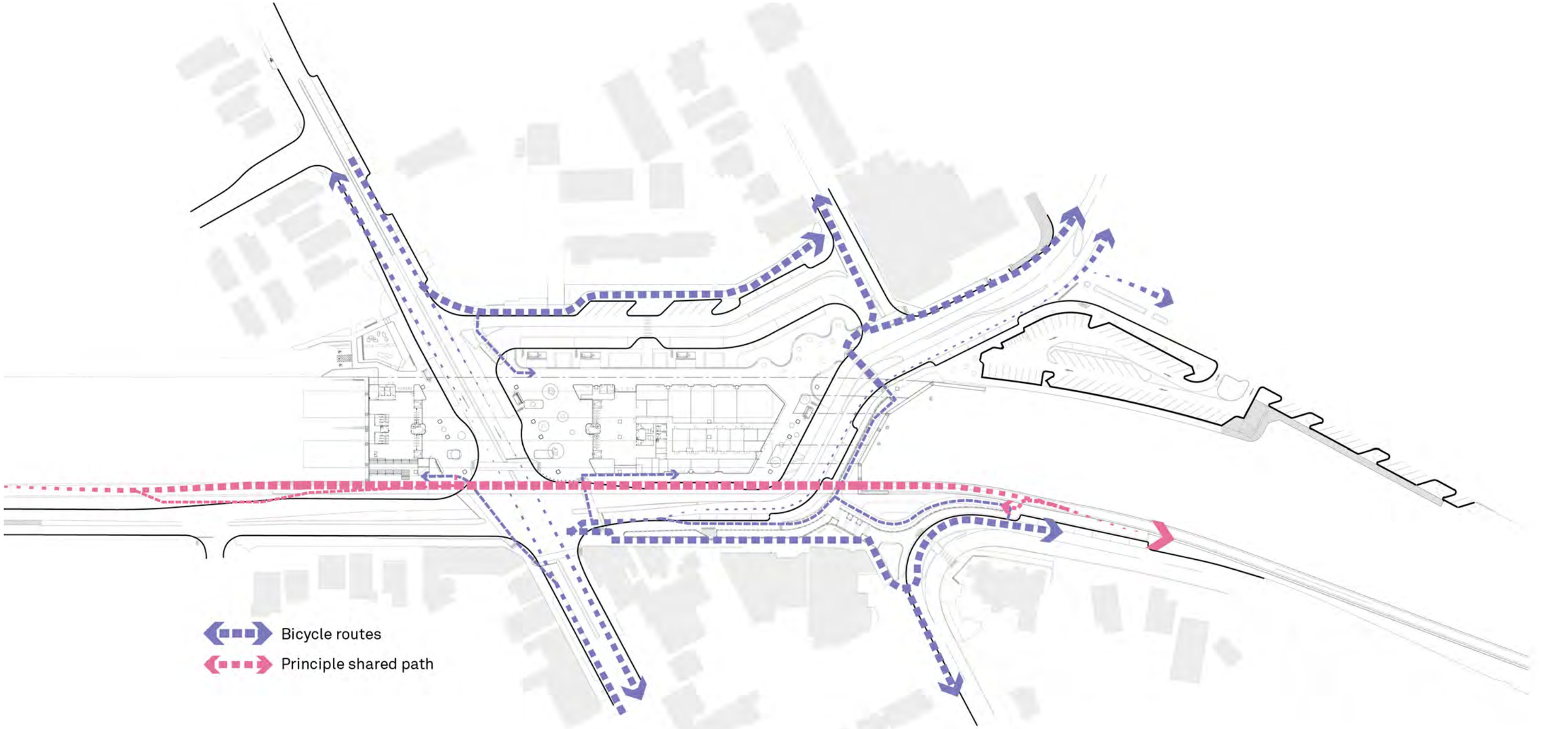
PEDESTRIAN CIRCULATION

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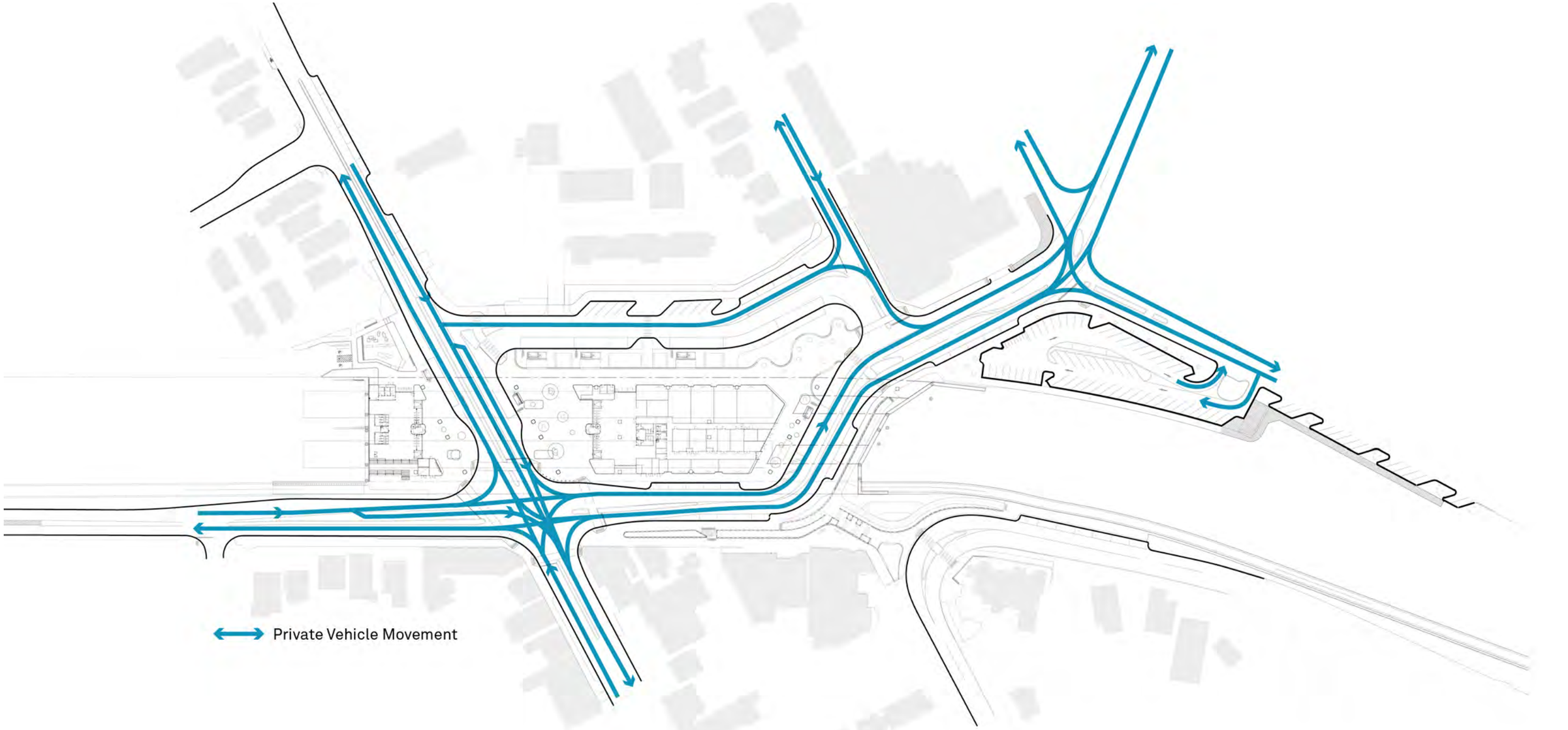
BIKE CIRCULATION

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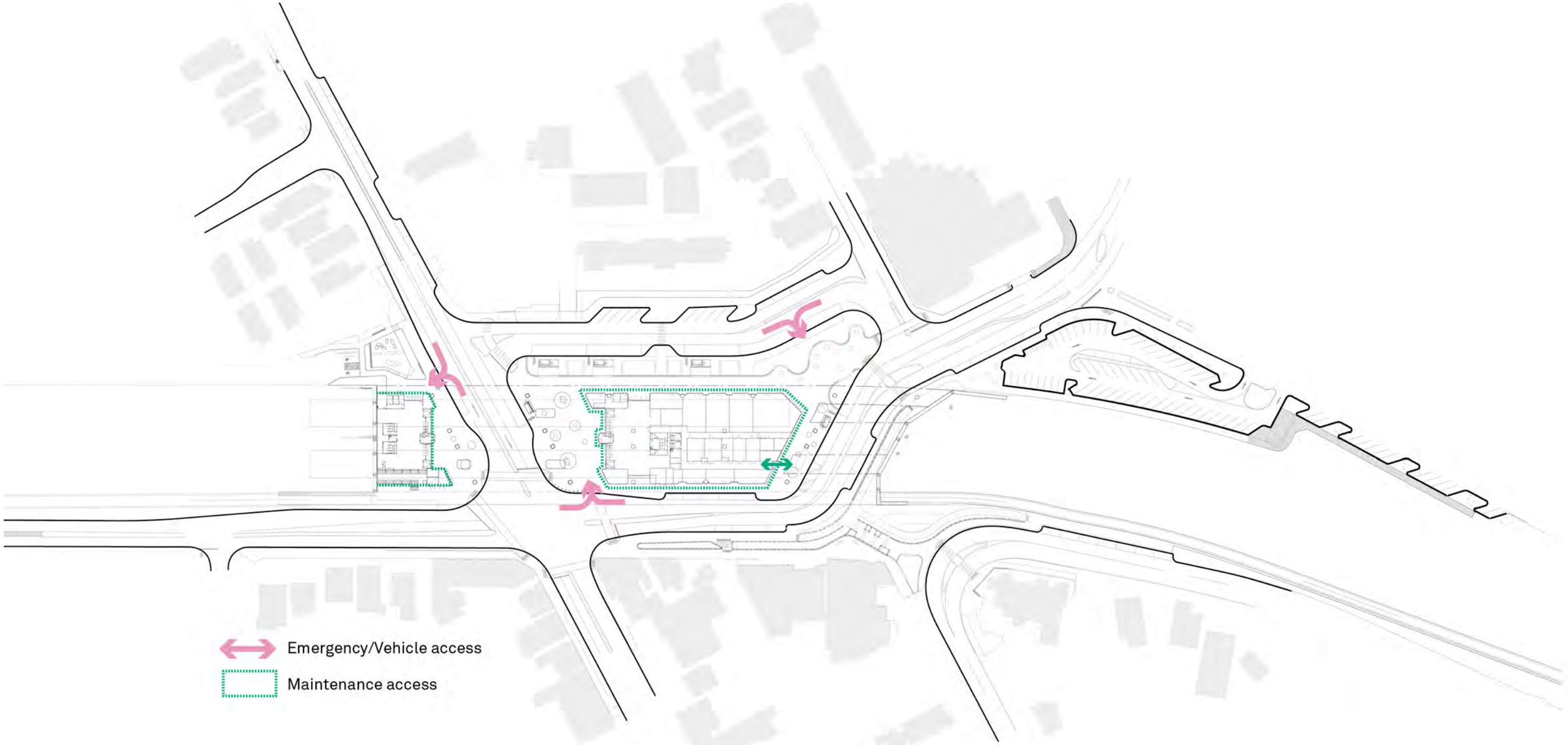
VEHICLE ROUTES

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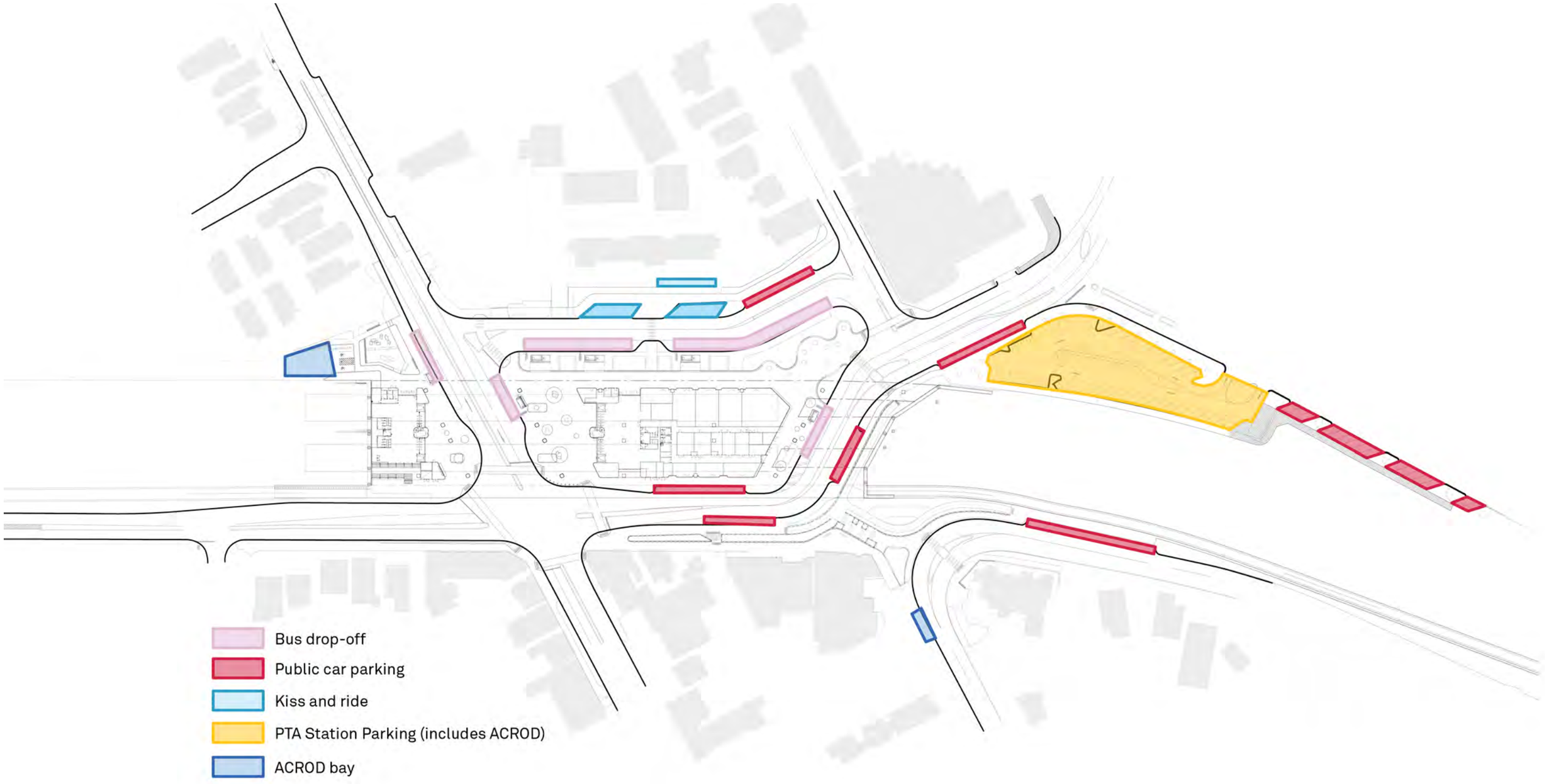
EMERGENCY ACCESS

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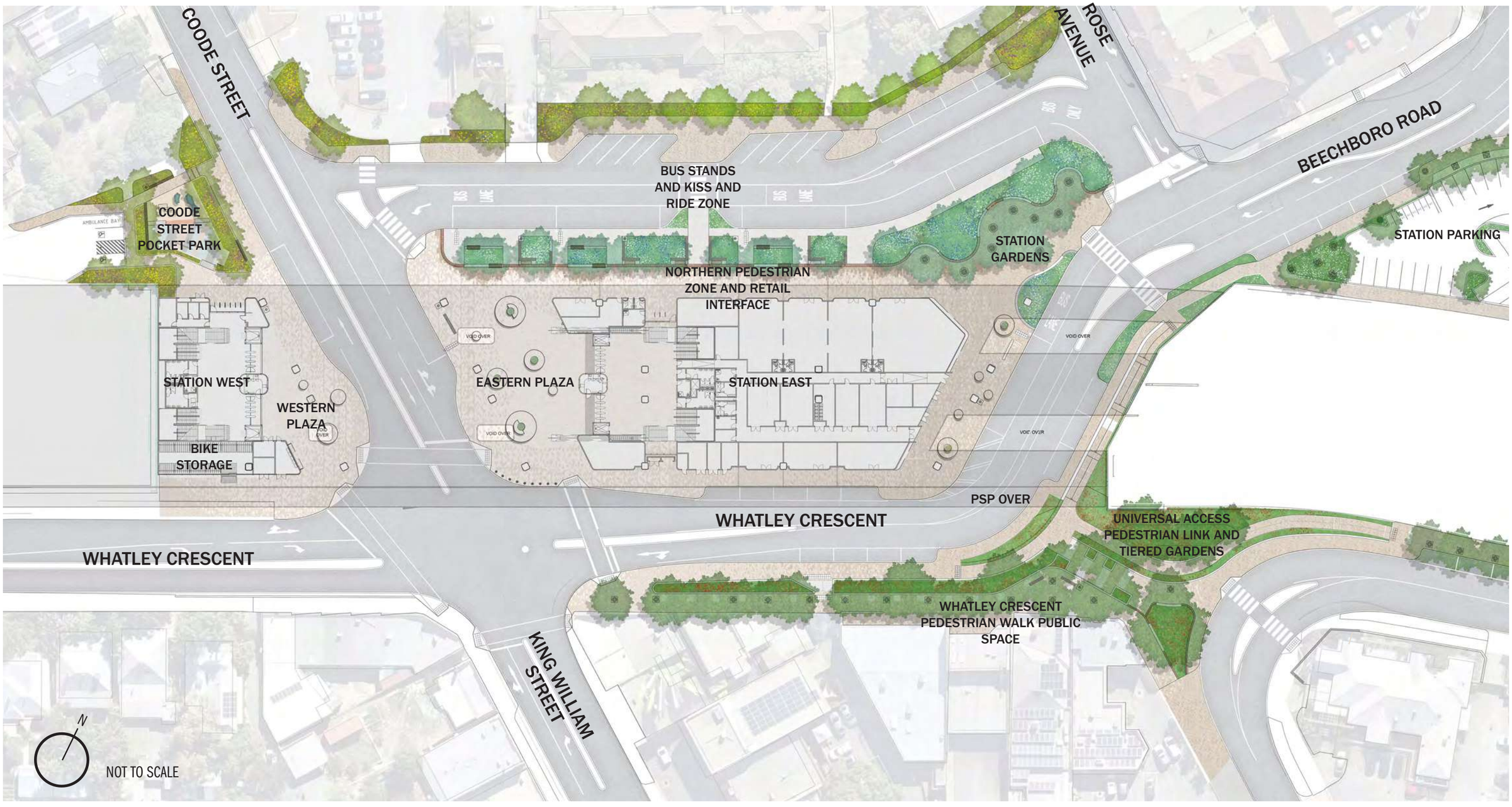
VEHICLE PARKING

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CONCEPT PLAN

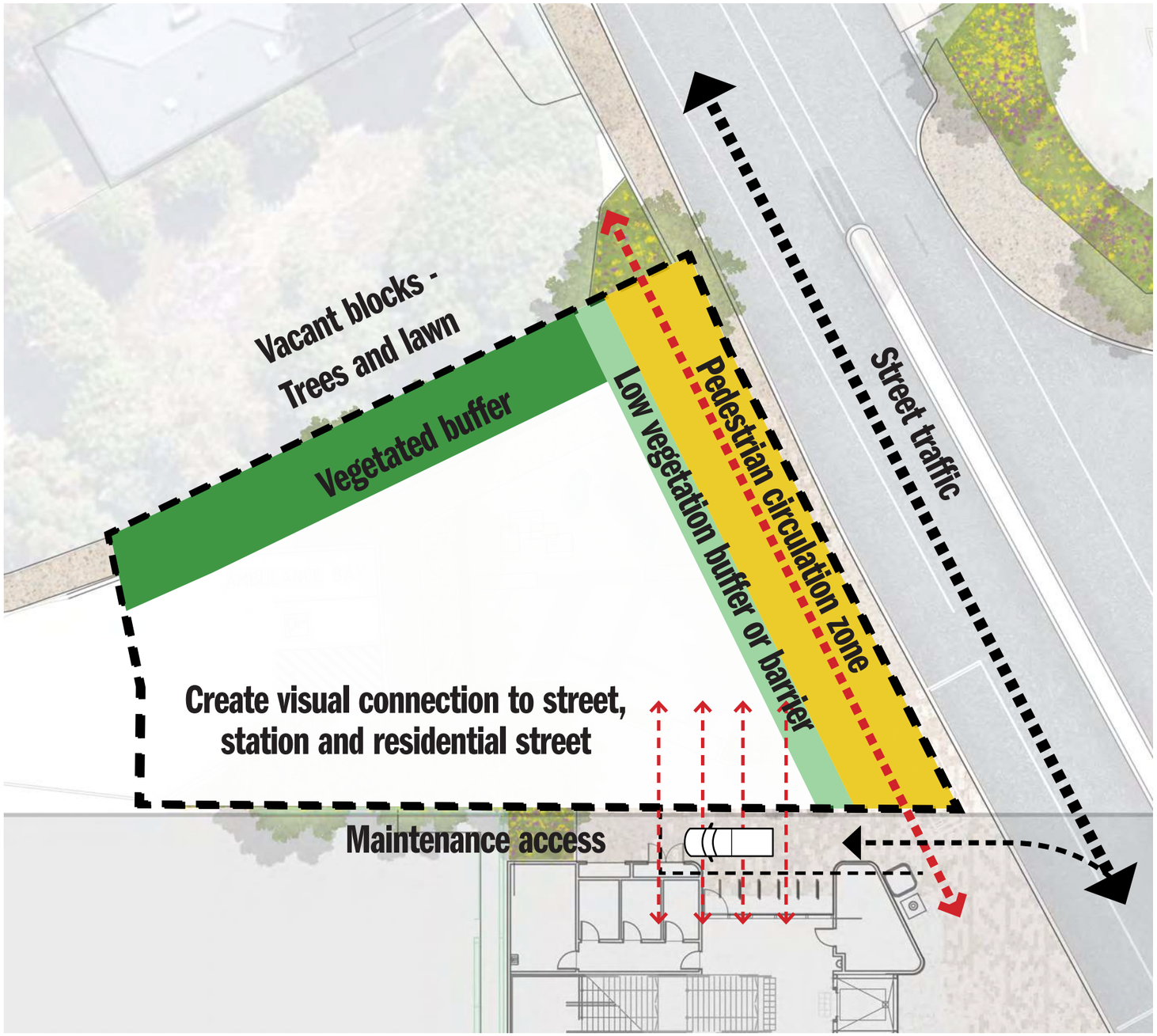
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POCKET PARK

CONSTRAINTS AND CONSIDERATIONS

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Constraints and Considerations

- Adjacent a busy street
- Cater to pedestrian and cyclist flows
- Provide good visual connection to street, station and surrounding areas
- Allow for station operations and vehicle access for maintenance

Design Aspirations

- Opportunity for lots of trees and display planting garden beds
- Provide a place to rest, wait and meet under shady trees or a canopy
- Explore opportunities for active recreation opportunities

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POCKET PARK

SCALE COMPARISONS

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Playground
Elizabeth Quay



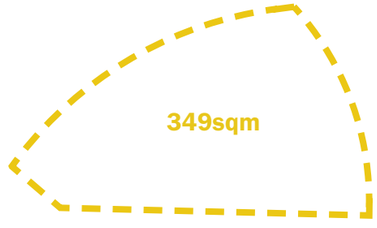


Rock climbing + parkour
Fremantle Youth Plaza





Skatepark
Lathlain plaza

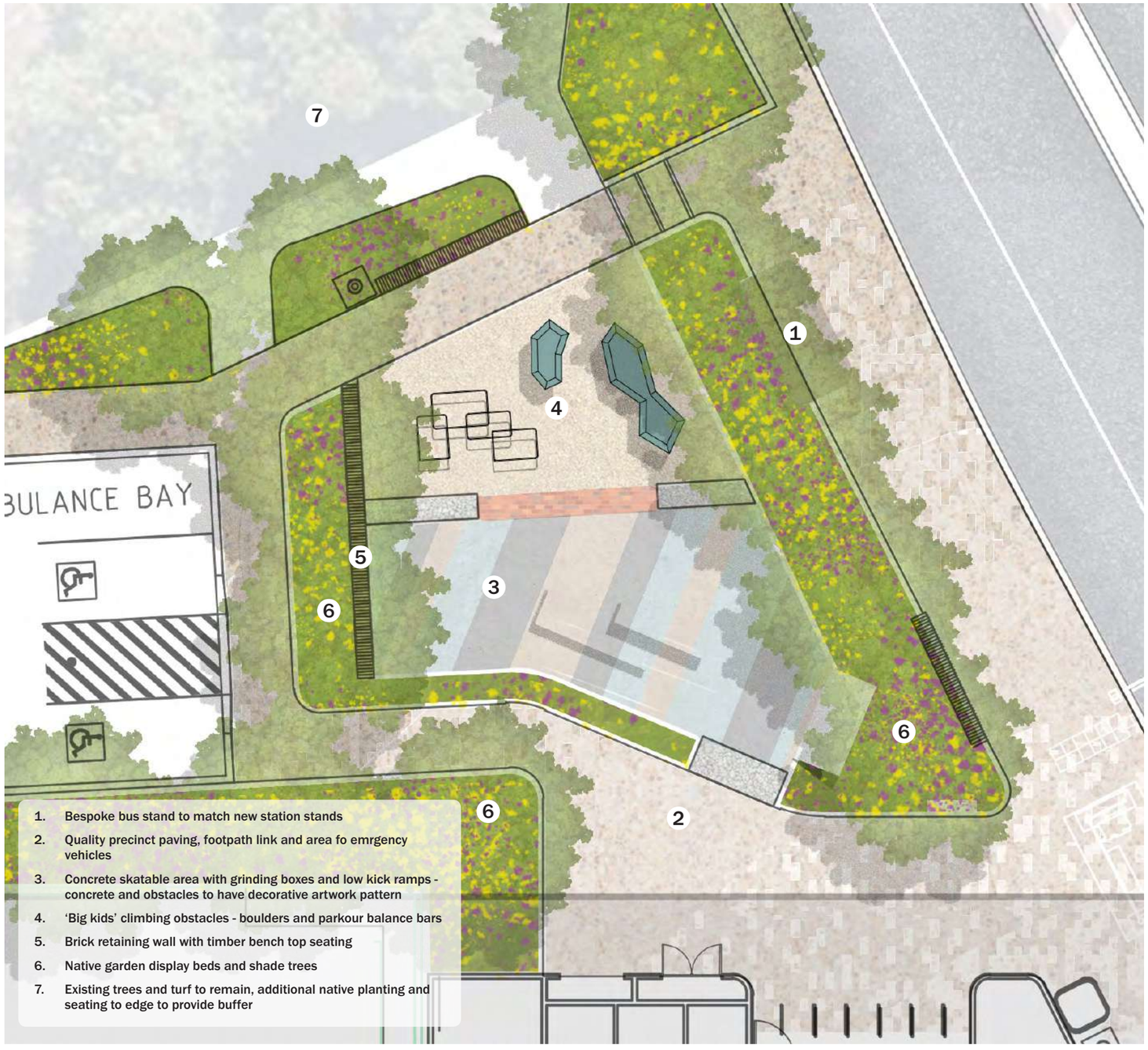




POCKET PARK

CONCEPT PLAN

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1. Bespoke bus stand to match new station stands
2. Quality precinct paving, footpath link and area fo emrgency vehicles
3. Concrete skatable area with grinding boxes and low kick ramps - concrete and obstacles to have decorative artwork pattern
4. 'Big kids' climbing obstacles - boulders and parkour balance bars
5. Brick retaining wall with timber bench top seating
6. Native garden display beds and shade trees
7. Existing trees and turf to remain, additional native planting and seating to edge to provide buffer









DESIGN ASPIRATION

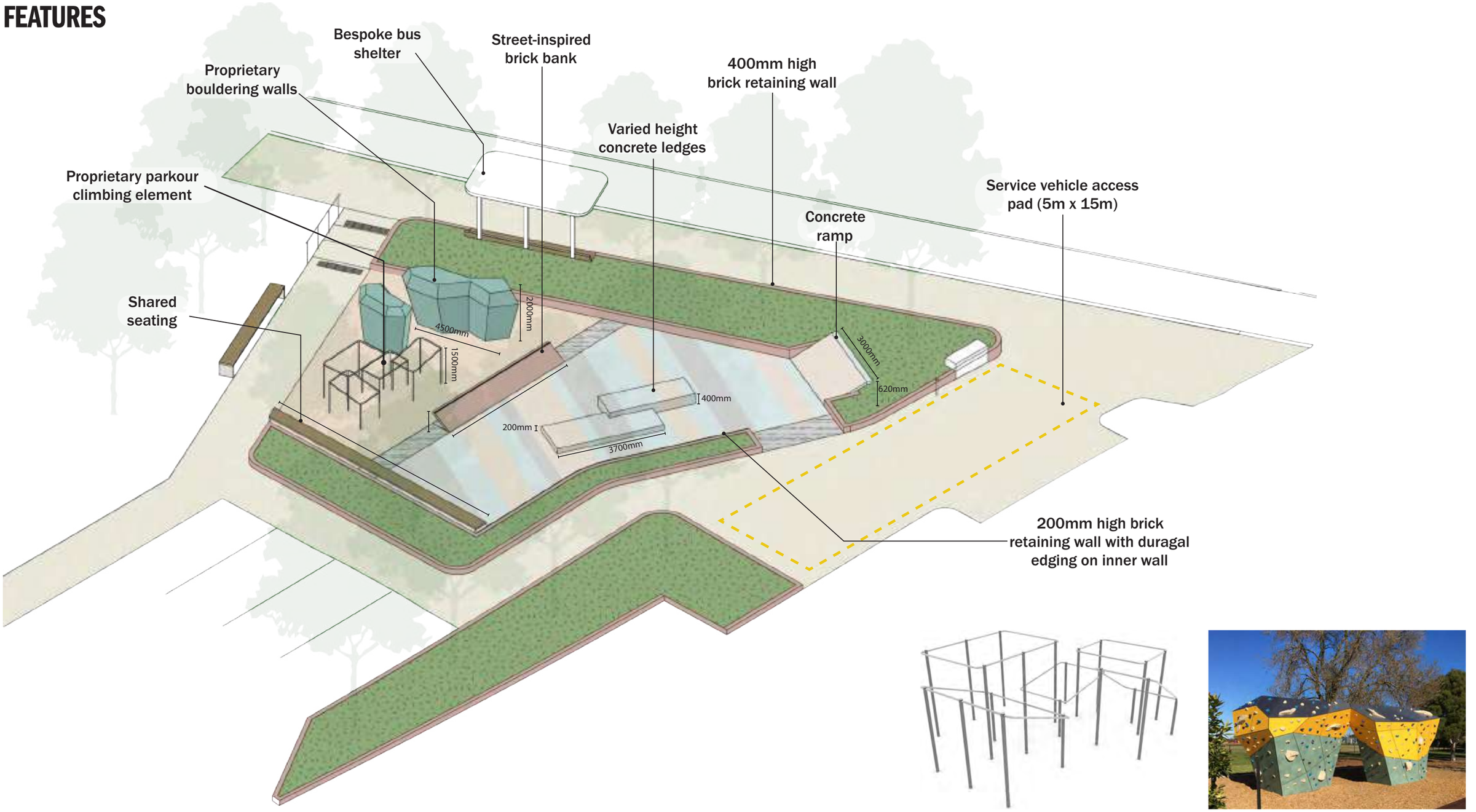
- Activated space catering to teens and young adults with skating, bouldering and parkour elements with ample shade and seating
- Provide barriers between active area and roads
- Maximise garden beds and tree planting
- Maintain pedestrian thoroughfares and universal accessibility with seperation from active areas
- Provide sufficient buffering to adjacent residencies

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POCKET PARK

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FEATURES



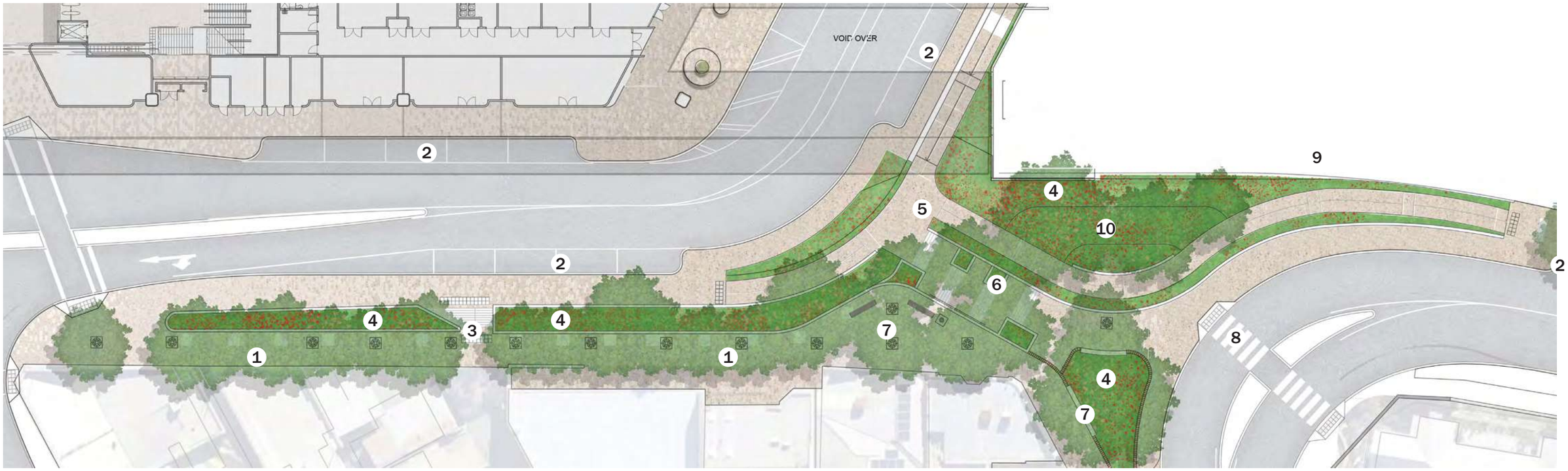
Lappset parkour cage
(or similar approved)
https://bladerecreation.com.au

Blade recreation bouldering wall
(or similar approved)
https://bladerecreation.com.au

Hassell ©

WHATLEY CRESCENT LINK

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Design Aspirations

- Provide clear and intuitive movements for universal access including pedestrians and cyclists
- Provide display garden beds, shady tree canopies with places to rest and meet
- Maximise connection and connection between street and existing shops
- Create opportunities for alfresco and recreation spaces at upper level near shops and through the green link





1. Wide pedestrian walkway with shade trees and street furniture
2. Public Parking
3. Stair access between existing shops and lower street level
4. Tiered native garden beds with trees, wildflower displays, cascading plants and vertical greening to walls
5. Universal access connection
6. Tiered stair connection with feature display garden beds
7. Public breakout space with communal civic feature seating and large shade trees
8. Pedestrian crossing
9. PSP bridge connection
10. Banked lawn area for passive recreation

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WHATLEY CRESCENT LINK

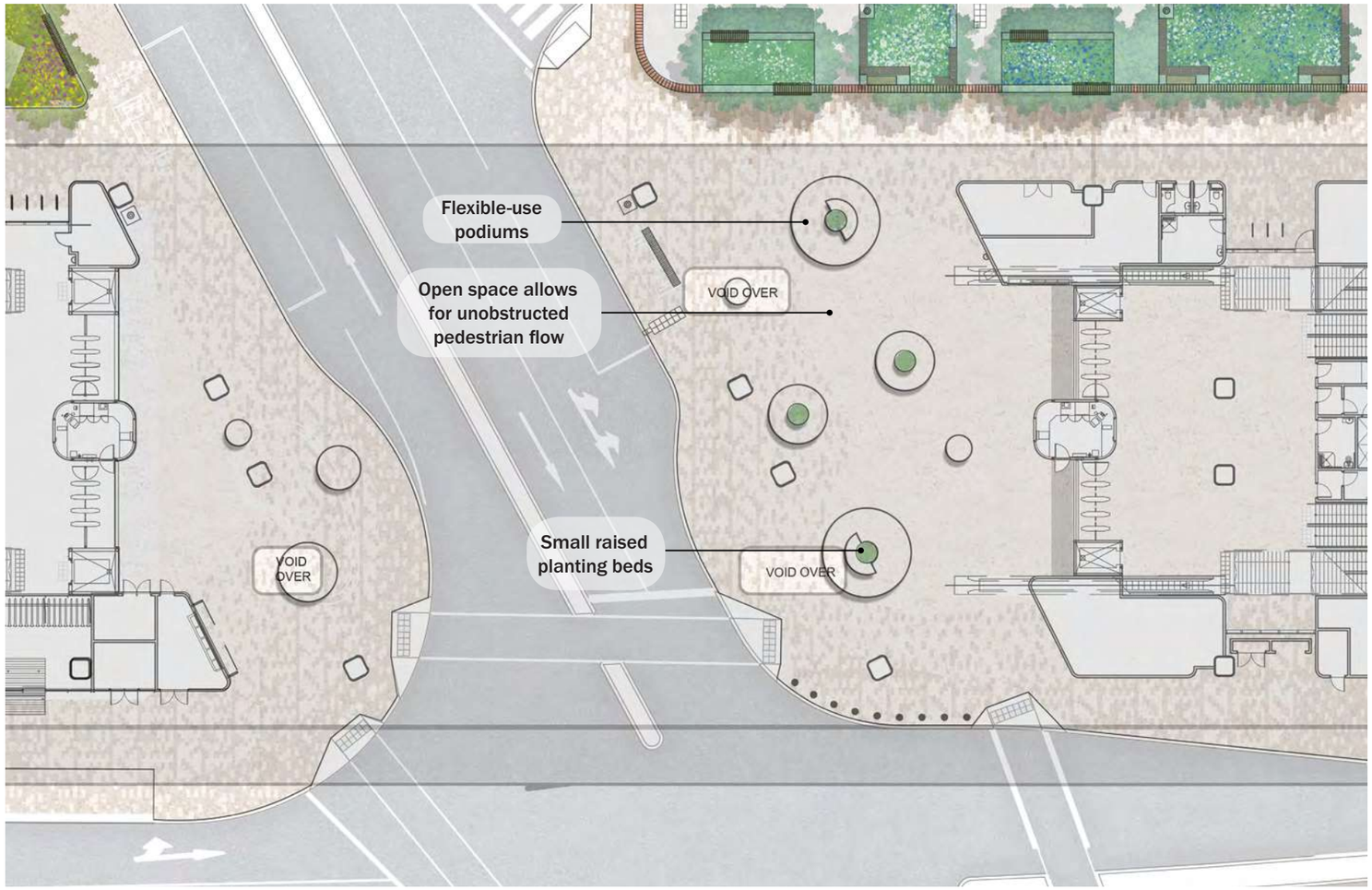
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PLAZA AND STATION ENTRY

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connecting people + places

ACTIVATED AND FLEXIBLE CENTRAL PLAZA



DESIGN ASPIRATION

- Flexible open space, catering for moments of pause and pedestrian access
- Movement through space is defined by large, statement design pieces
- Explore opportunities for integrated artwork and lighting display
- Recognisable arrival features
- Informal seating throughout to provide rest and waiting points whilst maintaining pedestrian movement as a priority.
- Small feature planting beds where viable





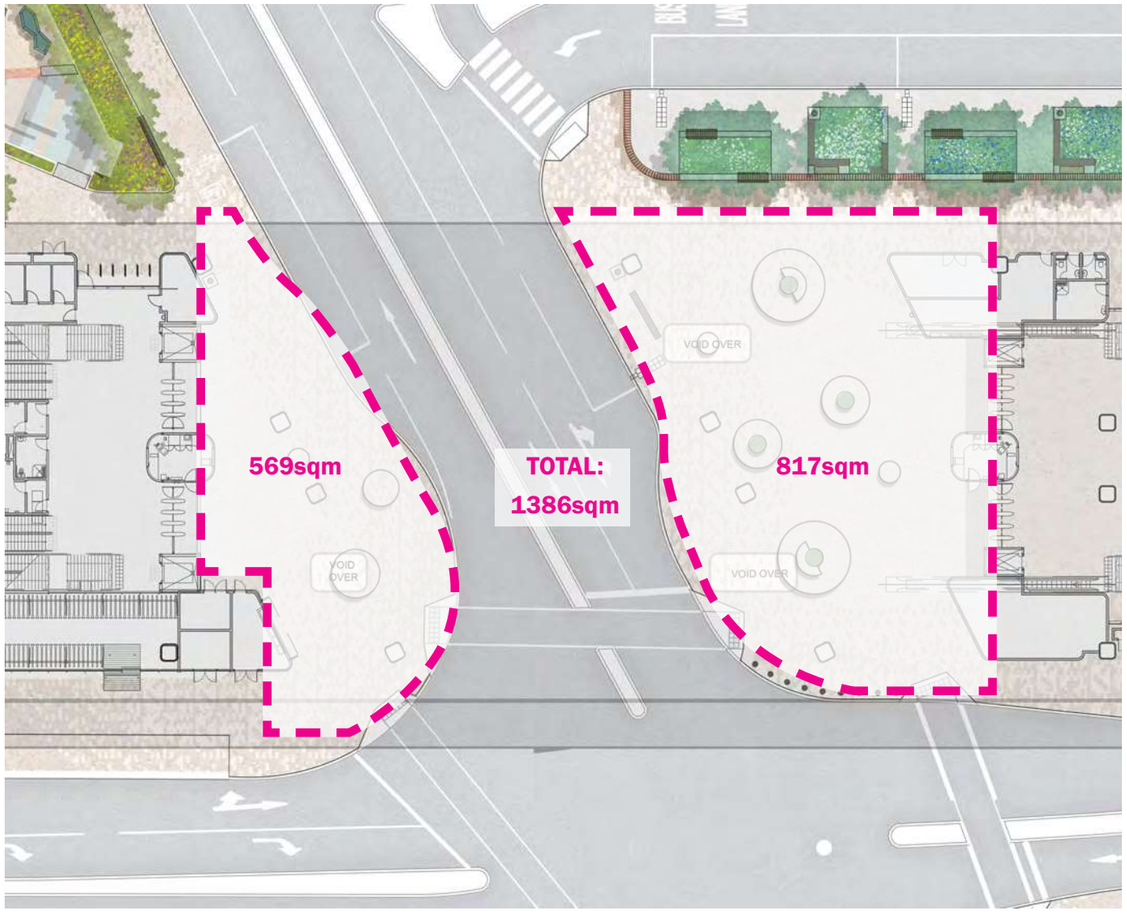




PLAZA AND STATION ENTRY

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ACTIVATED AND FLEXIBLE CENTRAL PLAZA



Forrest Chase event space

1250sqm



Bayswater Lacrosse Carpark

1730sqm

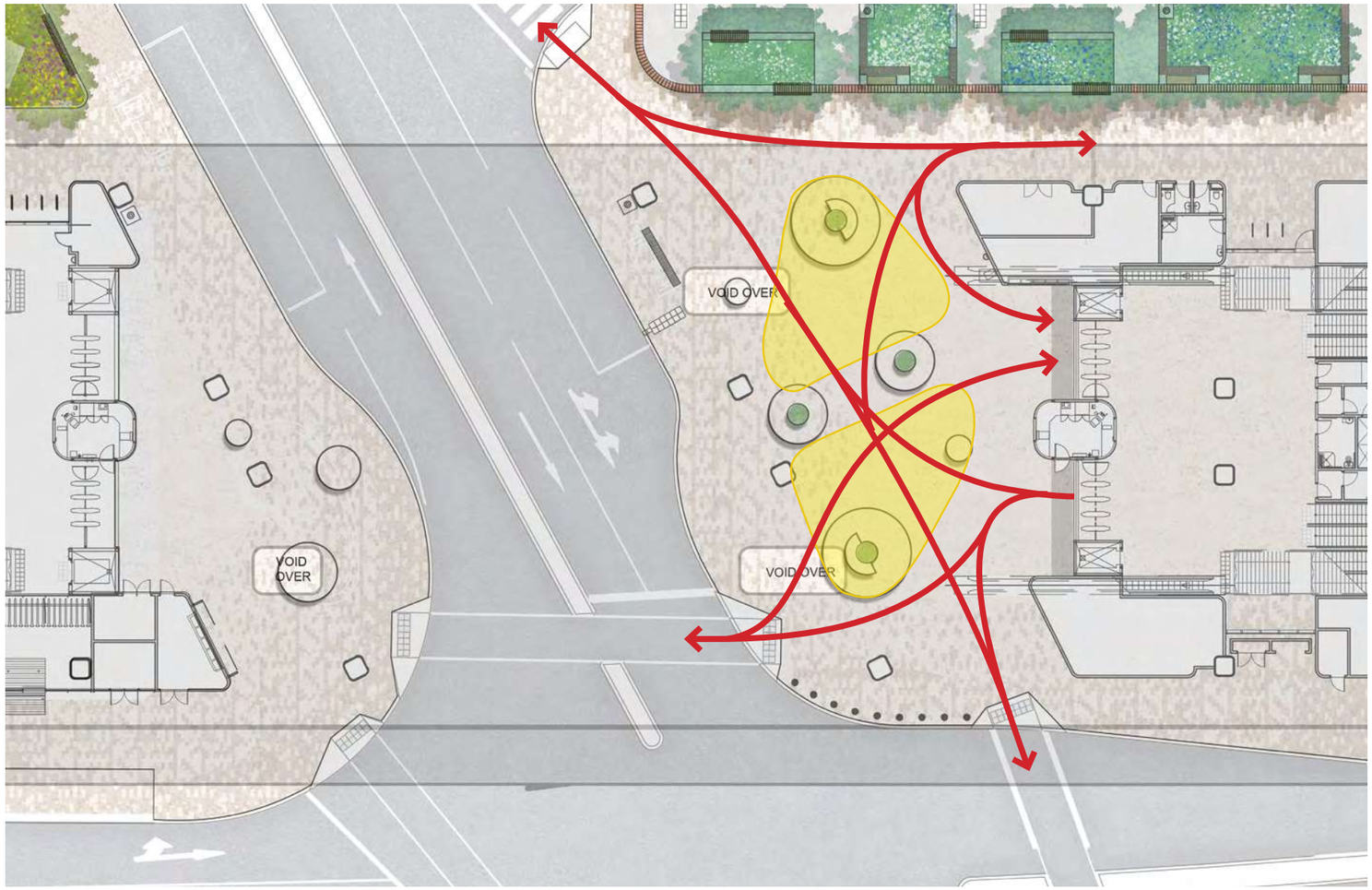


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PLAZA AND STATION ENTRY

ACTIVATED AND FLEXIBLE CENTRAL PLAZA

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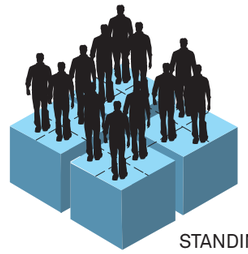


EVENT/PERFORMANCE SPACE

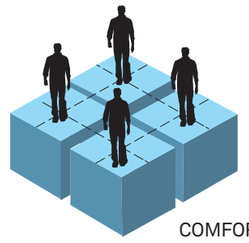
Area 220sqm

Type of event	*density*	*no. people*
Comfortable standing	1/sqm	220*
Standing crowd	3/sqm	660*

* Calculation based event space with allowance for circulation and supporting associated amenities



STANDING CROWD
3 PER SQM



COMFORTABLE STANDING
1 PER SQM

PLAZA AND STATION ENTRY

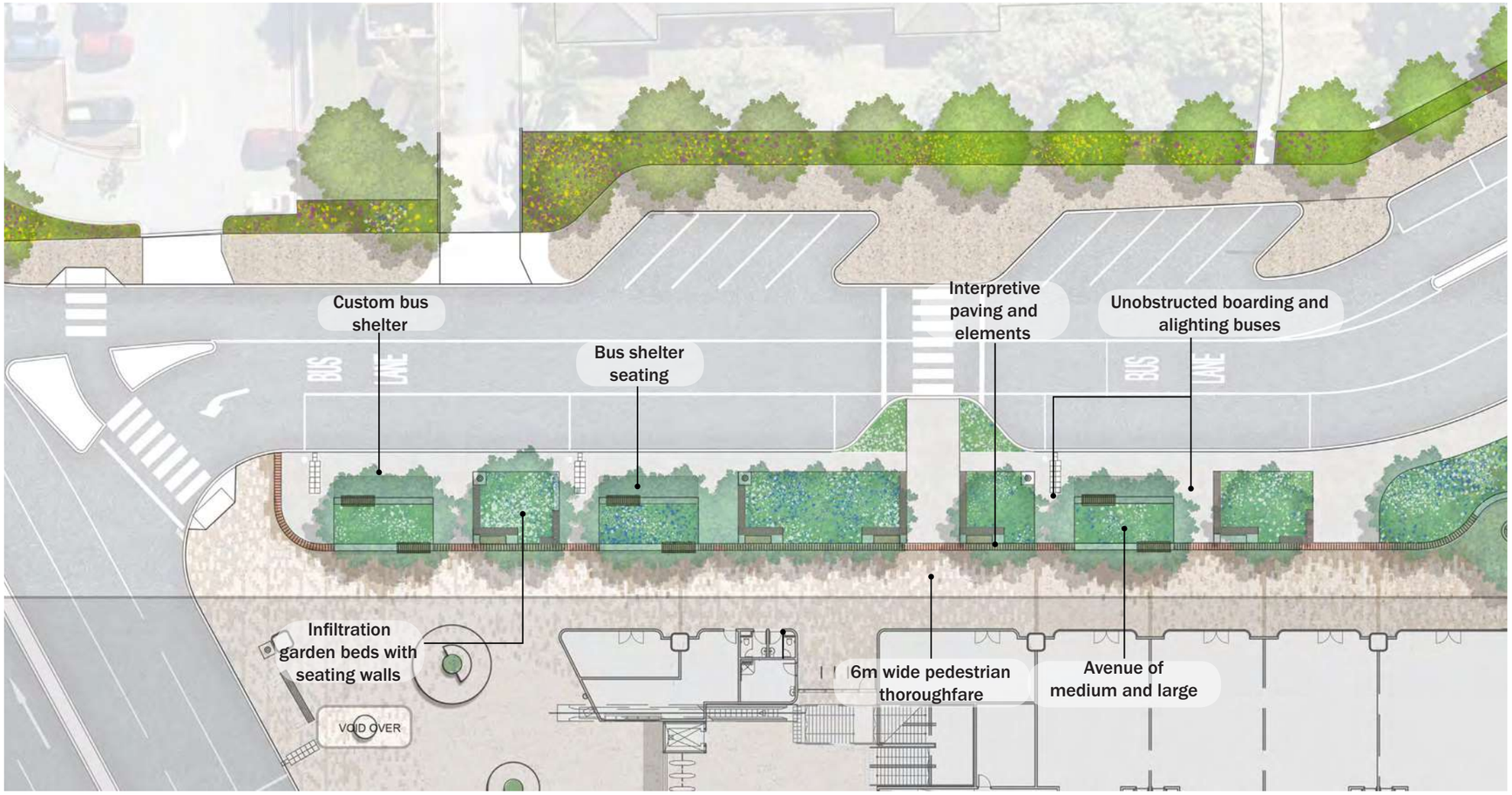
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BUS AND RETAIL HUB

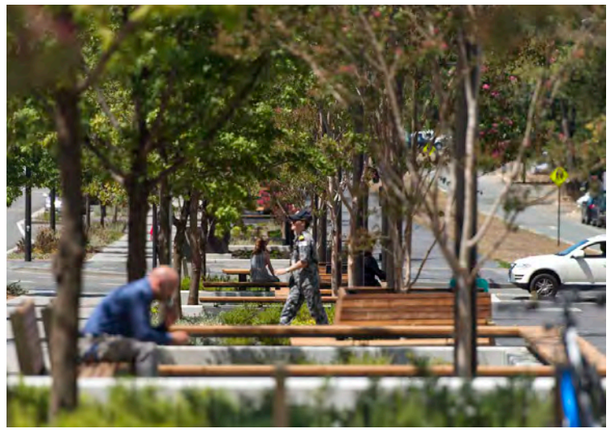
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SEAMLESSLY INTEGRATED TRANSFERS - FLEXIBLE EVENT AREA









DESIGN ASPIRATION

- Provide a generous pedestrian experience that facilitates efficient and easy boarding and alighting of buses.
- Custom bus shelters that provide a comfortable and safe waiting environment.
- Well-lit and clear sight-lines to ensure safety whilst also maximising tree canopy and garden beds.
- Provide space to cater for activation strategies.

BUS AND RETAIL HUB

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SCALE COMPARISON

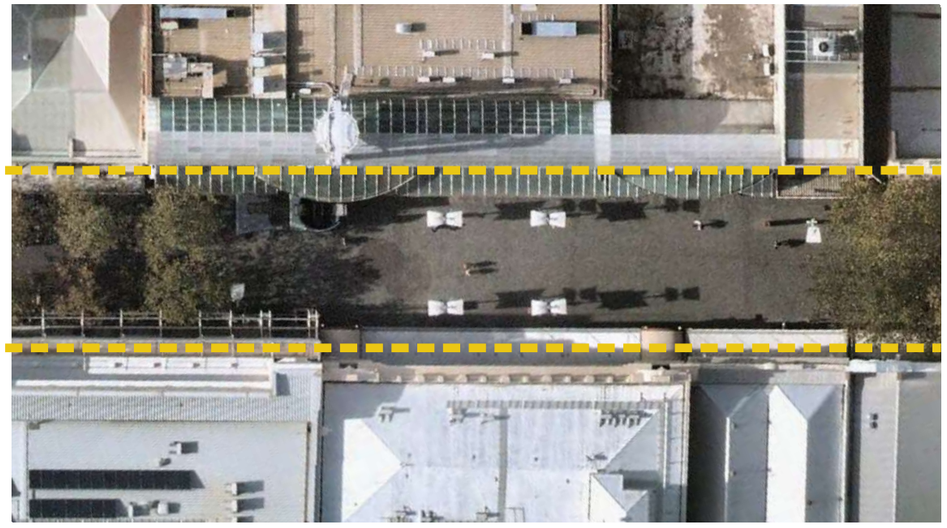


14m

15m

Hay Street Mall

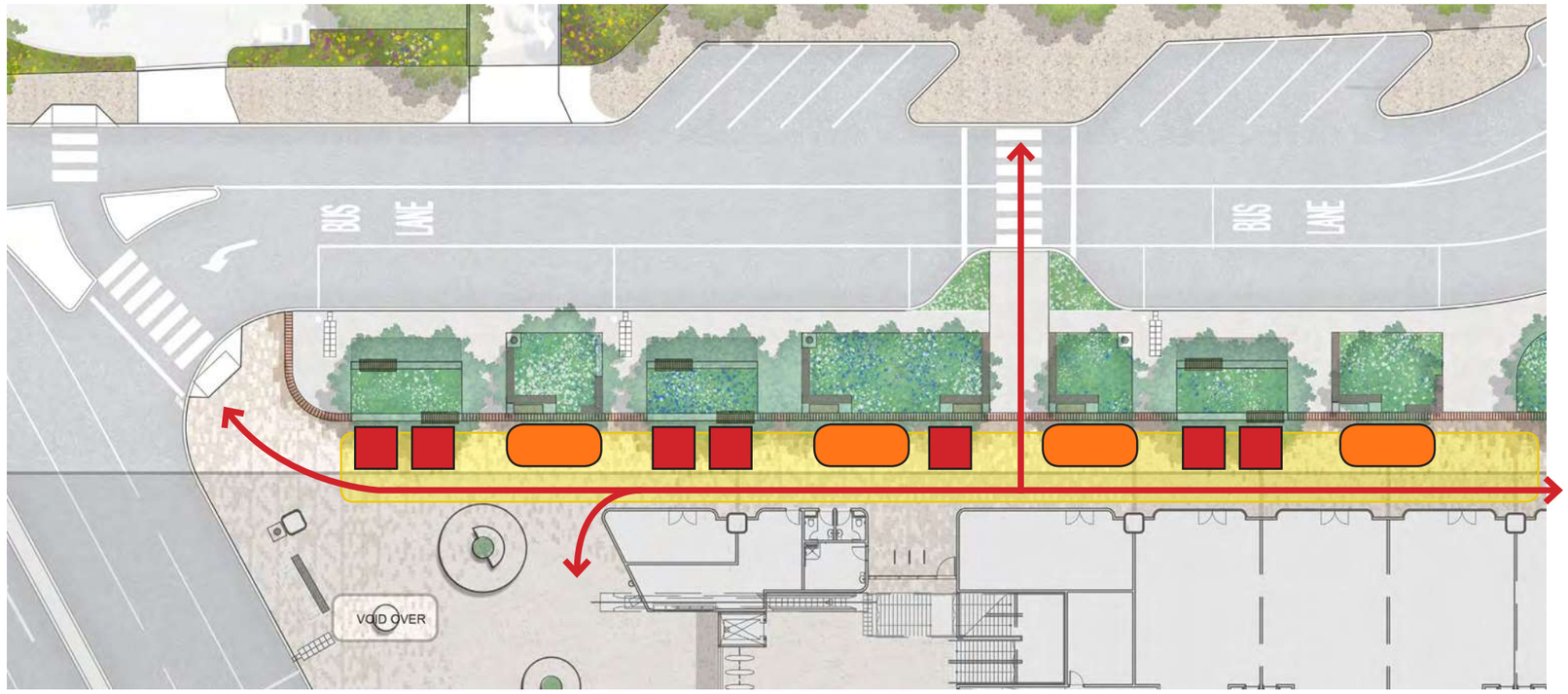




BUS AND RETAIL HUB

ACTIVATION OPPORTUNITIES

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EVENT CIRCULATION SPACE

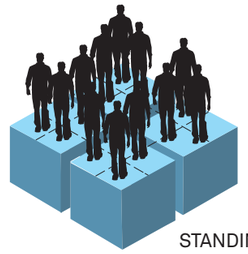
FOOD VAN

TYPICAL MARKET STALL 3 x 3 m

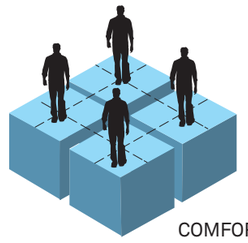
Area (Event circulation space)
350sqm

Type of event	*density*	*no. people*
Comfortable standing	1/sqm	350*
Standing crowd	3/sqm	1050*

* Calculation based event space with allowance for circulation and supporting associated amenities



STANDING CROWD
3 PER SQM



COMFORTABLE STANDING
1 PER SQM





BUS AND RETAIL HUB

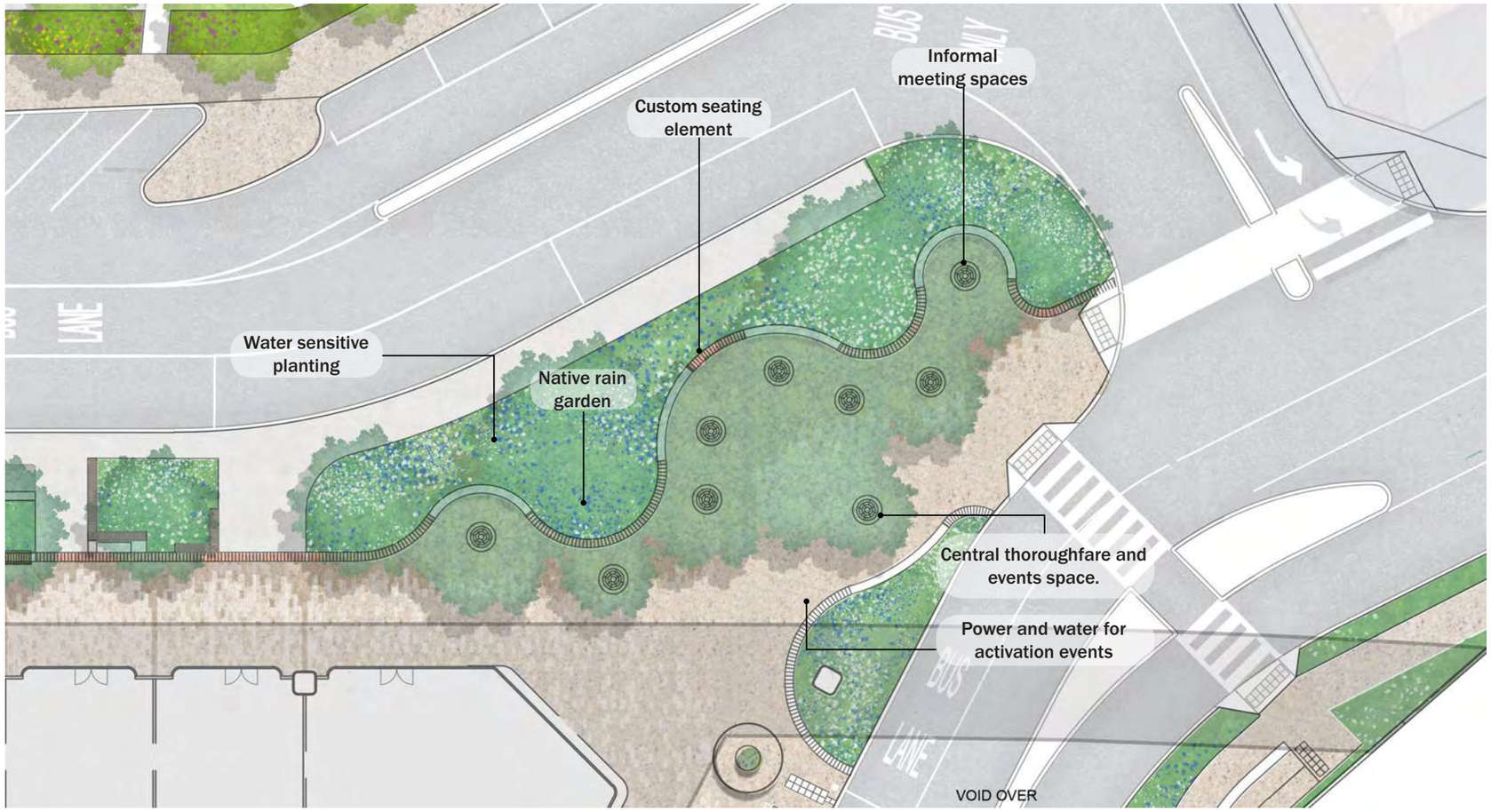
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NORTHERN GARDEN PLAZA

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URBAN MEETING AREA IN A GARDEN SETTING









DESIGN ASPIRATION

- Provide flexibility to support various scale events whilst maintaining a functional and comfortable space.
- Use large shade trees that create a dense canopy to sit beneath in a garden setting.
- Provide custom seating to provide multiple informal gathering spots.

NORTHERN GARDEN PLAZA

ACTIVATION OPPORTUNITIES

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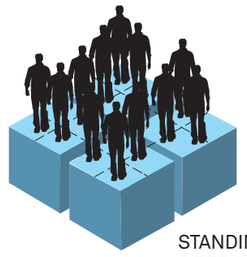
EVENT CIRCULATION SPACE

TYPICAL MARKET STALL 3 x 3 m

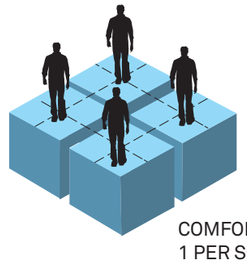
Area 290sqm

type of event	*density*	*no. people*
Comfortable standing	1/sqm	290*
Standing crowd	3/sqm	870*

* Calculation based event space with allowance for circulation and supporting associated amenities



STANDING CROWD
3 PER SQM



COMFORTABLE STANDING
1 PER SQM







NORTHERN GARDEN PLAZA

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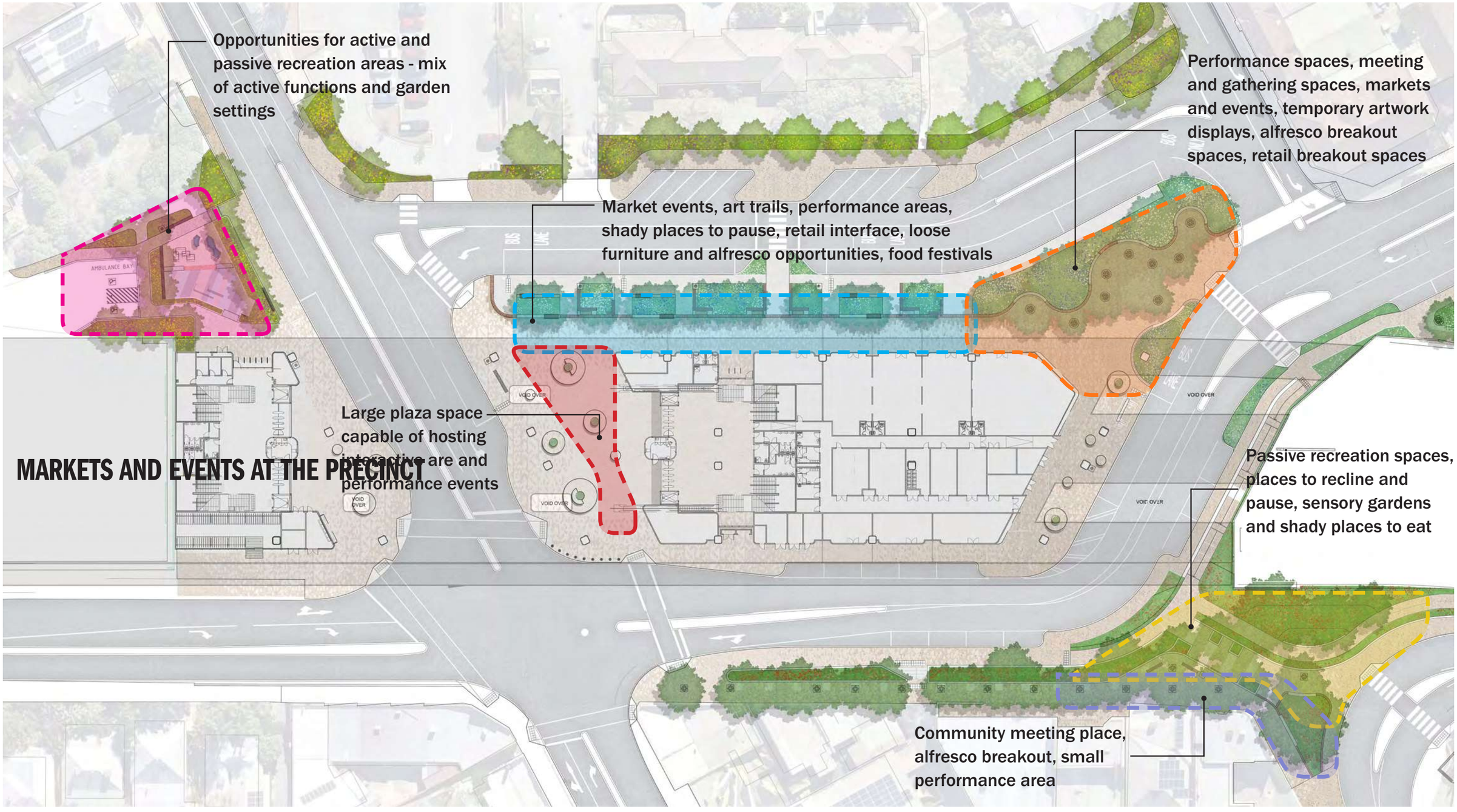
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ACTIVATION OPPORTUNITIES

MARKETS AND EVENTS AT THE PRECINCT

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MARKETS AND EVENTS AT THE PRECINCT

EXTENT OF PLANTING: CORRIDOR

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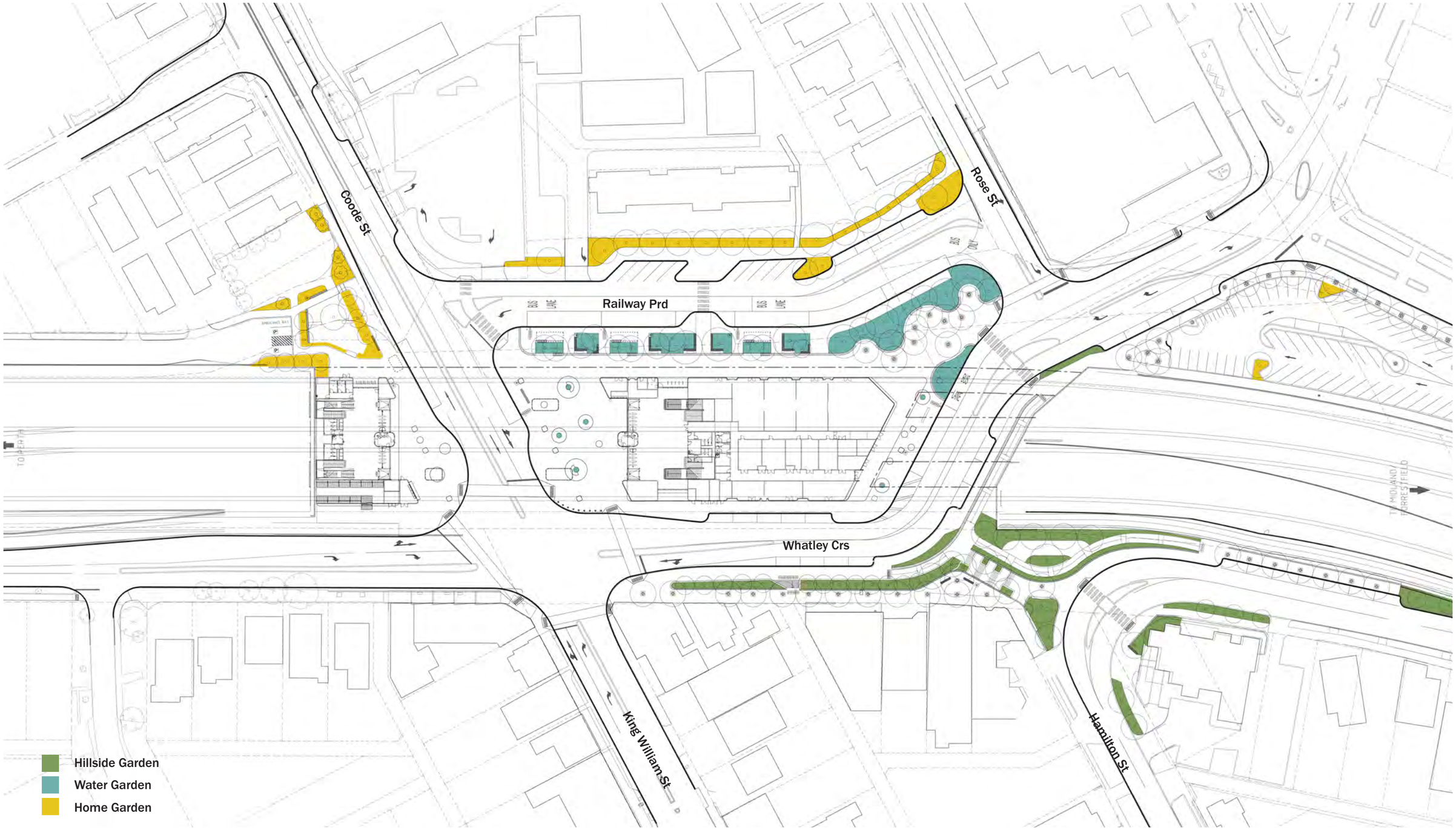
Western Corridor



Eastern Corridor

EXTENT OF PLANTING: PRECINCT

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PLANTING GROUPS

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The Hillside Garden

_Based on species typically found in Perths Hills

_Celebrates Perth Hills wildflowers



Acacia alata (Winged wattle)
Form: screening
Height: 2m
WA native
Part shade, full sun



Acacia dummondii (Drummods wattle)
Form: low shrub
Height: 1m
WA native
Part shade, full sun



Banksia menziesii 'little' (Red banksia)
Form: Low shrub
Height: 1m
WA native
Part shade, full sun



Beaufortia aestiva 'Summer flame'
Form: low shrub
Height: 1m
Endemic
Part shade, full sun



Callistemon phoeniceus 'dwarf'
Form: screening
Height: 1m
Groundcover
Part shade



Casuarina glauca (Cousin It)
Form: trailing
Height: 0.2m
Australian native
Part shade, full sun



Conostylis candicans (Grey cottonhead)
Form: screening
Height: 0.4m
WA native
Full sun



Dianella revoluta (Blue flax lilly)
Form: erect shrub
Height: 0.8m
WA native
Part shade, full sun



Eremophila glabra (Kalbarri carpet)
Form: groundcover
Height: 0.2m
WA native
Part shade, full sun



Hakea laurina 'Mini Pini' (Pincushion)
Form: spreading shrub
Height: 0.5m
WA native
Full sun



Kennedia prostrata (Running postman)
Form: groundcover
Height: 0.2m
WA native
Shade, part shade, full sun



Verticordia plumosa (Pom pom)
Form: screening
Height: 1.5m
Endemic
Part shade, full sun

The Water Garden

_Reflective of Swan Coastal Plain wetland and rivers edge species

_Emphasis on WA native and endemic species



Acacia saligna 'prostrate'
Form: groundcover
Height: 0.4m
WA native
Full sun



Baumea juncea (Bare twig rush)
Form: sedge
Height: 1.2m
WA native
Part shade, full sun



Beaufortia elegans (Elegant beaufortia)
Form: erect shrub
Height: 1m
WA native
Part shade, full sun



Boronia crenulata (Aniseed boronia)
Form: low shrub
Height: 1m
Endemic
Part shade



Carex tereticaulis (Rush sedge)
Form: sedge
Height: 0.7m
WA native
Part shade, full sun



Ficinia nodosa (Knotted club rush)
Form: sedge
Height: 1m
WA native
Part shade, full sun



Grevillea thelemanniana (Spidernet)
Form: screening
Height: 1.5m
Endemic
Part shade, full sun



Hemiandra pungens (Snakebush)
Form: groundcover
Height: 0.5
WA native
Shade, part sun



Melaleuca incana 'nana' (Honey myrtle)
Form: low shrub
Height: 1m
WA native
Part shade, full sun



Olearia axillaris 'Little Smokie'
Form: low shrub
Height: 0.5m
WA native
Shade, part shade, full sun



Patersonia occidentalis (Purple flag)
Form: low shrub
Height: 1m
WA native
Part shade, full sun



Hibbertia stellaris (Star guinea flower)
Form: groundcover
Height: 0.5m
WA native
Part shade, full sun

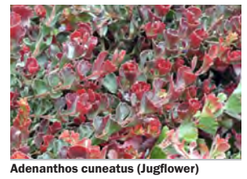
The Home Garden

_Celebrates the Bayswater 'Cottage Garden' with emphasis on flowering species

_Mix of both native and exotic species



Acacia lasiocarpa (Panjang)
Form: screening
Height: 1.5m
WA native
Part shade, full sun



Adenanthos cuneatus (Jugflower)
Form: groundcover
Height: 0.3m
WA native
Part shade, full sun



Brachyscome iberidifolia (Native daisy)
Form: groundcover
Height: 0.4m
WA native
Part shade, full sun



Grevillea pimeleoides 'little'
Form: hedging shrub
Height: 1m
Endemic
Part shade, full sun



Conostylis candicans (Grey cottonhead)
Form: screening
Height: 0.4m
WA native
Full sun



Grevillea obtusifolia 'Gin Gin Gem'
Form: groundcover
Height: 0.3m
WA native
Part shade, full sun



Hardenbergia comptoniana (native wisteria)
Form: screening
Height: 2m
WA native
Part shade



Lechenaultia biloba (Blue lechenaultia)
Form: speading shrub
Height: 1m
WA native
Part shade, full sun



Melaleuca pentagona (Honey myrtle)
Form: groundcover
Height: 1m
WA native
Part shade, full sun



Orthrosanthus laxus (Morning iris)
Form: erect shrub
Height: 0.5m
WA native
Part shade, full sun



Pimelea ferruginea (rice flower)
Form: screening
Height: 1.2m
WA native
Part shade, full sun



Rosmarinus officinalis (Rosmary)
Form: hedging shrub
Height: 1.2m
Exotic
Part shade, full sun



TREE GROUPS

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The Hillside Garden



Eucalyptus lansdowneana
(Crimson mallee)

Small (5m x 5m)
Australian native



Eucalyptus torquata
(Urn gum)

Medium (8m x 5m)
Australian native



Eucalyptus sideroxylon
(Iron bark)

Medium (15m x 10m)
Australian native



Corymbia calophylla
(Marri)

Large (30mm x 15m)
WA native



Eucalyptus gomphocephala
(Tuart)

Large (30m x 15m)
WA native



Eucalyptus wandoo
(Wandoo)

Large (25m x 10m)
WA native

The Water Garden



Melaleuca viminea
(Mohan)

Small (5m x 3m)
WA native



Callistemon citrinus
(Kings park special)

Small (4m x 2m)
WA native



Melaleuca cuticularis
(Salt water paperbark)

Medium (12m x 8m)
WA native



Eucalyptus spathulata
(Swamp mallet)

Medium (12m x 8m)
WA native



Eucalyptus todtiana
(Prickly bark gum)

Medium (15m x 10m)
Endemic



Eucalyptus rudis
(Flooded gum)

Large (20m x 6m)
WA native

The Home Garden



Cassia fistula
(Golden shower)

Small (4m x 4m)
Exotic



Olea europaea
(Swan hill olive)

Small (5m x 4m)
Exotic



Agonis flexuosa
(WA Peppermint)

Medium (15m x 15m)
WA native



Delonix regia
(Poinciana)

Medium (8m x 8m)
Exotic



Corymbia ficifolia
(Red flowering gum)

Medium (8m x 5m)
WA native



Brachychiton populneus
(Kurrajong)

Large (20m x 10m)
Australian native



FULL PLANT LIST

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HILLSIDE GARDEN

Species	Common Name	Shade	Part Shade	Full Sun	Aus native	Endemic	Exotic	Mature height	Form	Flowering Period
Acacia alata	Winged wattle							2m	Screening	Apr-Dec
Acacia drummondii	Drummonds wattle							1m	Low shrub	Jun-Oct
Acacia lasiocarpa (prostrate)	Glow wattle							0.2-1m	Groundcover	May-Oct
Anigozanthos (various)	Kangaroo paw							1m	Strappy shrub	Aug-Nov
Banksia menziesii (little)	Little red banksia							1m	Low shrub	Feb-Oct
Beaufortia aestiva 'Summer flame'	Kalbarri beautiforia							1m	Low shrub	Dec-Mar
Beaufortia purpea	Purple beautiforia							1.5m	Screening	Oct-Feb
Callistemon phoeniceus (dwarf)	Scarlet bottlebrush							1m	Groundcover	Oct-Nov
Calothamnus hirsutus								1.5m	Screening	Sep-Dec
Calothamnus quadrifidus	One-sided bottlebrush							2m	Screening	Jan-Dec
Calothamnus quadrifidus 'Little ripper'	One-sided bottlebrush							0.7m	Low shrub	Jan-Dec
Casuarina glauca 'Cousin It'	Swamp sheoak							0.2m	Trailing	
Conostylis candicans	Grey cottonheads							0.4m	Low shrub	Jun-Nov
Dianella revoluta	Blue flax lily							0.8m	Erect shrub	Jan-Apr
Dichondra argentea 'Silver falls'	Silver ponysfoot							0.5m	Trailing	Sep-Nov
Eremophila glabra	Kalbarri carpet							0.2m	Groundcover	Mar-Dec
Grevillea hybrid	Grevillea new blood							0.5	Groundcover	
Grevillea obtusifolia ‘Gin Gin Gem’	Gin Gin gem							0.3m	Groundcover	Apr-Nov
Grevillea wilsonii	Native fuschia							1.5m	Screening	Jan-May
Hakea laurina 'Mini Pini'	Pincushion hakea							0.5m	Spreading shrub	Apr-Aug
Hardenbergia comptoniana	Native wisteria							Climber	Climber	Jul-Oct
Hibbertia grossulariifolia	Guinea flower							0.2m	Groundcover	Aug-Dec
Hibbertia hypericoides	Yellow buttercups							1.5m	Screening	Apr-Dec
Hovea pungens	Devils pins							1.8m	Screening	May-Nov
Hypocalymma angustifolium	Myrtle							1.5m	Screening	Jun-Oct
Hypocalymma robustum	Pink myrtle							1.5m	Screening	Jun-Nov
Kennedia prostrata	Running postman							0.2m	Groundcover	Jun-Jan
Lechenaultia biloba	Blue leschenaultia							1m	Spreading shrub	Jul-Dec
Melaleuca fulgens	Scarlet honey myrtle							3m	Screening	Jul-Dec
Melaleuca incana nana	Grey honey myrtle							1m	Low shrub	May-Nov
Olearia axillaris ‘Little Smokie’	Coastal daisybush							0.5m	Low shrub	Jul-Dec
Patersonia occidentalis	Purple flag							0.5-1m	Low shrub	Aug-Dec
Verticordia plumosa	Pom pom							1.5	Screening	Jul-Feb
Xanthorrhoea preissii	Balga							2.5	Grass tree	Jun-Dec

FULL PLANT LIST

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WATER GARDEN

Species	Common Name	Shade	Part Shade	Full Sun	Aus native	Endemic	Exotic	Mature height	Form	Flowering Period
Acacia saligna (prostrate)	Golden wreath wattle							0.4m	Groundcover	Jul-Nov
Anigozanthos (various)	Kangaroo paw							1m	Strappy shrub	Aug-Nov
Baumea juncea	Bare twig rush							1.2m	Sedge	Dec-Mar
Baumea vaginalis	Sheath Twig Rush							1.5m	Sedge	
Beaufortia elegans	Elegant beautiforia							0.2-1m	Erect shrub	Jan-Feb
Boronia crenulata	Aniseed boronia							1m	Low shrub	Jan-May
Calothamnus quadrifidus	One-sided bottlebrush							2m	Screening	Jan-Dec
Calothamnus quadrifidus 'Little ripper'	One-sided bottlebrush							0.7m	Low shrub	Jan-Dec
Carex tereticaulis	Rush sedge							0.7m	Sedge	Sep-Oct
Chorizema varium	Seaside flame pea							0.3m	Groundcover	Jun-Oct
Conostylis candicans	Grey cottonheads							0.4m	Low shrub	Jun-Nov
Conostylis setigera	Bristly cottonhead							0.3m	Clumping, grasslike	Aug-Nov
Dampiera linearis	Common dampiera							0.6m	Low shrub	Jul-Dec
Dianella revoluta	Blue flax lily							0.8m	Erect shrub	Jan-Apr
Ficinia nodosa	Knotted club rush							1m	Sedge	Oct-Dec
Grevillea bipinnatifida	Fuchsia grevillea							0.2-1m	Spreading shrub	Mar-Dec
Grevillea crithmifolia 'Green Carpet'	Grevillea							0.5m	Groundcover	Jun-Nov
Grevillea thelemanniana	Spider-net greville							0.3-1.5m	Screening	May-Nov
Hakea laurina 'Mini Pini'	Pincushion hakea							0.5m	Spreading shrub	Apr-Aug
Hemiandra pungens	Snakebush							0.5m	Groundcover	Jan-Dec
Hibbertia stellaris	Star guinea flower							0.5m	Groundcover	Aug-Dec
Hypocalymma angustifolium	White myrtle							1.5m	Screening	Jun-Oct
Isolepis cernua	Slender club rush							0.3m	Sedge	Jun0Feb
Juncus kraussii	Salt marsh rush							1.2m	Sedge	Dec-Jan
Kennedia prostrata	Running postman							0.2m	Groundcover	Jun-Jan
Melaleuca incana nana	Grey honey myrtle							1m	Low shrub	May-Nov
Olearia axillaris ‘Little Smokie’	Coastal daisybush							0.5m	Low shrub	Jul-Dec
Patersonia occidentalis	Purple flag							0.5-1m	Low shrub	Aug-Dec
Verticordia plumosa	Pom pom							0.2-1.5m	Screening	Jul-Feb
Xanthorrhoea preissii	Balga							2.5	Grass tree	Jun-Dec

FULL PLANT LIST

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HOME GARDEN

Species	Common Name	Shade	Part Shade	Full Sun	Aus native	Endemic	Exotic	Mature height	Form	Flowering Period
Acacia lasiocarpa	Panjang							1.5m	Screening	May-Oct
Adenanthos cuneatus	Coastal jugflower							0.3m	Groundcover	Jan-Dec
Anigozanthos (various)	Kangaroo paw							1m	Strappy shrub	Aug-Nov
Banksia nivea	Honeypot banksia							1.5m	Low shrub	Apr-Nov
Brachyscome iberidifolia	Native daisy							0.4m	Groundcover	Jul-Nov
Callistemon viminalis ‘Better John’	Bottlebrush							1m	Hedging shrub	Sep-Nov
Callistemon viminalis 'green envy'	Bottlebrush							1m	Low shrub	Sep-Nov
Calothamnus quadrifidus	One-sided bottlebrush							2m	Screening	Jan-Dec
Calothamnus quadrifidus 'Little ripper'	One-sided bottlebrush							0.7m	Screening	Jan-Dec
Conostylis candicans	Grey cottonheads							0.4m	Low shrub	Jun-Nov
Darwinia citriodora 'prostrate'	Lemon scented myrtle							0.7m	Spreading shrub	May-Dec
Dianella revoluta	Blue flax lily							0.8m	Erect shrub	Jan-Apr
Eremophila glabra	Kalbarri carpet							0.2m	Groundcover	Mar-Dec
Grevillea obtusifolia ‘Gin Gin Gem’	Gin Gin gem							0.3m	Groundcover	Apr-Nov
Grevillea pimeleoides 'little'								1m	Hedging shrub	May-Nov
Hakea laurina 'Mini Pini'	Pincushion hakea							0.5m	Spreading shrub	Apr-Aug
Hardenbergia comptoniana	Native wisteria							-	Climber	Jul-Oct
Hemiandra pungens	Snakebush							1m	Groundcover	Jan-Dec
Kennedia prostrata	Running postman							0.2m	Groundcover	Jun-Jan
Lechenaultia biloba	Blue leschenaultia							1m	Spreading shrub	Jul-Dec
Melaleuca incana nana	Grey honey myrtle							1m	Low shrub	May-Nov
Melaleuca pentagona	Honey myrtle							1m	Groundcover	Sep-Dec
Olearia axillaris ‘Little Smokie’	Coastal daisybush							0.5m	Low shrub	Jul-Dec
Orthrosanthus laxus	Morning iris							0.5m	Erect shrub	Aug-Nov
Patersonia occidentalis	Purple flag							0.5-1m	Low shrub	Aug-Dec
Pimelea ferruginea	Rice flower							1.2m	Screening	Aug-Feb
Rosmarinus officinalis	Rosemary							1.2m	Hedging shrub	Nov-Jan
Syzygium smithii	Lili Pili							1m	Hedge	Dec-Feb
Xanthorrhoea preissii	Balga							2.5	Grass tree	Jun-Dec

FULL TREE LIST

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HILLSIDE GARDEN

Species	Common Name	Full Sun	Part Shade	Shade	Aus native	Endemic	Exotic	Flowering Period	Mature height	Mature width
SMALL TREES (<5m)										
• Eucalyptus decipiens	Redheart moit							Aug-Jun	3-6m	3-6m
• Eucalyptus forrestiana	Fuschia gum							Jan-Jun	5m	4m
• Eucalyptus lansdowneana	Crimson mallee							Sep-Feb	5m	4-5m
MEDIUM TREES (5m-15m)										
• Corymbia ficifolia	Red flowering gum							Dec-May	8m	5m
• Eucalyptus nicholii	Willow peppermint							Feb-Mar	12-16m	8-12m
• Eucalyptus sideroxylon	Iron bark							Apr-Dec	15m	6-10m
• Eucalyptus torquata	Urn gum							Aug-Dec	5-8m	5m
LARGE TREES (>15m)										
• Angophora costata	Sydney red gum							Dec-Feb	20m	12m
• Corymbia maculata	Spotted gum							Mar-Dec	20m	8-15m
Corymbia calophylla	Marri							Dec-May	30-40m	15m
Eucalyptus gomphocephala	Tuart							Jan-Apr	30-40m	15m
Eucalyptus wandoo	Wandoo							Dec-May	25m	10m

• Approved Bayswater Street Trees

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FULL TREE LIST

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WATER GARDEN

Species	Common Name	Full Sun	Part Shade	Shade	Aus native	Endemic	Exotic	Flowering Period	Mature height	Mature width
SMALL TREES (<5m)										
Callistemon 'Kings Park Special'	Kings Park special							Sep-Nov	4m	2m
Melaleuca viminea	Mohan							Jul-Nov	5m	4m
MEDIUM TREES (5m-15m)										
Callistemon salignus	Willow bottlebrush							Sep-Nov	8m	4m
• Eucalyptus torquata	Urn gum							Aug-Dec	5-8m	5m
Eucalyptus spathulata	Swamp mallet							Sep-Nov	8-12m	6-8m
Eucalyptus todtiana	Prickly bark gum							Jan-Apr	15m	10m
Melaleuca cuticularis	Saltwater paperbark							Aug-Nov	12m	8m
Melaleuca preissiana	Stout paperbark							Nov-Feb	9m	5m
Melaleuca rhaphiophylla	Swamp paperbark							Jul-Jan	6m	3m
LARGE TREES (>15m)										
Corymbia calophylla	Marri							Dec-May	30-40m	15m
Eucalyptus rudis	Flooded gum							Jul_Sep	20m	6m

• Approved Bayswater Street Trees

FULL TREE LIST

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HOME GARDEN

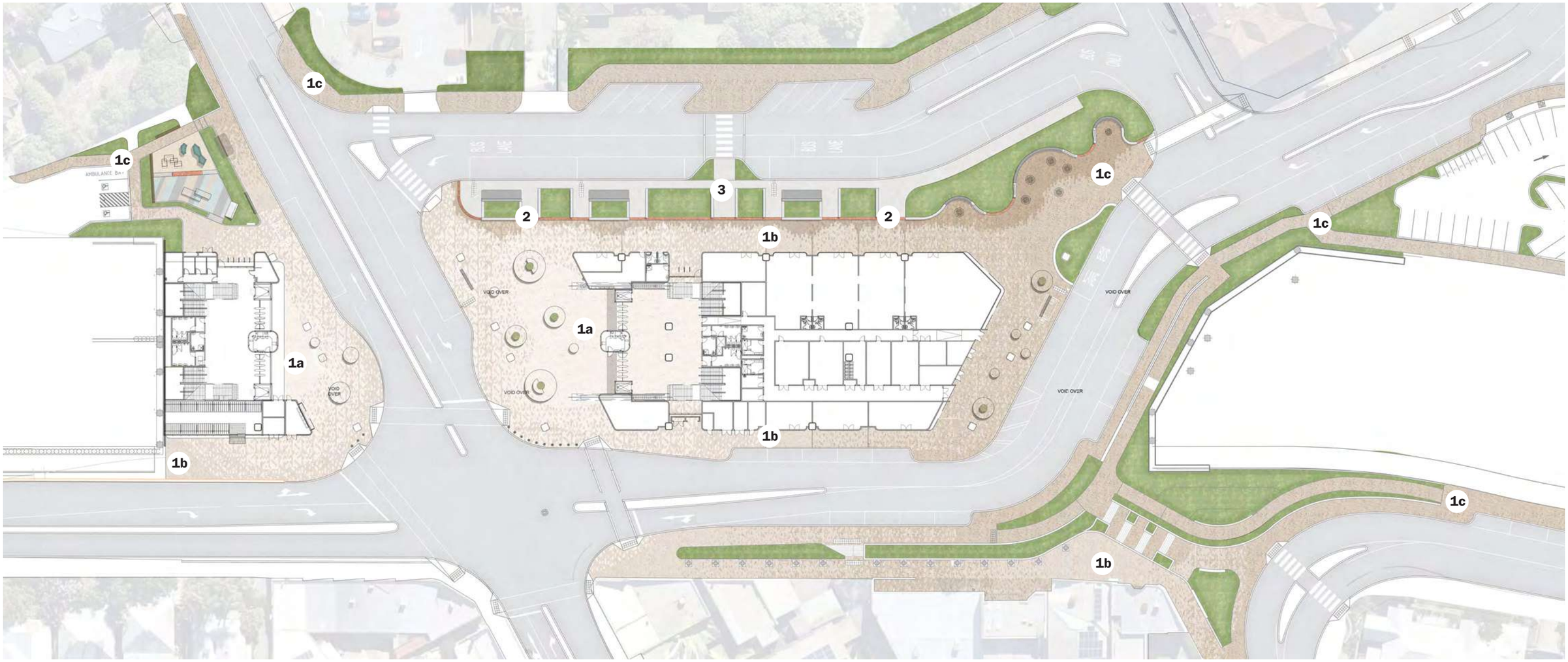
Species	Common Name	Full Sun	Part Shade	Shade	Aus native	Endemic	Exotic	Flowering Period	Mature height	Mature width
SMALL TREES (<5m)										
Callistemon 'Kings Park Special' E	Kings Park special							Sep-Nov	4m	2m
Cassia fistula	Golden shower							Dec-Feb	4m	4m
• Olea europaea 'Swan Hill'	Swan Hill Olive							Sep-Nov	5m	4m
• Sapium sebiferum	Chinese tallow							Nov-Dec	5m	5m
MEDIUM TREES (5m-15m)										
• Agonis flexuosa	WA Peppermint							Jul-Dec	15m	10-15m
• Corymbia ficifolia	Red flowering gum							Dec-May	8m	5m
• Delonix regia	Poinciana							Dec-Feb	8m	8m
• Eucalyptus torquata	Urn gum							Aug-Dec	5-8m	5m
• Pyrus ussuriensis	Manchurian pear							Sep-Nov	9m	7m
• Tristaniopsis laurina	Kanooka							Jan-Feb	6-8m	3-4m
LARGE TREES (>15m)										
Brachychiton populneus	Kurrajong							Sep-Nov	20m	10m

• Approved Bayswater Street Trees

PAVING DESIGN

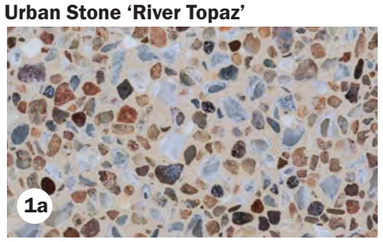
Material Palette

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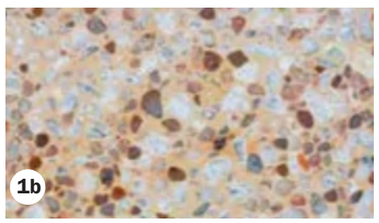


Precinct Paving

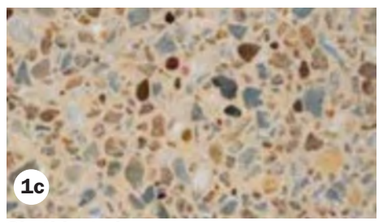
Urban Stone 'River Topaz'



Honed



Milled



Shotblasted

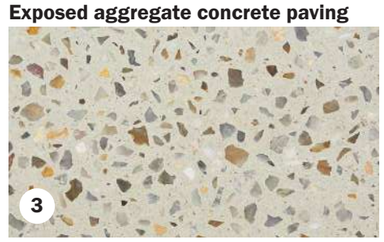
Brick header course

Midland Brick 'Restoration Red Coach'



Bus Stand Paving

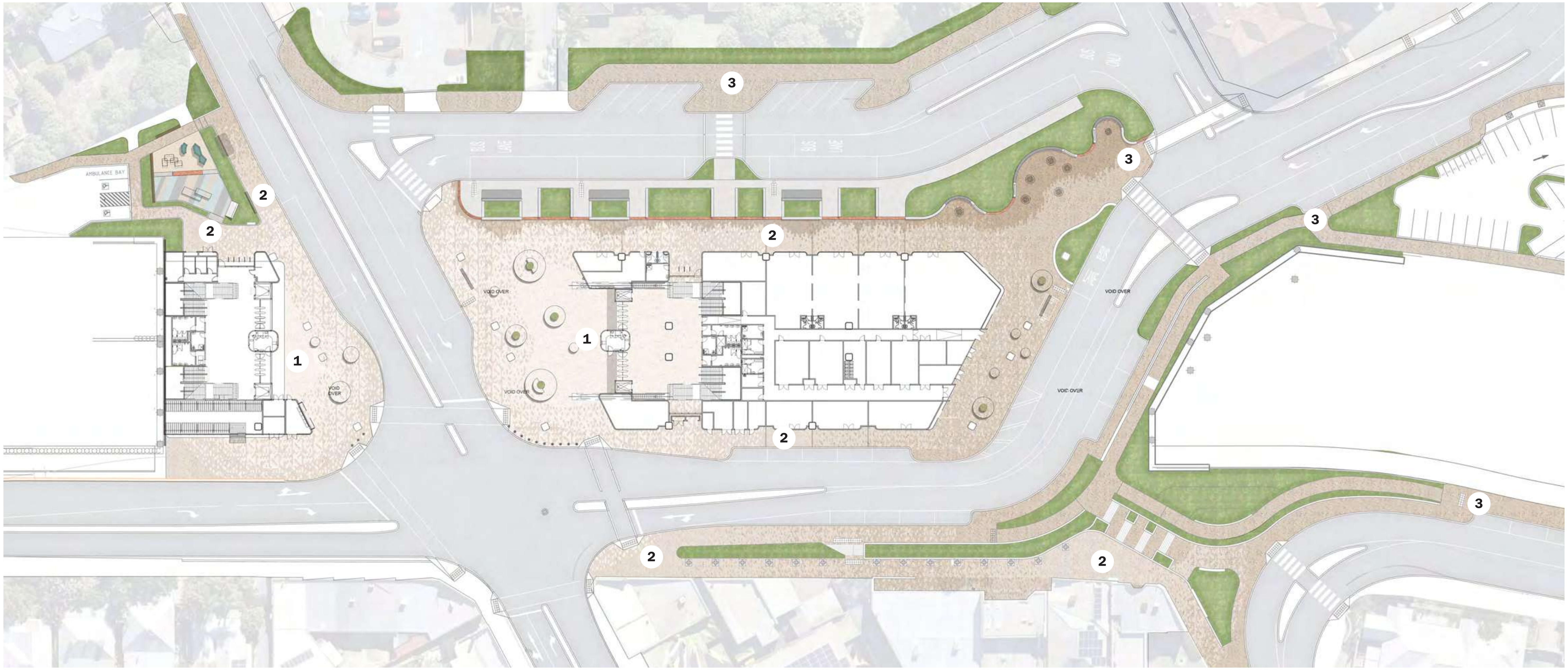
Exposed aggregate concrete paving



PAVING DESIGN

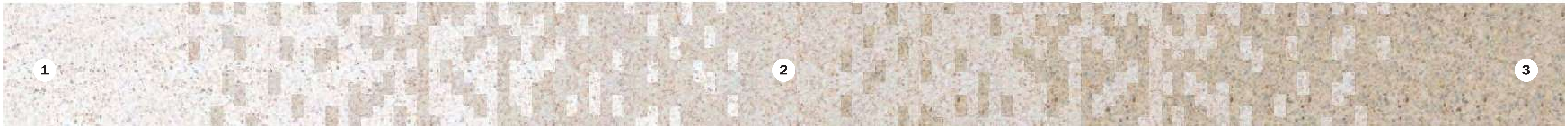
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Site-wide Strategy



Station entry < - - - - - - - - - - - - - - - **Transition** - - - - - - - - - - - - - - - > **Periphery**

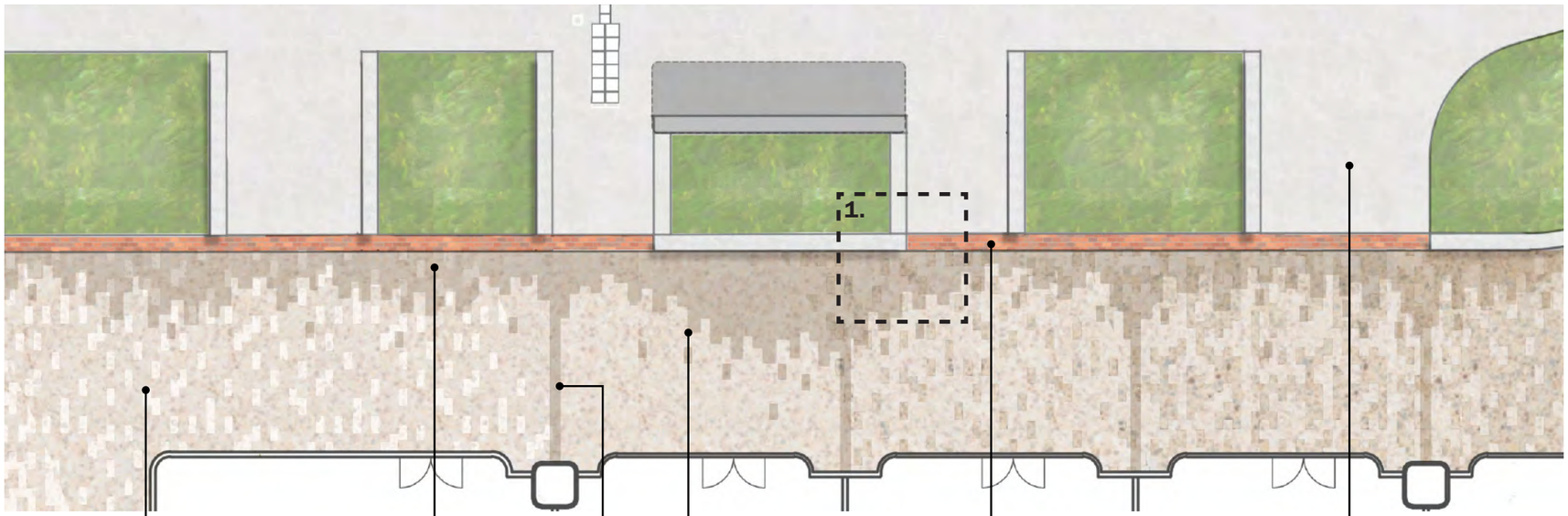
Honed, smooth, civic — Milled, textured — Shotblased, coarse, residential

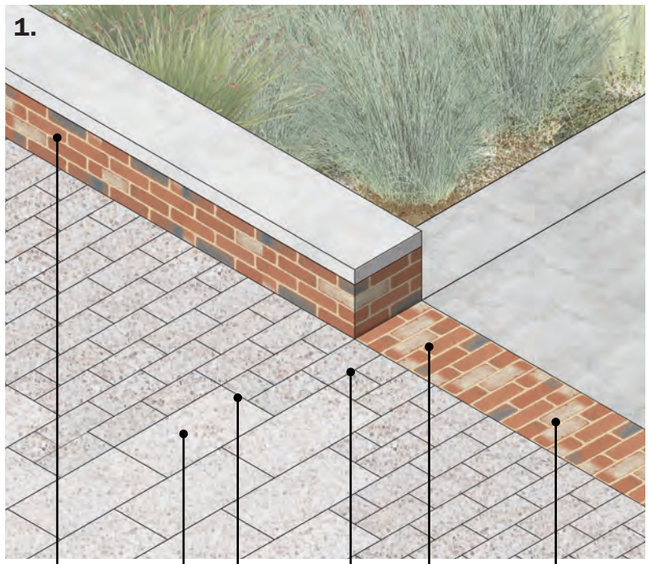


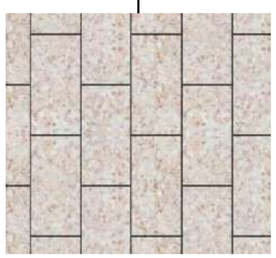
PAVING DESIGN

Detailed strategy

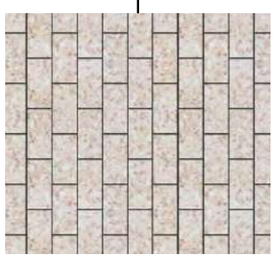
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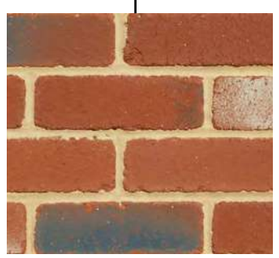
Large Format Precinct Paving - 800mm x 400mm



Small Format Precinct paving - 400mm x 200mm

Banding of small pavers at shop centerlines creates a relationship between the building and paving design

Feathered 'shoreline' between large format and small format pavers



Midland Brick
'Restoration Red Coach'



Concrete Bus Stand paving

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LIGHTING

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The lighting in the public realm is to be integrated into the built form design so that the light fixtures are not prominently visible during the day. Poles and mountings are to be rationalised to prevent clutter.

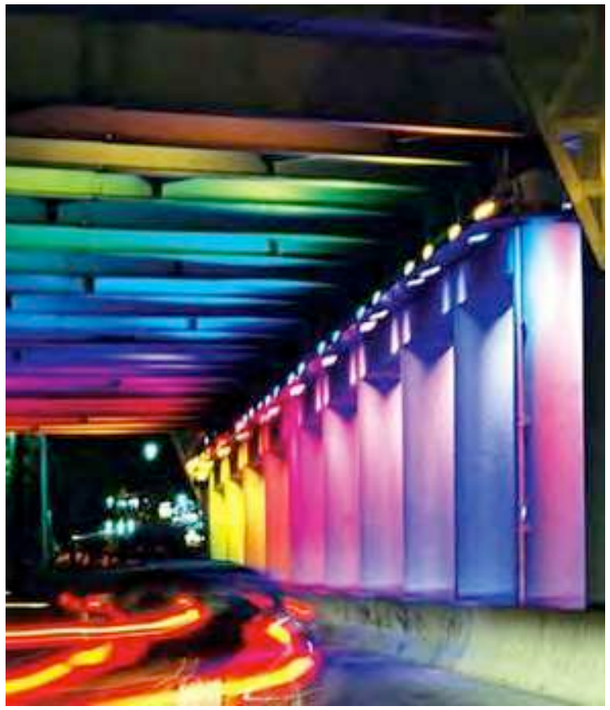
Feature lighting is to be controlled to allow dynamic input and change within feature lighting to suit events, time of day or various uses.

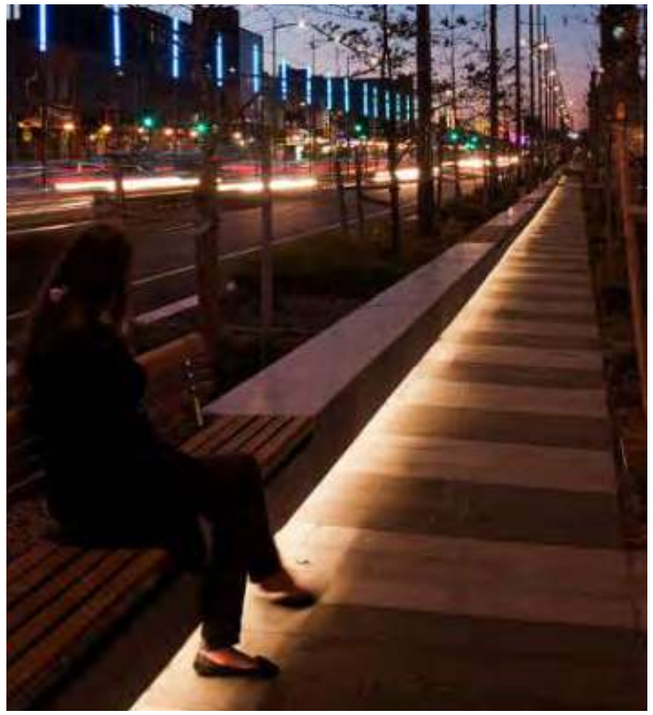
Lighting design to be developed closely with the lighting consultant.

- Recessed up-lighting for trees
- Soffit lighting for sculptural art and canopies
- Mounted outdoor wall lighting
- Recessed up-lighting for retaining walls
- Growing lights
- Furniture strip accent LED lighting
- Facade lighting
- LED lighting to paving art
- Event lighting















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INTERPRETATION

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Explore opportunities for interpretation through

- Lighting
- Planting
- Paving inscription and patternation
- way finding signage





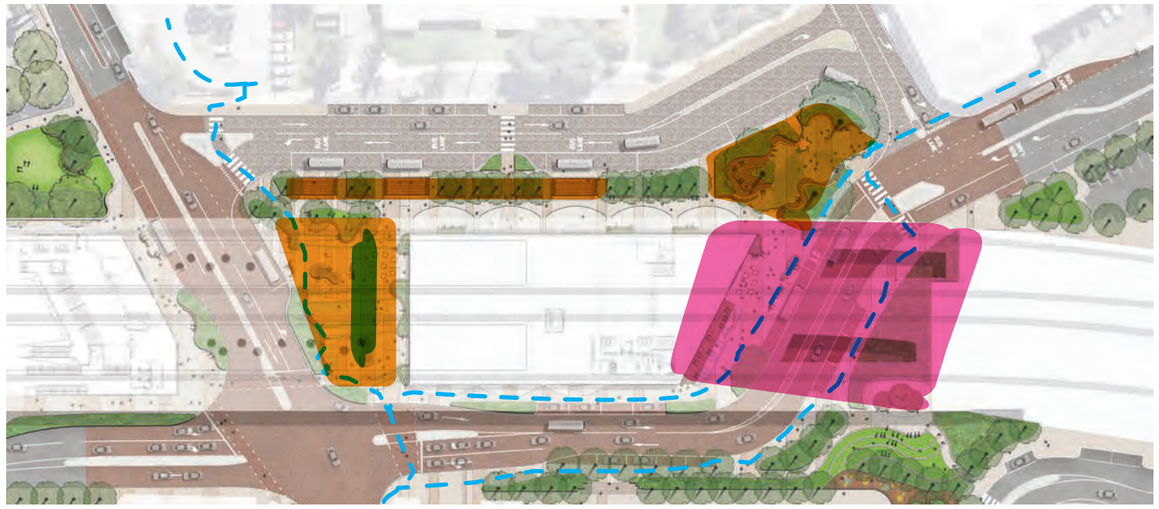




PUBLIC ART / INTERPRETATION

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LEGEND

- Beeralain Bidi
- Interactive Artworks
- Projection Artworks
- Light Sculpture

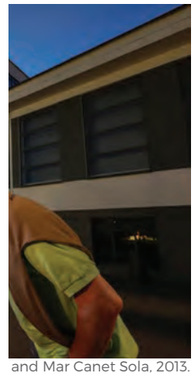

al Benches, Jeppe Hein. Lemvig. Photo: Artist.



Urban Lounge, Steve Tepper with Ecoscape. 2014.


el Magnolias, Jon Denaro.
. Photo: Frances Andrijich

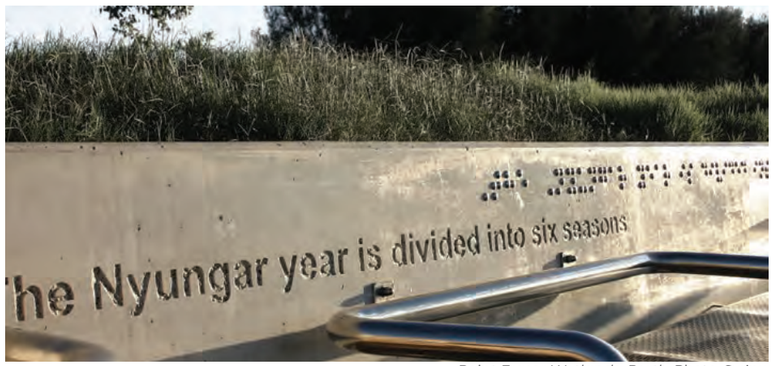

The Story of Stirling (detail), Margaret Dillon and Penny Bovell, 2005
City of Stirling Civic Complex. Photo: Courtesy the Artist


and Mar Canet Sola, 2013.
, courtesy Public Art Lab.


Digital Projection Bangarra Dance Company Vivid Sydney.
Photo: Vivid Sydney


ello.


Illuminated Pods, Paul Caporn with the City Design Team, 2010. Northbridge, Perth. I



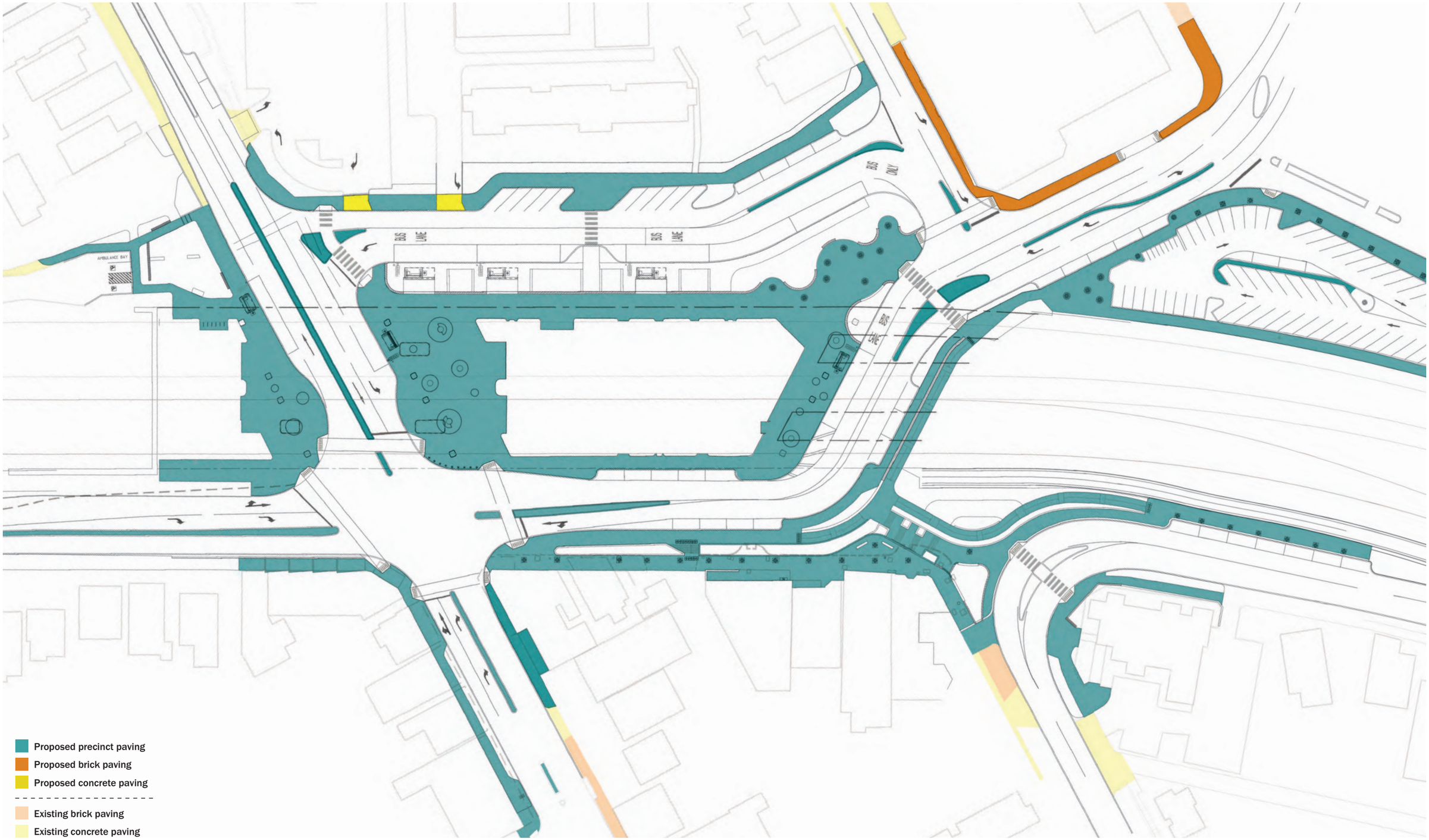
Point Fraser Wetlands, Perth. Photo: Syrinx.



The Manhattan Bridge project was a collaboration of artists Ryan Uzilevsky, Farkas Fülöp, Simon Anaya, Sina Taherkhani , John Ensor Parker, Johnny Moreno and Richard Jochum. Photo: CNN

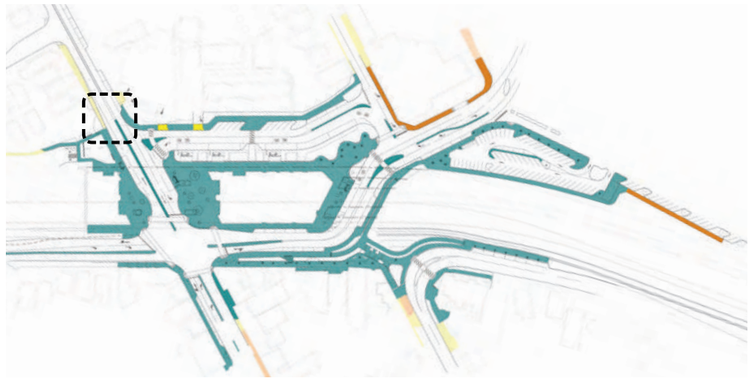
EXISTING PAVING INTERFACES

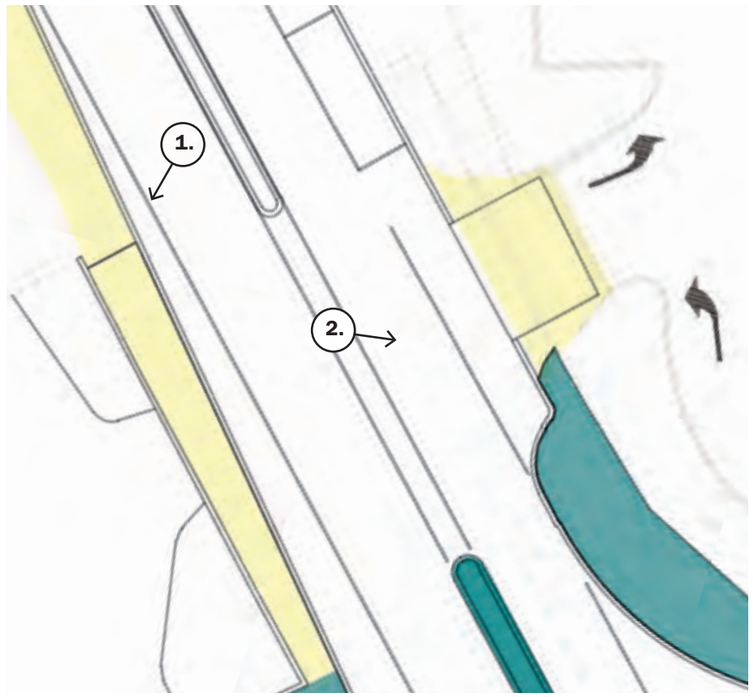
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connecting people + places



EXISTING PAVING INTERFACES

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Proposed precinct paving
Proposed brick paving
Proposed concrete paving

Existing brick paving
Existing concrete paving

Proposed precinct paving to terminate at residential fence/wall

Bus stop removed and new limestone retaining wall to replace and extend existing wall



1. Pocket Park

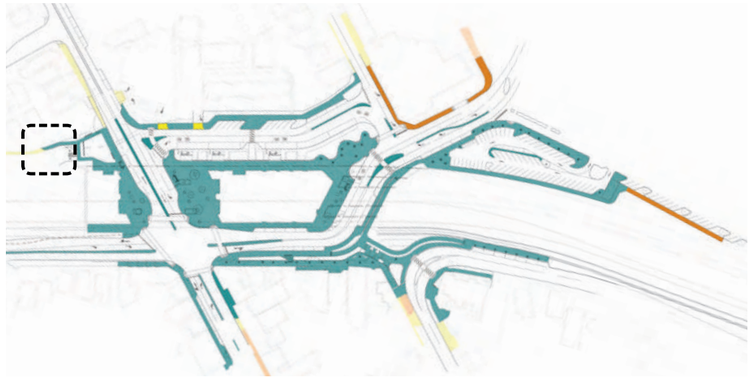
Proposed precinct paving to terminate at interface with driveway

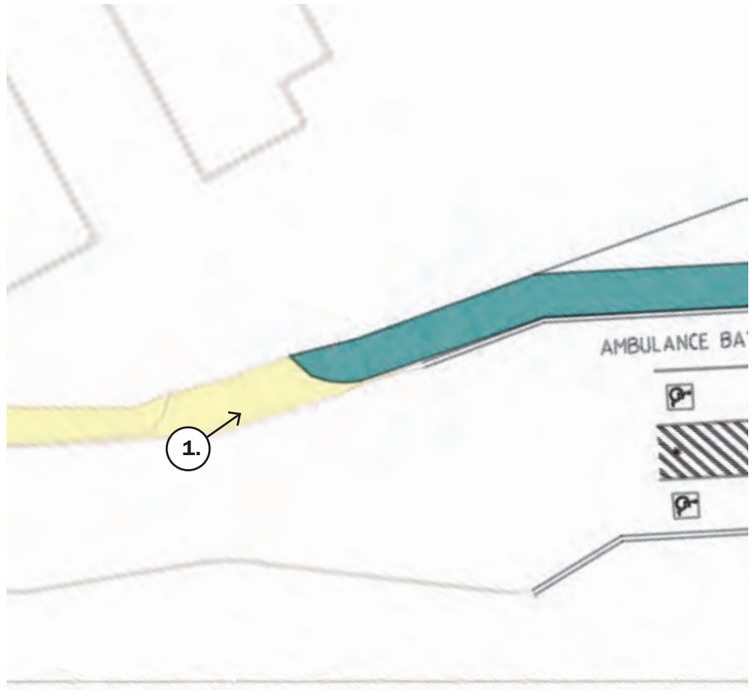


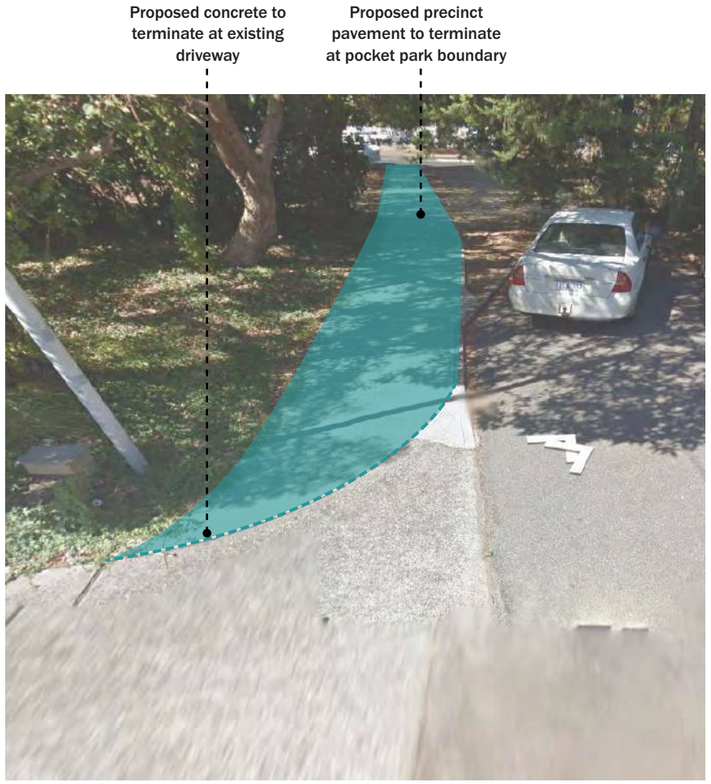
2. Bayswater Lacrosse

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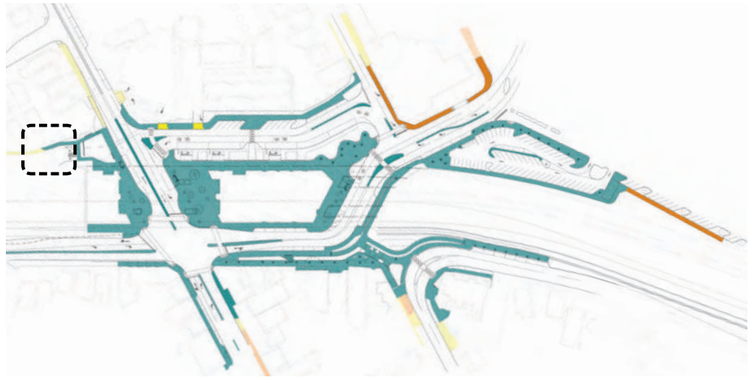


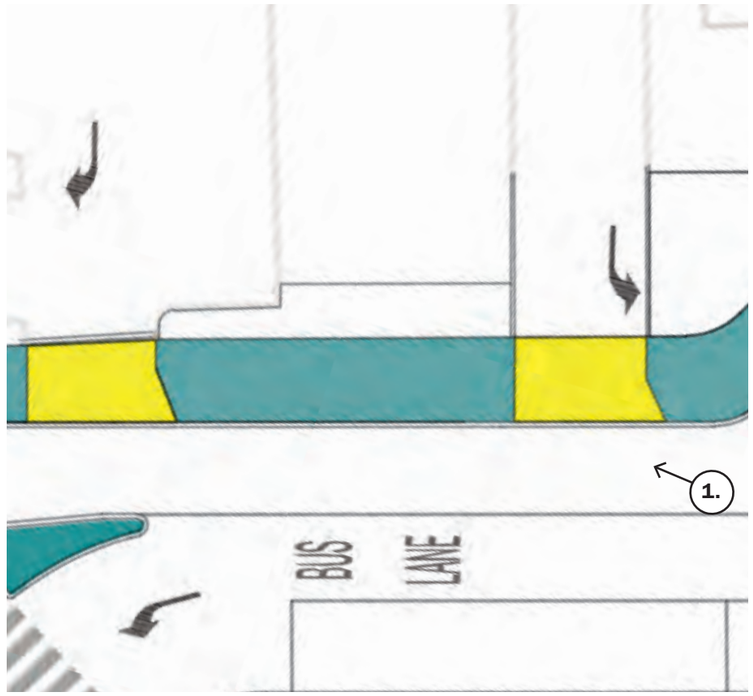
1. Railway Parade pocket park

Proposed precinct paving
Proposed brick paving
Proposed concrete paving
Existing brick paving
Existing concrete paving

EXISTING PAVING INTERFACES

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Proposed precinct paving
Proposed brick paving
Proposed concrete paving

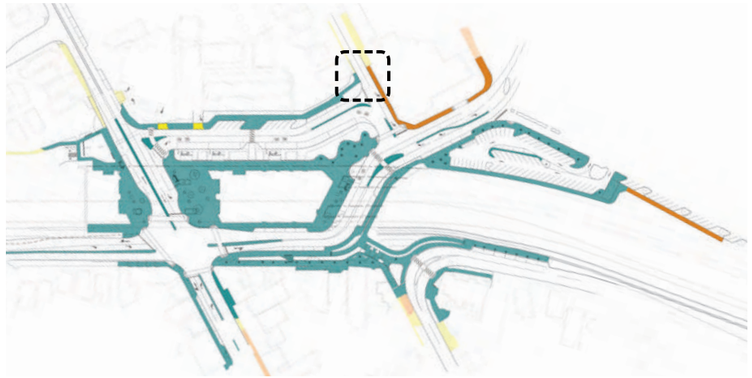
Existing brick paving
Existing concrete paving



1. Railway Parade bus stand

EXISTING PAVING INTERFACES

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Proposed precinct paving to terminate at residential fence

Proposed brick paving to terminate in line with precinct paving

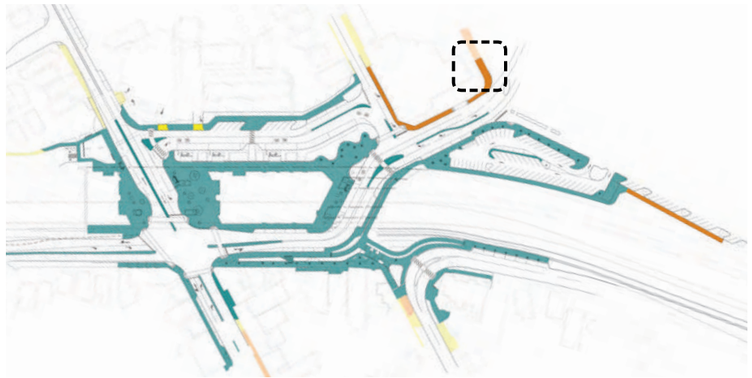


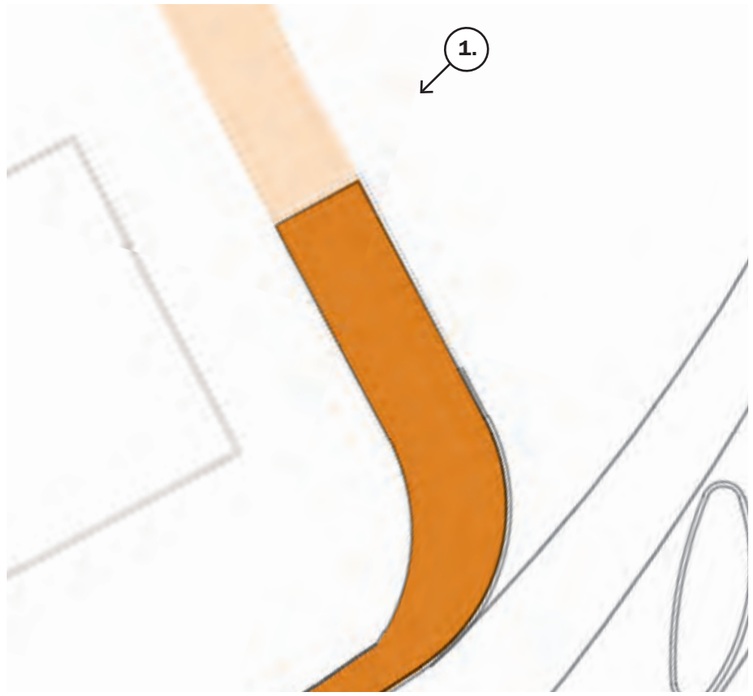
1. Rose Avenue

- Proposed precinct paving
- Proposed brick paving
- Proposed concrete paving
- Existing brick paving
- Existing concrete paving

EXISTING PAVING INTERFACES

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Proposed precinct paving
Proposed brick paving
Proposed concrete paving
Existing brick paving
Existing concrete paving

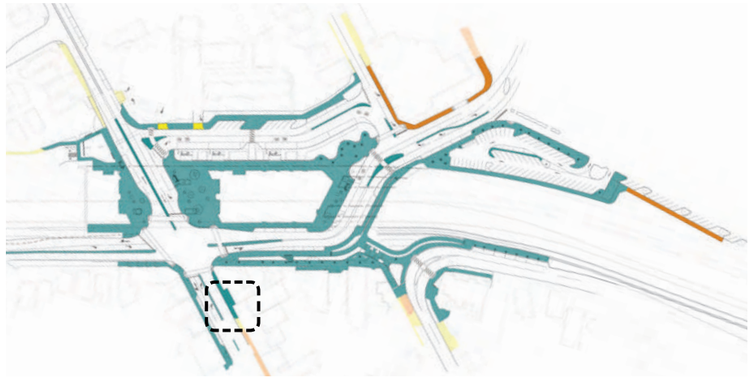
Proposed brick paving
to terminate at existing
brick paving

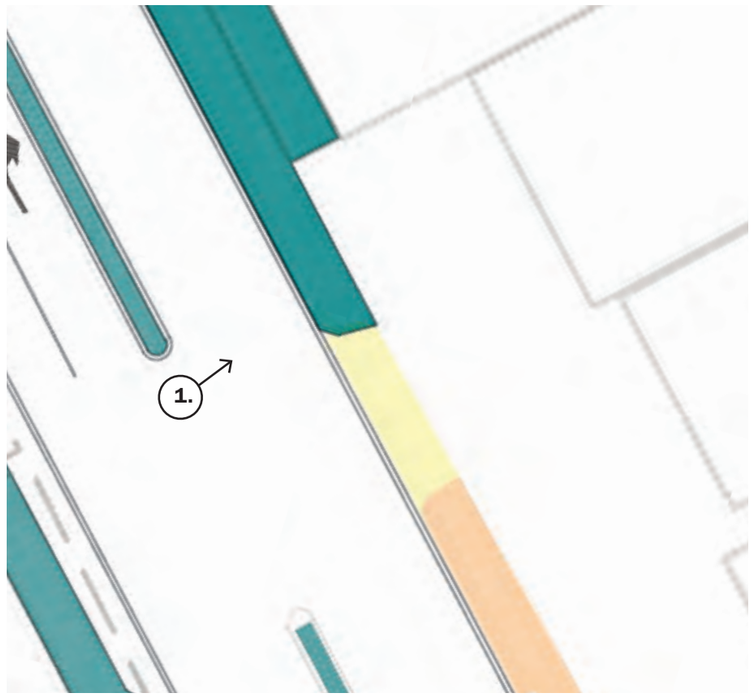


1. Drake Street Interface

EXISTING PAVING INTERFACES

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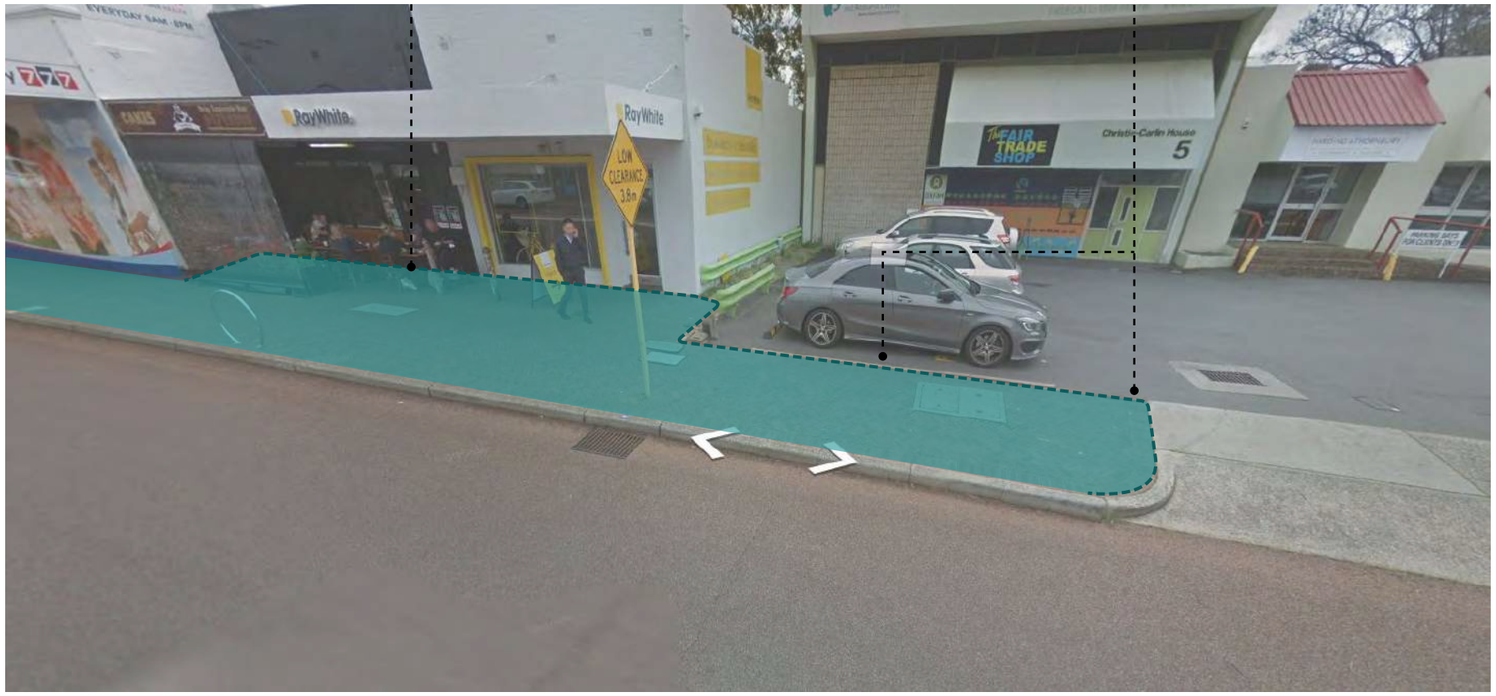




Proposed precinct paving
Proposed brick paving
Proposed concrete paving
Existing brick paving
Existing concrete paving

Proposed precinct paving replace existing brick paving infront of cafe and real estate agent

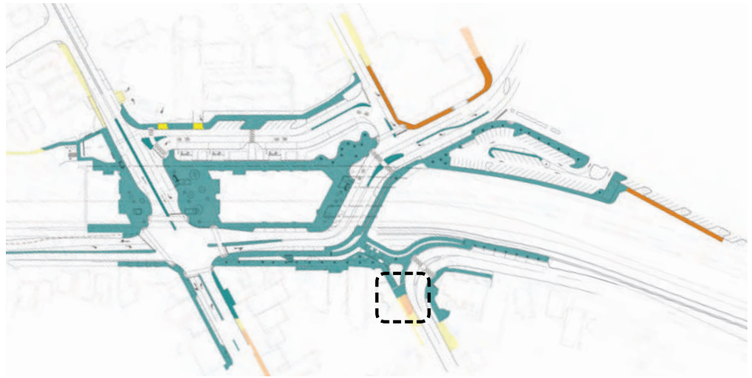
Proposed precinct paving to terminate at existing driveway and along carpark

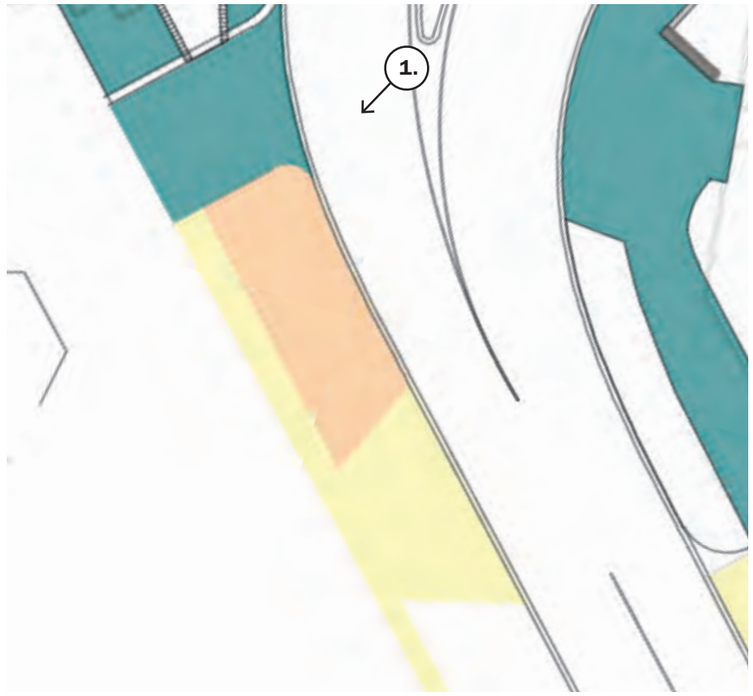


1. King William Street interface

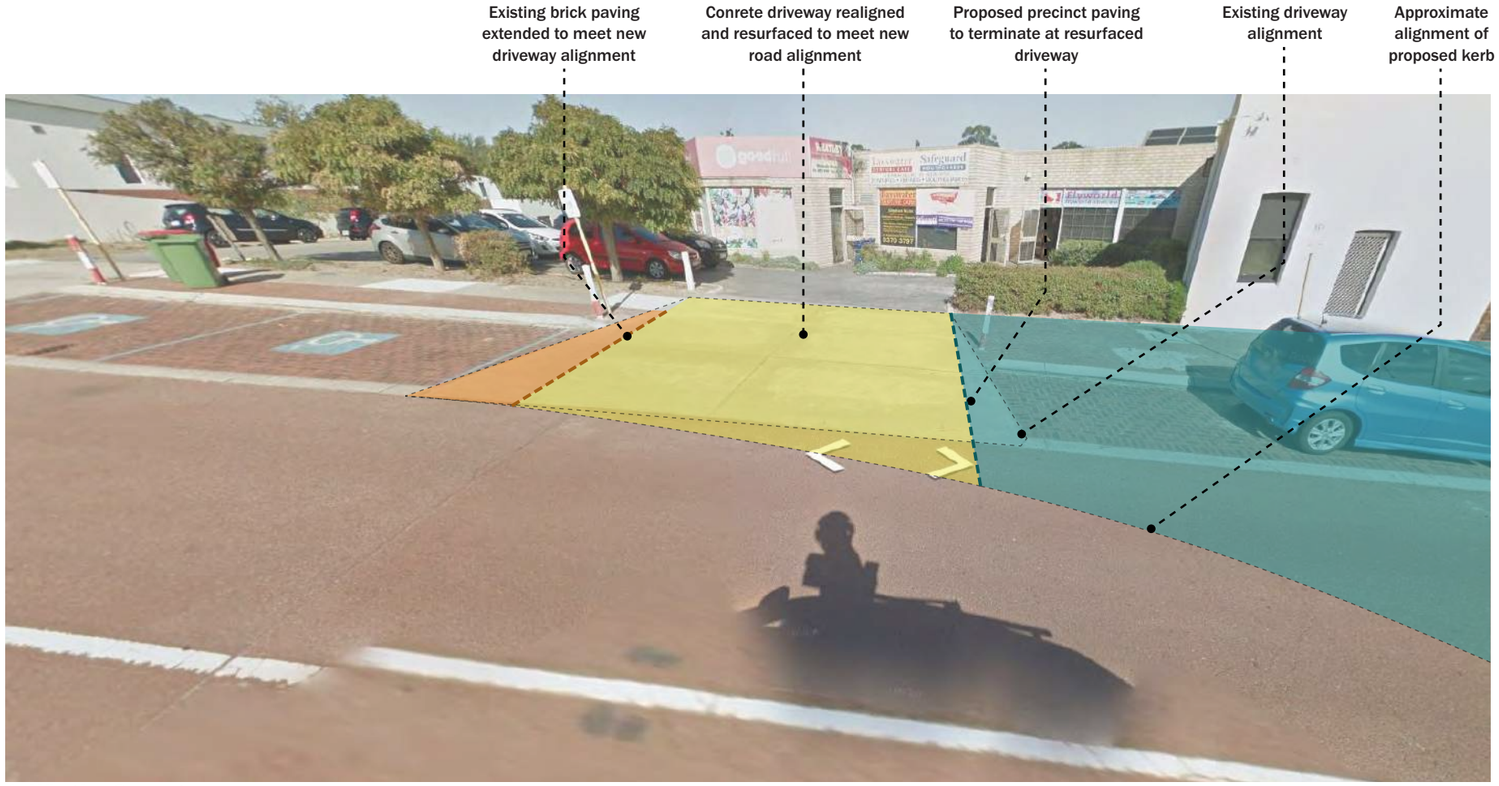
EXISTING PAVING INTERFACES

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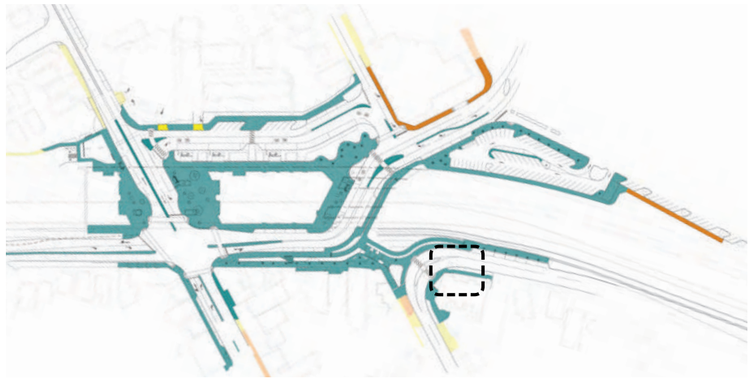
Proposed precinct paving
Proposed brick paving
Proposed concrete paving
Existing brick paving
Existing concrete paving

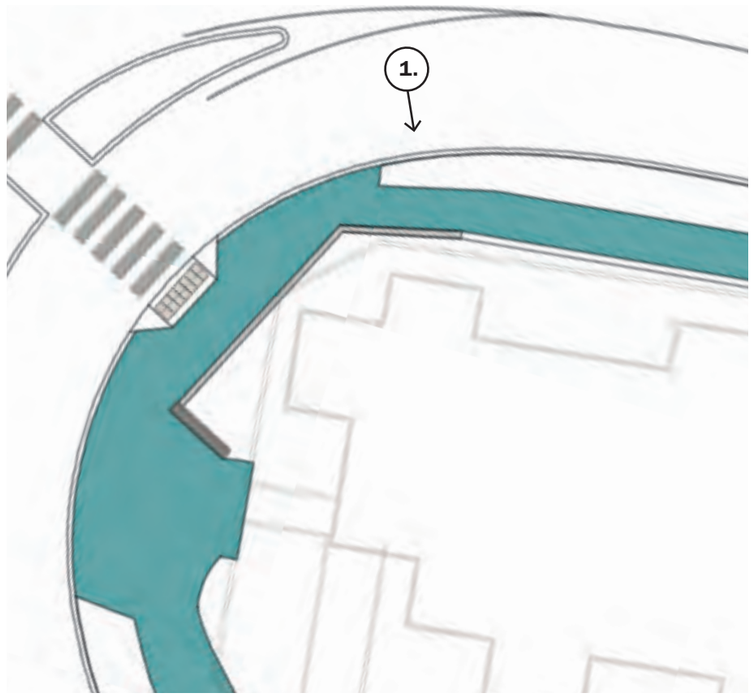


1. Whatley Cresent

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Proposed precinct paving
Proposed brick paving
Proposed concrete paving
Existing brick paving
Existing concrete paving

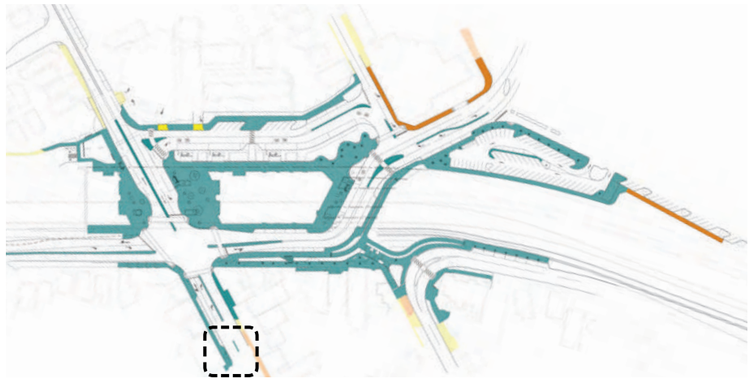
Existing retaining wall and stairs removed to allow for precinct paving to meet new road alignment

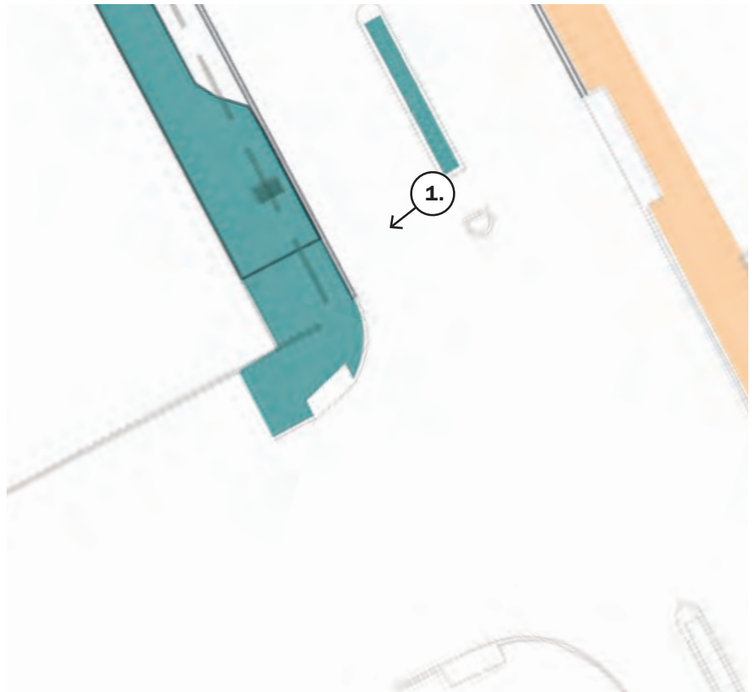


1. Police Station

EXISTING PAVING INTERFACES

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Proposed precinct paving
Proposed brick paving
Proposed concrete paving
Existing brick paving
Existing concrete paving

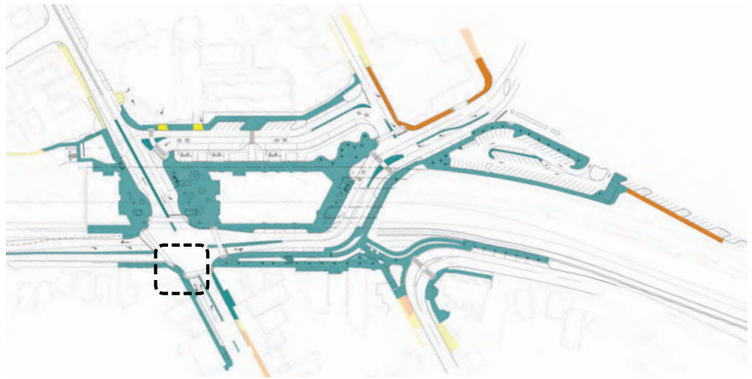
Proposed precinct paving to terminate at existing crossing

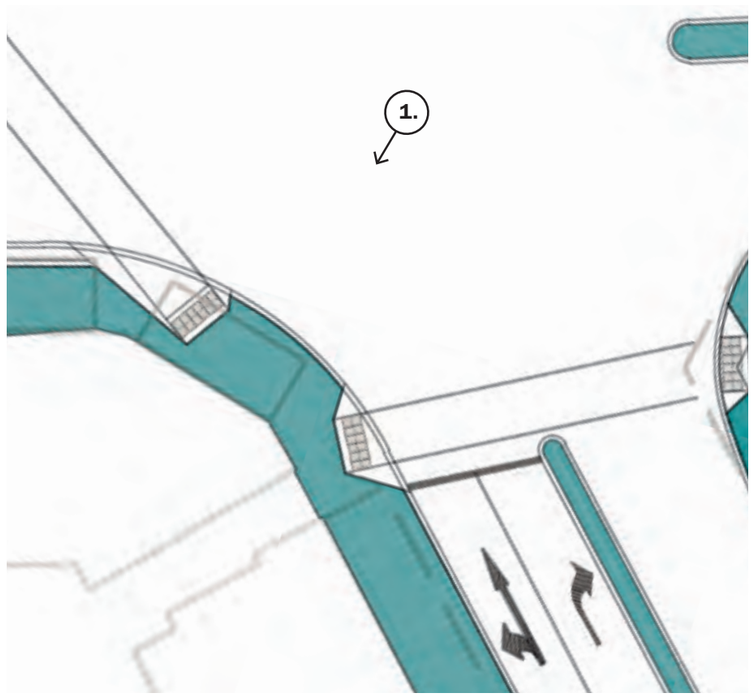


1. King William/Murray St

EXISTING PAVING INTERFACES

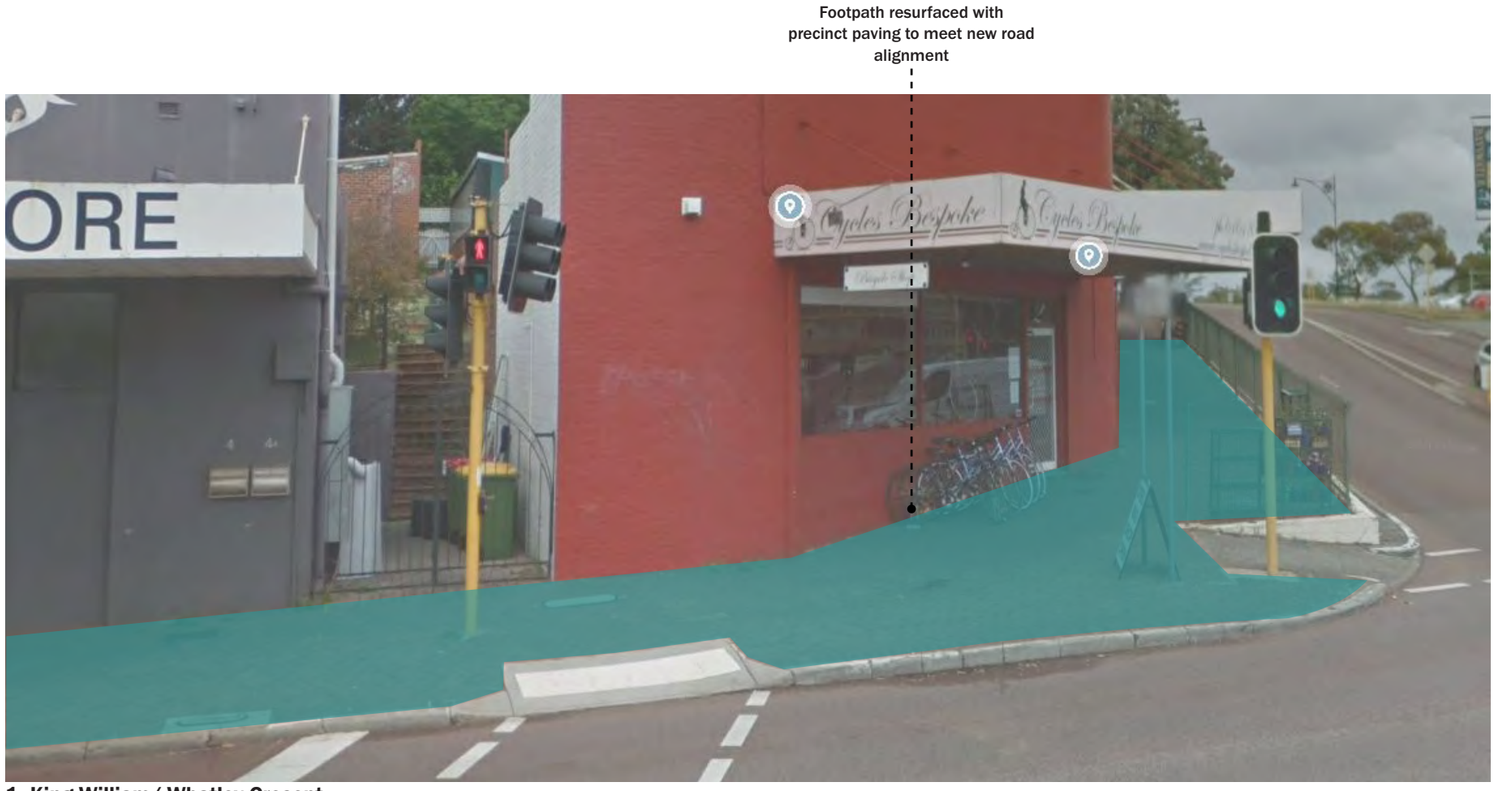
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Proposed precinct paving
Proposed brick paving
Proposed concrete paving

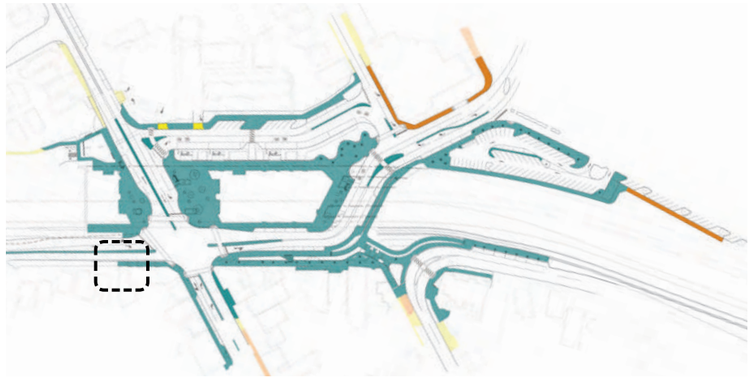
Existing brick paving
Existing concrete paving

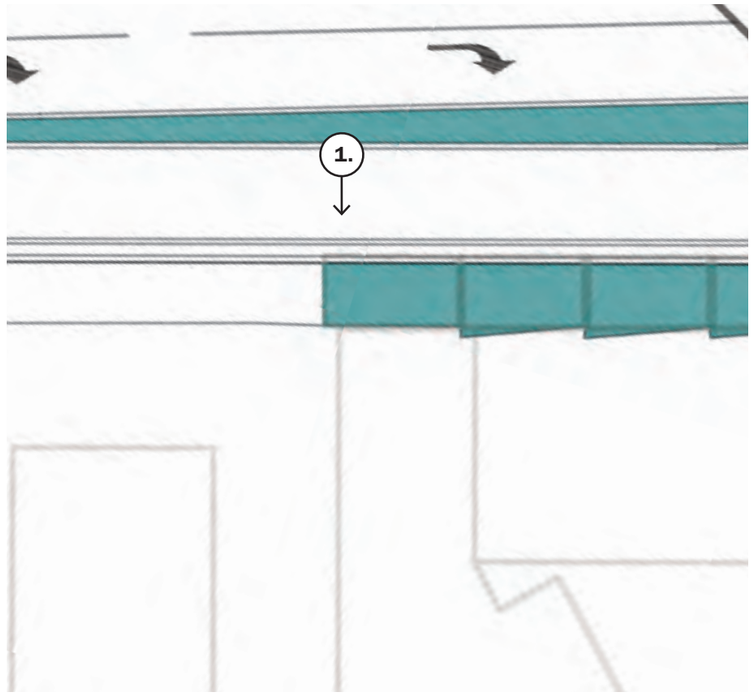


1. King William/ Whatley Cresent

EXISTING PAVING INTERFACES

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Proposed precinct paving
Proposed brick paving
Proposed concrete paving

Existing brick paving
Existing concrete paving

Precint paving to
terminate at end of shops



1. Whatley Cresent

Appendix H2

Landscape Design Approach Report prepared by Evolve Bayswater in conjunction with Hassell

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BAYSWATER STATION AND TURNBACK

LANDSCAPE DESIGN APPROACH

APPENDIX H



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Abbreviations and Acronyms

Term	Definition
BST	Bayswater Station and Turnback
BCA	Building Code of Australia
BIM	Building Information Modelling
CAG	Community Advisory Group
CoB	City of Bayswater
DA	Development Application
DDD	Developed Detailed Design 85%
DFES	Department of Fire and Emergency Services
DoPLH	Department of Planning, Lands and Heritage
DoT	Department of Transport
FAL	Forrestfield-Airport Link
FDD	Final Detailed Design 100%
FuBa	Future Bayswater
IDD	Initial Detailed Design 15%
IFC	Issued for Construction
IP&LS	Infrastructure Planning & Land Services
LDC	Lead Design Consultant
LGA	Local Government Authority
MEL	Morley-Ellenbrook Line
MPU	Major Projects Unit
MRWA	Main Roads Western Australia
N&I	Network and Infrastructure
NRG	Noongar Reference Group
ONRSR	Office of the National Rail Safety Regulator
PAA	Project Alliance Agreement
PDP	Project Definition Plan
PDR	Project Definition Report
PRG	Project Review Group
PRRD	Public Realm Detailed Design 50%
PTA	Public Transport Authority
RAMS	Reliability, Availability, Maintainability and Safety
SDRP	State Design Review Panel
SWTC	Scope of Works and Technical Criteria
TTO	Transperth Train Operations
WAPC	Western Australia Planning Committee

1.0 Document Purpose

Document Audience

This Appendix report is configured to provide the background to, and details of, the landscape design prepared within the Development application of the BST project for the PTA.

2.0 Project Description

2.1 Bayswater Station and Turnback Project

The Bayswater Station and Turnback Project as incorporated in the PAA for the Project includes:

- Stage One: The Turnback Works;
- Stage Two: The Bayswater Station Southern Section;
- Stage Three: The Bayswater Station Northern Section;

2.1.1 Stage One: Turnback Works

Stage One: Turnback Works comprises the following:

- New turnback siding between Bayswater and Meltham stations (configured to provide accommodation for 1 x 6 car sets);
- A shunters path (walkway) and a new driver's washroom;
- Relocation of the Leake Street underpass;
- Maintenance of the principal shared path along the southern side of the railway reserve;
- Other Project works including standard station systems, signaling, overhead line equipment, communications, utility relocations and noise mitigation;

2.1.2 Stage Two: The Bayswater Station Southern Section

Stage Two: The Bayswater Station Southern Section, comprises the following:

- Two new rail bridges over King William Street, immediately south of the existing railway;
- New station island platform (150m long and 10m wide) complete with associated infrastructure and supported by the railway bridges ;
- Provision for the principal shared path on the southern side of the southern railway bridge
- The first stage of western and eastern entry buildings complete with fare gates, commuter access to the platforms (lifts and stairs) and equipment rooms to service railway operations:
- Integrated pedestrian, cyclist, bus and vehicle access into the station and future Bayswater town centre;
- Relocation of the dual gauge tracks and all associated track infrastructure to align with the new platform faces;
- New bus bays and vehicle parking bays;
- Other Project works including standard station systems, signaling, overhead line equipment, communications, utility relocations and noise mitigation;
- Landscaping and urban design features within the station precinct; and

2.1.3 Stage Three: The Bayswater Station Northern Section

Stage Three: The Bayswater Station Northern Section comprises the following:

- Demolition of the existing Bayswater station and associated infrastructure.
- A second set of two new rail bridges over King William Street, located immediately north of the first new set of railway bridges delivered as part of Stage One;
- A second island platform (150m long and 10m wide) complete with station infrastructure again supported by the northern pair of railway bridges;
- The second stage of the western and eastern entry buildings complete with fare gates, commuter access to the platforms (lifts and stairs) and retail tenancies:
- Additional station infrastructure to meet the needs of the expanded (4 line, 4 platform face) station;
- Landscaping and urban design features within the station precinct;
- Other Project works including standard station systems, signaling, overhead line equipment, communications, utility relocations and noise mitigation;
- Completion of new bus bays and vehicle parking bays.
- Landscaping and urban design features within the station precinct;

3.0 Design Development

3.1 Basis of Design

3.1.1 Station Brief

3.1.1.1 Station Location

Bayswater Town Centre is located approximately 2km from the Swan River and 13km from the Perth CBD and is predominately surrounded by low density suburban residences. The topography of the site plays an important role in generating Bayswater's unique character within the local context, with the land north of the station being generally flat around Halliday Park, with Beechboro Road South rising as it heads north away from the station. To the south of the railway line, King William Street sits in a localised valley, with land rising between 6-10m up to local ridgelines on each side.

The station is a natural focal point for the Town Centre, yet its associated tracks currently create a physical and psychological barrier between the north and south of the station precinct for both pedestrian and vehicular traffic. The Urban Design and Landscaping proposal for the new Bayswater Station and Precinct will be fundamental to the success of the project. The station and precinct will seamlessly integrate into the existing surrounds, in a way that reconnects the currently divided north and south suburban areas together. This will be achieved through an approach to public realm that places the user journey experience as the primary focus. This journey will be enhanced through the concept of the 'Garden Station' within the Garden City, which has the following key themes:

- A balance of hard and soft landscaping that continues and reinforces Bayswater's 'Garden City' character, helping to tie together the adjacent areas north and south of the precinct;

- Applying a rhythm and scale to the landscape that matches is surrounds, creates a human scaled environment that people will be happy to spend time in; and
- Provides a high quality garden environment as a setting that supports station operations, facilitates intuitive user wayfinding and provides flexibility for activation and future proofing.

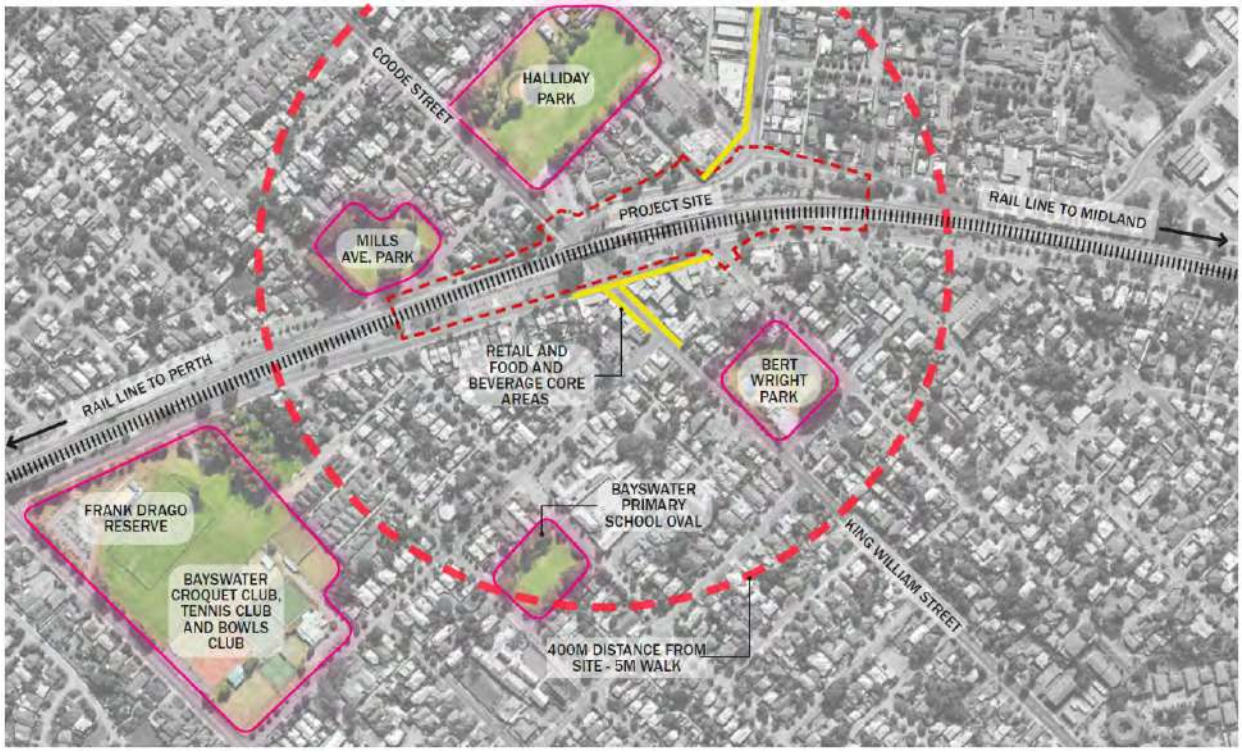


Figure 1: Location Diagram. Source: Evolve Bayswater, 2020.

The design of the Public Realm will additionally adhere to the design principles and requirements identified in the METRONET Station Precinct Design Guide, which establishes a list of specific Station Precinct Design Objectives *(Section 5.3, METRONET Station Precincts Design and Planning Guide, June 2018, pg. 8)*, as listed below.

1. *Station precincts are designed to optimise the place making and development strategies with impact of parking, services and reserves appropriately considered and integrated.*
2. *Station precincts are designed to enable the development of well designed, liveable places with appropriate built form character, development density, function and amenity.*
3. *Station precincts are designed to support environmentally sustainable urban development with efficient, transit supporting land use and better urban water management.*
4. *Direct, legible and comfortable access to and through stations is prioritised for pedestrians and cyclists, enhancing convenience, safety, health and wellbeing.*

5. *Station precincts are designed to seamlessly integrate with the surrounding urban fabric and landscape and enhance connections with the natural environment.*

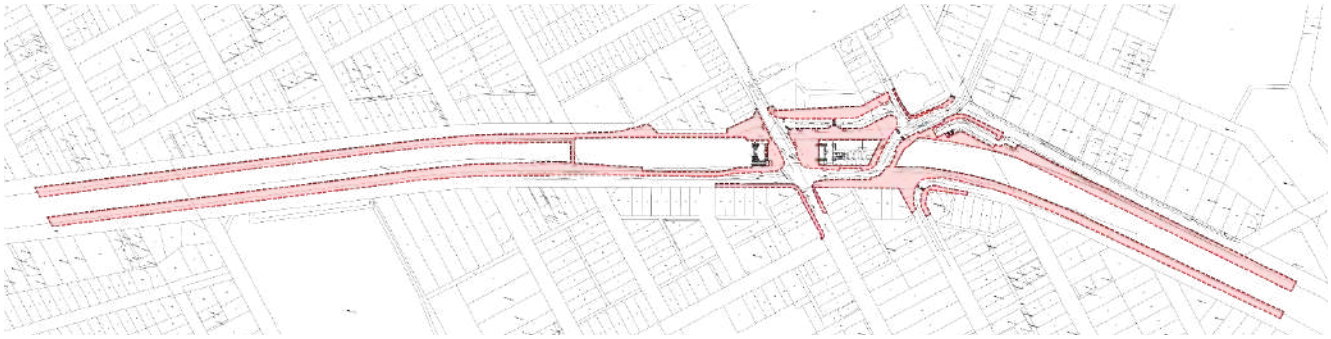


Figure 2: Limit of Works and Rail Corridor. Source: Evolve Bayswater, 2020.

3.1.1.2 General Project Brief

On the basis outlined above, there are a series of physical constraints that the Bayswater Station and Turnback project is aiming to mitigate, including:

- Relocating the platforms closest to Whatley Crescent onto the rail bridge. This means replanning all passenger parking along Whatley Crescent, and redistribution of parking to Meltham and Ashfield Station locations;
- Allowing space to connect the proposed Morley-Ellenbrook Line with a new double track and island platform;
- Longer platforms to accommodate future six-car trains;
- Building a new and higher rail bridge across King William Street, including providing an elevated principal-shared path (PShP) that provides connection into the existing principal-shared path network;
- Additional rail infrastructure between Bayswater and Meltham stations; and
- Connecting the existing pedestrian underpass at Leake Street into new works within the limit of works boundary.

3.1.1.3 Response to Site

Site/ Station Access

The Bayswater Station Precinct and Station site is currently a brown-field site, with existing road network and pedestrian infrastructure. The Station is located to the north of the Bayswater Town Centre linking it to residential, recreational and future development areas to the north of the Station Precinct.

During the Public Realm Detained Design stage, further consultation and coordination will be undertaken with the relevant Statutory Authorities, adjacent Land Owners and other key community stakeholders to ensure connections and site access provisions for future development opportunities can be accommodated with the proposed Station Precinct works.

Station Forecourts and Entrance Buildings

Station forecourts and entrance buildings are located under the proposed rail bridges and platforms with access from both sides of King William Street. The eastern forecourt extends and wraps around the northern side of the station, providing access to the new bus stand locations and drop-off areas.

This forecourt will predominantly provide access between the eastern station entrance and ground floor tenancy areas, with a direct connection across the shared busway and drop-off area to proposed future developments to the north of the site. The location of the main station entry is positioned to maximise this exposure and potential rail patronage.

Busway and Bus Stands

The busway is located on the northern side of the eastern entry building. It is accessible in a one-way direction from the east via Rose Avenue.

A dedicated bus lane and three (3) bus stands provide boarding and alighting points with direct pedestrian connection from the northern plaza and the eastern concourse entry building for bus-rail interchange patrons. Two (2) bus layover bays are provided at the eastern end of the busway.

A new bus stand is located on either side of King William Street, providing direct access to the eastern and western entry buildings via pedestrianised forecourt and plaza spaces. An additional bus stand is located on the New Link Road providing an interchange point for bus services operating along Beechboro Road and to the north east of Bayswater

Drop Off Parking Bays

Passenger drop off facilities are provided to the north and south sides of eastern station entry building, providing access to the station, busway and adjacent properties. The southern drop off will include accessible parking bays where required to ensure equitable access across the station forecourt, as well and to and from the Town Centre.

By positioning the drop off bays in these locations, it allows passengers to access the station from multiple directions.

Car Parking

Long Term car parking facilities are provided within the existing station carpark to the east of the station, on the opposite side of the New Link Road and is accessed from Railway Parade.

The car parking area will be accessible directly from the existing road network. This area of the site will be connected to the station via pedestrian footpaths and a pedestrian crossing on the New Link Road.

Due to the increased rail infrastructure footprint, the number of dedicated station parking bays within station will be reduced. Additional parking bays will be provided at both Meltham and Ashfield Stations under a separate project to make up any shortfall.

Emergency Vehicle Access

Emergency vehicle access will be provided to both station entry buildings for incidents as required, including the forecourt, busway and car parking areas where appropriate. Emergency vehicle parking will be provided within the eastern and western station forecourts, immediately adjacent to the station entrances, hydrants and FIP's.

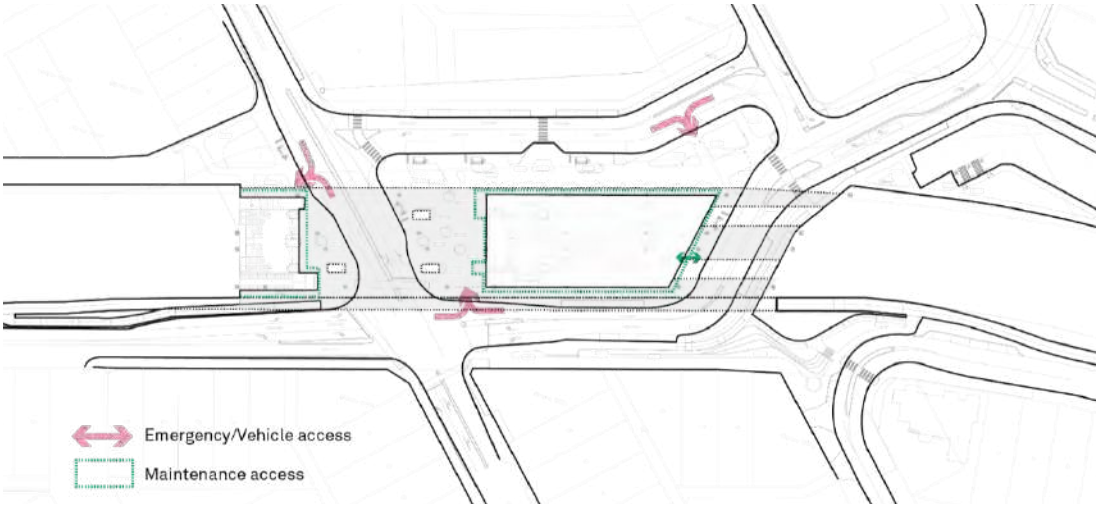


Figure 3: Service and Emergency Vehicle Access Locations. Source: Evolve Bayswater, 2020.

Pedestrian and Cycle Access

Pedestrian and cycle access will be provided from within the Station Limit of Works to connect to all future paths on adjacent roads of the Bayswater Station Precinct and Town Centre. A dedicated PShP is elevated and attached to the south side of Bridge No.1, maintaining a continuous route through the station precinct for users commuting through to the Perth CBD, and avoiding potential clashes between pedestrian and cycle movements at street level. The elevated PShP connects to the bike storage area located below in the Western Entry Building.



Figure 4: Pedestrian Circulation Routes. Source: Evolve Bayswater, 2020.

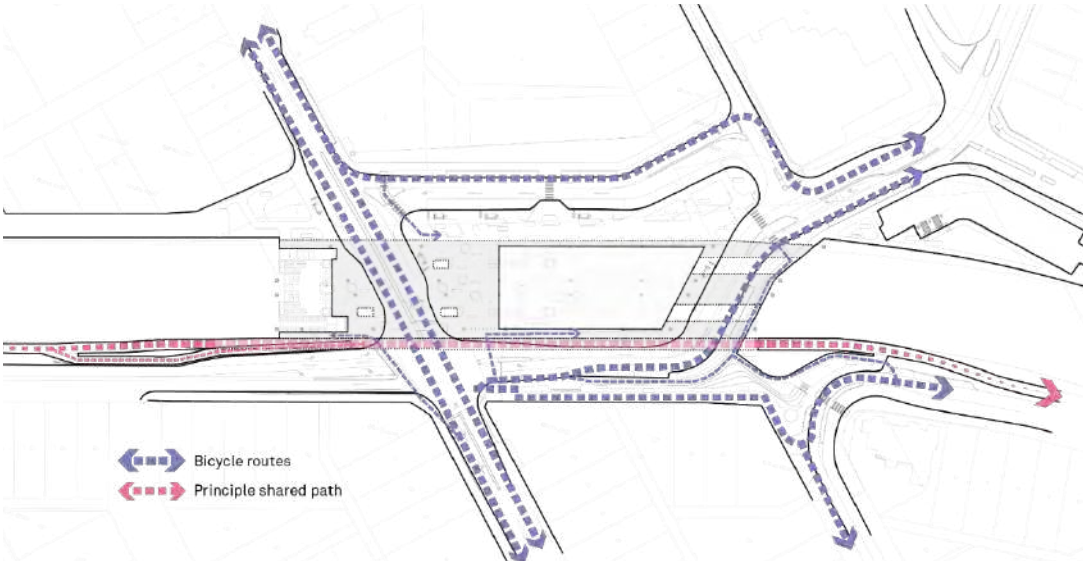


Figure 5: Cyclist Circulation Routes. Source: Evolve Bayswater, 2020.

Staff and Service Vehicles

Staff and Services vehicles, including tenancy operator parking is located within the long term parking facility, short term street parking and loading bays are located to the south side of the eastern entry building.

3.1.1.4 Cultural Context

Evolve Bayswater acknowledges the elders, past and present, of the Noongar peoples as the Traditional Owners of the land and its knowledge.

Evolve Bayswater have commenced engagement with the Metronet Noongar Reference Group and will continue to do so throughout the design process.

The Alliance have reviewed the Metronet Gnarla Biddi Strategy and also the project specific Cultural Context Report. The design team are committed to bringing the themes and cultural narrative into the overall Station design solution, including the Public Realm.

Further to this the Public Art strategy will be largely influenced by opportunity to further explore the Cultural Context document.

3.1.2 Design Solution

3.1.2.1 Design Concept

Design Aspiration

A highly functional, efficient and safe station that sits within a garden setting. A station and precinct that feels 'of' Bayswater and somewhere people feel comfortable. A Station and precinct that respond to the changing suburban context and can provide amenity year round and into the future.

Design Vision

The habitation of the area dates back to the use as a campsite by the Whadjuk Noongar peoples, who used this area as camp grounds thanks to its proximity to abundant natural resource. Since European settlement the area has been developed as nurseries and market gardens and more recently a close knit suburban 'Garden City'.

The design approach is to continue to support and enhance the green credentials of the Bayswater community. Providing public transport infrastructure that is of its place, green and inviting.



Figure 6: Design Vision. Source: Evolve Bayswater, 2019

Whilst the station infrastructure and precinct are significant it is envisaged these elements would act as a catalyst for positive development within the existing heart of Bayswater, contributing to the surrounding fabric functionally and aesthetically.

The station and precinct will become the Garden Station in the Garden City.

Design Principles

Our approach to the vision of the 'Garden Station' responds to the SWTC's requirement for the Station Precinct to connect with the surrounding urban context and streetscape character.

Garden – the 'garden' design principle addresses the activation of the Station Precinct through a mixture of hard and soft landscaping across a plaza that will be accessible to all ages and range of mobility – a station setting that is familiar, welcoming and comfortable.

Rhythm – Addresses the scale of the surrounding streetscape. The rhythm of the station and precinct synchronise with the surrounding suburban grain creating a seamless experience that feels local.

Infrastructure - the bridge plays a key role in the future of Bayswater. The Bridge will be a key piece of the Architectural identity within Bayswater and will allow the suburb to stitch together below it.

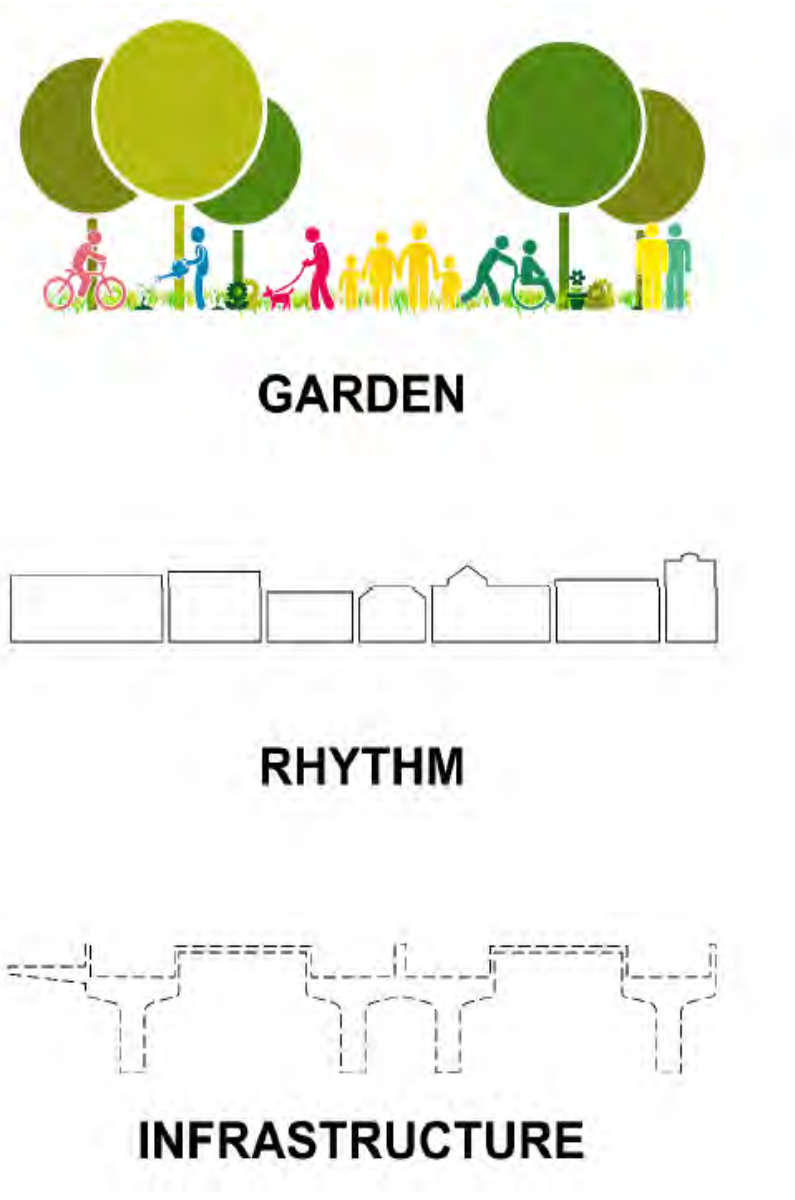


Figure 7: Design Principles. Source: Evolve Bayswater, 2019

METRONET Station Precincts Document (Specified Criteria)

The Bayswater Station and Turnback site has been classified as a type SP5 'Neighbourhood Station' development within the METRONET Station Precincts Design and Planning Guide. The design response to the specified criteria for this classification is outlined below.

Section 6.0 Station Precinct Typology (pg 14) (This responds to SWTC Clause 19.2.1.2)

The below principles are supported with the design diagrams and documents provided in Appendix J – Supporting documents

1. **Urban Structure**

   Station Precincts have a robust, flexible and permeable urban structure that can support the long term development of a place responsive built form.

   The proposed urban design and precinct arrangement enhances connections across the rail corridor and into the existing Town Centre. Access to surrounding lots is maintained and supported, while additional routes for intermodal travel have been implemented to allow intuitive navigation and minimise impact to the functionality of the adjacent network. Walking, cycling, train, bus and vehicle networks have all been accommodated and integrated into the existing grid to provide quality, modern transport experience.

2. **Built Form**

   The built form is designed to respond to the place context, and support the developing future character, function and liveability of the station precinct.

   The design of the station structure and rail infrastructure responds to the physical surrounds and the cultural context. Built form will embody the interpretation of Bayswater's changing suburban context. The station and precinct will be integrated and beautiful and will aesthetically complement the existing surrounds while anticipating the future development of the Bayswater town centre.

   The station architecture will respond to the suburban retail grain adjacent and will provide a variety of opportunities for new tenancies and operations, helping the station contribute as a part of the suburb.

   The adoption of the "Garden Station" concept creates a sense of place that feels intrinsically 'of Bayswater' while catering for and catalysing community development and growth. The precinct built form will be reflective of the surrounds in scale and aesthetic creating a human scaled environment.

3. **Movement Priority and Street Design**

   Local movement and access for pedestrians and cyclists is prioritised within station precincts, with a focus on the provision of high quality pedestrian and cycling environments.

   The expansion of the public realm and station prioritises pedestrians and cyclists via simple and intuitive network connections. Restrictive movements within the current condition created by the rail corridor will be replaced with expansive open, inviting areas, welcoming station forecourts and legible entries. Pedestrian movements are logically located along key routes and sightlines and will contributing to a permeable precinct.

   The design has specifically co-located the bus lane with the main entrance to the station, as well as connecting the existing principal-shared path with the station and bicycle parking facilities. The

refinement of the street alignment design supports slower vehicle movements, again enhancing the pedestrian experience.

4. Intersections and Crossings

Intersections and crossings are designed in consideration of movement priority to support the legibility and connectivity of the station precinct.

The Reference Design provides a station precinct where pedestrians can traverse safely and effortlessly across the ground plane, by way of safe intermodal hierarchies, intuitive wayfinding and logical circulation patterns at ground and platform level. Key connections are made via controlled signalled intersections and wherever possible priority is given to the pedestrian, cyclist and public transport modes.

5. Rail and Bus Infrastructure Integration

Rail and bus infrastructure is efficiently designed and integrated into the urban fabric to promote connectivity and support the long term development of the station precinct.

Buses will deliver passengers to the station front doors via the busway and layover bays to the north of site, encouraging pedestrian linkages to future developments, including the Department of Communities site to the north of the station precinct. The Bus bays are integrated within a public roadway creating a more seamless piece of community infrastructure.

6. Station Design

Stations are considered as integral elements of station precincts, and are designed to support and enhance local character and identity.

The proposed Station design breaks down the scale of the station interface at ground and platform level to reflect the urban grain of the surrounding residential and commercial developments on Whatley Crescent, Railway Parade and beyond.

7. Parking

Parking is considered holistically within station precincts to ensure the development of a walkable urban form.

Dedicated private vehicle pickup/ drop-off is configured to help activate all edges of the entry buildings and station plaza, which will be lined with amenities such as retail and bicycle storage where appropriate. City of Bayswater parking numbers have been replicated while station parking is developed in line with SWTC requirements. ACROD parking has been located to provide bays as close to entries as possible.

8. Public Realm

The public realm within station precincts is designed with a focus on walkability and sense of place, incorporating appropriately scaled and integrated water sensitive urban design elements.

The plaza will be a welcoming, lively and safe place that provides opportunities for hosting a variety of activation events such as market stalls, food trucks or temporary art installations. The public realm will also act as ‘spill-out’ and alfresco space for proposed retail tenancies within the station precinct and those adjacent to the south. These active areas will be balanced with areas for people to dwell, relax and come together amongst gardens showcasing local native wildflowers and plantings.

Interpretation of Traditional Owners Culture as well as contemporary context will be integrated within the public realm design through a meaningful engagement process.

3.1.2.2 WAPC Design Principles

The proposed design addresses the Western Australian Planning Commission's State Planning Policy 7.0 '*Design for the Built Environment*' through consideration and integration of the following ten Principles outlined within the document.

Principle 1: Context and Character

Good design responds to and enhances the distinctive characteristics of a local area, contributing to a sense of place.

By responding to the surrounding scale and grain of the existing Town Centre, and taking cues from local materials and aesthetics, the human scaled station and precinct will sit naturally within the Bayswater setting.

Opportunities for locally relevant art, interpretation, a welcoming and comfortable precinct and an effortlessly functioning station will all contribute to the Station and Precinct becoming a well-loved local meeting place.

Within the Station Precinct, the public spaces and proposed tenancies located beneath the rail bridge will be smaller in scale to reflect the finer built grain of Bayswater's vernacular, as developed over the last century. This will create a more human scale experience that echoes the existing built form, public spaces, retail and commercial and residential areas.

Principle 2: Landscape Quality

Good design recognises that together landscape and buildings operate as an integrated and sustainable system, within a broader ecological context.

The Station and Station Precinct will create a comfortable environment for the general public and passengers by offering opportunities for people to meet and socialise, providing external amenity through street furniture and soft planting that does not interrupt the flow of the ground plane and contributing and supporting the existing circulation network. Importantly, the Public Realm will facilitate social inclusion, equitable access and consideration of surrounding residents.

A significant amount of planting and shade trees are proposed with an emphasis on endemic species to create a local feeling garden setting.

Water sensitive urban design principles are being employed onsite with the intent to capture all hard paved areas runoff within garden beds and tree pits, as well as the use of local native species to reduce water needs. High quality materials are proposed throughout that contribute to the amenity and are robust to reduce maintenance and prevent replacement. Materials are locally sourced wherever possible.

Principle 3: Built Form and Scale

Good design ensures that the massing and height of development is appropriate to its setting and successfully negotiates between existing built form and the intended future character of the local area.

The massing, scale and height of the Station Buildings on the East and West of King William Street will respond to the built form of existing Town and proposed future development opportunities adjacent.

The overall aesthetic and material choice seeks to mitigate significant visual impact, instead promoting permeability and transparency, and creating a unique identity for the station.

The orientation, configuration, proportion and articulation of the Station Buildings and other built elements will be responsive to how people will use the space, also defining streetscapes and access ways that provide key connections to the north and south. This will recognise the potential future adaptability of the precinct as the needs of the local community change, considering arrangements that attract businesses and operators that bring new activities and experiences not currently offered in the town.

Principle 4: Functionality and Build Quality

Good design meets the needs of users efficiently and effectively, balancing functional requirements to perform well and deliver optimum benefit over the full life-cycle.

The design provides intuitive passenger journeys, whether arriving by foot, bicycle or public transport. The plazas will facilitate clear and direct travel. This will be accomplished by providing an intuitive hierarchy of travel paths free of obstacles with direct access to all main destination points. Crossings to roads are all located to connect to existing street networks in a way that is efficient and above all, safe.

Two station buildings are located and orientated such that the entrances are clear on approach to the station precinct, with supporting signage and wayfinding. Spaces have been designed to be adaptable to the future needs of the community without requiring any significant future works, ensuring the long term viability of the station and providing new activities and experiences.

Material selection is durable and timeless, with chosen architectural and landscape material palettes being robust and practical for maintenance minimisation, whilst also being sympathetic to the surrounding context. Build quality will focus on resilience, with consideration given to material life cycles and potential climate change impacts.

Principle 5: Sustainability

Good design optimises the sustainability of the built environment, delivering positive environmental, social and economic outcomes.

Through consideration of the sustainability framework outlined in the METRONET Sustainability Strategy (BST-MET-PM-RPT-00001, April 2019), the proposed design has been developed with the intention to comply with ISCA and Green Star target requirements as specified in the SWTC.

The Station and Precinct design has considered the use of passive design measures, such as natural ventilation, shading, weather protection and thermal performance. Where applicable, the Station Precinct and Buildings will incorporate sustainable construction materials that are sourced locally, recycling facilities, good waste management strategies and water sensitive design outcomes.

On top of this, energy use and operational costs across the station life-cycle has been considered as an integral design feature, specifically in the selection of materials and finishes that will meet the requirements of the PTA document *8803-000-002: Maintainability and Constructability.*

Principle 6: Amenity

Good design provides successful places that offer a variety of uses and activities while optimising internal and external amenity for occupants, visitors and neighbours, providing environments that are comfortable, productive and healthy.

The proposed design provides universally accessible external spaces, including platform safe zones, effectively shaded areas, adequate weather protection from unwanted wind and rain and a flexible public realm that can cater for events.

Internal spaces will be appropriately sized for their use, providing adequate circulation for the user in comfortable, well lit and well ventilated spaces. Additionally, there will be strategies in place to reduce acoustic impact and implement visual privacy where relevant.

The surrounding gardens provide an opportunity to contribute to the Main Roads WA Wildflower Way Initiative through native planting displays, structural walls function as a canvas for continuing the interpretive art proposed for the station and the abutment areas – creating a seamless connection between landscape and station – and provide a beautiful, engaging, landscape feature that helps foster a sense of place.

The precinct and station provide a variety of experiences, allowing patrons to shelter or engage with environment in different ways at different times of the year. This is achieved through careful design of the public realm while considering the microclimate conditions.

Principle 7: Legibility

Good design results in buildings and places that are legible, with clear connections and easily identifiable elements to help people find their way around.

The existing site presents some significant restraints regarding street networks and topography. The level change between Whatley Crescent requires retaining to provide viable quality pedestrian access areas to the existing retail at the higher level and facilitate pedestrian, cyclist and vehicle movements at the lower level.

The design proposal has provided a well-connected and intuitive precinct which ensures pedestrian and cyclist safety. To the north of the Precinct, the shared street intersection with Beechboro Road and King William Street will provide a logical pathway from bus drop off bays through the Plaza to the eastern entry building, by ensuring clear lines of sight across the intermodal transfer, as well as including clear and appropriately scaled signage and wayfinding at relevant locations across the site and beyond.

It is intended that specific spaces within the Precinct are clearly identifiable; larger scale landscaped elements direct passengers through the main circulation spaces, whilst planting beds define smaller scale spaces for dwelling or socialising. This ensures a clarity of movement and visual amenity across the site, whilst maintaining a fully activated building perimeter.

Principle 8: Safety

Good design optimises safety and security, minimising the risk of personal harm and supporting safe behaviour and use.

Within the Station Buildings and Public Realm, opportunities for passive surveillance will be maximised wherever possible through the provision of clearly defined paid and unpaid zones, with well-lit, secure access points and circulation routes. The location of the CSO Office between the thresholds of these zones also allows continuous staff surveillance, as well as optimising sight lines across the wider precinct.

Throughout the station site, the configuration of vehicular circulation and set down locations such as busways and private car drop off bays will mitigate any negative impacts on pedestrian amenity and key movement routes across the Station Plazas.

Material selection has also informed a design approach to key safety inclusions. For example, concrete planters around the edge of the site are installed to dissuade unwarranted vehicular impacts, and glazed lifts have been specified site-wide to maximise visual permeability across the entire length of the station precinct and platforms.

Principle 9: Community

Good design responds to local community needs as well as the wider social context, providing environments that support a diverse range of people and facilitate social interaction.

Public spaces will be serviced with water, power and vehicle access points to facilitate the ability to host a variety of event modes while maintaining standard station operations.

Active tenancies in the building contribute to the existing and developing streetscapes and ccommunity amenity will be provided through flexible event spaces, active recreation areas, and shady tree canopies to meet and dwell beneath.

Traffic calming strategies will assist in facilitating an even distribution of vehicles around the new road alignment and mitigate the perceived impact of increased volumes of traffic.

Principle 10: Aesthetics

Good design is the product of a skilled, judicious design process that results in attractive and inviting buildings and places that engage the senses.

The station will address a variety of scales to minimise visual impact and strive for seamless integration that will be considerate and sympathetic to the scale and character of the existing Town Centre. The conceptual approach of the ‘Garden Station’ is celebrated within the architecture and landscape with a focus on plating, tree canopies and connecting to the surrounding environment.

Articulation of building form and selection and detailing of materials and finishes, alongside the overall contemporary aesthetic of the bridge structure is designed to be as lightweight as possible, and the permeable balustrading that faces Whatley Crescent and Railway Parade elevations are designed for optimum transparency.

3.1.2.3 Landscape Design Standards

As a minimum, the landscape design must be undertaken in accordance with the following standards and guidelines:

- *Standards listed in SWTC Book 4 - section 9.2.1.8;*
- *AS/NZS 1477:2006 “PVC pipes and fittings for pressure applications”;*

- *PTA Doc No. 8803-000-009 "Guideline for Station Functional Planning and Urban Design";*
- *CPTED principles;*
- *PTA offset requirements for vegetation from overhead lines;*
- *MRWA's "Guideline for Vegetation Placement within the Road Reserve";*
- *MRWA's "Guideline for Vegetation Placement Adjacent to PSPs"*
- *Creating Places for People –An Urban Design Protocol for Australian Cities; and,*
- *PTA Doc No. 8803-000-008 "Specification for Station Functional Planning and Urban Design.*
- *the Government of Western Australia's "Better Places and Spaces – A policy for the built environment in WA";*
- *Australian Government's "Creating Places for People – An Urban Design Protocol for Australian Cities"; and*
- *WAPC "State Planning Policy No.7 – Design of the Built Environment*
- *BSTPR-PTAWA-CI-GDL-00001 Bus stop design guidelines*

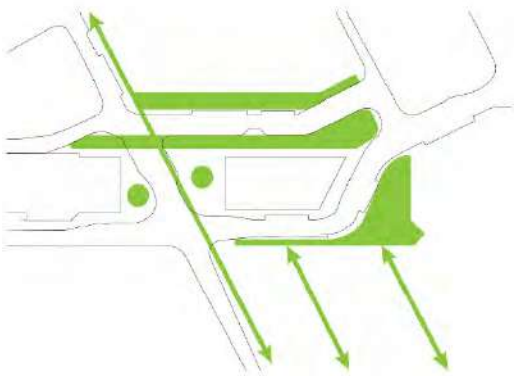
3.1.2.4 Landscape Design Response and Approach

Design Response

The Bayswater Station offers a number of opportunities to contribute to the enhancement of the existing Town Centre. The Landscape and Urban design response will achieve these enhancements by applying the above principles in combination with the 3 design themes below:

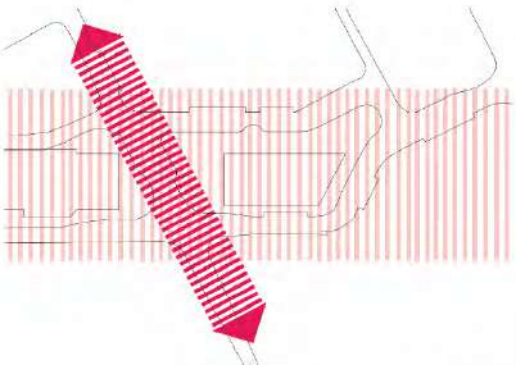
Garden

- Station plaza and surrounds to continue and enhance the suburbs green leafy 'garden city'
- Maximise the planting while ensuring this doesn't impede on circulation, ease of use, safety or infrastructure
- Gardens as amenity, creating shaded, human scale environments and places people are happy to spend time in
- Softening of infrastructure interface with surrounds through layered planting
- Expression of surrounding suburbs gardens in scale and texture
- Predominantly use low maintenance, endemic ground covers and low shrubs particular to the region
- Explore opportunities for community experiences such as community herb gardens and fruit trees



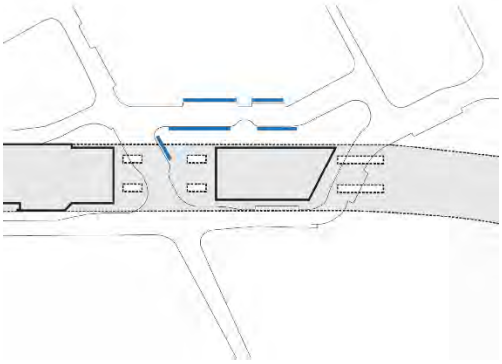
Rhythm

- The station and public spaces pick up on the scale, texture and structure of the surrounding suburb – synchronising to the area's rhythm
- Contributing and continuing to the streetscape
- Reinforcing and enhancing the main routes of travel
- Provide a seamlessly integrated, easy to navigate community space that stitches the fabric of the suburbs back together
- Ensure the plaza and station is a high quality space that functions with the ebbs and flows of commuter rhythms as well as quieter times – providing amenity for the variety of experiences
- Reflect the surrounding suburban scale and grain, ensuring the station and plaza feel intrinsically 'of the place'



Infrastructure

- Provide a completely integrated Urban design and landscape response with the goal of a highly functioning station as the ultimate goal
- Contribute to the user experience while ensure ease of access and legibility
- Ensure landscape responds to infrastructure operations requirements and prioritise maintenance and operations



Landscape Approach

The landscape approach will provide for planting to all areas of the rail reserve including, batters, earthworks, drainage basins and swales (using suitable riparian species), and redundant areas within the rail reserve, within the limit of works.

The Landscape and Urban Design will ensure all disturbed areas within the rail reserve are designed in accordance with Book 3 – Part A - section 7.3 - Environmental Requirements and will provide stability to the ground surface on rail corridor batters without intruding into the area, defined by the 4m clearance from closest running rail on either side of the running railway tracks. The landscape design will be produced top work collaboratively with the civil/ drainage designs for the rail reserve and the PSP and pedestrian paths.

The Urban Design and Landscape approach will ensure that all planting will to adhere to the PTA offsets for vegetation, which include plants to be planted a minimum distance of 4m from any overhead lines, plants planted between 4m and 7m from any overhead lines must consist of ground covers and small shrubs less than 1m in height. Trees must also be planted a minimum of their mature height plus 1m from any overhead lines. There will be no planting within 1m from any reserve fencing. In respect to the PShP, all trees are to be a minimum of 3m from the edge of the path. The area between the path and 3m delineation will be vegetated with ground cover or small shrubs (less than 1m in height). Maintenance access to the rail reserve will be provided.

The design approach will consider the fire implications and provide a 3m wide firebreak within the rail reserve against the reserve fencing as per PTA specifications.

The design approach will provide safe maintenance access and minimise ongoing operating and maintenance costs for PTA, the planting will be arranged well clear of all lights, signals, signs, CCTV or other reserve infrastructure so it will not become a future maintenance problem.

Safety of the patrons and surrounding community are important to the design approach. Low-growing native planting combined with tree planting will ensure optimal CPTED principles are integrated into the project and ensure passive surveillance is maintained.

Accessible hard landscaped areas will comply with AS 1428 and the DSAPT.

Plant species will be selected from probable remnant vegetation types and plants from the Swan Coastal Plain with proven success in revegetation works, to the approval of PTA

Irrigation Design

Irrigation systems for the landscaped plaza, forecourt and carpark areas will be designed by a specialist irrigation designer and/or subcontractor. Initial design for the irrigation system is to be included in the 50% issue for Landscape and Urban design

3.1.2.5 Design Aspiration for Key Areas

The areas below have undergone design development following the BID submission.

Throughout all areas planting, materiality, activation opportunities and design integration have been considered, further detail can be found in Appendix J of this report

The following specific design aspirations and developments have been considered within the areas below:

Whatley Crescent and pedestrian link

- Provide clear and intuitive movements for universal access including pedestrians and cyclists
- Provide display garden beds, shady tree canopies with places to rest and meet
- Maximise connection and connection between street and existing shops
- Explore opportunities for alfresco and recreation spaces at upper level near shops and through the green link
- Explore opportunities for art integration with retaining walls, projection and gardens

Station Gardens

- Provide flexibility to support various scale events whilst maintaining a functional and comfortable space.
- Use large shade trees that create a dense canopy to sit beneath in a garden setting.
- Provide custom seating to provide multiple informal gathering spots.

Bus Stands

- Provide a generous pedestrian experience that facilitates efficient and easy boarding and alighting of buses.
- Custom bus shelters that provide a comfortable and safe waiting environment.
- Well-lit and clear sight-lines to ensure safety whilst also maximising tree canopy and garden beds.
- Provide space to cater for activation strategies.

Plaza

- Flexible open space, catering for moments of pause and pedestrian access
- Explore opportunities for integrated artwork and lighting display
- Informal seating throughout to provide rest and waiting points whilst maintaining pedestrian movement as a priority.
- Maximise greening to soften space in viable planting locations – careful consideration required to ensure viability of planting in low light conditions with no access to rain

Pocket park

- Opportunity for lots of trees and display planting garden beds
- Provide a place to rest, wait and meet under shady trees or a canopy
- Explore opportunities for active recreation opportunities
- Ensure activities in this area are considered against adjacent high volume traffic street

Leake street underpass

- Increase visual connection to the street
- Provide multiple entries and widen angle of vision coming around corners of tunnel
- Rationalise alignment to connect bike boulevard while working with street levels

3.1.2.6 Planting Principles

Plants will be chosen which contribute to a sense of place for the station precinct. Species planted will be able to thrive in the location with minimum maintenance and water requirements. The planting will strengthen the character of the place. Trees will contribute to cooling in summer and encourage solar gain in winter. Groundcovers will add colour, form and texture and break up expanses of paving.

- **Station forecourt** – Feature trees with broad canopies will provide shade in the summer months, and light throughout the winter.

  Arrival spaces and main activity nodes will incorporate the State's Wildflower Initiative by using a selection of unique flora including a multitude of textures and forms whilst also ensuring year round flowering displays.

- **Streetscapes and car parks** – Flora will be predominantly native and offer seasonal variation to assist in reinforcing the 'Sense of Place'. Selections will provide interest and be suitable to the Swan Coastal Plain. All plants will be clear of lights and CCTV and will not obscure pedestrian sight lines.

- **Corridor and natural systems** – Plants chosen will be very low maintenance, have spreading form and the ability to grow well on slopes.

Trees

Trees are selected for attributes which provide maximum shade, good structure and slow growing. They should be safe and not incur maintenance costs. Suggested species shall be predominantly endemic to the area to ensure low water requirements and minimum pesticide use. A mix of Mature, 500l, 200l, 100 and 45L species will be used.

No trees are proposed within the Rail Corridor.



Agonis Flexuosa located in surrounding Streetscapes and Car Parks.

Source: Evolve Bayswater, 2019



Melaleuca Rhaphiophylla located in the Station Forecourt.

Source: Evolve Bayswater, 2019

Mid-Storey and Ground Cover

Selection of groundcovers and shrubs will be decorative, endemic where possible, characteristic of the area and suitable to the Swan Coastal Plain.

All plantings within the Rail Corridor are lower than 500mm in height to ensure passive surveillance.

Re-planted grass tree transplant will be utilised in the precinct.



Examples of Mid-Storey and Ground Cover Across Station Forcourts, Streetscapes and Car Parks and Rail Corridor. Source: Evolve Bayswater, 2019

Additional information regarding Trees and planting can be found within appendix J in the Landscape Concept Document

3.1.2.7 Materials and Furniture

- **Station forecourt** - A consistent material palette will bind the forecourts with the station architecture. A robust selection of natural and raw materials will create an appealing, yet hard wearing precinct. Integrated art elements could reference traditional stories of place and encourage curiosity

- **Streetscapes and car parks** – Wide and consistent footpath treatments will assist wayfinding, accessibility and improve visual quality

- **Corridor and natural systems** – Stabilisation will be required where slopes are greater than 1 in 3. Mulching will be required to all planted and stabilised slopes.

In addition to the information below further information regarding materiality and interpretation can be found within appendix J

Pavement/ Surface Treatment

Wide and consistent footpath treatments will assist wayfinding, accessibility and improve visual quality.

These materials will be robust and cost effective while contributing to a high quality pedestrian experience. Surfaces will be non-slip, durable, trafficable and easy to maintain.

Within the station forecourt, large format (Nominally 600mm x 400mm) paving will create a cohesive ground plane.



Corridor and Natural Systems Plat Batter Slopes and Geoweb Stablilisation Mat.

Source: Evolve Bayswater, 2019



Streetscapes and Car Parks Brick paving.

Source: Evolve Bayswater, 2019



Station Forecourt Large Format Concrete Paver.

Source: Evolve Bayswater, 2019

Seating

The selection of durable and practical furniture will seamless blend within a cohesive precinct palette, offering moments to wait, pause or reflect.

Seating will be integrated into feature planters and low retaining walls where ever possible in the station plaza. A selection of standalone bench seats with anti-skate deterrents will be provided in the bus stands and within the adjacent streetscapes.

No seating elements will be provided in the Rail Corridor.

Furniture

A cohesive suite of robust, stainless steel furniture items will create to a high quality public realm. Bollards will be positioned and specified to mitigate hostile vehicle activity. All elements to PTA Specifications.



Streetscapes and Car Parks Stainless Steel Bollards.

Source: Evolve Bayswater, 2019



Corridor and Natural Systems Palisade Fencing

Source: Evolve Bayswater, 2019



Station Forecourt Drink Fountain and Stainless Steel Bin.

Source: Evolve Bayswater, 2019

3.1.2.8 Cultural Interpretation Opportunities

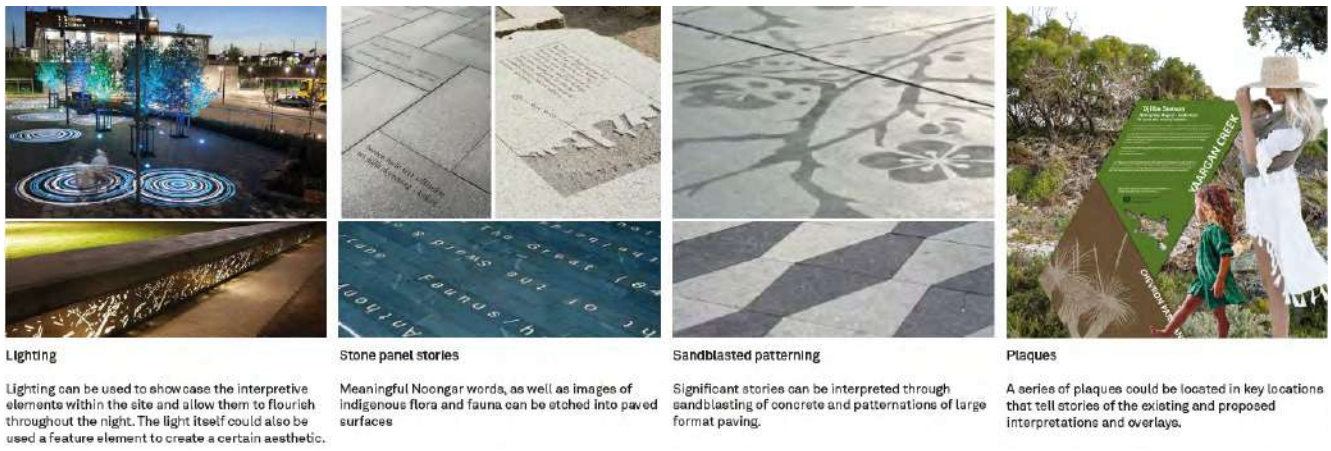
Through a series of workshops with indigenous artists and elders, the design team will amplify the potential for art and indigenous interpretation throughout the site.

An example of this process was the involvement of the Whadjuk elders, representatives and artists in the design of the Stadium Park. Artworks within the Chevron Parkland were procured through public art consultancy by FORM. HASSELL worked closely with FORM, the Whadjuk Working Party and all the artists to ensure that the artworks were fully integrated into their landscape setting and playscape identity and narrative.

In addition to commissioned works, the site's rich cultural narrative can be incorporated through a variety of methods and applications. The landscape precinct is capable of presenting cultural narratives in compelling and meaningful ways. This layer of interpretation aims to celebrate the Noongar culture and its tangible and intangible links to community and land.



Figure 8: Stadium Park by HASSELL. Source: Evolve Bayswater, 2019



Examples of Cultural Interpretation Opportunities. Source: Evolve Bayswater, 2019

3.2 Other Design Considerations

3.2.1 Customer Experience and Design

At the forefront of Evolve Bayswater's approach to the design of the station and station precinct is an architectural, urban and landscape design that responds directly to the needs of the customer.

A true customer focus, which has been adopted by the Evolve Bayswater design team embraces the:

- Needs of people who live and work near, and pass through, the station precincts.
- The local community that each station sits within.
- The owners, managers and operators of nearby places and businesses.
- The people who use the transport networks that the stations and station precincts serve.

3.2.1.1 The Customer

Bayswater Station and Station Precinct will accommodate the different user requirements including:

- **Commuters** – typically defined as passengers commuting to and from work activities.
- **Mobility Impaired** – including those with prams/strollers, wheelchair users, passengers carrying luggage, pregnant women, people with children and elderly people.
- **Educational users** – including school students and young accompanied minors as well as teenagers who sometimes travel in groups.
- **Intellectually/Visually Impaired** – DDA consideration needs to be made to ensure they are safe at all times, including consideration for wayfinding and signage.
- **Local Residents** – including local retailers, adjacent landowners and residents living nearby, as well as car users that drop off and pick-up passengers at drop off parking areas.
- **PTA/Transperth Staff** – There will be a range of Transperth staff for who the Bayswater Station product will need to cater for, including customer services assistants, train drivers, and transit police on trains and at stations.
- **Occasional/Infrequent Users** – regular services will continue to run on the Midland Line, and ultimately connect to the FAL and MEL Lines as through services to the Perth CBD.
- **Other Third Party Employees** – There are a number of third party employees that will strongly interact with the Bayswater Station product. These employees include: bus drivers, taxi drivers, advertisers and their employees.

Customer Service Drivers

Customer service drivers for Bayswater Station which may also be expressed as wants and needs, have framed Evolve Bayswater's approach to the station, precinct and corridor design to ensure cognitive, physical and sensory experience of the project is as satisfying and pleasurable for all. All customers need as a minimum:

- Legible station and interchange identity and address.
- High performance through timeliness, convenience and efficiency in plaza, concourse, ticketing, vertical transport and platform areas.
- Safety and security at all times.
- Excellent information and communication
- Clear wayfinding
- High amenity and comfort
- Barrier-free access
- Immediate, people focussed and insightful customer service.

Evolve Bayswater is committed to providing high levels of customer service for Bayswater Station. This is reflected in our key focus on the customer as the reason why, working in partnership with the PTA, we will deliver a safe, affordable, frequent, punctual, sustainable and integrated transport system.

Some key features include:

- A fully-integrated transport solution via a “door to door” journey with convenient and seamless connections between transport modes through an entire journey planning approach and maximising interchange opportunities.
- A high quality station, station precinct and trains that are safe, efficient, easy to use, aesthetic, comfortable and highly accessible by incorporating customer views and satisfaction drivers into every facet of design and delivery.
- Amenities, interchanges, retailing and services close to stations, located to optimise proximity for safe priority of access, in accord with adjacent land uses and which are environmentally friendly.

Customer Services Outcomes

The key to providing exceptional customer experience and services, includes developing an understanding of the following key factors:

- **Time**
- **Comfort**
- **Reassurance**
- **Systems and efficiency.**

Of these, **Time** is by far the largest area of focus. Therefore, any design features that minimise journey time and maximise overall network efficiency will enhance customer satisfaction.

Comfort – relates not just to the station and precinct, but also to the rolling stock. It is about comfortable journeys, comfortable waiting times and stations that provide for efficient circulation and intrinsically prevent over-crowding.

Reassurance – touches on the customers’ desire to feel safe at all stages of their journey and the design of intermodal interchanges, stations and precincts has a direct impact on the level of safety provided and perceived.

Systems and efficiency – from a customer perspective, largely refers to integrated transport outcomes and how easily a system user can complete their journey and swap between modes of transport.

The design of Bayswater Station and station precinct will address all of these customer needs.

An Integrated, Efficient, Safe and Enjoyable Journey

Evolve Bayswater will prioritise pedestrians and cyclists above vehicles. Wherever possible bus set down and pick up locations are proposed to be immediately adjacent to the station entrance buildings to optimise customer comfort, ease of access and safety.

The Door To Door Journey

The integration of the Project's travel experience into the wider network is important for the future success of Bayswater Station as a primary interchange station between the Midland, FAL and MEL Lines. The customer journey begins at home and in the local neighbourhood and progresses through a sequence of experiences: buying, seeking and receiving information, departing, travelling and arriving.

Evolve Bayswater will partner with the PTA to help create a seamless customer journey experience, an effortless progression of activities and a familiar and delightful part of everyday life.

Station and Existing Town Centre Precinct

The travel experience will be a welcoming sense of arrival at the Bayswater Town Centre; daylight penetration through platform voids and between the new bridge structures will be maximised to provide relief and connect with the local conditions at street level below. Arrival at platform level will provide an elevated outlook over the existing Town Centre in all directions; the Town Centre will be on display.

Signature Places and Buildings

A signature building and urban design spaces will be the legacy of Bayswater Station. The station and station precinct will encapsulate the Spirit of Place. The station locale will have a distinctive character, purpose and pattern of land use and occupation. Evolve Bayswater's design response will address these unique place-defining characteristics and activate the public life of the local community.

3.2.2 Sustainability and Passive Design

3.2.2.1 Sustainability in Design

Design features and decisions associated with sustainability have been considered and implemented through the initial design development process and will be progressed throughout the development lifecycle of the project. Where applicable and appropriate these design features and decisions have been referenced in the design report and will also be captured in a Sustainability Design Decision Register.

The Design Decision Register will be included in the EBA Sustainability Management Plan (SuMP) and will also include opportunities identified through the option development and value management processes for the project. A summary of some of the key sustainability in design measures currently been considered and / or progressed is provided in the SuMP.

Where the design features or decisions are associated with the performance outcomes of the Sustainability Management Plan and its sub-components, including the Green Star Volume Certification, these have been identified in the SuMP.

3.2.2.2 Overarching Initiatives

Key sustainability initiatives being explored within the Landscape and Urban design are:

- WSUD principles:
    - Currently reviewing design to include infiltration garden beds within precinct garden beds;
    - Side capture tree pits where possible,
    - Low water use planting (endemic and native species) and,
    - All irrigation to be sourced from bore
- Material selection:
    - Wherever possible locally sourced materials are prioritised
    - Robust enduring material palette that minimises maintenance and replacement requirements
    - Value for money is considered in the proposal of materials taking into consideration life cycles and replacement cost as well as availability and labour required to maintain and replace

Material Selection

Materials are proposed to be consistent with the intent of the SWTC and fulfil the requirements of the PTA document *8803-000-002 – Maintainability and Constructability*. The design of the station facilities

and the proposed material selections reflect the requirements for higher levels of durability of infrastructure and reduced overall lifecycle costs and consider the following:

- Low embodied energy materials.
- Recycled materials.
- Low carbon material selection/life cycle assessment.
- Local material selection.
- Durability.
- Robustness.

Refer to Appendix B of this report for the preliminary Landscape Materials and Finishes Schedule

GreenStar Rating and Designing for Rail Stations

The proposed Reference Design for the Station will achieve a 4-Star GreenStar rating. In consultation with the project's specialist Sustainability Consultant and the architectural design principals, documentation and materials and finishes selections will be developed in more detail during the PAA phase of the project. Refer to Section 5.8.4 – Sustainability, in this report.

3.2.3 Crime Prevention (CPTED)

3.2.3.1 General

Crime Prevention Through Environmental Design (CPTED) is a multi-disciplinary approach to deterring criminal behaviour through environmental design. CPTED strategies rely upon the ability to influence offender decisions that precede criminal acts and most implementations of CPTED occur solely within the built environment. CPTED principles of design affect elements of the built environment ranging from the small-scale (such as the strategic use of shrubbery and other vegetation) to the overarching, including building form of an entire urban neighbourhood and the amount of opportunity for "eyes on the street".

The Station and Public Realm Reference Designs have been assessed against the core principles of CPTED to ensure that the designs suitably incorporate the principles.

3.2.3.2 Core Principles

CPTED comprises three key principles with respect to design – **Natural Access Control, Natural Surveillance and Territorial Reinforcement**. The fourth CPTED principle of **Space Management** is applicable once the station and public realm areas are operational.

- **Natural Access Control:** Natural access control involves decreasing opportunities for crime by controlling access to a potential target, and by creating a perception of risk to an offender. Physical and symbolic barriers can be used to attract, channel or restrict the movement of people.
- **Natural Surveillance:** Natural surveillance is about creating environments that keep intruders or offenders under observation. It also aims to provide opportunities for people engaged in their normal daily business to observe the space around them. Natural surveillance is facilitated by creating clear sightlines. It works by designing the placement of physical features, activities and people in such a way so that maximum visibility and positive interaction occurs among legitimate users of the space.
- **Territorial Reinforcement:** Territorial reinforcement is about clearly defining private space from semi-public and public space to create a sense of ownership. The created ownership shows that the owner has a vested interest in the location, which increases the actual and perceived risk of detection of offenders.
- **Space Management:** Popular public space is often attractive, well maintained and well used space. Linked to the principle of territorial reinforcement, space management ensures that a space is appropriately utilised and well cared for.

3.2.3.3 CPTED Design Interfaces

CPTED will be implemented through the following coordination items in station and public realm design:

- **Lighting:** Designed to the appropriate AS/NZS 1158 lighting category for pedestrian pathways, considering the risk of crime and both vertical and horizontal lux.
- **Signage:** Appropriate wayfinding and identification signage to assist in enforcing valid paths of travel and territorial reinforcement. Signage for both direction and emergency assistance.
- **Sightlines:** Station entrances should provide patrons with a wide and unobstructed view as they enter the concourse and platform.
    - Entrances should have a clear view from surrounding facilities such as car parks and drop off areas.

  - Any structures around the concourse and public realm should be permeable to allow line of sight into the development from the public domain.
  - Blind bends and corners to be avoided, together with obstructions.
  - Landscaping should avoid vegetation and streetscape elements that obstruct sight lines – for example, dense low hanging tree branches.
- **Areas of isolation**
  - Consideration of maximum distances between:
  - People and help /duress call points.
  - People and exit/ escape routes.
  - Pedestrian routes should make it easy to predict when people will soon be nearby.
- **Areas of entrapment and seclusion**
  - Remove any possibility of a person being locked in any area.
  - Minimise small areas that are confined by most sides by building elements such as pillars, walls or other non-opaque.
- **Movement prediction**
  - It should be easy for PTA staff and the public to identify that someone is walking a usual route.
  - Pedestrians should be able to clearly see the next waypoint of final destination as they travel.
- **Materials, textures, colours and features**
  - Should deter and prevent graffiti and vandalism and provide a level of tamper evidence and resistance against forced attack.
  - Should provide a sense of safety.

Appendix I

Operational Noise Assessment prepared by Lloyd George Acoustics

evolve bayswater
connecting people + places

PTA

BAYSWATER STATION AND TURNBACK

RFP: PTA190037

DESIGN REPORT

DESIGN PACKAGE NO. 040
OPERATIONAL NOISE ASSESSMENT

BST-EVO-NV-RPT-00042

AUTHORISED TO USE: _____(ALLIANCE MANAGER), DATE: _____

Submit to Client for Review and Approval where required in the Contract (Client to complete one box only):					
❑	Rejected, resubmit	Name:	Sign:		Date:
❑	Endorsed, with comments to add or change	Name:	Sign:		Date:
❑	Endorsed	Name:	Sign:		Date:
A	29/09/2020	Issued for Comment	TG	OM	
Rev	Date	Reason for Issue	Prepared	Checked	Approval

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1 INTRODUCTION

Bayswater Station will be the point at which the Forrestfield-Airport Link will connect to Bayswater, as well as the future Morley-Ellenbrook line. The main project requirements for Bayswater Station and Turnback (BST) are to design and deliver a new fully operational and integrated station at Bayswater and make amendments to the existing rail infrastructure as necessary. The project extents are shown in *Figure 1-1* and *Figure 1-2*.

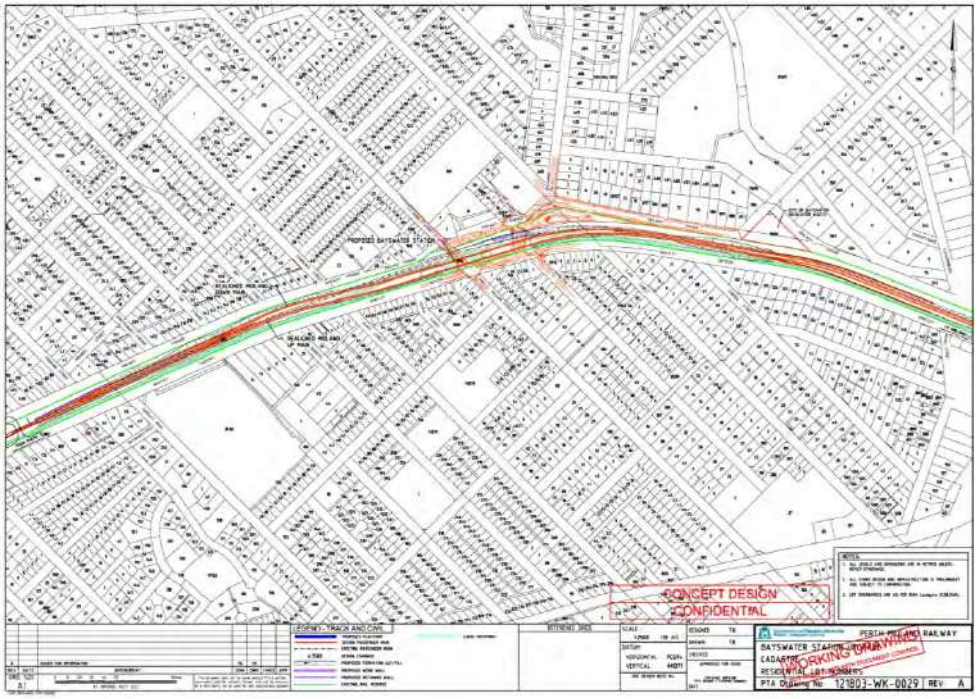


Figure 1-1 Project Extents with Proposed Rail



Figure 1-2 Project Extents on Existing Aerial

This report presents the results of the noise modelling of train movements from the future Perth to Midland railway track, with consideration also given to train movements west of Bayswater train station for the Morley to Ellenbrook line.

This report follows on and references the baseline noise measurements undertaken and reported in BST-EVO-NV-RPT-00045.A.IFR.

2 CRITERIA

The criteria for the project are provided in Table 61 of Book 4 (Technical Criteria) of the *Scope of Work and Technical Criteria* (SWTC), which are summarised in *Table 2-1*.

Table 2-1 Rail Operations Noise Criteria

Parameter	Criterion	Value	Basis
Rail Operations – Noise Generally	Noise levels from rail operations will be managed as low as is reasonably practicable.	Demonstrated	SPP 5.4
Rail Operations – Airborne Noise Target Level	Noise mitigation must be considered where the noise level is at or above the prescribed rail operations – Airborne Noise Target Level at an external distance of 1 metre from a suitably representative building facade with a noise sensitive use located on noise sensitive premises and 1.5m above ground, with L_{Amax} applicable to the 95th percentile train passby event.	60 dB $L_{Aeq(Day)}$ 55 dB $L_{Aeq(Night)}$ 75 dB L_{Amax}	SPP 5.4 (L_{Amax} – industry best practice)
Rail Operations – Airborne Noise Design Level	Noise mitigation must be provided where the combined noise level resulting from the proposal and existing rail operations is both - above the rail operations – Airborne Noise Target Level, and - above the $L_{Aeq(Day)}$ or $L_{Aeq(Night)}$ noise level that would result from operation of existing Rail Infrastructure prior to the proposal. At an external distance of 1 metre from a suitably representative building facade with a noise sensitive use located on noise sensitive premises and 1.5m above ground, with L_{Amax} applicable to the 95th percentile train passby event.	Demonstrated	Bayswater Station Upgrade, Reference Design, Noise and Vibration Assessment, SLR, 2019

By way of further explanation of the criteria, this implies:

- Where the existing noise levels are below the criteria of 60 dB $L_{Aeq(Day)}$ / 55 dB $L_{Aeq(Night)}$ / 75 dB L_{Amax}, the future design is not to exceed these criteria;
- Where the existing noise levels are above the criteria of 60 dB $L_{Aeq(Day)}$ / 55 dB $L_{Aeq(Night)}$ / 75 dB L_{Amax}, the future design is to not exceed these existing levels.

3 METHODOLOGY

Noise measurements and modelling have been undertaken in accordance with the requirements of the SWTC and State Planning Policy No. 5.4. With regard to the baseline noise measurements, these are reported in BST-EVO-NV-RPT-00045.A.IFR. The methodology provided below relates to the noise modelling aspects.

The computer programme *SoundPLAN 8.1* was utilised incorporating the *Nord 2000 Rail* algorithms, modified to reflect site conditions. Input parameters are discussed in *Section 3.1* to *Section 3.4*. Some input parameters were a continuation of that used by SLR, since the basis of the model was the SLR model (e.g. meteorological conditions).

Predictions are made at heights of 1.5 m above ground floor level. For assessment, the noise is predicted at 1.0 metre from an assumed building facade resulting in an increase in noise level due to facade reflection.

3.1 Ground Topography & Rail Design

Existing topography was provided within the SLR noise model, provided by PTA, originating from Landgate. This was updated with survey data (predominantly within the rail reserve). Also provided were floor levels of some first row houses, in order to check the accuracy of that assumed in the SLR model. Generally, that assumed in the SLR model was lower than that from the survey and therefore floor levels of houses were adjusted accordingly. Also updated were some house outlines, being where new houses had been constructed in place of those within the Landgate information. In some cases, it is evident that land has been subdivided but dwellings are yet to be constructed (e.g. 137-147 Whatley Crescent) such that nominal buildings have been shown.

An image of the 3D noise model is presented below in *Figure 3-1*.

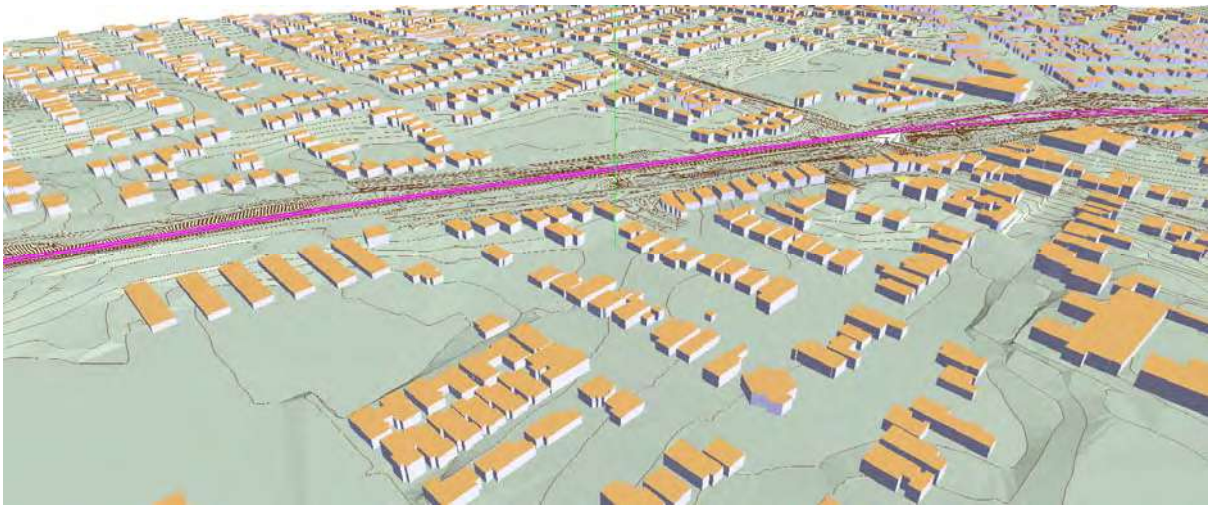


Figure 3-1 Image of Noise Model – Existing Scenario

The future (ultimate) rail design (west of Bayswater Station) was provided by the design team as a 3D AutoCAD file (dated 31 August 2020) and incorporated into the noise model to determine noise mitigation requirements. This was combined with information from the SLR MEL model to the east of the station, including noise mitigation to MEL and noise mitigation on the north side, east of the station.

This ultimate design will not occur until the Morley to Ellenbrook line is constructed. As such, the interim design was also considered to check that the ultimate noise walls are also suitable for the interim design. The PDF's of the ultimate and interim design are provided in *Appendix B*.

Where the rail design has a radius of less than 500 metres, a + 3 dB adjustment is applied to account for potential wheel squeal. Also, where tracks cross another track (crossing points), such as where the MEL line connects to the Bayswater line, a + 6 dB adjustment is applied 5 metres either side of this point.

The track is assumed to be continuously welded and ground smooth to the same specifications as existing (or better) and maintained to be free of defects. The majority of the track will be ballasted on ballast mat (e.g. Pandrol RP65221, 8mm thick), with parts near the station being direct slab fix, incorporating resilient rail fasteners (e.g. Delkor ALT 1).

3.2 Train Speed

The existing train speed used in the modelling was provided by the design team and is shown in *Figure 3-2*.

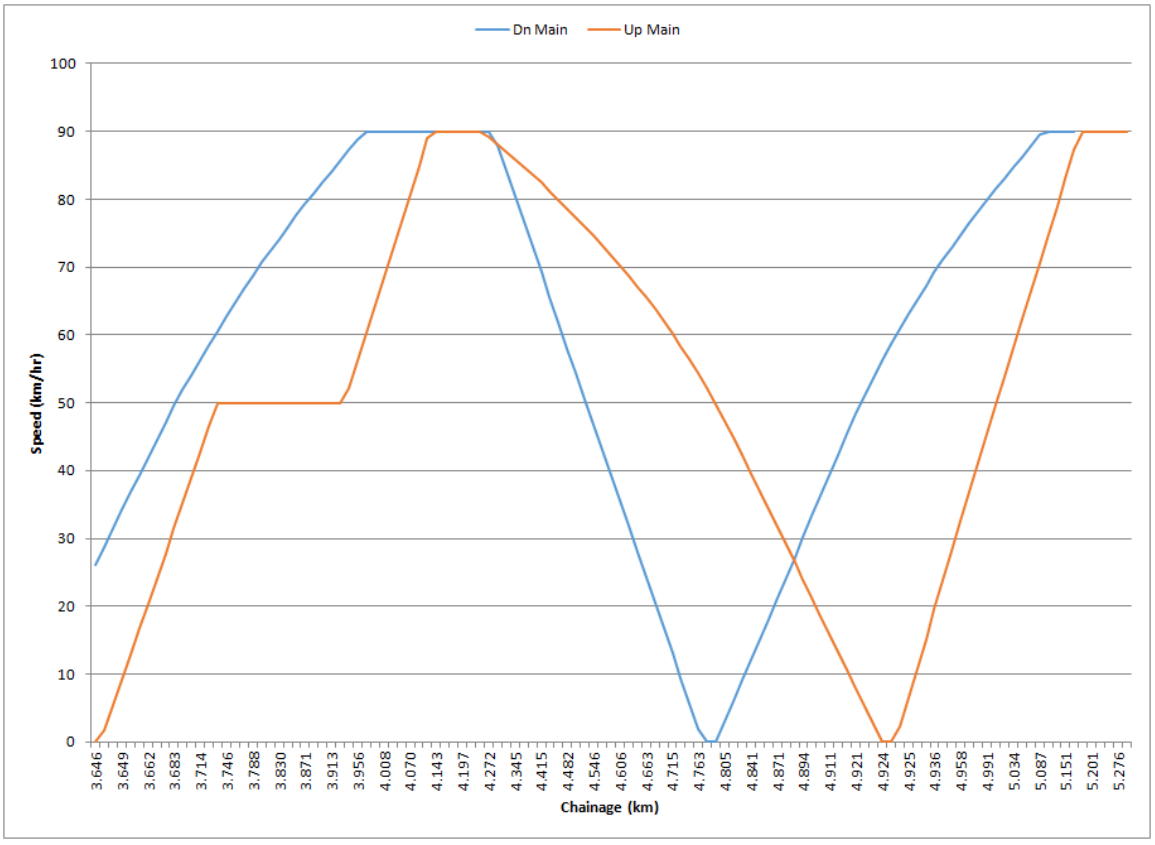


Figure 3-2 Modelled Train Speed

Such a profile is not available at this stage for the future scenario and therefore a similar profile has been approximated, shifted to align with the new station location and taking into consideration some maximum speed limitations.

Note that for modelling purposes, the speed is not reduced below 50 km/hr.

3.3 Train Volumes

Table 3-1 provides the train volumes used in the noise modelling as provided by the design team, noting these differ from that used in the SLR model.

Table 3-1 Modelled Train Volumes

Scenario	Direction							
	Down Main (Perth to Midland)				Up Main (Midland to Perth)			
	Night (10pm to 6am)		Day (6am to 10pm)		Night (10pm to 6am)		Day (6am to 10pm)	
	2/3 Car Sets	4 Car Sets	2/3 Car Sets	4 Car Sets	2/3 Car Sets	4 Car Sets	2/3 Car Sets	4 Car Sets
Existing	8	4	8	66	7	3	9	67
Future (Interim)[1]	8	11	70	71	8	10	71	73
Future (Ultimate)[2]	20	2	179	21	17	2	173	23

1. Interim includes the Airport services and Midland services.
2. Ultimate design includes Airport services, Midland services and Ellenbrook services.

3.4 Ground Attenuation

The ground attenuation has been assumed to be 0.6 (60%) overall, with roads at 0.0 (0%) and parkland at 0.8 (80%). Note 0.0 represents hard reflective surfaces such as water and 1.00 represents absorptive surfaces such as grass.

4 RESULTS

4.1 Model Calibration

From the Baseline Noise Report, long term monitoring over a few days was undertaken to obtain statistically representative noise level data. The baseline noise report notes that given the SWTC criteria, the L_{Amax} parameter will determine the compliance, noting that this utilises the 95th percentile measured noise level, meaning the top 5% of the noisiest trains.

Originally the model was set-up with the 'a' and 'b' N2k algorithm constants used by SLR in their noise model. However, to align with the baseline measurements, the 'b' constant was varied and also modified depending on if the train was accelerating or decelerating near a station or considered to be cruising. *Table 4-1* provides a comparison between the measurement locations and noise model.

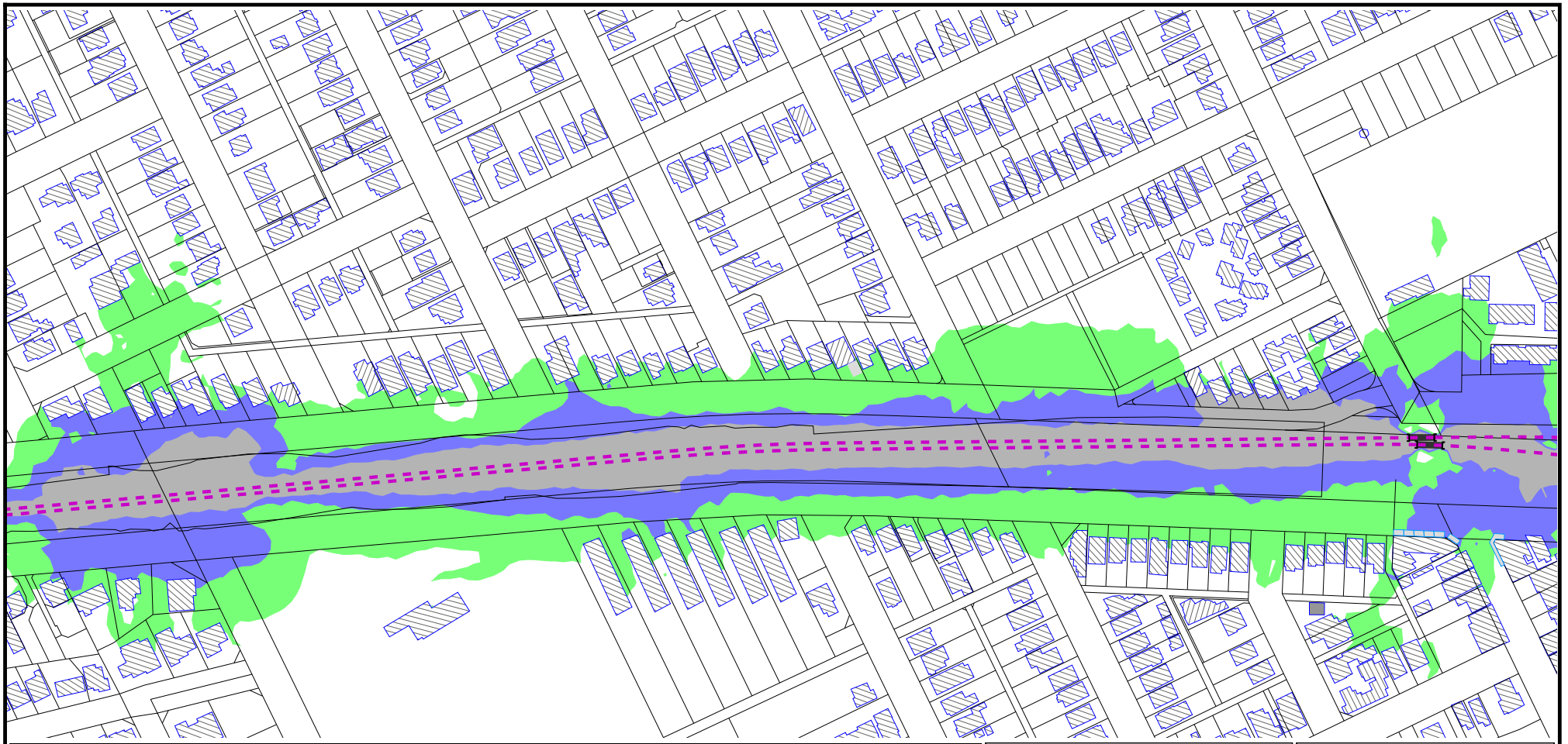
Table 4-1 Model Calibration: L_{Amax}

Monitoring Session	Location	Measured 95th Percentile	Modelled	Difference
1	Railway Reserve	88.3	86.7	-1.6
	68 Railway Parade	78.9	78.9	0.0
	59 Whatley Crescent	77.6	79.4	+1.8
2	Railway Reserve	91.4	89.9	-1.5
	96 Railway Parade	88.0	88.0	0.0
	105 Whatley Crescent	79.3	80.6	+1.3
3	Railway Reserve	85.6	84.6	-1.0
	134 Railway Parade	70.0	77.4	+7.4
	157 Whatley Crescent	76.8	78.9	+2.1

Overall, the model is considered reasonably representative of measured noise levels. It is noted that the location of 134 Railway Parade is significantly over-predicted, however this could not be reduced without under-predicting at other locations.

4.2 Noise Model - Existing

Results of the noise modelling are presented as noise contour plots in *Figure 4-1* to *Figure 4-3*, with A and B provided for each figure number being the western and eastern ends of the project. These plots provide the L_{Amax}, $L_{Aeq(Day)}$ and $L_{Aeq(Night)}$ values respectively. *Table 4-2* provides the predicted noise levels to the closest receivers.



Bayswater Station Project Passenger Train (Perth to Midland Line) - Existing Noise Level Contours

L_{Amax}- Noise Level Contours Based on Existing Conditions - Map 01
Ground Floor Level

SoundPLAN v8.1
Nord2000 Algorithms

12 August 2020

Lloyd George Acoustics
PO Box 717
HILLARYS WA 6923
(08) 9401 7770

Length Scale 1:3500

0 20 40 80 120 160 m

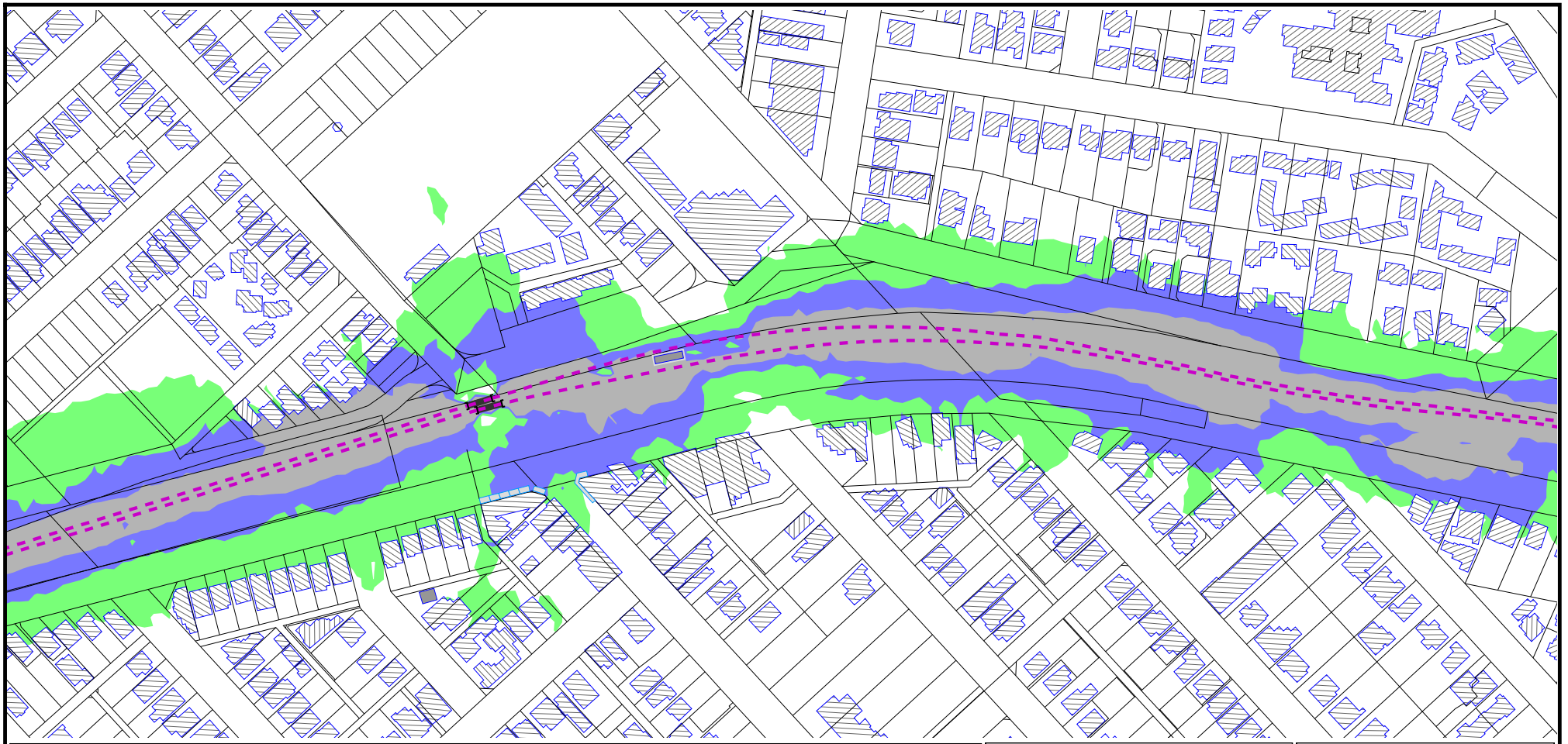
Figure 4-1A

Signs and symbols

- Railway Existing
- Bridge
- Building

Noise levels
L_{Amax}- dB

- <= 75
- <= 80
- <= 85
- > 85



Bayswater Station Project Passenger Train (Perth to Midland Line) - Existing Noise Level Contours

L_{Amax}- Noise Level Contours Based on Existing Conditions - Map 02
Ground Floor Level

SoundPLAN v8.1
Nord2000 Algorithms

12 August 2020

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Length Scale 1:3500

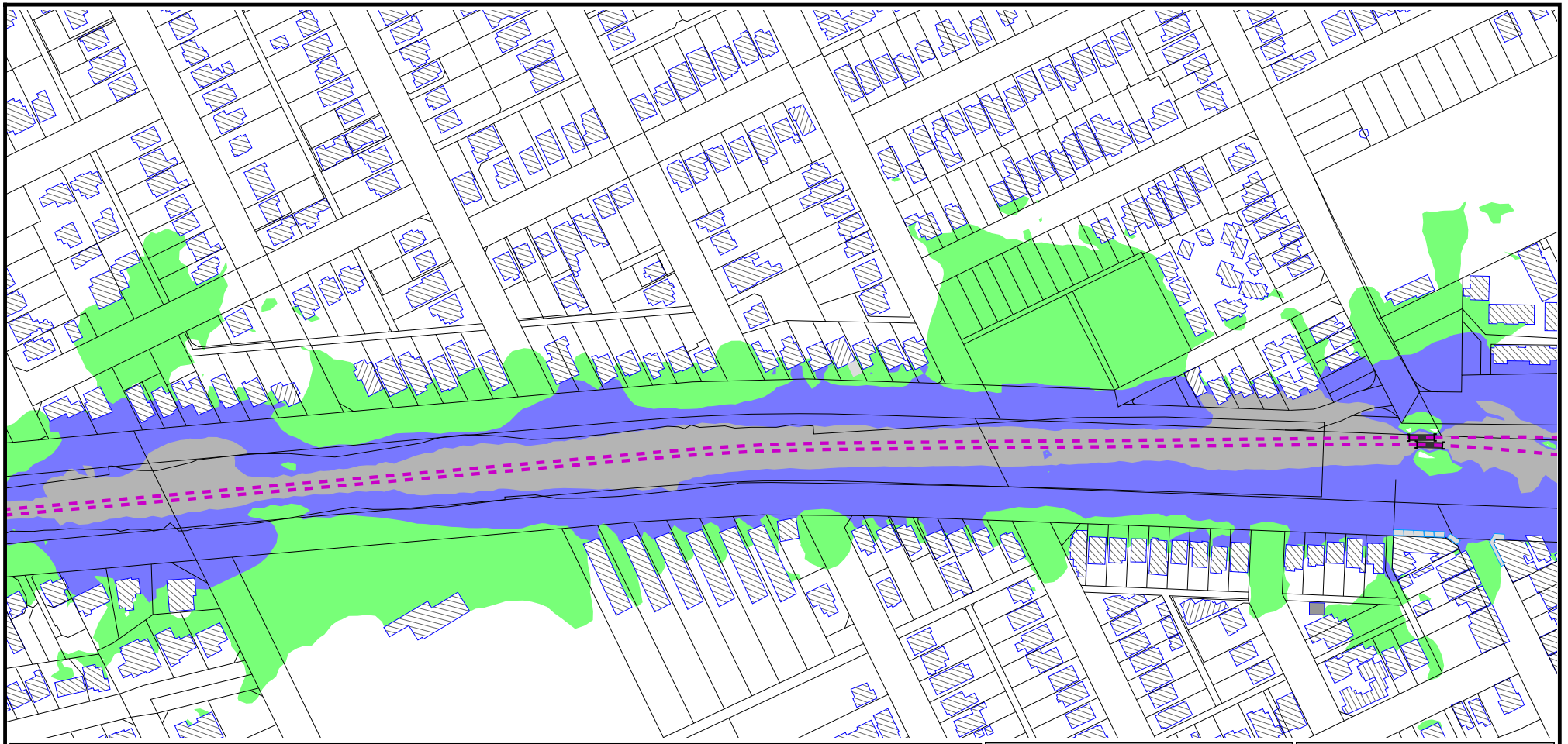
0 20 40 80 120 160 m

Figure 4-1B

Signs and symbols
- Railway Existing
- Bridge
- Building

Noise levels
L_{Amax}- dB
- <= 75
- <= 80
- <= 85
- > 85

N



Bayswater Station Project Passenger Train (Perth to Midland Line) - Existing Noise Level Contours

$L_{Aeq(Day)}$- Noise Level Contours Based on Existing Conditions - Map 01
Ground Floor Level

SoundPLAN v8.1
Nord2000 Algorithms

13 August 2020

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Length Scale 1:3500

0 20 40 80 120 160 m

Figure 4-2A

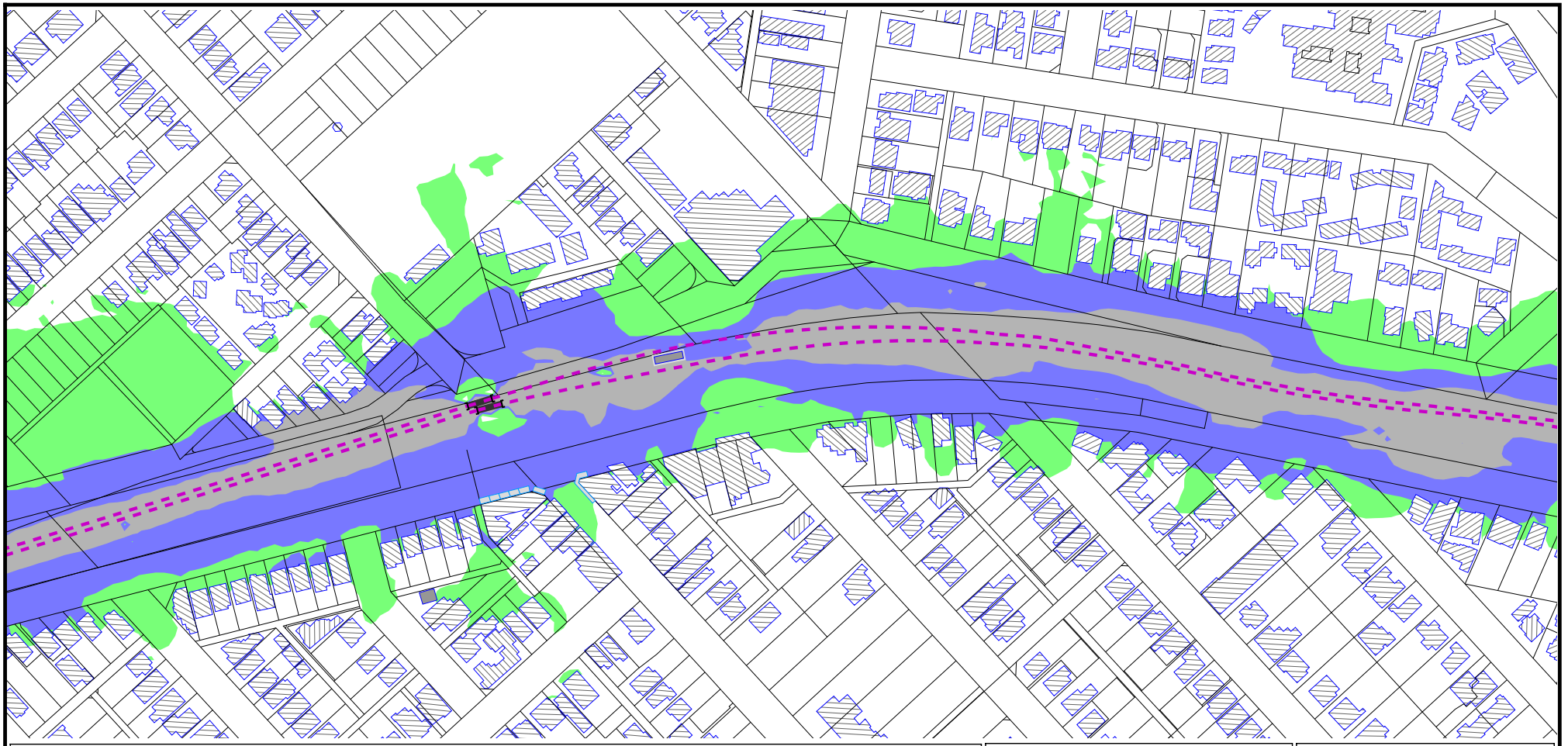
Signs and symbols

- Railway Existing
- Bridge
- Building

Noise levels
$L_{Aeq(Day)}$- dB

<= 55
55 < <= 60
60 < <= 65
65 <

SPP 5.4 (Sep 2019)



Bayswater Station Project Passenger Train (Perth to Midland Line) - Existing Noise Level Contours

$L_{Aeq(Day)}$- Noise Level Contours Based on Existing Conditions - Map 02
Ground Floor Level

SoundPLAN v8.1
Nord2000 Algorithms

13 August 2020

Lloyd George Acoustics
PO Box 717
HILLARYS WA 6923
(08) 9401 7770

Length Scale 1:3500

0 20 40 80 120 160 m

Figure 4-2B

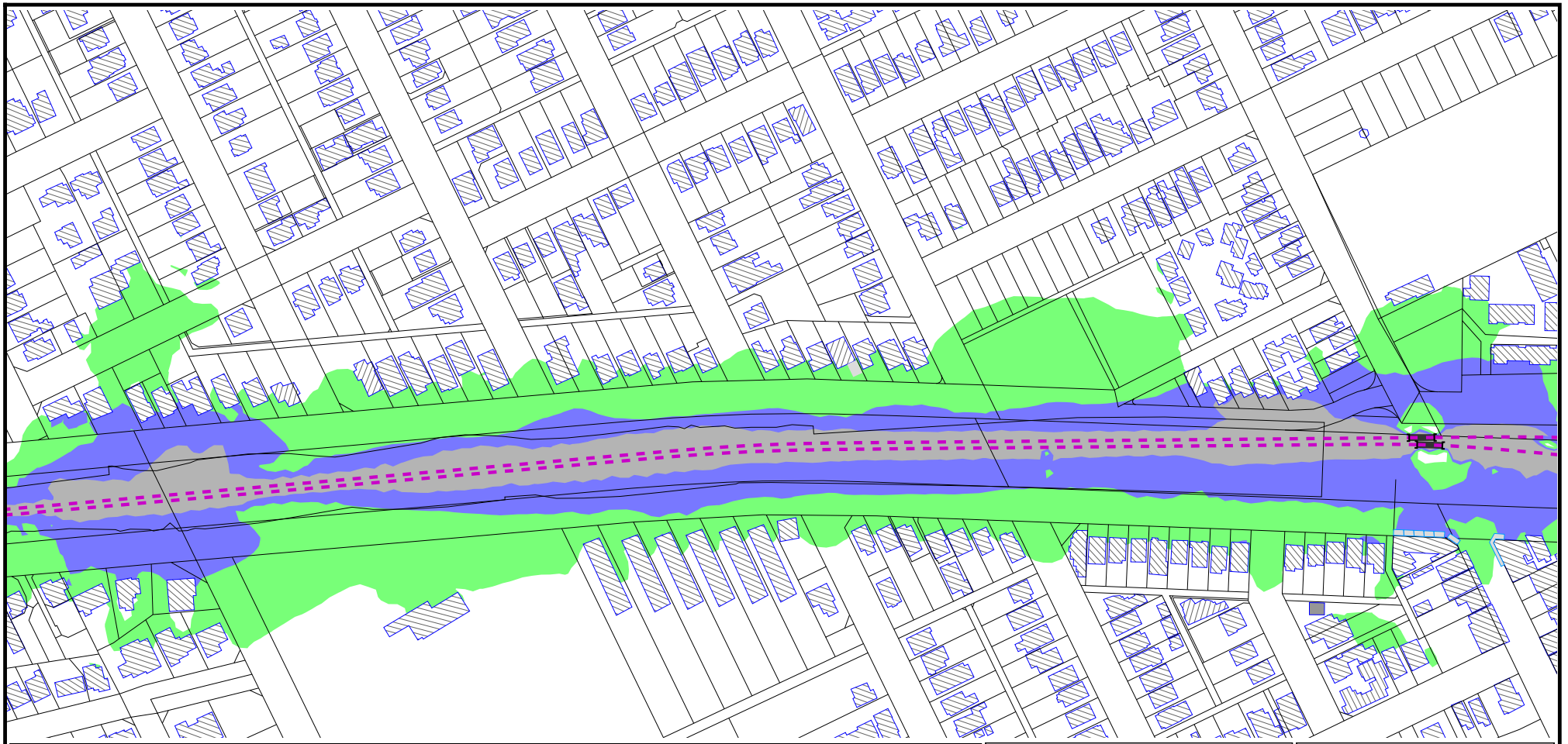
Signs and symbols

- Railway Existing
- Bridge
- Building

Noise levels
$L_{Aeq(Day)}$- dB

- <= 55
- <= 60
- <= 65
- > 65

SPP 5.4 (Sep 2019)



Bayswater Station Project Passenger Train (Perth to Midland Line) - Existing Noise Level Contours

$L_{Aeq(Night)}$- Noise Level Contours Based on Existing Conditions - Map 01
Ground Floor Level

SoundPLAN v8.1
Nord2000 Algorithms

13 August 2020

Lloyd George Acoustics
PO Box 717
HILLARYS WA 6923
(08) 9401 7770

Length Scale 1:3500

0 20 40 80 120 160 m

Figure 4-3A

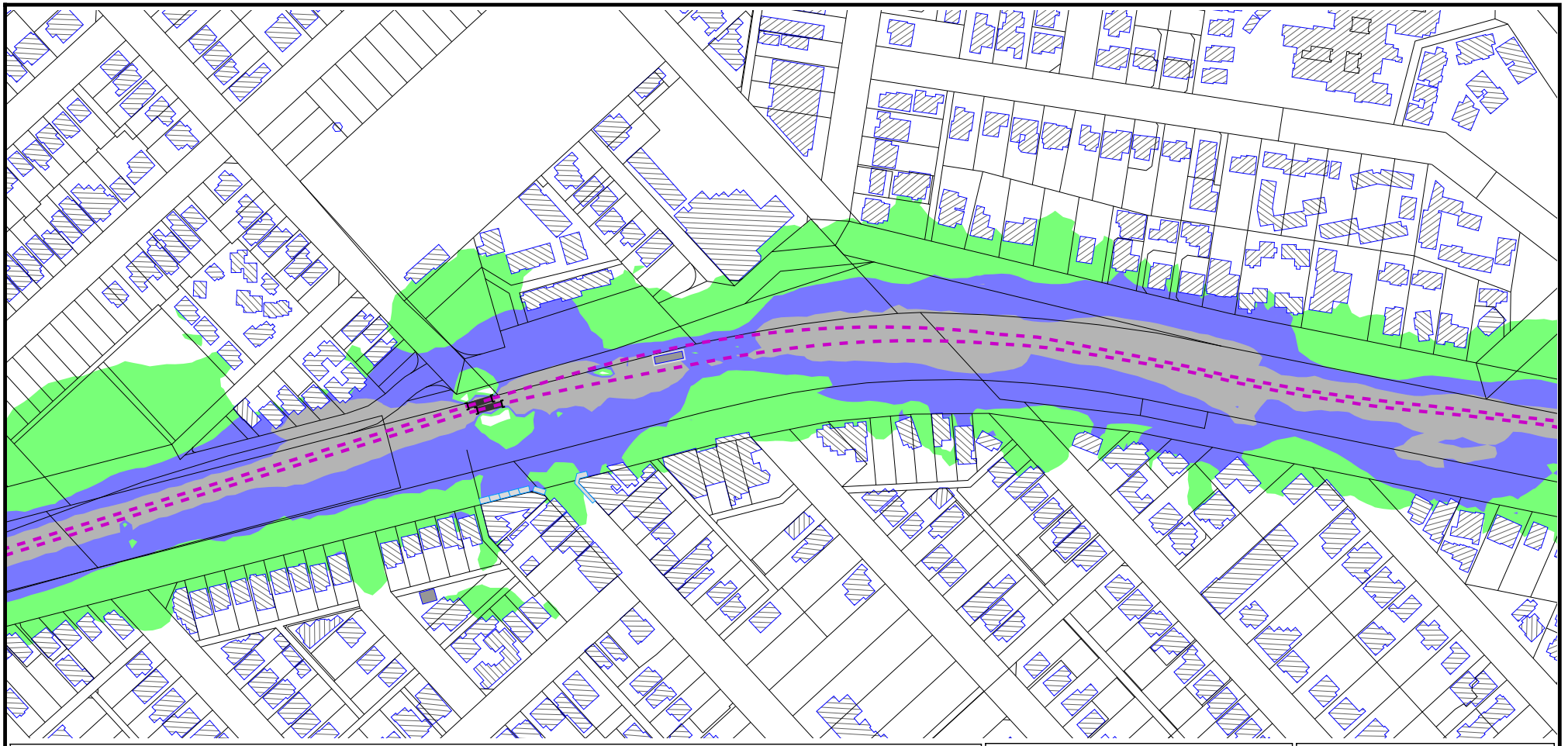
Signs and symbols

- Railway Existing
- Bridge
- Building

Noise levels
$L_{Aeq(Night)}$- dB

- <= 50
- <= 55
- <= 60
- > 60

SPP 5.4 (Sep 2019)



Bayswater Station Project Passenger Train (Perth to Midland Line) - Existing Noise Level Contours

$L_{Aeq(Night)}$- Noise Level Contours Based on Existing Conditions - Map 02
Ground Floor Level

SoundPLAN v8.1
Nord2000 Algorithms

13 August 2020

Signs and symbols
- Railway Existing
- Bridge
- Building

Noise levels
$L_{Aeq(Night)}$- dB
- <= 50
- <= 55
- <= 60
- > 60

N

SPP 5.4 (Sep 2019)

Lloyd George Acoustics
PO Box 717
HILLARYS WA 6923
(08) 9401 7770

Length Scale 1:3500
0 20 40 80 120 160 m

Figure 4-3B

Table 4-2 Calculated Noise Levels (Existing Scenario), dB

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
190 RAILWAY PDE	52.3	45.7	66.0	45 WHATLEY CR	60.8	54.2	81.0
186 RAILWAY PDE	52.3	45.8	65.9	47 WHATLEY CR	61.9	55.2	82.7
184A RAILWAY PDE	55.8	49.4	71.6	49 WHATLEY CR	62.7	56.0	82.8
184D RAILWAY PDE	55.9	49.6	73.4	1 COBDEN ST	64.8	58.0	85.9
182 RAILWAY PDE	51.5	45.2	70.0	1 COBDEN ST	63.9	57.2	84.2
180 RAILWAY PDE	57.0	50.8	74.5	1 COBDEN ST	60.9	54.2	79.7
174 RAILWAY PDE	63.0	56.9	82.9	2 COBDEN ST	58.4	51.9	74.5
170 RAILWAY PDE	64.4	58.3	82.8	2 COBDEN ST	59.0	52.6	75.9
168B RAILWAY PDE	64.0	57.9	81.7	53 WHATLEY CR	60.1	53.6	76.5
168A RAILWAY PDE	64.3	58.1	82.8	53 WHATLEY CR	60.8	54.4	78.1
166 RAILWAY PDE	64.2	58.1	82.2	55 WHATLEY CR	61.9	55.6	81.5
164 RAILWAY PDE	63.4	57.3	83.0	55 WHATLEY CR	62.3	56.1	81.2
162 RAILWAY PDE	61.0	54.9	81.5	57 WHATLEY CR	62.3	56.1	81.7
160 RAILWAY PDE	59.7	53.6	79.0	57 WHATLEY CR	62.5	56.3	82.3
156 RAILWAY PDE	58.9	52.7	77.1	57 WHATLEY CR	61.6	55.4	81.0
154 RAILWAY PDE	58.9	52.6	76.8	59 WHATLEY CR	62.2	56.0	81.8
152 RAILWAY PDE	58.6	52.2	75.8	59 WHATLEY CR	61.8	55.7	81.1
150 RAILWAY PDE	59.0	52.5	75.9	61 WHATLEY CR	62.4	56.2	81.2
148 RAILWAY PDE	57.8	51.2	75.8	61 WHATLEY CR	60.4	54.2	78.4
146 RAILWAY PDE	59.7	53.1	77.2	63 WHATLEY CR	62.1	56.0	78.3
142 RAILWAY PDE	61.2	54.5	80.1	65 WHATLEY CR	64.4	58.3	81.6
140 RAILWAY PDE	60.9	54.2	80.2	67 WHATLEY CR	62.9	56.8	80.8
138 RAILWAY PDE	60.1	53.4	79.3	69 WHATLEY CR	63.4	57.3	82.3
136 RAILWAY PDE	59.5	52.8	77.9	75 WHATLEY CR (Police)	62.2	56.1	80.4
134 RAILWAY PDE	58.7	52.0	75.0	75 WHATLEY CR (Police)	61.9	55.7	80.9
132 RAILWAY PDE	58.9	52.3	76.3	75 WHATLEY CR (Police)	61.2	55.0	79.3

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
130 RAILWAY PDE	60.1	53.6	78.1	75 WHATLEY CR (Police)	56.9	50.5	73.7
128 RAILWAY PDE	60.1	53.5	78.4	79 WHATLEY CR (Commercial)	56.3	50.0	73.7
126 RAILWAY PDE	60.3	53.8	78.2	79 WHATLEY CR (Commercial)	59.7	53.1	77.6
124 RAILWAY PDE	60.0	53.5	78.3	79 WHATLEY CR (Commercial)	60.5	53.6	79.5
122 RAILWAY PDE	60.3	53.8	78.9	79 WHATLEY CR (Commercial)	62.2	55.4	81.5
120 RAILWAY PDE	61.0	54.6	80.0	5 KING WILLIAM ST (Commercial)	61.1	54.2	80.9
118 RAILWAY PDE	61.1	54.7	79.7	1 KING WILLIAM ST (Commercial)	63.0	56.1	82.4
118 RAILWAY PDE	56.7	50.3	74.0	7 KING WILLIAM ST (Commercial)	61.7	54.9	82.0
54 BURNSIDE ST	57.6	51.1	73.8	89 WHATLEY CR (Commercial)	65.7	58.9	84.3
52 BURNSIDE ST	57.7	51.2	74.1	89 WHATLEY CR (Commercial)	63.0	56.3	82.1
46 BURNSIDE ST	56.7	50.2	73.2	93 WHATLEY CR	62.4	55.9	79.6
44 BURNSIDE ST	56.6	50.1	73.0	95 WHATLEY CR	63.3	56.8	81.8
42 BURNSIDE ST	56.5	50.1	73.2	97 WHATLEY CR	62.7	56.3	80.2
102 RAILWAY PDE	63.3	57.0	81.3	99 WHATLEY CR	62.7	56.3	80.7
102 RAILWAY PDE	66.0	59.8	85.8	101 WHATLEY CR	62.8	56.4	82.1
102 RAILWAY PDE	67.1	60.9	88.1	101 WHATLEY CR	59.9	53.6	79.3
100 RAILWAY PDE	68.2	62.0	89.0	103 WHATLEY CR	60.6	54.3	78.6
98 RAILWAY PDE	68.3	62.1	89.1	103 WHATLEY CR	63.4	57.0	81.7
96 RAILWAY PDE	67.6	61.4	88.4	105 WHATLEY CR	62.7	56.3	80.5
96 RAILWAY PDE	67.2	61.0	88.6	107 WHATLEY CR	62.4	55.9	80.0
5 COODE ST	63.2	56.9	82.9	109 WHATLEY CR	61.6	55.1	79.5
86 RAILWAY PDE	63.0	56.3	82.1	111 WHATLEY CR	61.4	54.9	79.5
86 RAILWAY PDE	62.2	55.6	80.3	111 WHATLEY CR	61.7	55.1	79.3
86 RAILWAY PDE	61.5	54.8	80.7	113 WHATLEY CR	60.7	54.2	78.5

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
86 RAILWAY PDE	59.9	53.2	78.4	115 WHATLEY CR	59.9	53.4	77.7
5 ROSE AV	57.1	50.5	73.7	117 WHATLEY CR	60.0	53.5	78.2
5 ROSE AV	56.8	50.2	72.9	119 WHATLEY CR	60.0	53.4	78.0
78 RAILWAY PDE	51.2	44.7	67.0	121 WHATLEY CR	58.6	52.0	76.8
78 RAILWAY PDE	55.2	48.7	70.6	121 WHATLEY CR	59.8	53.3	78.0
78 RAILWAY PDE	55.6	49.1	70.6	123 WHATLEY CR	60.1	53.6	78.4
2 BEECHBORO RD	58.3	52.1	75.8	125 WHATLEY CR	60.1	53.5	78.2
4A BEECHBORO RD	57.2	51.1	74.7	127 WHATLEY CR	60.7	54.1	79.4
74 RAILWAY PDE	59.1	52.9	76.4	129 WHATLEY CR	59.2	52.7	77.6
72 RAILWAY PDE	59.7	53.6	75.8	129 WHATLEY CR	60.2	53.7	78.5
70 RAILWAY PDE	59.7	53.5	76.7	129 WHATLEY CR	60.1	53.6	78.3
68 RAILWAY PDE	60.9	54.8	80.1	133 WHATLEY CR	59.4	52.8	77.7
66 RAILWAY PDE	61.5	55.3	81.0	133 WHATLEY CR	60.3	53.8	78.6
64 RAILWAY PDE	63.3	57.1	83.3	135 WHATLEY CR	58.5	52.0	77.1
62 RAILWAY PDE	63.3	57.1	83.4	135 WHATLEY CR	61.3	54.8	79.7
60 RAILWAY PDE	63.1	56.9	82.6	137 WHATLEY CR	61.4	54.8	79.1
56 RAILWAY PDE	64.0	57.8	84.4	139 WHATLEY CR	60.9	54.3	78.7
56 RAILWAY PDE	62.0	55.7	81.1	141 WHATLEY CR	61.3	54.6	78.9
56 RAILWAY PDE	62.1	55.7	82.2	143 WHATLEY CR	61.4	54.8	80.7
56 RAILWAY PDE	61.8	55.4	81.7	145 WHATLEY CR	61.3	54.6	80.5
56 RAILWAY PDE	60.6	54.1	80.2	147 WHATLEY CR	60.9	54.2	79.6
52 RAILWAY PDE	60.0	53.5	78.1	2 GARRATT RD	60.5	54.4	79.5
50 RAILWAY PDE	59.0	52.4	77.4	2 GARRATT RD	63.8	57.6	82.0
48 RAILWAY PDE	59.0	52.3	76.8	153 WHATLEY CR	61.8	55.7	80.1
46 RAILWAY PDE	58.8	52.2	77.0	155 WHATLEY CR	61.1	54.9	79.6
46 RAILWAY PDE	59.0	52.5	76.3	157 WHATLEY CR	62.8	56.7	82.8
46 RAILWAY PDE	56.7	50.1	74.2	157 WHATLEY CR	62.4	56.2	82.9
1 BASSENDEAN RD	58.0	51.5	75.6	157 WHATLEY CR	60.4	54.2	79.9
				159 WHATLEY CR	58.6	52.3	77.9

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
				159 WHATLEY CR	53.3	46.9	69.6
				161 WHATLEY CR	55.3	49.0	71.8
				163 WHATLEY CR	57.4	51.0	73.0
				165 WHATLEY CR	56.6	50.2	72.9
				167 WHATLEY CR	56.0	49.6	72.2
				169 WHATLEY CR	52.9	46.5	67.3
				169 WHATLEY CR	53.5	47.1	68.8
				169 WHATLEY CR	52.8	46.2	65.2

4.2.1 Comparison to Reference Design

A reference design report was also produced by SLR (BST-SLR-EN-RPT-00001.2.0.IFI), which provided the existing noise levels similar to that of *Table 4-2*. A comparison between the predicted noise levels is provided in *Table 4-3*, where the $L_{Aeq(Day)}$ is at least 60 dB. Note, it is expected for the results to be different as SLR did not undertake baseline noise measurements and the latest modelling incorporates more accurate survey information. Also, SLR have provided the values rounded to a whole number.

Table 4-3 Comparison Between SLR and LG Acoustics, dB

Address	$L_{Aeq(Day}$			L_{Amax}		
	LG	SLR	Difference	LG	SLR	Difference
174 RAILWAY PDE	63	61	2	83	78	5
170 RAILWAY PDE	64	63	1	83	79	4
168B RAILWAY PDE	64	63	1	82	80	2
168A RAILWAY PDE	64	63	1	83	80	3
166 RAILWAY PDE	64	64	0	82	81	1
164 RAILWAY PDE	63	63	0	83	80	3
162 RAILWAY PDE	61	63	-2	82	81	1
142 RAILWAY PDE	61	62	-1	80	79	1
140 RAILWAY PDE	61	61	0	80	78	2
132 RAILWAY PDE	59	61	-2	76	77	-1
130 RAILWAY PDE	60	62	-2	78	78	0

Address	$L_{Aeq(Day}$			L_{Amax}		
	LG	SLR	Difference	LG	SLR	Difference
128 RAILWAY PDE	60	62	-2	78	79	-1
126 RAILWAY PDE	60	63	-3	78	80	-2
124 RAILWAY PDE	60	63	-3	78	81	-3
122 RAILWAY PDE	60	64	-4	79	82	-3
120 RAILWAY PDE	61	65	-4	80	84	-4
118 RAILWAY PDE	61	65	-4	80	83	-3
54 BURNSIDE ST	58	61	-3	74	75	-1
52 BURNSIDE ST	58	61	-3	74	75	-1
102 RAILWAY PDE	67	66	1	88	85	3
100 RAILWAY PDE	68	65	3	89	83	6
98 RAILWAY PDE	68	65	3	89	82	7
96 RAILWAY PDE	68	64	4	88	82	6
5 COODE ST	63	62	1	83	79	4
86 RAILWAY PDE	63	59	4	82	75	7
68 RAILWAY PDE	61	60	1	80	76	4
66 RAILWAY PDE	62	60	2	81	76	5
64 RAILWAY PDE	63	61	2	83	77	6
62 RAILWAY PDE	63	61	2	83	77	6
60 RAILWAY PDE	63	61	2	83	77	6
56 RAILWAY PDE	64	61	3	84	78	6
45 WHATLEY CR	61	61	0	77	77	0
47 WHATLEY CR	62	59	3	83	76	7
49 WHATLEY CR	63	58	5	83	74	9
1 COBDEN ST	65	N/A	-	86	N/A	-
53 WHATLEY CR	61	58	3	78	74	4
55 WHATLEY CR	62	60	2	82	77	5
57 WHATLEY CR	62	61	1	82	78	4
59 WHATLEY CR	62	62	0	82	79	3
61 WHATLEY CR	62	62	0	81	79	2

Address	$L_{Aeq(Day}$			L_{Amax}		
	LG	SLR	Difference	LG	SLR	Difference
63 WHATLEY CR	62	60	2	78	76	2
65 WHATLEY CR	64	60	4	82	76	6
67 WHATLEY CR	63	61	2	81	76	5
69 WHATLEY CR	63	60	3	82	75	7
75 WHATLEY CR (Police)	62	59	3	80	74	6
79 WHATLEY CR (Commercial)	62	57	5	82	71	11
5 KING WILLIAM ST (Commercial)	61	56	5	81	71	10
1 KING WILLIAM ST (Commercial)	63	58	5	82	72	10
7 KING WILLIAM ST (Commercial)	62	57	5	82	71	11
89 WHATLEY CR (Commercial)	66	58	8	84	72	12
93 WHATLEY CR	62	60	2	80	74	6
95 WHATLEY CR	63	60	3	82	75	7
97 WHATLEY CR	63	60	3	80	74	6
99 WHATLEY CR	63	60	3	81	75	6
101 WHATLEY CR	63	61	2	82	76	6
103 WHATLEY CR	61	61	0	79	76	3
103 WHATLEY CR	63	61	2	82	76	6
105 WHATLEY CR	63	62	1	80	77	3
107 WHATLEY CR	62	61	1	80	76	4
109 WHATLEY CR	62	61	1	79	77	2
111 WHATLEY CR	61	61	0	80	76	4
111 WHATLEY CR	62	61	1	79	76	3
113 WHATLEY CR	61	61	0	78	76	2
119 WHATLEY CR	60	61	-1	78	77	1
121 WHATLEY CR	60	61	-1	78	76	2
123 WHATLEY CR	60	61	-1	78	76	2

Address	$L_{Aeq(Day}$			L_{Amax}		
	LG	SLR	Difference	LG	SLR	Difference
125 WHATLEY CR	60	61	-1	78	76	2
127 WHATLEY CR	61	61	0	79	76	3
129 WHATLEY CR	60	61	-1	79	77	2
133 WHATLEY CR	59	61	-2	78	77	1
133 WHATLEY CR	60	61	-1	79	77	2
135 WHATLEY CR	61	62	-1	80	78	2
137 WHATLEY CR	61	61	0	79	78	1
139 WHATLEY CR	61	61	0	79	77	2
141 WHATLEY CR	61	62	-1	79	78	1
143 WHATLEY CR	61	N/A	-	81	N/A	-
145 WHATLEY CR	61	N/A	-	81	N/A	-
147 WHATLEY CR	61	N/A	-	80	N/A	-
2 GARRATT RD	64	62	2	82	79	3
153 WHATLEY CR	62	61	1	80	79	1
155 WHATLEY CR	61	61	0	80	78	2
157 WHATLEY CR	63	62	1	83	78	5
159 WHATLEY CR	59	61	-2	78	78	0
163 WHATLEY CR	57	62	-5	73	78	-5
165 WHATLEY CR	57	62	-5	73	79	-6
167 WHATLEY CR	56	61	-5	72	78	-6

For the most part, the LG Acoustics noise model is predicting higher existing noise levels. This is likely to be a combination of the baseline noise measurements leading to model calibration, receiver heights being increased as a result of the survey information and potentially a different speed profile near the station.

Where the SLR model predicts a higher noise level, these areas have been reviewed as follows:

- Between 118 and 162 Railway Parade – There is a calibration point at 134 Railway Parade, which is being significantly over-predicted. As such, any increase in noise level to match the SLR model would result in even greater over-prediction and therefore not considered appropriate.

- Between 119 and 135 Whatley Crescent – The difference is relatively small in this case, being generally 1 dB and therefore no change is made to the model.
- Between 155 and 167 Whatley Crescent – The difference here is quite significant. The terrain is variable in this area so it may be that the survey information is more accurately representing the actual terrain than what SLR would have had on file. Also, there is a calibration point at 157 Whatley Crescent which is being over-predicted. As such, any increase in noise level to match the SLR model would result in even greater over-prediction and therefore not considered appropriate.

4.2.2 Project Criteria

The applicable noise levels for the future scenario are dependent on the existing predicted noise levels and therefore, these are provided in *Table 4-4* for the $L_{Aeq(Day)}$, $L_{Aeq(Night)}$ and L_{Amax} parameters. Note that the criteria are only applicable to noise sensitive properties such that the commercial buildings, including the Police Station, are not included.

Table 4-4 Project Criteria, dB

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
190 RAILWAY PDE	60.0	55.0	75.0	45 WHATLEY CR	60.8	55.0	81.0
186 RAILWAY PDE	60.0	55.0	75.0	47 WHATLEY CR	61.9	55.2	82.7
184A RAILWAY PDE	60.0	55.0	75.0	49 WHATLEY CR	62.7	56.0	82.8
184D RAILWAY PDE	60.0	55.0	75.0	1 COBDEN ST	64.8	58.0	85.9
182 RAILWAY PDE	60.0	55.0	75.0	1 COBDEN ST	63.9	57.2	84.2
180 RAILWAY PDE	60.0	55.0	75.0	1 COBDEN ST	60.9	55.0	79.7
174 RAILWAY PDE	63.0	56.9	82.9	2 COBDEN ST	60.0	55.0	75.0
170 RAILWAY PDE	64.4	58.3	82.8	2 COBDEN ST	60.0	55.0	75.9
168B RAILWAY PDE	64.0	57.9	81.7	53 WHATLEY CR	60.1	55.0	76.5
168A RAILWAY PDE	64.3	58.1	82.8	53 WHATLEY CR	60.8	55.0	78.1
166 RAILWAY PDE	64.2	58.1	82.2	55 WHATLEY CR	61.9	55.6	81.5
164 RAILWAY PDE	63.4	57.3	83.0	55 WHATLEY CR	62.3	56.1	81.2
162 RAILWAY PDE	61.0	55.0	81.5	57 WHATLEY CR	62.3	56.1	81.7
160 RAILWAY PDE	60.0	55.0	79.0	57 WHATLEY CR	62.5	56.3	82.3
156 RAILWAY PDE	60.0	55.0	77.1	57 WHATLEY CR	61.6	55.4	81.0
154 RAILWAY PDE	60.0	55.0	76.8	59 WHATLEY CR	62.2	56.0	81.8
152 RAILWAY PDE	60.0	55.0	75.8	59 WHATLEY CR	61.8	55.7	81.1
150 RAILWAY PDE	60.0	55.0	75.9	61 WHATLEY CR	62.4	56.2	81.2
148 RAILWAY PDE	60.0	55.0	75.8	61 WHATLEY CR	60.4	55.0	78.4

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
146 RAILWAY PDE	60.0	55.0	77.2	63 WHATLEY CR	62.1	56.0	78.3
142 RAILWAY PDE	61.2	55.0	80.1	65 WHATLEY CR	64.4	58.3	81.6
140 RAILWAY PDE	60.9	55.0	80.2	67 WHATLEY CR	62.9	56.8	80.8
138 RAILWAY PDE	60.1	55.0	79.3	69 WHATLEY CR	63.4	57.3	82.3
136 RAILWAY PDE	60.0	55.0	77.9	93 WHATLEY CR	62.4	55.9	79.6
134 RAILWAY PDE	60.0	55.0	75.0	95 WHATLEY CR	63.3	56.8	81.8
132 RAILWAY PDE	60.0	55.0	76.3	97 WHATLEY CR	62.7	56.3	80.2
130 RAILWAY PDE	60.1	55.0	78.1	99 WHATLEY CR	62.7	56.3	80.7
128 RAILWAY PDE	60.1	55.0	78.4	101 WHATLEY CR	62.8	56.4	82.1
126 RAILWAY PDE	60.3	55.0	78.2	101 WHATLEY CR	60.0	55.0	79.3
124 RAILWAY PDE	60.0	55.0	78.3	103 WHATLEY CR	60.6	55.0	78.6
122 RAILWAY PDE	60.3	55.0	78.9	103 WHATLEY CR	63.4	57.0	81.7
120 RAILWAY PDE	61.0	55.0	80.0	105 WHATLEY CR	62.7	56.3	80.5
118 RAILWAY PDE	61.1	55.0	79.7	107 WHATLEY CR	62.4	55.9	80.0
118 RAILWAY PDE	60.0	55.0	75.0	109 WHATLEY CR	61.6	55.1	79.5
54 BURNSIDE ST	60.0	55.0	75.0	111 WHATLEY CR	61.4	55.0	79.5
52 BURNSIDE ST	60.0	55.0	75.0	111 WHATLEY CR	61.7	55.1	79.3
46 BURNSIDE ST	60.0	55.0	75.0	113 WHATLEY CR	60.7	55.0	78.5
44 BURNSIDE ST	60.0	55.0	75.0	115 WHATLEY CR	60.0	55.0	77.7
42 BURNSIDE ST	60.0	55.0	75.0	117 WHATLEY CR	60.0	55.0	78.2
102 RAILWAY PDE	63.3	57.0	81.3	119 WHATLEY CR	60.0	55.0	78.0
102 RAILWAY PDE	66.0	59.8	85.8	121 WHATLEY CR	60.0	55.0	76.8
102 RAILWAY PDE	67.1	60.9	88.1	121 WHATLEY CR	60.0	55.0	78.0
100 RAILWAY PDE	68.2	62.0	89.0	123 WHATLEY CR	60.1	55.0	78.4
98 RAILWAY PDE	68.3	62.1	89.1	125 WHATLEY CR	60.1	55.0	78.2
96 RAILWAY PDE	67.6	61.4	88.4	127 WHATLEY CR	60.7	55.0	79.4
96 RAILWAY PDE	67.2	61.0	88.6	129 WHATLEY CR	60.0	55.0	77.6
5 COODE ST	63.2	56.9	82.9	129 WHATLEY CR	60.2	55.0	78.5
86 RAILWAY PDE	63.0	56.3	82.1	129 WHATLEY CR	60.1	55.0	78.3
86 RAILWAY PDE	62.2	55.6	80.3	133 WHATLEY CR	60.0	55.0	77.7
86 RAILWAY PDE	61.5	55.0	80.7	133 WHATLEY CR	60.3	55.0	78.6

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
86 RAILWAY PDE	60.0	55.0	78.4	135 WHATLEY CR	60.0	55.0	77.1
5 ROSE AV	60.0	55.0	75.0	135 WHATLEY CR	61.3	55.0	79.7
5 ROSE AV	60.0	55.0	75.0	137 WHATLEY CR	61.4	55.0	79.1
78 RAILWAY PDE	60.0	55.0	75.0	139 WHATLEY CR	60.9	55.0	78.7
78 RAILWAY PDE	60.0	55.0	75.0	141 WHATLEY CR	61.3	55.0	78.9
78 RAILWAY PDE	60.0	55.0	75.0	143 WHATLEY CR	61.4	55.0	80.7
2 BEECHBORO RD	60.0	55.0	75.8	145 WHATLEY CR	61.3	55.0	80.5
4A BEECHBORO RD	60.0	55.0	75.0	147 WHATLEY CR	60.9	55.0	79.6
74 RAILWAY PDE	60.0	55.0	76.4	2 GARRATT RD	60.5	55.0	79.5
72 RAILWAY PDE	60.0	55.0	75.8	2 GARRATT RD	63.8	57.6	82.0
70 RAILWAY PDE	60.0	55.0	76.7	153 WHATLEY CR	61.8	55.7	80.1
68 RAILWAY PDE	60.9	55.0	80.1	155 WHATLEY CR	61.1	55.0	79.6
66 RAILWAY PDE	61.5	55.3	81.0	157 WHATLEY CR	62.8	56.7	82.8
64 RAILWAY PDE	63.3	57.1	83.3	157 WHATLEY CR	62.4	56.2	82.9
62 RAILWAY PDE	63.3	57.1	83.4	157 WHATLEY CR	60.4	55.0	79.9
60 RAILWAY PDE	63.1	56.9	82.6	159 WHATLEY CR	60.0	55.0	77.9
56 RAILWAY PDE	64.0	57.8	84.4	159 WHATLEY CR	60.0	55.0	75.0
56 RAILWAY PDE	62.0	55.7	81.1	161 WHATLEY CR	60.0	55.0	75.0
56 RAILWAY PDE	62.1	55.7	82.2	163 WHATLEY CR	60.0	55.0	75.0
56 RAILWAY PDE	61.8	55.4	81.7	165 WHATLEY CR	60.0	55.0	75.0
56 RAILWAY PDE	60.6	55.0	80.2	167 WHATLEY CR	60.0	55.0	75.0
52 RAILWAY PDE	60.0	55.0	78.1	169 WHATLEY CR	60.0	55.0	75.0
50 RAILWAY PDE	60.0	55.0	77.4	169 WHATLEY CR	60.0	55.0	75.0
48 RAILWAY PDE	60.0	55.0	76.8	169 WHATLEY CR	60.0	55.0	75.0
46 RAILWAY PDE	60.0	55.0	77.0				
46 RAILWAY PDE	60.0	55.0	76.3				
46 RAILWAY PDE	60.0	55.0	75.0				
1 BASSENDEAN RD	60.0	55.0	75.6				

4.2.3 Ultimate Scenario

Table 4-5 provides the predicted noise levels for the ultimate scenario, with noise contour plots provided in *Figure 4-4* to *Figure 4-6*.

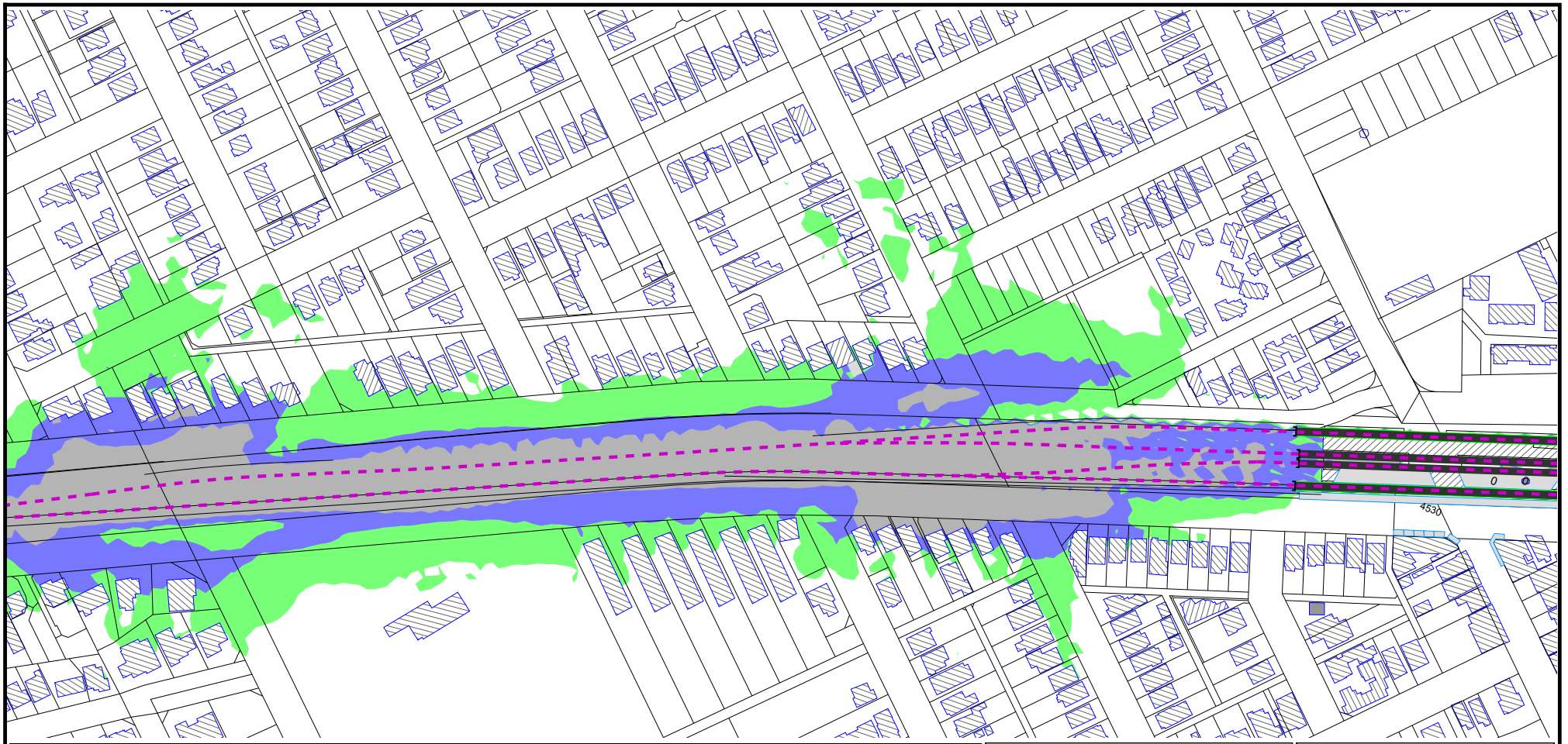
Table 4-5 Calculated Noise Levels (Ultimate Scenario), dB

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
190 RAILWAY PDE	59.1	52.1	73.6	45 WHATLEY CR	59.1	52.2	75.4
186 RAILWAY PDE	59.6	52.6	75.2	47 WHATLEY CR	58.8	51.9	75.0
184A RAILWAY PDE	63.2	56.3	78.8	49 WHATLEY CR	58.7	51.8	74.6
184D RAILWAY PDE	62.9	56.0	75.6	1 COBDEN ST	59.9	52.9	75.7
182 RAILWAY PDE	57.5	50.6	69.4	1 COBDEN ST	59.5	52.5	75.4
180 RAILWAY PDE	63.3	56.5	77.0	1 COBDEN ST	58.1	51.1	73.0
174 RAILWAY PDE	69.7	63.0	86.5	2 COBDEN ST	58.1	51.2	73.5
170 RAILWAY PDE	71.1	64.5	87.4	2 COBDEN ST	58.9	52.0	75.0
168B RAILWAY PDE	69.2	62.6	84.4	53 WHATLEY CR	59.5	52.5	75.6
168A RAILWAY PDE	70.2	63.5	86.5	53 WHATLEY CR	59.7	52.8	75.1
166 RAILWAY PDE	68.7	62.0	85.6	55 WHATLEY CR	59.5	52.5	75.8
164 RAILWAY PDE	68.2	61.5	86.2	55 WHATLEY CR	59.5	52.5	76.1
162 RAILWAY PDE	65.0	58.3	82.7	57 WHATLEY CR	58.5	51.5	74.3
160 RAILWAY PDE	64.4	57.6	80.0	57 WHATLEY CR	59.0	52.0	75.7
156 RAILWAY PDE	62.6	55.8	77.6	57 WHATLEY CR	57.9	50.9	74.9
154 RAILWAY PDE	62.0	55.2	76.3	59 WHATLEY CR	59.0	52.0	75.8
152 RAILWAY PDE	62.0	55.1	75.9	59 WHATLEY CR	58.5	51.5	75.3
150 RAILWAY PDE	61.9	54.9	75.3	61 WHATLEY CR	58.8	51.7	75.4
148 RAILWAY PDE	59.9	53.0	74.2	61 WHATLEY CR	58.5	51.5	73.9
146 RAILWAY PDE	61.8	54.9	75.8	63 WHATLEY CR	62.3	55.4	77.3
142 RAILWAY PDE	61.6	54.7	75.2	65 WHATLEY CR	63.5	56.5	80.0
140 RAILWAY PDE	61.3	54.4	76.0	67 WHATLEY CR	64.8	57.9	82.1
138 RAILWAY PDE	61.4	54.5	76.0	69 WHATLEY CR	66.0	59.1	83.6

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
136 RAILWAY PDE	61.7	54.8	75.0	75 WHATLEY CR (Police)	66.6	59.7	83.8
134 RAILWAY PDE	61.9	55.0	75.3	75 WHATLEY CR (Police)	67.4	60.5	83.4
132 RAILWAY PDE	62.6	55.7	76.3	75 WHATLEY CR (Police)	67.1	60.2	82.6
130 RAILWAY PDE	63.2	56.4	78.4	75 WHATLEY CR (Police)	63.2	56.4	78.6
128 RAILWAY PDE	63.8	56.9	78.7	79 WHATLEY CR (Commercial)	62.6	55.9	80.7
126 RAILWAY PDE	64.6	57.7	79.4	79 WHATLEY CR (Commercial)	63.3	56.5	79.6
124 RAILWAY PDE	64.4	57.5	80.1	79 WHATLEY CR (Commercial)	60.4	53.5	77.8
122 RAILWAY PDE	65.7	58.8	80.9	79 WHATLEY CR (Commercial)	58.7	51.7	72.1
120 RAILWAY PDE	68.4	61.6	84.7	5 KING WILLIAM ST (Commercial)	54.4	47.4	68.2
118 RAILWAY PDE	67.6	60.9	84.4	1 KING WILLIAM ST (Commercial)	52.8	45.8	64.9
118 RAILWAY PDE	62.6	55.8	80.0	7 KING WILLIAM ST (Commercial)	50.8	43.7	64.9
54 BURNSIDE ST	63.2	56.3	78.0	89 WHATLEY CR (Commercial)	57.4	50.5	71.8
52 BURNSIDE ST	62.8	56.0	78.1	89 WHATLEY CR (Commercial)	54.6	47.7	67.0
46 BURNSIDE ST	61.3	54.4	76.8	93 WHATLEY CR	54.8	47.9	66.8
44 BURNSIDE ST	60.9	54.0	75.8	95 WHATLEY CR	56.1	49.2	68.2
42 BURNSIDE ST	60.9	54.0	75.7	97 WHATLEY CR	56.5	49.6	67.9
102 RAILWAY PDE	60.0	53.2	74.4	99 WHATLEY CR	57.9	50.9	69.2
102 RAILWAY PDE	60.1	53.3	75.4	101 WHATLEY CR	58.6	51.6	70.8
102 RAILWAY PDE	60.2	53.4	76.3	101 WHATLEY CR	57.7	50.7	70.5
100 RAILWAY PDE	60.4	53.6	76.3	103 WHATLEY CR	56.0	49.0	69.8
98 RAILWAY PDE	60.0	53.3	75.7	103 WHATLEY CR	60.9	53.8	73.8

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
96 RAILWAY PDE	56.9	50.2	69.1	105 WHATLEY CR	60.9	53.8	74.5
96 RAILWAY PDE	54.3	47.5	71.1	107 WHATLEY CR	61.8	54.7	75.0
5 COODE ST	52.5	45.7	67.2	109 WHATLEY CR	62.3	55.2	75.5
86 RAILWAY PDE	50.2	43.4	63.2	111 WHATLEY CR	61.6	54.5	75.4
86 RAILWAY PDE	49.9	43.1	63.1	111 WHATLEY CR	62.6	55.4	77.8
86 RAILWAY PDE	50.6	43.9	63.4	113 WHATLEY CR	64.6	57.3	82.2
86 RAILWAY PDE	51.7	44.9	63.7	115 WHATLEY CR	64.5	57.2	82.6
5 ROSE AV	50.2	43.3	63.3	117 WHATLEY CR	65.4	58.1	84.5
5 ROSE AV	53.7	47.0	69.8	119 WHATLEY CR	65.6	58.3	83.3
78 RAILWAY PDE	47.7	40.9	61.5	121 WHATLEY CR	64.6	57.4	82.9
78 RAILWAY PDE	52.2	45.4	68.5	121 WHATLEY CR	66.9	59.7	83.9
78 RAILWAY PDE	53.0	46.2	69.5	123 WHATLEY CR	67.1	59.9	84.7
2 BEECHBORO RD	57.3	50.6	77.9	125 WHATLEY CR	67.9	60.8	85.3
4A BEECHBORO RD	54.5	47.7	72.8	127 WHATLEY CR	68.9	61.8	87.3
74 RAILWAY PDE	55.9	49.2	75.7	129 WHATLEY CR	68.2	61.1	85.9
72 RAILWAY PDE	55.5	48.8	76.2	129 WHATLEY CR	68.7	61.6	86.8
70 RAILWAY PDE	56.3	49.5	76.2	129 WHATLEY CR	68.7	61.7	86.7
68 RAILWAY PDE	51.5	44.8	68.6	133 WHATLEY CR	67.5	60.5	86.5
66 RAILWAY PDE	51.2	44.4	65.9	133 WHATLEY CR	66.0	59.0	83.8
64 RAILWAY PDE	50.1	43.4	63.9	135 WHATLEY CR	62.8	55.9	78.4
62 RAILWAY PDE	51.6	44.8	63.1	135 WHATLEY CR	64.9	57.9	80.1
60 RAILWAY PDE	51.6	44.7	62.7	137 WHATLEY CR	64.7	57.8	79.9
56 RAILWAY PDE	51.0	44.1	64.2	139 WHATLEY CR	64.0	57.1	79.3
56 RAILWAY PDE	50.0	43.0	64.1	141 WHATLEY CR	63.6	56.7	79.0
56 RAILWAY PDE	51.1	44.0	65.0	143 WHATLEY CR	63.6	56.7	79.2
56 RAILWAY PDE	50.7	43.7	65.3	145 WHATLEY CR	63.2	56.3	78.5

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
56 RAILWAY PDE	50.7	43.6	64.3	147 WHATLEY CR	62.7	55.8	78.4
52 RAILWAY PDE	51.1	44.1	65.2	2 GARRATT RD	64.7	57.9	79.2
50 RAILWAY PDE	53.0	45.9	65.7	2 GARRATT RD	68.4	61.7	82.7
48 RAILWAY PDE	53.8	46.7	67.5	153 WHATLEY CR	66.7	59.9	81.3
46 RAILWAY PDE	53.9	46.8	67.9	155 WHATLEY CR	66.1	59.4	80.6
46 RAILWAY PDE	54.3	47.2	69.3	157 WHATLEY CR	67.5	60.7	82.3
46 RAILWAY PDE	52.3	45.4	65.6	157 WHATLEY CR	67.4	60.6	81.8
1 BASSENDEAN RD	54.2	47.3	67.7	157 WHATLEY CR	66.1	59.3	80.7
				159 WHATLEY CR	64.5	57.7	78.1
				159 WHATLEY CR	59.6	52.6	75.1
				161 WHATLEY CR	62.0	55.0	76.1
				163 WHATLEY CR	64.2	57.2	79.6
				165 WHATLEY CR	62.9	55.9	79.1
				167 WHATLEY CR	62.7	55.6	78.8
				169 WHATLEY CR	59.1	52.1	71.9
				169 WHATLEY CR	59.1	52.1	72.1
				169 WHATLEY CR	57.4	50.5	67.8



Bayswater Station Project Passenger Train (Perth to Midland Line incl MEL) - Ultimate Noise Level Contours

L_{Amax}- Noise Level Contours Based on Ultimate Conditions - Map 01
Ground Floor Level

SoundPLAN v8.1
Nord2000 Algorithms

27 September 2020

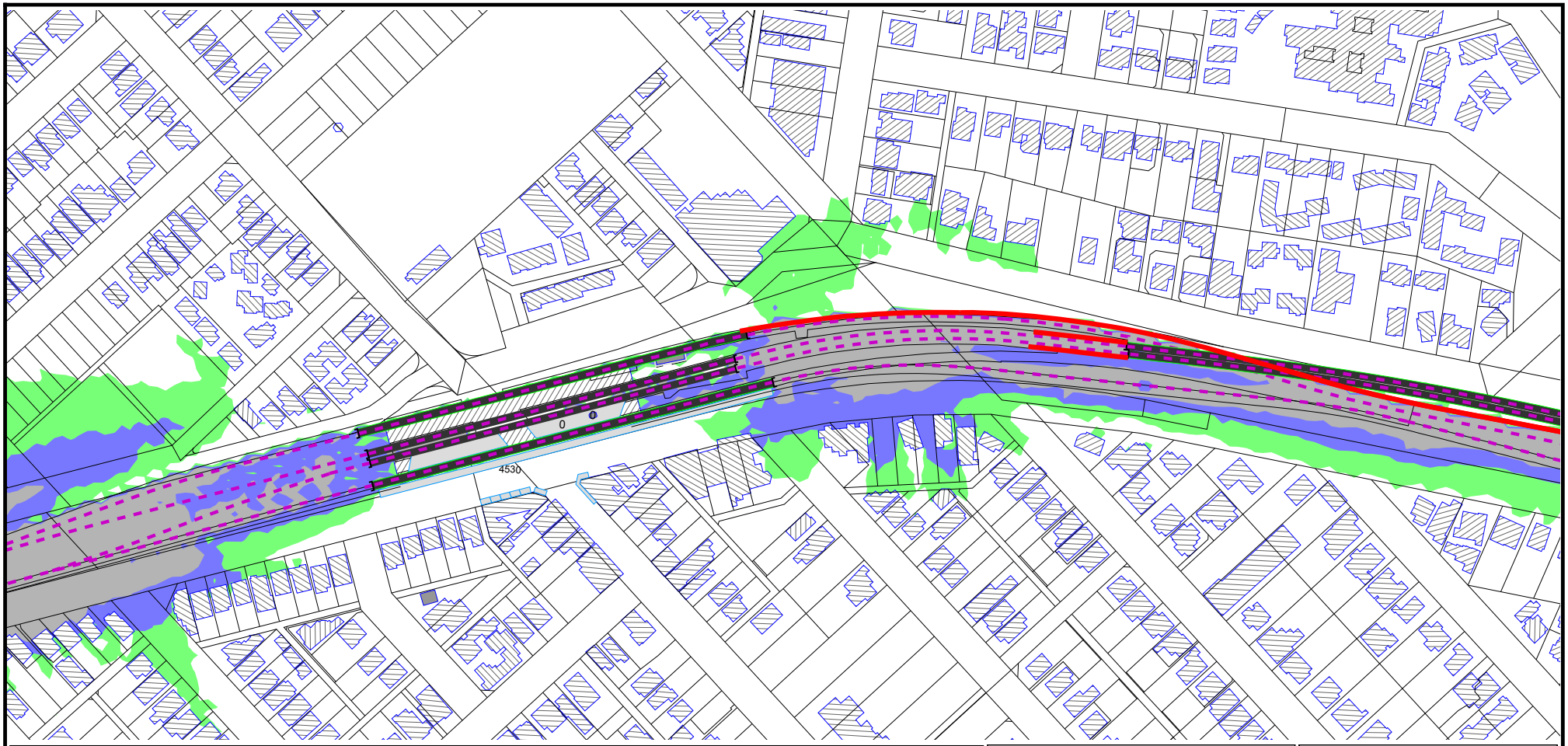
Signs and symbols
- Railway Existing
- Bridge
- Building

Noise levels
L_{Amax}- dB
- <= 75
- <= 80
- <= 85
- > 85

Lloyd George Acoustics
PO Box 717
HILLARYS WA 6923
(08) 9401 7770

Length Scale 1:3500
0 20 40 80 120 160 m

Figure 4-4A



Bayswater Station Project Passenger Train (Perth to Midland Line incl MEL) - Ultimate Noise Level Contours

L_{Amax}- Noise Level Contours Based on Ultimate Conditions - Map 02
Ground Floor Level

SoundPLAN v8.1
Nord2000 Algorithms

27 September 2020

Lloyd George Acoustics
PO Box 717
HILLARYS WA 6923
(08) 9401 7770

Length Scale 1:3500

0 20 40 80 120 160 m

Figure 4-4B

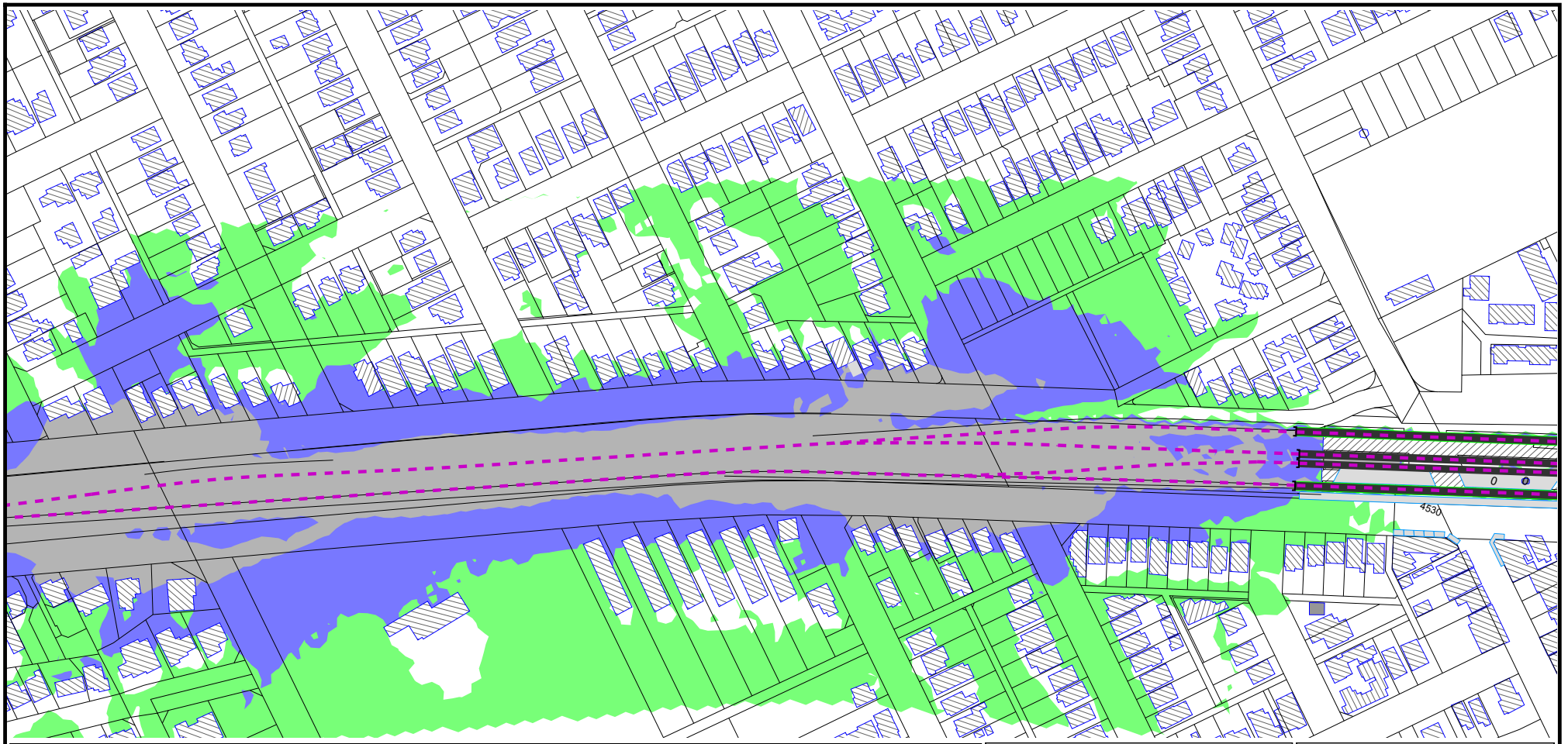
Signs and symbols

- Railway Existing
- Bridge
- Building
- MEI Walls by Others

Noise levels
L_{Amax}- dB

- <= 75
- <= 80
- <= 85
- > 85

N



Bayswater Station Project Passenger Train (Perth to Midland Line incl MEL) - Ultimate Noise Level Contours

$L_{Aeq(Day)}$- Noise Level Contours Based on Ultimate Conditions - Map 01
Ground Floor Level

SoundPLAN v8.1
Nord2000 Algorithms

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PO Box 717
HILLARYS WA 6923
(08) 9401 7770

Length Scale 1:3500

0 20 40 80 120 160 m

Figure 4-5A

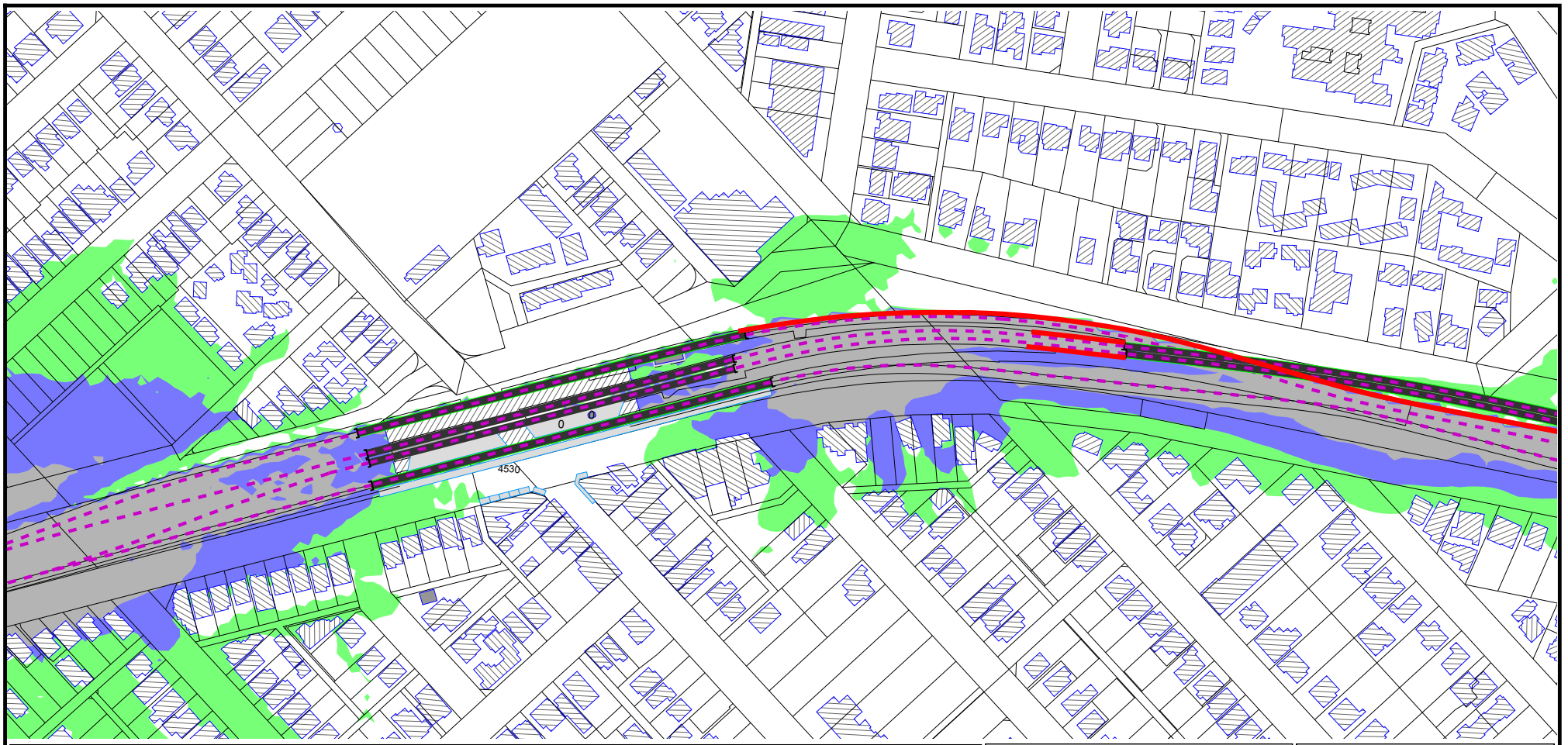
Signs and symbols

- Railway Existing
- Bridge
- Building

Noise levels
$L_{Aeq(Day)}$- dB

	<= 55
55 <	<= 60
60 <	<= 65
65 <	

SPP 5.4 (Sep 2019)



Bayswater Station Project Passenger Train (Perth to Midland Line incl MEL) - Ultimate Noise Level Contours

$L_{Aeq(Day)}$- Noise Level Contours Based on Ultimate Conditions - Map 02
Ground Floor Level

SoundPLAN v8.1
Nord2000 Algorithms

26 September 2020

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HILLARYS WA 6923
(08) 9401 7770

Length Scale 1:3500

0 20 40 80 120 160 m

Figure 4-5B

Signs and symbols

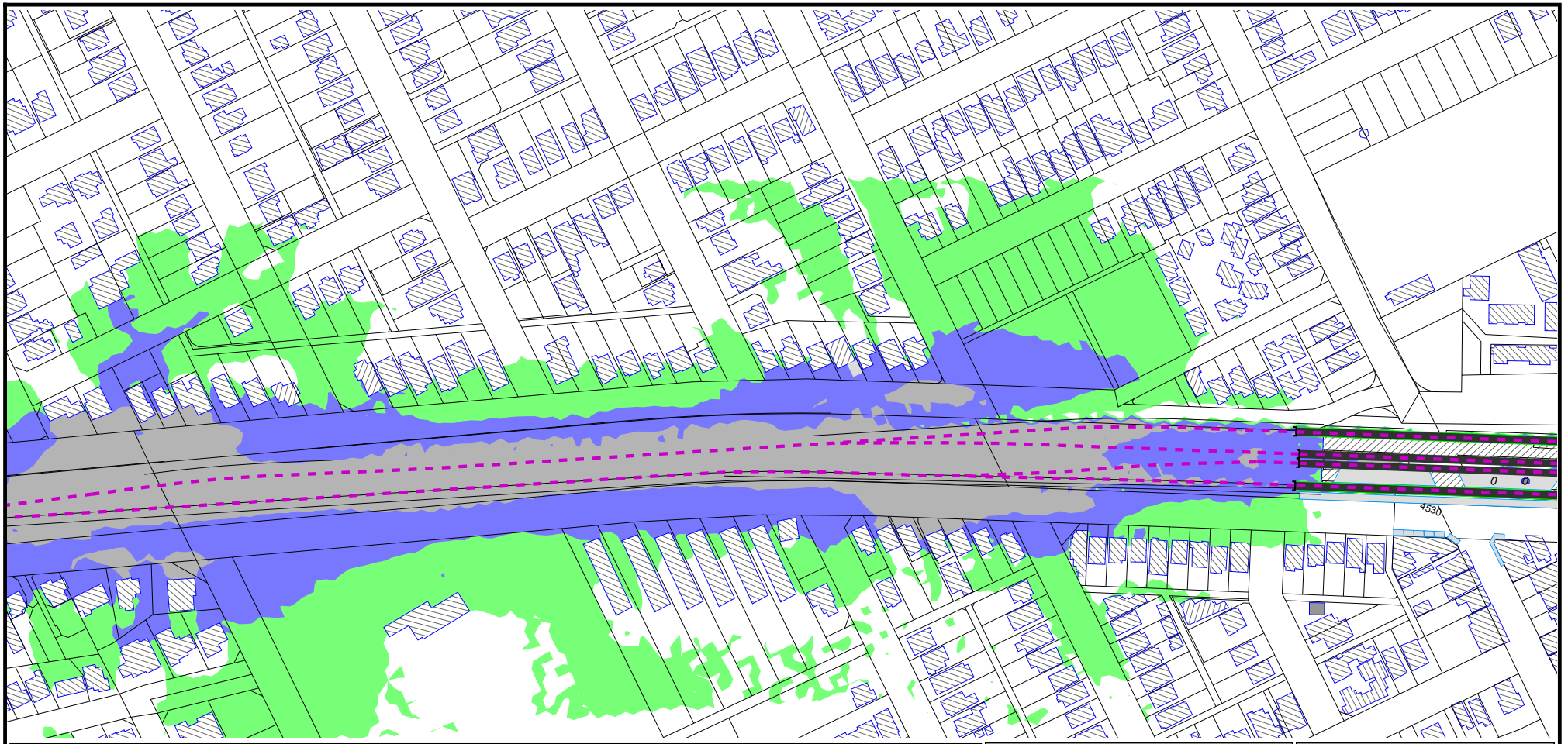
- Railway Existing
- Bridge
- Building
- MEL Walls by Others

Noise levels
$L_{Aeq(Day)}$- dB

- <= 55
- <= 60
- <= 65
- > 65

N

SPP 5.4 (Sep 2019)



Bayswater Station Project Passenger Train (Perth to Midland Line incl MEL) - Ultimate Noise Level Contours

$L_{Aeq(Night)}$- Noise Level Contours Based on Ultimate Conditions - Map 01
Ground Floor Level

SoundPLAN v8.1
Nord2000 Algorithms

27 September 2020

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PO Box 717
HILLARYS WA 6923
(08) 9401 7770

Length Scale 1:3500

0 20 40 80 120 160 m

Figure 4-6A

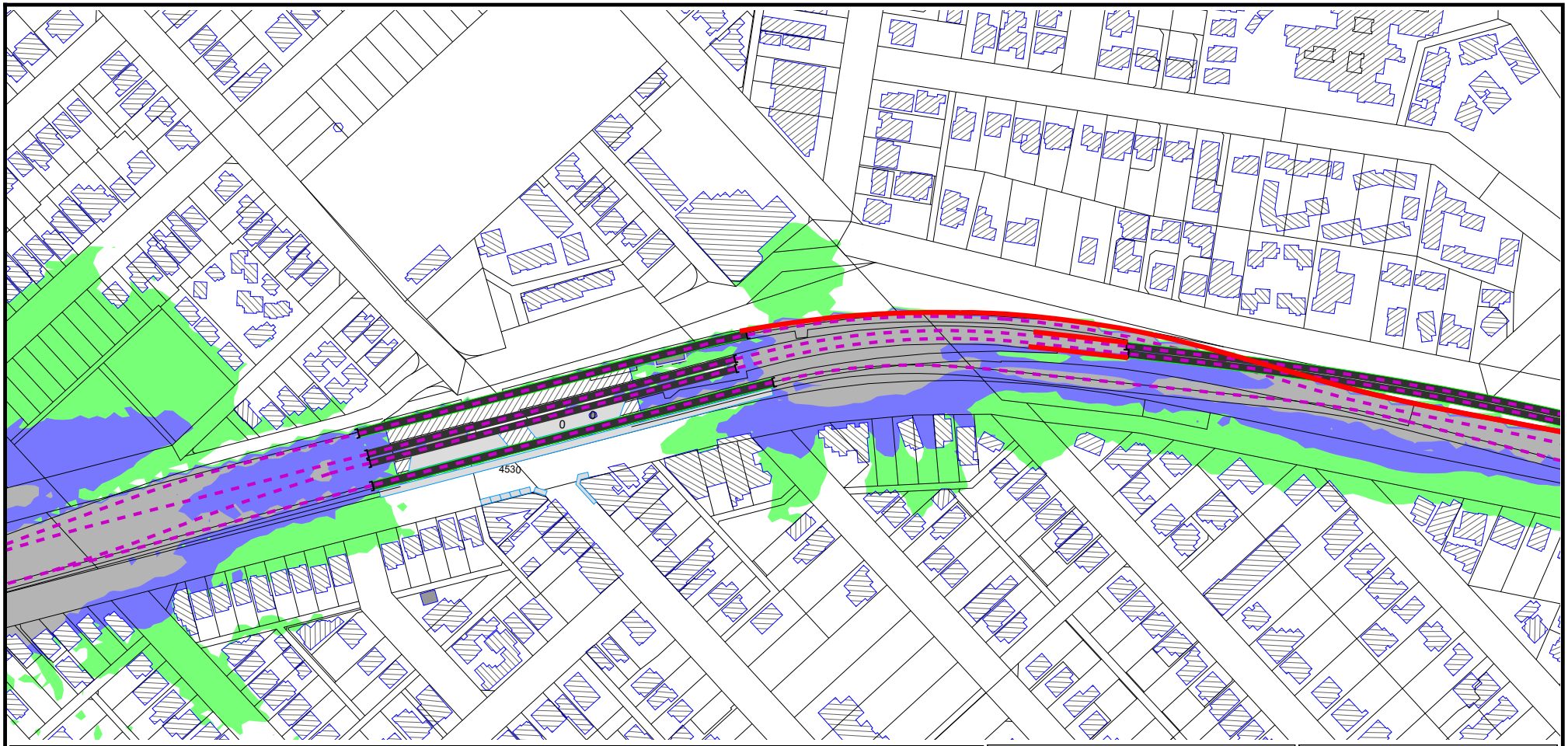
Signs and symbols

- Railway Existing
- Bridge
- Building

Noise levels
$L_{Aeq(Night)}$- dB

- <= 50
- <= 55
- <= 60
- > 60

SPP 5.4 (Sep 2019)



Bayswater Station Project Passenger Train (Perth to Midland Line incl MEL) - Ultimate Noise Level Contours

$L_{Aeq(Night)}$- Noise Level Contours Based on Ultimate Conditions - Map 02
Ground Floor Level

SoundPLAN v8.1
Nord2000 Algorithms

27 September 2020

Lloyd George Acoustics
PO Box 717
HILLARYS WA 6923
(08) 9401 7770

Length Scale 1:3500

0 20 40 80 120 160 m

Figure 4-6B

Signs and symbols

- Railway Existing
- Bridge
- Building
- MEL Walls by Others

Noise levels
$L_{Aeq(Night)}$- dB

- <= 50
- <= 55
- <= 60
- > 60

SPP 5.4 (Sep 2019)

Comparing the results of *Table 4-5* with *Table 4-4* provides the exceedances as shown in *Table 4-6*. Those shown in italics relate to commercial properties where the criteria does not apply. Those shown in grey are on the north side of the railway line and east of the station and include the noise walls put forward in the SLR MEL project that will ultimately be designed by others and are not part of this project.

Table 4-6 Calculated Exceedances (Ultimate Scenario), dB

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
190 RAILWAY PDE	-	-	-	45 WHATLEY CR	-	-	-
186 RAILWAY PDE	-	-	-	47 WHATLEY CR	-	-	-
184A RAILWAY PDE	3.2	1.3	3.8	49 WHATLEY CR	-	-	-
184D RAILWAY PDE	2.9	1.0	0.6	1 COBDEN ST	-	-	-
182 RAILWAY PDE	-	-	-	1 COBDEN ST	-	-	-
180 RAILWAY PDE	3.3	1.5	2.0	1 COBDEN ST	-	-	-
174 RAILWAY PDE	6.7	6.1	3.6	2 COBDEN ST	-	-	-
170 RAILWAY PDE	6.7	6.2	4.6	2 COBDEN ST	-	-	-
168B RAILWAY PDE	5.2	4.7	2.7	53 WHATLEY CR	-	-	-
168A RAILWAY PDE	5.9	5.4	3.7	53 WHATLEY CR	-	-	-
166 RAILWAY PDE	4.5	3.9	3.4	55 WHATLEY CR	-	-	-
164 RAILWAY PDE	4.8	4.2	3.2	55 WHATLEY CR	-	-	-
162 RAILWAY PDE	4.0	3.3	1.2	57 WHATLEY CR	-	-	-
160 RAILWAY PDE	4.4	2.6	1.0	57 WHATLEY CR	-	-	-
156 RAILWAY PDE	2.6	0.8	0.5	57 WHATLEY CR	-	-	-
154 RAILWAY PDE	2.0	-	-	59 WHATLEY CR	-	-	-
152 RAILWAY PDE	2.0	-	-	59 WHATLEY CR	-	-	-
150 RAILWAY PDE	1.9	-	-	61 WHATLEY CR	-	-	-
148 RAILWAY PDE	-	-	-	61 WHATLEY CR	-	-	-
146 RAILWAY PDE	1.8	-	-	63 WHATLEY CR	-	-	-
142 RAILWAY PDE	-	-	-	65 WHATLEY CR	-	-	-
140 RAILWAY PDE	-	-	-	67 WHATLEY CR	1.9	1.1	1.3
138 RAILWAY PDE	1.3	-	-	69 WHATLEY CR	2.6	1.8	1.3
136 RAILWAY PDE	1.7	-	-	75 WHATLEY CR (Police)	*4.4*	*3.6*	*3.4*

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
134 RAILWAY PDE	1.9	-	-	75 WHATLEY CR (Police)	*5.5*	*4.8*	*2.5*
132 RAILWAY PDE	2.6	0.7	-	75 WHATLEY CR (Police)	*5.9*	*5.2*	*3.3*
130 RAILWAY PDE	3.1	1.4	-	75 WHATLEY CR (Police)	*3.2*	*1.4*	*3.6*
128 RAILWAY PDE	3.7	1.9	-	79 WHATLEY CR (Commercial)	*2.6*	*0.9*	*5.7*
126 RAILWAY PDE	4.3	2.7	1.2	79 WHATLEY CR (Commercial)	*3.3*	*1.5*	*2.0*
124 RAILWAY PDE	4.4	2.5	1.8	79 WHATLEY CR (Commercial)	-	-	-
122 RAILWAY PDE	5.4	3.8	2.0	79 WHATLEY CR (Commercial)	-	-	-
120 RAILWAY PDE	7.4	6.6	4.7	5 KING WILLIAM ST (Commercial)	-	-	-
118 RAILWAY PDE	6.5	5.9	4.7	1 KING WILLIAM ST (Commercial)	-	-	-
118 RAILWAY PDE	2.6	0.8	5.0	7 KING WILLIAM ST (Commercial)	-	-	-
54 BURNSIDE ST	3.2	1.3	3.0	89 WHATLEY CR (Commercial)	-	-	-
52 BURNSIDE ST	2.8	1.0	3.1	89 WHATLEY CR (Commercial)	-	-	-
46 BURNSIDE ST	1.3	-	1.8	93 WHATLEY CR	-	-	-
44 BURNSIDE ST	0.9	-	0.8	95 WHATLEY CR	-	-	-
42 BURNSIDE ST	0.9	-	0.7	97 WHATLEY CR	-	-	-
102 RAILWAY PDE	-	-	-	99 WHATLEY CR	-	-	-
102 RAILWAY PDE	-	-	-	101 WHATLEY CR	-	-	-
102 RAILWAY PDE	-	-	-	101 WHATLEY CR	-	-	-
100 RAILWAY PDE	-	-	-	103 WHATLEY CR	-	-	-
98 RAILWAY PDE	-	-	-	103 WHATLEY CR	-	-	-
96 RAILWAY PDE	-	-	-	105 WHATLEY CR	-	-	-
96 RAILWAY PDE	-	-	-	107 WHATLEY CR	-	-	-
5 COODE ST	-	-	-	109 WHATLEY CR	0.7	-	-

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
86 RAILWAY PDE	-	-	-	111 WHATLEY CR	-	-	-
86 RAILWAY PDE	-	-	-	111 WHATLEY CR	0.9	-	-
86 RAILWAY PDE	-	-	-	113 WHATLEY CR	3.9	2.3	3.7
86 RAILWAY PDE	-	-	-	115 WHATLEY CR	4.5	2.2	4.9
5 ROSE AV	-	-	-	117 WHATLEY CR	5.4	3.1	6.3
5 ROSE AV	-	-	-	119 WHATLEY CR	5.6	3.3	5.3
78 RAILWAY PDE	-	-	-	121 WHATLEY CR	4.6	2.4	6.1
78 RAILWAY PDE	-	-	-	121 WHATLEY CR	6.9	4.7	5.9
78 RAILWAY PDE	-	-	-	123 WHATLEY CR	7.0	4.9	6.3
2 BEECHBORO RD	-	-	2.1	125 WHATLEY CR	7.8	5.8	7.1
4A BEECHBORO RD	-	-	-	127 WHATLEY CR	8.2	6.8	7.9
74 RAILWAY PDE	-	-	-	129 WHATLEY CR	8.2	6.1	8.3
72 RAILWAY PDE	-	-	-	129 WHATLEY CR	8.5	6.6	8.3
70 RAILWAY PDE	-	-	-	129 WHATLEY CR	8.6	6.7	8.4
68 RAILWAY PDE	-	-	-	133 WHATLEY CR	7.5	5.5	8.8
66 RAILWAY PDE	-	-	-	133 WHATLEY CR	5.7	4.0	5.2
64 RAILWAY PDE	-	-	-	135 WHATLEY CR	2.8	0.9	1.3
62 RAILWAY PDE	-	-	-	135 WHATLEY CR	3.6	2.9	-
60 RAILWAY PDE	-	-	-	137 WHATLEY CR	3.3	2.8	0.8
56 RAILWAY PDE	-	-	-	139 WHATLEY CR	3.1	2.1	0.6
56 RAILWAY PDE	-	-	-	141 WHATLEY CR	2.3	1.7	-
56 RAILWAY PDE	-	-	-	143 WHATLEY CR	2.2	1.7	-
56 RAILWAY PDE	-	-	-	145 WHATLEY CR	1.9	1.3	-
56 RAILWAY PDE	-	-	-	147 WHATLEY CR	1.8	0.8	-
52 RAILWAY PDE	-	-	-	2 GARRATT RD	4.2	2.9	-
50 RAILWAY PDE	-	-	-	2 GARRATT RD	4.6	4.1	0.7
48 RAILWAY PDE	-	-	-	153 WHATLEY CR	4.9	4.2	1.2
46 RAILWAY PDE	-	-	-	155 WHATLEY CR	5.0	4.4	1.0
46 RAILWAY PDE	-	-	-	157 WHATLEY CR	4.7	4.0	-

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
46 RAILWAY PDE	-	-	-	157 WHATLEY CR	5.0	4.4	-
1 BASSENDEAN RD	-	-	-	157 WHATLEY CR	5.7	4.3	0.8
				159 WHATLEY CR	4.5	2.7	-
				159 WHATLEY CR	-	-	-
				161 WHATLEY CR	2.0	-	1.1
				163 WHATLEY CR	4.2	2.2	4.6
				165 WHATLEY CR	2.9	0.9	4.1
				167 WHATLEY CR	2.7	0.6	3.8
				169 WHATLEY CR	-	-	-
				169 WHATLEY CR	-	-	-
				169 WHATLEY CR	-	-	-

The above shows that exceedances are calculated to occur and therefore noise mitigation is required. A noise wall design has been prepared, shown on *Figure 4-7a* and *Figure 4-7b* and described below:

- Generally positioning the noise wall at the higher point of either alongside the railway or at the railway reserve, where the rail is in cut.
- NW1 – Located on the railway reserve, ranging in height from 1.8 to 4.6 metres. Height is relative to the survey levels provided;
- NW2 – Located at the top of the batter, ranging in height from 2.4 to 4.6 metres. Height is relative to the design string provided.
- NW3 – Located on the railway reserve, ranging in height from 1.8 to 3.2 metres. Height is relative to the survey levels provided;
- NW4 – Located on the top of a retaining wall, ranging 1.8 to 4.0 metres. Height is relative to design string provided.
- NW5 – Located parallel to the railway, ranging 1.8 to 4.4 metres. Height is relative to the Midland Up Main.
- NW6 - Located parallel to the railway, ranging in height from 1.8 to 4.0 metres. Height is relative to the design string provided.

The locations of the noise walls will be refined as the design progresses.

The calculated noise levels with the noise wall in place are provided in *Table 4-7* with those on the north side and east of the station not shown.



Bayswater Station Project Passenger Train (Perth to Midland Line incl MEL)

Noise Wall Design - Map 01
North Side Walls - Heights read from left to right
South Side Walls - Heights read from right to left

SoundPLAN v8.1
Nord2000 Algorithms

27 September 2020

Signs and symbols

- Railway Existing
- Bridge
- Building
- Noise Wall

Lloyd George Acoustics
PO Box 717
HILLARYS WA 6923
(08) 9401 7770

Length Scale 1:3500

0 20 40 80 120 160 m

Figure 4-7A



Bayswater Station Project Passenger Train (Perth to Midland Line incl MEL)

Noise Wall Design - Map 02
North Side Walls - Heights read from left to right
South Side Walls - Heights read from right to left

SoundPLAN v8.1
Nord2000 Algorithms

27 September 2020

Signs and symbols

- Railway Existing
- Bridge
- Building
- Noise Wall

N

Lloyd George Acoustics
PO Box 717
HILLARYS WA 6923
(08) 9401 7770

Length Scale 1:3500

0 20 40 80 120 160 m

Figure 4-7B

Table 4-7 Calculated Noise Levels (Ultimate Scenario) With Walls, dB

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
190 RAILWAY PDE	57.6	50.6	72.9	45 WHATLEY CR	58.9	52.0	75.4
186 RAILWAY PDE	56.5	49.5	70.8	47 WHATLEY CR	58.6	51.7	75.0
184A RAILWAY PDE	59.6	52.7	73.0	49 WHATLEY CR	58.6	51.7	74.6
184D RAILWAY PDE	58.5	51.7	71.0	1 COBDEN ST	59.8	52.9	75.7
182 RAILWAY PDE	52.5	45.6	63.9	1 COBDEN ST	59.5	52.5	75.4
180 RAILWAY PDE	58.1	51.4	72.8	1 COBDEN ST	57.9	50.9	73.0
174 RAILWAY PDE	60.8	54.1	76.8	2 COBDEN ST	58.1	51.1	73.5
170 RAILWAY PDE	63.8	57.1	78.6	2 COBDEN ST	58.9	52.0	75.0
168B RAILWAY PDE	61.6	54.9	76.0	53 WHATLEY CR	59.4	52.4	75.6
168A RAILWAY PDE	62.9	56.2	78.7	53 WHATLEY CR	59.7	52.7	75.0
166 RAILWAY PDE	59.4	52.6	71.0	55 WHATLEY CR	58.7	51.8	74.9
164 RAILWAY PDE	58.5	51.7	73.2	55 WHATLEY CR	58.2	51.4	74.1
162 RAILWAY PDE	59.0	52.1	73.7	57 WHATLEY CR	56.9	50.1	74.3
160 RAILWAY PDE	60.0	53.1	72.9	57 WHATLEY CR	57.3	50.5	74.3
156 RAILWAY PDE	*60.0*	53.7	75.5	57 WHATLEY CR	56.0	49.1	72.9
154 RAILWAY PDE	59.8	52.9	72.9	59 WHATLEY CR	57.1	50.3	73.4
152 RAILWAY PDE	59.4	52.5	72.0	59 WHATLEY CR	56.8	50.0	72.4
150 RAILWAY PDE	59.5	52.6	72.1	61 WHATLEY CR	57.0	50.1	70.7
148 RAILWAY PDE	55.7	48.8	69.6	61 WHATLEY CR	56.8	50.0	71.1
146 RAILWAY PDE	60.1	53.2	74.7	63 WHATLEY CR	60.8	54.0	77.3
142 RAILWAY PDE	59.9	52.9	74.2	65 WHATLEY CR	61.3	54.6	79.8
140 RAILWAY PDE	60.7	53.8	75.3	67 WHATLEY CR	61.6	54.9	81.0
138 RAILWAY PDE	60.1	53.2	74.8	69 WHATLEY CR	63.4	56.7	82.7
136 RAILWAY PDE	58.8	51.9	72.1	75 WHATLEY CR (Police)	*63.2*	*56.5*	*82.4*
134 RAILWAY PDE	59.0	52.1	73.3	75 WHATLEY CR (Police)	*63.4*	*56.7*	*81.8*
132 RAILWAY PDE	59.2	52.3	74.0	75 WHATLEY CR (Police)	*63.7*	*57.0*	*80.8*
130 RAILWAY PDE	59.4	52.5	74.7	75 WHATLEY CR (Police)	*61.7*	*54.9*	*77.5*

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
128 RAILWAY PDE	59.1	52.2	75.3	79 WHATLEY CR (Commercial)	*61.9*	*55.2*	*80.4*
126 RAILWAY PDE	59.0	52.1	74.9	79 WHATLEY CR (Commercial)	*63.1*	*56.3*	*79.6*
124 RAILWAY PDE	59.9	53.0	72.7	79 WHATLEY CR (Commercial)	*60.4*	*53.5*	*77.8*
122 RAILWAY PDE	57.7	50.9	70.5	79 WHATLEY CR (Commercial)	*58.5*	*51.6*	*72.1*
120 RAILWAY PDE	58.1	51.2	72.0	5 KING WILLIAM ST (Commercial)	*53.9*	*46.8*	*68.2*
118 RAILWAY PDE	59.5	52.7	76.2	1 KING WILLIAM ST (Commercial)	*52.6*	*45.6*	*64.9*
118 RAILWAY PDE	59.0	52.2	*75.0*	7 KING WILLIAM ST (Commercial)	*51.2*	*44.1*	*64.9*
54 BURNSIDE ST	59.9	53.0	72.3	89 WHATLEY CR (Commercial)	*57.3*	*50.4*	*71.8*
52 BURNSIDE ST	60.0	53.0	74.1	89 WHATLEY CR (Commercial)	*54.8*	*47.9*	*67.0*
46 BURNSIDE ST	59.5	52.6	75.1	93 WHATLEY CR	54.7	47.8	66.8
44 BURNSIDE ST	59.8	52.9	75.1	95 WHATLEY CR	55.7	48.8	68.2
42 BURNSIDE ST	59.4	52.5	74.8	97 WHATLEY CR	56.0	49.1	67.9
102 RAILWAY PDE	56.9	50.1	73.7	99 WHATLEY CR	57.3	50.4	69.2
102 RAILWAY PDE	54.8	47.9	71.2	101 WHATLEY CR	57.9	51.0	70.9
102 RAILWAY PDE	53.0	46.1	63.4	101 WHATLEY CR	56.9	50.0	70.5
100 RAILWAY PDE	53.7	46.8	65.2	103 WHATLEY CR	55.2	48.3	67.1
98 RAILWAY PDE	53.5	46.6	65.6	103 WHATLEY CR	59.7	52.8	73.2
96 RAILWAY PDE	52.4	45.5	64.2	105 WHATLEY CR	59.4	52.5	73.0
96 RAILWAY PDE	51.7	44.9	64.8	107 WHATLEY CR	59.8	52.9	72.7
5 COODE ST	51.7	44.9	64.9	109 WHATLEY CR	59.8	52.9	73.0
				111 WHATLEY CR	59.0	52.2	72.6
				111 WHATLEY CR	59.3	52.4	73.3
				113 WHATLEY CR	60.0	53.2	74.0
				115 WHATLEY CR	58.5	51.6	71.6

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
				117 WHATLEY CR	58.5	51.6	72.2
				119 WHATLEY CR	59.4	52.3	72.8
				121 WHATLEY CR	57.9	50.8	74.1
				121 WHATLEY CR	60.0	52.9	73.8
				123 WHATLEY CR	58.5	51.6	74.6
				125 WHATLEY CR	59.4	52.4	73.3
				127 WHATLEY CR	60.3	53.4	75.3
				129 WHATLEY CR	58.9	51.9	73.0
				129 WHATLEY CR	59.1	52.2	73.5
				129 WHATLEY CR	59.8	52.9	73.3
				133 WHATLEY CR	58.9	52.0	73.5
				133 WHATLEY CR	60.1	53.3	75.2
				135 WHATLEY CR	58.4	51.7	75.4
				135 WHATLEY CR	60.8	54.0	77.9
				137 WHATLEY CR	61.0	54.2	78.3
				139 WHATLEY CR	59.9	53.2	76.6
				141 WHATLEY CR	58.8	52.1	75.9
				143 WHATLEY CR	57.7	50.9	73.5
				145 WHATLEY CR	*58.2*	51.3	71.9
				147 WHATLEY CR	*59.7*	52.8	74.7
				2 GARRATT RD	60.0	53.2	71.5
				2 GARRATT RD	61.5	54.7	74.3
				153 WHATLEY CR	60.4	53.7	73.3
				155 WHATLEY CR	59.4	52.7	74.4
				157 WHATLEY CR	59.6	52.9	75.2
				157 WHATLEY CR	59.6	53.0	75.5
				157 WHATLEY CR	59.0	52.4	73.5
				159 WHATLEY CR	59.8	53.1	72.6
				159 WHATLEY CR	54.2	47.4	68.1

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
				161 WHATLEY CR	58.1	51.4	70.2
				163 WHATLEY CR	60.1	53.3	72.0
				165 WHATLEY CR	59.8	52.9	73.5
				167 WHATLEY CR	59.8	52.9	73.7
				169 WHATLEY CR	57.8	50.8	71.4
				169 WHATLEY CR	58.4	51.4	71.6
				169 WHATLEY CR	57.1	50.1	67.0

4.2.4 Interim Scenario

The ultimate design assesses noise from the final rail design, including the MEL project and the final train volumes. The project however will be handing over an interim design whilst constructing the walls for the ultimate design. As such, *Table 4-8* shows the noise levels for the interim design with the ultimate noise walls.

Noise levels are considered compliant with the project criteria, at all but one location, being 53 Whatley Crescent, with the exceedance being marginal at 0.5 dB. Noise levels in this area are generally higher as a result of the up main being closer to these residences. As this will be a temporary issue, noise control may not be warranted. However, it is noted that noise walls in this area are at 1.8 metres high above rail and could therefore be increased to 2.4 metres high if considered necessary.

Table 4-8 Calculated Noise Levels (Interim Scenario) With Walls, dB

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
190 RAILWAY PDE	57.6	50.6	72.9	45 WHATLEY CR	58.9	52.0	75.4
186 RAILWAY PDE	56.5	49.5	70.8	47 WHATLEY CR	58.6	51.7	75.0
184A RAILWAY PDE	59.6	52.7	73.0	49 WHATLEY CR	58.6	51.7	74.6
184D RAILWAY PDE	58.5	51.7	71.0	1 COBDEN ST	59.8	52.9	75.7
182 RAILWAY PDE	52.5	45.6	63.9	1 COBDEN ST	59.5	52.5	75.4
180 RAILWAY PDE	58.1	51.4	72.8	1 COBDEN ST	57.9	50.9	73.0
174 RAILWAY PDE	60.8	54.1	76.8	2 COBDEN ST	58.1	51.1	73.5
170 RAILWAY PDE	63.8	57.1	78.6	2 COBDEN ST	58.9	52.0	75.0
168B RAILWAY PDE	61.6	54.9	76.0	53 WHATLEY CR	59.4	52.4	75.6
168A RAILWAY PDE	62.9	56.2	78.7	53 WHATLEY CR	59.7	52.7	75.0

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
166 RAILWAY PDE	59.4	52.6	71.0	55 WHATLEY CR	58.7	51.8	74.9
164 RAILWAY PDE	58.5	51.7	73.2	55 WHATLEY CR	58.2	51.4	74.1
162 RAILWAY PDE	59.0	52.1	73.7	57 WHATLEY CR	56.9	50.1	74.3
160 RAILWAY PDE	60.0	53.1	72.9	57 WHATLEY CR	57.3	50.5	74.3
156 RAILWAY PDE	*60.0*	53.7	75.5	57 WHATLEY CR	56.0	49.1	72.9
154 RAILWAY PDE	59.8	52.9	72.9	59 WHATLEY CR	57.1	50.3	73.4
152 RAILWAY PDE	59.4	52.5	72.0	59 WHATLEY CR	56.8	50.0	72.4
150 RAILWAY PDE	59.5	52.6	72.1	61 WHATLEY CR	57.0	50.1	70.7
148 RAILWAY PDE	55.7	48.8	69.6	61 WHATLEY CR	56.8	50.0	71.1
146 RAILWAY PDE	60.1	53.2	74.7	63 WHATLEY CR	60.8	54.0	77.3
142 RAILWAY PDE	59.9	52.9	74.2	65 WHATLEY CR	61.3	54.6	79.8
140 RAILWAY PDE	60.7	53.8	75.3	67 WHATLEY CR	61.6	54.9	81.0
138 RAILWAY PDE	60.1	53.2	74.8	69 WHATLEY CR	63.4	56.7	82.7
136 RAILWAY PDE	58.8	51.9	72.1	75 WHATLEY CR (Police)	*63.2*	*56.5*	*82.4*
134 RAILWAY PDE	59.0	52.1	73.3	75 WHATLEY CR (Police)	*63.4*	*56.7*	*81.8*
132 RAILWAY PDE	59.2	52.3	74.0	75 WHATLEY CR (Police)	*63.7*	*57.0*	*80.8*
130 RAILWAY PDE	59.4	52.5	74.7	75 WHATLEY CR (Police)	*61.7*	*54.9*	*77.5*
128 RAILWAY PDE	59.1	52.2	75.3	79 WHATLEY CR (Commercial)	*61.9*	*55.2*	*80.4*
126 RAILWAY PDE	59.0	52.1	74.9	79 WHATLEY CR (Commercial)	*63.1*	*56.3*	*79.6*
124 RAILWAY PDE	59.9	53.0	72.7	79 WHATLEY CR (Commercial)	*60.4*	*53.5*	*77.8*
122 RAILWAY PDE	57.7	50.9	70.5	79 WHATLEY CR (Commercial)	*58.5*	*51.6*	*72.1*
120 RAILWAY PDE	58.1	51.2	72.0	5 KING WILLIAM ST (Commercial)	*53.9*	*46.8*	*68.2*
118 RAILWAY PDE	59.5	52.7	76.2	1 KING WILLIAM ST (Commercial)	*52.6*	*45.6*	*64.9*
118 RAILWAY PDE	59.0	52.2	*75.0*	7 KING WILLIAM ST (Commercial)	*51.2*	*44.1*	*64.9*

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
54 BURNSIDE ST	59.9	53.0	72.3	89 WHATLEY CR (Commercial)	*57.3*	*50.4*	*71.8*
52 BURNSIDE ST	60.0	53.0	74.1	89 WHATLEY CR (Commercial)	*54.8*	*47.9*	*67.0*
46 BURNSIDE ST	59.5	52.6	75.1	93 WHATLEY CR	54.7	47.8	66.8
44 BURNSIDE ST	59.8	52.9	75.1	95 WHATLEY CR	55.7	48.8	68.2
42 BURNSIDE ST	59.4	52.5	74.8	97 WHATLEY CR	56.0	49.1	67.9
102 RAILWAY PDE	56.9	50.1	73.7	99 WHATLEY CR	57.3	50.4	69.2
102 RAILWAY PDE	54.8	47.9	71.2	101 WHATLEY CR	57.9	51.0	70.9
102 RAILWAY PDE	53.0	46.1	63.4	101 WHATLEY CR	56.9	50.0	70.5
100 RAILWAY PDE	53.7	46.8	65.2	103 WHATLEY CR	55.2	48.3	67.1
98 RAILWAY PDE	53.5	46.6	65.6	103 WHATLEY CR	59.7	52.8	73.2
96 RAILWAY PDE	52.4	45.5	64.2	105 WHATLEY CR	59.4	52.5	73.0
96 RAILWAY PDE	51.7	44.9	64.8	107 WHATLEY CR	59.8	52.9	72.7
5 COODE ST	51.7	44.9	64.9	109 WHATLEY CR	59.8	52.9	73.0
				111 WHATLEY CR	59.0	52.2	72.6
				111 WHATLEY CR	59.3	52.4	73.3
				113 WHATLEY CR	60.0	53.2	74.0
				115 WHATLEY CR	58.5	51.6	71.6
				117 WHATLEY CR	58.5	51.6	72.2
				119 WHATLEY CR	59.4	52.3	72.8
				121 WHATLEY CR	57.9	50.8	74.1
				121 WHATLEY CR	60.0	52.9	73.8
				123 WHATLEY CR	58.5	51.6	74.6
				125 WHATLEY CR	59.4	52.4	73.3
				127 WHATLEY CR	60.3	53.4	75.3
				129 WHATLEY CR	58.9	51.9	73.0
				129 WHATLEY CR	59.1	52.2	73.5
				129 WHATLEY CR	59.8	52.9	73.3
				133 WHATLEY CR	58.9	52.0	73.5

North Side Receivers				South Side Receivers			
Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}	Address	$L_{Aeq(Day}$	$L_{Aeq(Night)}$	L_{Amax}
				133 WHATLEY CR	60.1	53.3	75.2
				135 WHATLEY CR	58.4	51.7	75.4
				135 WHATLEY CR	60.8	54.0	77.9
				137 WHATLEY CR	61.0	54.2	78.3
				139 WHATLEY CR	59.9	53.2	76.6
				141 WHATLEY CR	58.8	52.1	75.9
				143 WHATLEY CR	57.7	50.9	73.5
				145 WHATLEY CR	*58.2*	51.3	71.9
				147 WHATLEY CR	*59.7*	52.8	74.7
				2 GARRATT RD	60.0	53.2	71.5
				2 GARRATT RD	61.5	54.7	74.3
				153 WHATLEY CR	60.4	53.7	73.3
				155 WHATLEY CR	59.4	52.7	74.4
				157 WHATLEY CR	59.6	52.9	75.2
				157 WHATLEY CR	59.6	53.0	75.5
				157 WHATLEY CR	59.0	52.4	73.5
				159 WHATLEY CR	59.8	53.1	72.6
				159 WHATLEY CR	54.2	47.4	68.1
				161 WHATLEY CR	58.1	51.4	70.2
				163 WHATLEY CR	60.1	53.3	72.0
				165 WHATLEY CR	59.8	52.9	73.5
				167 WHATLEY CR	59.8	52.9	73.7
				169 WHATLEY CR	57.8	50.8	71.4
				169 WHATLEY CR	58.4	51.4	71.6
				169 WHATLEY CR	57.1	50.1	67.0

5 DISCUSSION

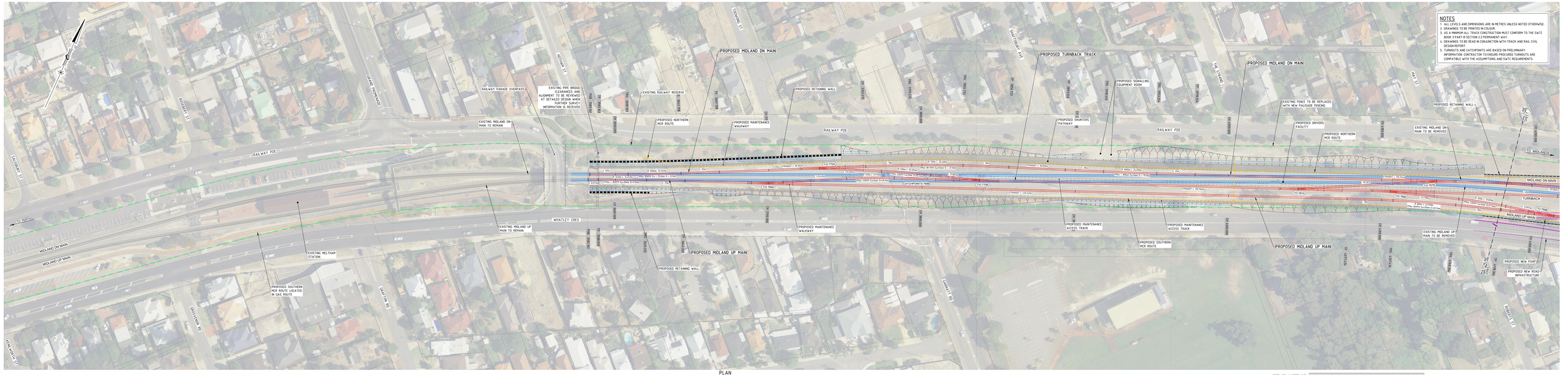
The outcomes of this noise study are:

- The project criteria is determined by both existing noise levels and the target of 60 dB $L_{Aeq(Day)}$, 55 dB $L_{Aeq(Night)}$ and 75 dB L_{Amax} as shown in *Table 4-4*.
- The noise levels of the interim and ultimate scenarios are reasonably similar. The increased train movements are offset by the increased use of 3 car sets rather than 4 car sets, with 3 car sets being quieter.
- The noise wall design is presented in *Figure 4-7A* and *Figure 4-7B*. This requires further input from the design team and is therefore subject to change.
- Walls are to provide minimum R_w 28 performance or where this is unknown, achieve a surface mass of minimum 15kg/m^2. Walls shall be acoustically absorptive on the railway side to minimise reflected noise. Such walls may come as a complete unit (e.g. Acoustisorb supplied by Modular Walls) or as an add on panel (e.g. 50mm thick Reapor supplied by Pyrotek). For NW1 and NW3, this is not mandatory given their separation distance to the railway.
- The wall design is calculated to achieve the project criteria of *Table 4-4*. It is noted that in many instances, the noise levels will be above the current noise target of *State Planning Policy 5.4*. The overall project objectives of *Table 2-1* are to minimise noise as far as reasonably practicable. As such, it is recommended the project also incorporate rail web dampers.
- Walls on the east side of the station and north side of the track have not been assessed, as this will form part of the MEL project.
- No walls are shown on the station platforms themselves. This is on the basis of the station platform being minimum 1.2 metres higher than the top of rail (on the residence side) and this providing barrier. Absorptive panels are to be incorporated on the vertical faces of both sides of the trough shaped bridges near the station. This also assumes the majority of trains (at least 95%) stop at Bayswater Station and therefore their speed approaches 0 km/hr.

Vibration requirements will form part of a separate report, however ballast mat will be used for the entire project with resilient rail fasteners used on the concrete structures.

Appendix A

Ultimate and Interim PDF Plans



PLAN
SCALE 1:500

1500 (A3) / 1:1000 (A1)

NOTES
1. ALL LEVELS AND DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. DRAWINGS TO BE PRINTED IN COLOUR.
3. AS A MINIMUM ALL TRACK CONSTRUCTION MUST CONFORM TO THE SWTC BOOK 3 PART B SECTION 2.2 PERMANENT WAY.
4. DRAWINGS TO BE READ IN CONJUNCTION WITH TRACK AND RAIL CIVIL DESIGN REPORT.
5. TURNOUTS AND CATCHPOINTS ARE BASED ON PRELIMINARY INFORMATION. CONTRACTOR TO ENSURE PROCURED TURNOUTS ARE COMPATIBLE WITH THE ASSUMPTIONS AND SWTC REQUIREMENTS.

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
A1	29.09.2020	ISSUED FOR TON INITIAL DETAILED DESIGNED	RB	CD	EW	PB

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REFERENCES
XREF_DWG_ALIGNMENT_EST_20200807
XREF_PWAY01-A1-ALIGNXTRAC_20200807
XREF_TAS_DESIGN_20200807
XREF_DWG_ALIGNMENT_20200807
XREF_RAIL RESERVE EXISTING_20200807
XREF_RAIL EXISTING_20200807
XREF_PWAY_20200807
XREF_TURNBACK & NEW PERMANENT STN_20200807
XREF_EVOLVE BRIDGE FOOTPRINT_20200807
XREF_EARTHWORKS_20200807
XREF_RAIL ALIGNMENT ULTIMATE_20200807
XREF_PROPOSED ROAD_20200807

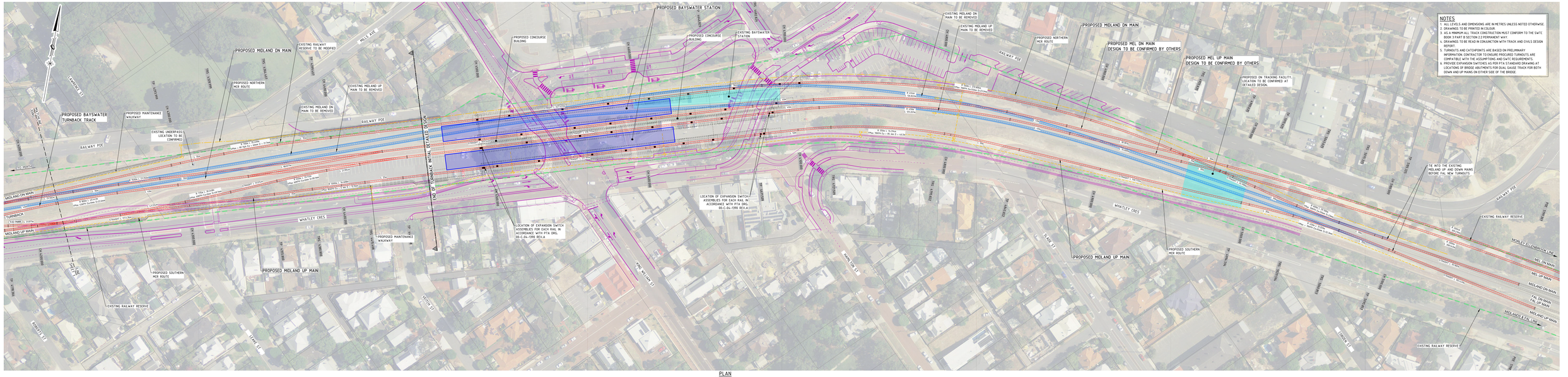
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DATUM	
HORIZONTAL:	PCG94
VERTICAL:	AHD71

DESIGNED	RB
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BAYSWATER STATION
BAYSWATER STATION
PWAY
GENERAL ARRANGEMENT - ULTIMATE - SHEET 1 OF 2
PTA Drawing No: 12-C-13-0128 | Rev: A1

FILE LOCATION: C:\Users\cbryant.supplier\Evolve Group\Team\Projects_and_Jobs\Bayswater\Drawings\Civil\12-C-13-0128.dwg



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REFERENCES
APDC_RAIL ALIGNMENT RST_20200819
APDC_PWAYS-ALIGNMENTRAL_20200819
APDC_FAC DESIGN_20200821
APDC_RAIL ALIGNMENT_20200819
APDC_RAIL RESERVE EXISTING_20200819
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APDC_RAIL_20200819
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BAYSWATER STATION

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5. TURNOUTS AND CATCHPOINTS ARE BASED ON PRELIMINARY INFORMATION. CONTRACTOR TO ENSURE PROCURED TURNOUTS ARE COMPATIBLE WITH THE ASSUMPTIONS AND SWTC REQUIREMENTS.
6. NEW MEL ALIGNMENT NOT SHOWN FOR CLARITY.

PLAN
SCALE 1 : 500

1:500 (A1) / 1:1000 (A3) 0 5m 10 15 20 25 30 35 40 45 50 55 60 65 70 75

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
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REFERENCES
XR12C_RAIL ALIGNMENT BST_20200817
XR12C_P18097-X-CADASTRAL_20200817
XR12C_CAD DESIGN_20200817
XR12C_RAIL EARTHWORKS_20200817
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XR12H_TURNBACK & NEW PERMANENT STN_20200817
XR12S_EVOLVE BRIDGE FOOTPRINT_20200817
XR12C_LINEMARKING_20200817
XR12I_PROPOSED COMMS_20200817

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VERTICAL: AHD71

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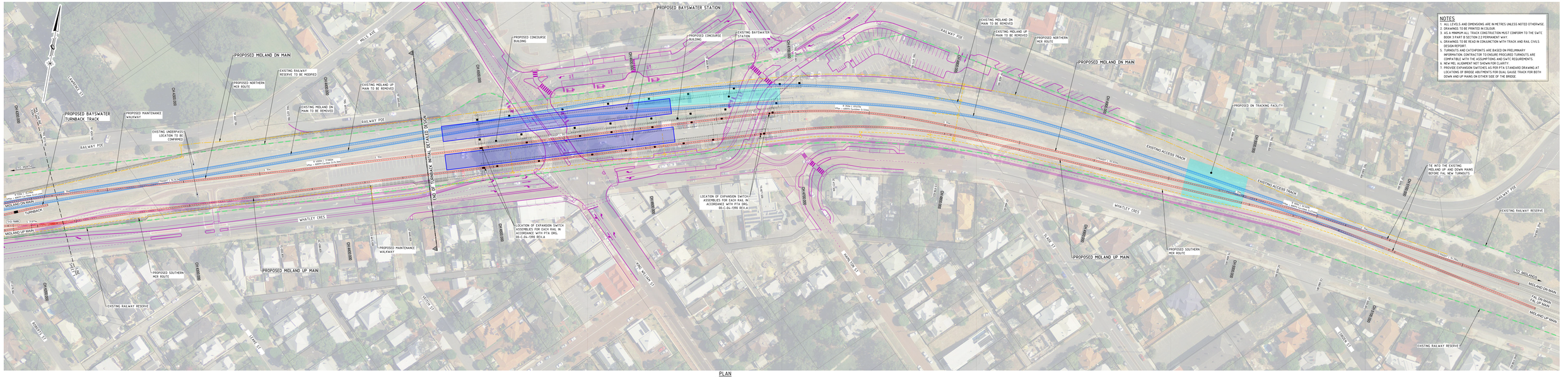
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BAYSWATER STATION

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GENERAL ARRANGEMENT SHEET 1 OF 2

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PLAN
SCALE 1 : 500

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6. NEW MEL ALIGNMENT NOT SHOWN FOR CLARITY.
7. PROVIDE EXPANSION SWITCHES AS PER PTA STANDARD DRAWING AT LOCATIONS OF BRIDGE ABUTMENTS FOR DUAL GAUGE TRACK FOR BOTH DOWN AND UP MAINS ON EITHER SIDE OF THE BRIDGE.

REV	DATE	AMENDMENT	DSN	DRN	CHK	APP
B1	29.09.2020	ISSUED FOR TON INITIAL DETAILED DESIGNED	RB	CD	EW	PB
A	17.08.20	ISSUED FOR TON INITIAL DETAILED DESIGNED	DN	CD	EW	PB

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REFERENCES
APDC_RAIL ALIGNMENT RST_20200819
APDC_PWAY&FA-FLASHATING_20200819
APDC_FAC DESIGN_20200817
APDC_RAIL RESERVE_20200819
APDC_ RAIL RESERVE EXISTING_20200819
APDC_RAIL EXISTING_20200819
APDC_RAIL_20200819
APDC_EVOLVE BRIDGE FOOTPRINT2_20200819
APDC_LINEMARKING_20200819
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BAYSWATER STATION
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GENERAL ARRANGEMENT SHEET 2 OF 2
PTA Drawing No: 12-C-13-0127 | Rev: B1

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Appendix B

Design Review

Appendix C

Terminology

The following is an explanation of the terminology used throughout this report.

Decibel (dB)
The decibel is the unit that describes the sound pressure and sound power levels of a noise source. It is a logarithmic scale referenced to the threshold of hearing.

A-Weighting
An A-weighted noise level has been filtered in such a way as to represent the way in which the human ear perceives sound. This weighting reflects the fact that the human ear is not as sensitive to lower frequencies as it is to higher frequencies. An A-weighted sound level is described as L_A dB.

L_1
An L_1 level is the noise level which is exceeded for 1 per cent of the measurement period and is considered to represent the average of the maximum noise levels measured.

L_{10}
An L_{10} level is the noise level which is exceeded for 10 per cent of the measurement period and is considered to represent the "*intrusive*" noise level.

L_{90}
An L_{90} level is the noise level which is exceeded for 90 per cent of the measurement period and is considered to represent the "*background*" noise level.

L_{eq}
The L_{eq} level represents the average noise energy during a measurement period.

$L_{A10,18hour}$
The $L_{A10,18\ hour}$ level is the arithmetic average of the hourly L_{A10} levels between 6.00 am and midnight. The *CoRTN* algorithms were developed to calculate this parameter.

$L_{Aeq,24hour}$
The $L_{Aeq,24\ hour}$ level is the logarithmic average of the hourly L_{Aeq} levels for a full day (from midnight to midnight).

$L_{Aeq,8hour}$ / $L_{Aeq\ (Night)}$
The $L_{Aeq\ (Night)}$ level is the logarithmic average of the hourly L_{Aeq} levels from 10.00 pm to 6.00 am on the same day.

$L_{Aeq,16hour}$ / $L_{Aeq\ (Day)}$
The $L_{Aeq\ (Day)}$ level is the logarithmic average of the hourly L_{Aeq} levels from 6.00 am to 10.00 pm on the same day. This value is typically 1-3 dB less than the $L_{A10,18hour}$.

Noise-sensitive land use and/or development
Land-uses or development occupied or designed for occupation or use for residential purposes (including dwellings, residential buildings or short-stay accommodation), caravan park, camping ground, educational establishment, child care premises, hospital, nursing home, corrective institution or place of worship.

About the Term 'Reasonable'

An assessment of reasonableness should demonstrate that efforts have been made to resolve conflicts without comprising on the need to protect noise-sensitive land-use activities. For example, have reasonable efforts been made to design, relocate or vegetate a proposed noise barrier to address community concerns about the noise barrier height? Whether a noise mitigation measure is reasonable might include consideration of:

- The noise reduction benefit provided;
- The number of people protected;
- The relative cost vs benefit of mitigation;
- Road conditions (speed and road surface) significantly differ from noise forecast table assumptions;
- Existing and future noise levels, including changes in noise levels;
- Aesthetic amenity and visual impacts;
- Compatibility with other planning policies;
- Differences between metropolitan and regional situations and whether noise modelling requirements reflect the true nature of transport movements;
- Ability and cost for mobilisation and retrieval of noise monitoring equipment in regional areas;
- Differences between Greenfield and infill development;
- Differences between freight routes and public transport routes and urban corridors;
- The impact on the operational capacity of freight routes;
- The benefits arising from the proposed development;
- Existing or planned strategies to mitigate the noise at source.

About the Term 'Practicable'

'Practicable' considerations for the purposes of the policy normally relate to the engineering aspects of the noise mitigation measures under evaluation. It is defined as "reasonably practicable having regard to, among other things, local conditions and circumstances (including costs) and to the current state of technical knowledge" (*Environmental Protection Act 1986*). These may include:

- Limitations of the different mitigation measures to reduce transport noise;
- Competing planning policies and strategies;
- Safety issues (such as impact on crash zones or restrictions on road vision);
- Topography and site constraints (such as space limitations);
- Engineering and drainage requirements;
- Access requirements (for driveways, pedestrian access and the like);
- Maintenance requirements;
- Bushfire resistance or BAL ratings;
- Suitability of the building for acoustic treatments.

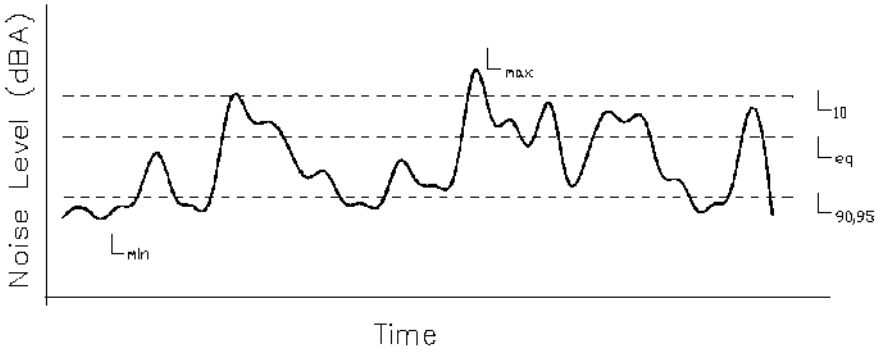
R_w

This is the weighted sound reduction index and is similar to the previously used STC (Sound Transmission Class) value. It is a single number rating determined by moving a grading curve in integral steps against the laboratory measured transmission loss until the sum of the deficiencies at each one-third-octave band, between 100 Hz and 3.15 kHz, does not exceed 32 dB. The higher the R_w value, the better the acoustic performance.

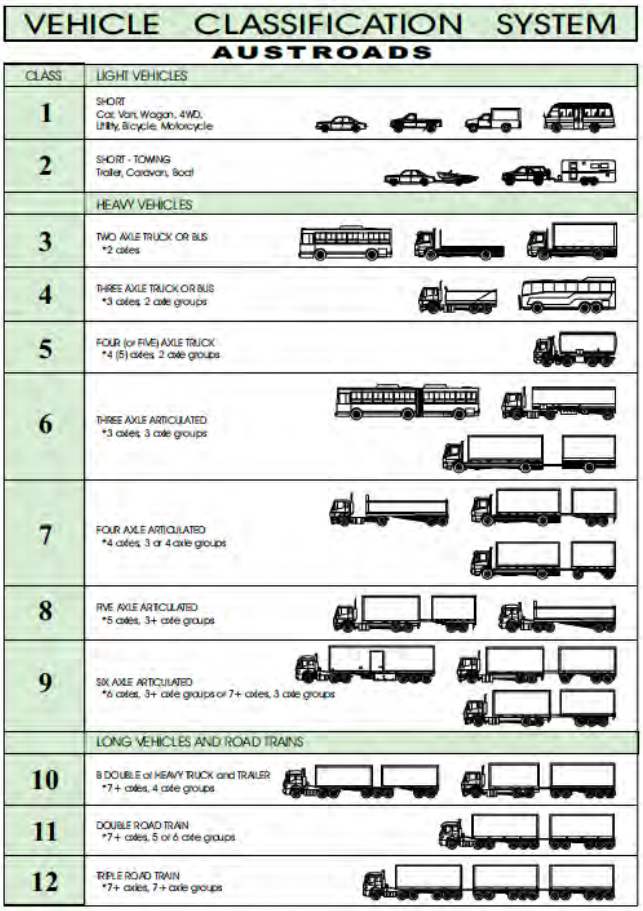
C_{tr}

This is a spectrum adaptation term for airborne noise and provides a correction to the R_w value to suit source sounds with significant low frequency content such as road traffic or home theatre systems. A wall that provides a relatively high level of low frequency attenuation (i.e. masonry) may have a value in the order of –4 dB, whilst a wall with relatively poor attenuation at low frequencies (i.e. stud wall) may have a value in the order of -14 dB.

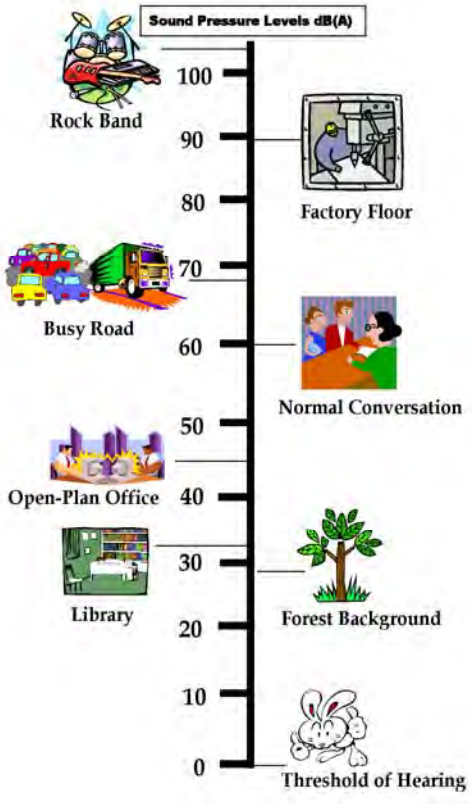
Chart of Noise Level Descriptors



Austroads Vehicle Class



Typical Noise Levels



Appendix J

Traffic and Transport Management Plan prepared by Evolve Bayswater

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PTA

BAYSWATER STATION AND TURNBACK

PTA190037

TRAFFIC & TRANSPORT MANAGEMENT PLAN

BST-EVO-TM-PLN-00002

AUTHORISED TO USE: _____(ALLIANCE MANAGER), DATE: _____

Submit to Client for Review and Approval where required in the Contract (Client to complete one box only):				
❑	Rejected, resubmit	Name:	Sign:	Date:
❑	Endorsed, with comments to add or change	Name:	Sign:	Date:
❑	Endorsed	Name:	Sign:	Date:

Rev	Date	Reason for Issue	Prepared	Checked	Approval
A	13/11/19	Draft - Issued for Comment	Travis Green	Michelle Dehais	Travis Tremain
B	15/06/20	For Stakeholder Review	Travis Green	Michelle Dehais	Travis Tremain
C	17/07/2020	For Stakeholder Review	Travis Green	Michelle Dehais	Travis Tremain
D	27/07/2020	For Stakeholder Review	Travis Green	Michelle Dehais	Travis Tremain
E	21/08/2020	For Stakeholder Review	Travis Green	Michelle Dehais	Travis Tremain
0	28/08/2020	Final	Travis Green	Michelle Dehais	Travis Tremain
1	15/9/2020	Issued for approval	Travis Green	Michelle Dehais	Travis Tremain

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Compliance Matrix

7100-000-003 Safety Management Systems Contractor Standard Clause No.	Section/Description	Section in TTMP Rev C
5.5	**Traffic Management** The Contractor must issue 4 weeks prior to commencing work a traffic management plan (TMP) specific to the involved stage of works when the work activity has the potential of impeding vehicular, cycling and/or pedestrian traffic inside or outside PTA land. The TMP must be accordance with any development approval conditions, and must detail the following:	
	• Defined roles and responsibilities under the plan	6.3
	• Details of any sequence of changes to existing traffic arrangements presented on plans and their timing (including permanent and temporary traffic diversion), along with anticipated impacts	2.3
	• Method of management of construction traffic, including site access and security	7.3.5
	• Details of any temporary works, including design and construction standards	5.3
	• Methods of communication of any traffic changes to the public	5.7.2
	• Appropriate provisions for special events	5.4.7
	• Emergency and incident response plans	8.0
	• Bulk material haulage routes	5.4.4
	• Method of management of maintenance or replacement of signs and devices, including after-hours monitoring	7.3.1 / 9.1
	• Specific arrangements for the movement of vehicles, pedestrians, cyclists and the disabled	5.4.1 / 5.4.2
	• How the Contractor will update the plan in response to any incidents arising from the works or changes in approach to construction that would influence traffic management arrangements	10.0
	• How the Contractor will minimise interference to traffic flow on and in the vicinity of any construction sites and make adequate provision for the safe and efficient movement of all legal road users, pedestrians, cyclists and public transport passengers	5.2.4.4
	• Describe how the Contractor will ensure traffic control measures will be in accordance with Main Roads Western Australia (MRWA) traffic management requirements for works on roads available on the MRWA website	10.2
	• Describe how street lighting will be maintained and operated to provide at least the existing lighting levels at all times during	5.2.4.9

	the works. Temporary lighting must be provided where lighting is diminished by the work or traffic is detoured	
	• Detail the various proposed temporary and permanent traffic layout strategies and summarise the likely impacts from the, if applicable, traffic modelling	2.3
	• Detail how the Contractor will comply with any order given by the Australian Federal Police, the WA Police Service, a relevant Government Agency or the PTA in respect of traffic and transport management. The Australian Federal Police, the WA Police Service, a relevant Government Agency or PTA may, at any time, order the Contractor to re-open a track, lane, shoulder, footpath and/or shared path without delay, whether or not that track, lane, shoulder, footpath or shared path was closed by prior agreement. The Contractor must immediately comply with such orders	8.6
	• Include a comprehensive register which details all temporary traffic control measures in place during the course of works and the timing of their implementation and removal. This register must be made available for inspection by PTA at all times and must be supplied as part of the as constructed information	2.3
5.5	The TMP must ensure:	
	• That traffic flow on roads must not be interrupted without the approval of relevant Government Agencies and that detouring of public transport services must be approved by Transperth	10.3
	• That any temporary road closures must be carried out in accordance with section 3.50 of the Local Government Act 1995 (WA)	5.3.9
	• When site activities impact a public road, the TMP must meet the requirements of the Australian Standard Manual of Uniform Traffic Control Devices AS 1742 using Australian Standard Part 3: Traffic Control Devices to Works on Road AS 1742.3	5.2.4 & throughout TTMP
	The TMP must state that as the works proceed, the TMP will be supplemented by approved proposals to change traffic management arrangements so that it becomes a complete record of traffic management for the Contractor's activities. The approved proposals must be added sub-plans (traffic control plans) to the TMP.	2.3
5.5.1	**Pedestrian/Cyclist Requirements** Where applicable, the TMP must detail the following bicycle provisions:	
	• How the Contractor will plan and execute the works to ensure safe cycling conditions are maintained at all times during the works	5.4.1
	• How the Contractor will comply with "AustRoads Guide to Traffic Engineering Practice - Part 14 - Bicycles" in relation to the measures to be taken to ensure safe cycling conditions	5.4.2

	• How the Contractor will ensure that any temporary or modified provisions for bicycles will comply with the requirements of relevant Government Agencies.	5.4.1
	• State that as a minimum, the temporary or modified bicycle provision must be to the same standard as the existing bicycle provision it is replacing.	5.4.1
5.5.2	**Pedestrian Provisions** The TMP must detail the following pedestrian provisions:	
	• How the Contractor will plan and execute its activities to ensure safe pedestrian conditions are maintained at all times during the works	5.4.1
	• How the Contractor will comply with "AustRoads Guide to Traffic Engineering Practice - Part 15 – Pedestrians" in relation to the measures to be taken to ensure safe pedestrian conditions	5.4.1
	• How the Alliance will ensure that any temporary or modified provisions for pedestrians will comply with the requirements of relevant Government Agencies	5.4.1
	• State that as a minimum, the temporary or modified pedestrian provision must be to the same standard as the existing pedestrian provision it is replacing	5.4.1

Abbreviations and Acronyms

Term	Definition
AWTM	Advanced Worksite Traffic Management
BWTM	Basic Worksite Traffic Management
CAH	Controlled Access Highway
CAR	Corrective Action Report
CIC	Customer Information Centre
COB	City of Bayswater
COP	Code of Practice
FWY	Freeway
TGS	Traffic Guidance Scheme
HVO	Heavy Vehicle Operations
HVS	Heavy Vehicle Services
HWY	Highway
IFC	Issued For Construction
LGA	Local Government Authority
MRWA	Main Roads Western Australia
OS&H	Occupational Safety and Health
OSH MR	Occupational Safety and Health Main Roads Representative
PShP	Principal Shared Path
RNOC	Road Network Operations Centre
RSA	Road Safety Audit(or)

Term	Definition
RTM	Roadworks Traffic Manager
SCATS	Sydney Co-ordinated Adaptive Traffic System
SIDRA	Signalised and un-signalised Intersection Design and Research Aid
SWTC	Scope of Work and Technical Criteria
TC	Traffic Controller
TCP	Traffic Control Plan
TGS	Traffic Guidance Scheme
TMA	Truck/Trailer Mounted Attenuator
TRD	Temporary Road Design
TTM	Temporary Traffic Management
TTMP	Traffic and Transport Management Plan
VMS	Variable Message Sign
WTM	Worksite Traffic Management

1.0 Background

1.1 Introduction

METRONET is the State's vision to integrate transport and land use planning in the State and provide a framework to support sustainable growth of greater metropolitan Perth over the next 50 to 100 years. Aligned with Commonwealth planning and infrastructure policies and the State's metropolitan growth strategies, *Perth and Peel @ 3.5 million* and *Transport @ 3.5 million*, METRONET Initiatives will deliver around 70 kilometres of new passenger rail and up to 18 new stations.
More than just rail infrastructure works, METRONET recognises the potential for urban intensification in more than 5,000 hectares of land. Planning goes beyond the station forecourts to shape and support development of communities within a walkable distance of 400 metres from a public transport hub.
METRONET Initiatives include approximately 70 kilometres of new heavy passenger rail and 16 new rail stations, which represents the single largest investment in public transport in Perth's history.
The State has prioritised the following METRONET Initiatives:

- Forrestfield – Airport Link;
- Thornlie – Cockburn Link;
- Yanchep Rail Extension;
- Morley – Ellenbrook Line;
- Extension of the Armadale Line to Byford;
- Bayswater Station Upgrade
- New station at Karnup
- New station at Bellevue
- Station upgrade and relocation of Midland Station to Cale Street;
- Extension of the Midland Line to Bellevue; and
- Level crossing removal program.

1.2 Bayswater Station and Turnback Project

The Bayswater Station and Turnback Project as incorporated in the PAA for the Project includes:

- Stage One: The Turnback Works;
- Stage Two: The Bayswater Station Southern Section; and
- Stage Three: The Bayswater Station Northern Section.

1.3 Stage One: Turnback Works

Stage One: Turnback Works comprises the following:

- New turnback siding between Bayswater and Meltham stations (configured to provide accommodation for 1 x 6 car sets);
- A shunters path (walkway) and a new driver's washroom;
- Relocation of the Leake Street underpass;
- Maintenance of the principle shared path along the southern side of the railway reserve; and
- Other Project works including standard station systems, signaling, overhead line electrifications, communications, utility relocations and noise mitigation.

1.4 Stage Two: The Bayswater Station Southern Section

Stage Two: The Bayswater Station Southern Section, comprises the following:

- Two new rail bridges over King William Street, immediately south of the existing railway;
- New station island platform (150m long and 10m wide) complete with associated infrastructure and supported by the railway bridges;
- Provision for the principle shared path on the southern side of the southern railway bridge
- The first stage of western and eastern entry buildings complete with fare gates, commuter access to the platforms (lifts and stairs) and equipment rooms to service railway operations:
- Integrated pedestrian, cyclist, bus and vehicle access into the station and future Bayswater town centre;
- Relocation of the dual gauge tracks and all associated track infrastructure to align with the new platform faces;
- New bus bays and vehicle parking bays;
- Other Project works including standard station systems, signaling, overhead line electrifications, communications, utility relocations and noise mitigation; and
- Landscaping and urban design features within the station precinct.

1.5 Stage Three: The Bayswater Station Northern Section

Stage Three: The Bayswater Station Northern Section comprises the following:

- Demolition of the existing Bayswater station and associated infrastructure.
- A second set of two new rail bridges over King William Street, located immediately north of the first new set of railway bridges delivered as part of Stage One;
- A second island platform (150m long and 10m wide) complete with station infrastructure again supported by the northern pair of railway bridges;
- The second stage of the western and eastern entry buildings complete with fare gates, commuter access to the platforms (lifts and stairs) and retail tenancies:
- Additional station infrastructure to meet the needs of the expanded (4-line, 4 platform face) station;
- Landscaping and urban design features within the station precinct;
- Other Project works including standard station systems, signaling, overhead line electrifications, communications, utility relocations and noise mitigation;
- Completion of new bus bays and vehicle parking bays; and
- Landscaping and urban design features within the station precinct.

1.6 Optional Works Packages

The METRONET Initiatives include for other additional Project Works beyond the scope listed in 1.2.1, 1.2.2 and 1.2.3 above and these may be included during the Delivery Phase.

2.0 Introduction

2.1 Purpose and Scope

This Traffic and Transport Management Plan (TTMP) outlines the traffic control and traffic management procedures to be implemented by Evolve Bayswater to manage potential hazards associated with the traffic environment during the project.

The project will deliver a series of key road network and rail network changes that include multiple stages. The TTMP will outline how the temporary changes to the road and path network will be managed to maintain the safety for all stakeholders.

2.1.1 Integration Within Evolve Bayswater Project Management Framework

Our proposed project management system (shown in Figure 1) shows full integration of proven management plans and sub-plans that will facilitate a seamless approach to design and construction, assurance, organisation and value creation management. This TTMP is to be read in conjunction with the Safety Management Plan, which complies with the requirements of Book 2 of the SWTC.

Our project management systems are underpinned by strong governance and compliance management, and clearly embodies Alliances objectives and success factors.

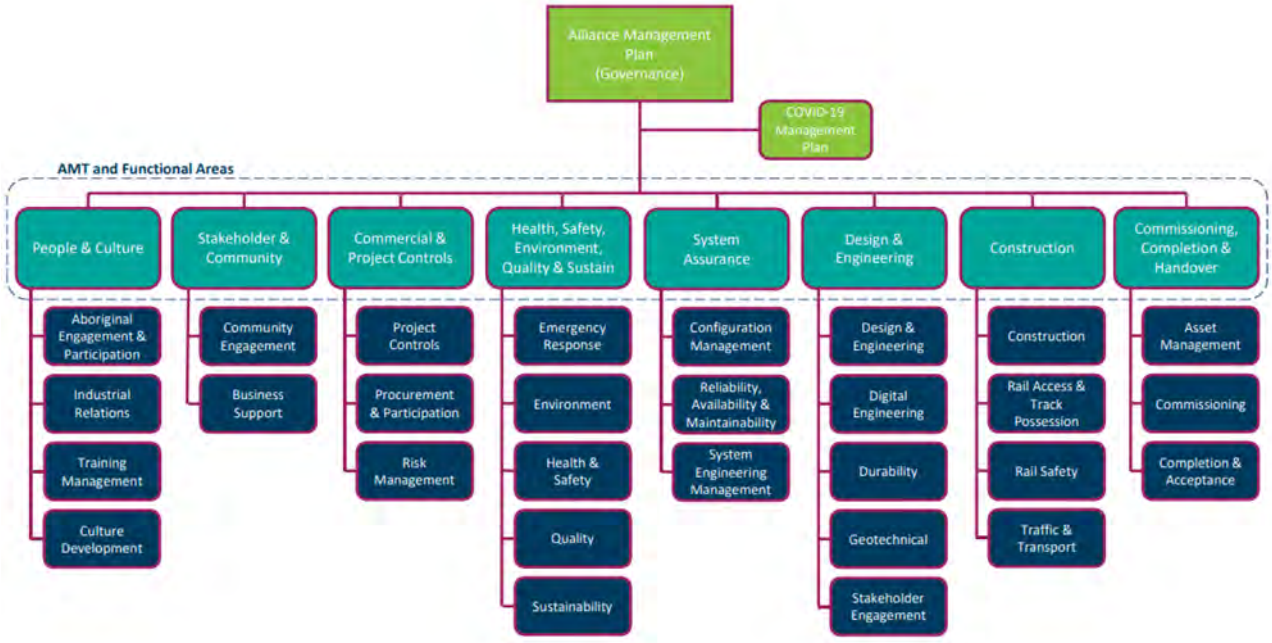


Figure 1 – Project Management Systems Framework

2.2 Objectives and Strategies

The objectives of the TTMP are:

- To provide protection to workers and the general public from traffic hazards that may arise as a result of the construction activity.
- To manage potential adverse impacts on traffic flows to ensure network performance is maintained at an acceptable level.

- To minimise adverse impacts on users of the road reserve and adjacent properties and facilities.

In an effort to meet these objectives the Traffic Management Plan will incorporate the following strategies:

- Providing a sufficient number of traffic lanes to accommodate vehicle volumes.
- Ensuring delays are minimised.
- Ensuring all road users are managed including motorists, pedestrians, cyclists, people with disabilities and people using public transport.
- Ensuring work activities are carried out sequentially to minimise adverse impacts.
- Provision will be made for works personnel to enter the work area in a safe manner in accordance with safety procedures.
- All entry and exit movements to and from traffic streams shall be in accordance with the requirements of safe working practices.
- Developing contingency plans to manage incidents/events that will significantly impact traffic flows.

2.3 Integration with Traffic Control Plans

Due to the nature of this project, it is not possible to include details for all of the planned works in this document. Instead, addendums to this TTMP will be created, referred to as Traffic Control Plans (TCPs), which will be submitted to PTA and relevant authorities for approval prior to use. These will follow the same structure as a TTMP, but will contain site-specific information, including risk analysis, traffic volumes and flow analysis, work overviews, impact on road users, and Traffic Guidance Schemes (TGSs).

The TCPs are to be read in conjunction with the TTMP. With this in mind, numerous sections of the TCP will be omitted, as they are duplicates of the corresponding section in the TTMP. These section headings will remain but will simply refer the reader to the TTMP document.

TCPs will present:

- Details of any sequence of changes to existing traffic arrangements, their timing (including permanent and temporary traffic diversion) and anticipated impacts will be presented in the TCPs and/or Traffic Control Diagrams (TCDs).
- The various proposed temporary and permanent traffic layout strategies and summarises the likely impacts from the, if applicable, traffic modelling
- A comprehensive register which details all temporary traffic control measures in place during the course of works and the timing of their implementation and removal. This register will be made available for inspection by PTA at all times and supplied as part of the as constructed information.

The process for the development and implementation of Traffic Control Plans are found in Section 5.2 and Section 7.0 respectively. The TCPs will need to be approved by the relevant authority / land owner (LGA or MRWA)

3.0 Project Overview

3.1 Location

The Bayswater Station is located at the Bayswater Town Centre and adjacent area. The project is located in the vicinity of the junction of the following roads:

- Railway Parade
- King William Street.
- Whatley Crescent
- Coode Street
- Beechboro Road South
- Railway Pde
- Hamilton Street



Figure 3 – Site Location.

3.2 Project Details, Site Assessment and Site Constraints/Impacts

Project Title	Bayswater Station and Turnback Project
Location	Bayswater: • Railway Parade • King William Street. • Whatley Crescent • Coode Street • Beechboro Road South • Railway Pde • Hamilton Street
Road Classification, Existing Speed Limit	King William St: District Distributor A, 60/40km/h Coode St: District Distributor A, 60km/h Railway Pde (East of Coode St): District Distributor A, 50km/h Railway Pde (West of Coode St): Access St, 50km/h Whatley Crescent (East of King William St): Local Distributor, 50km/h (currently 30km/h temporary road works zone is in operation) Whatley Crescent (West of King William St): District Distributor A, 60 km/h
Road Authority	Main Roads Western Australia
Local Government	City of Bayswater
Client	Public Transport Authority
Main Contractor	Evolve Bayswater
Sub-Contractor	TBA
Scope of Works	The project involves the following: - Constructing a new four-platform station, with passenger amenities and long enough to accommodate six-car trains, on a higher rail bridge over King William-Coode streets. This requires removing all passenger parking along Whatley Crescent - Building an elevated Principal Shared Path along the Whatley Crescent side of the rail bridge - Additional rail infrastructure between Bayswater and Meltham stations

	- Upgrading the pedestrian underpass at Leake Street - Whatley Crescent-Beechboro Road South connection under the railway, and surrounding road works, such as reconfiguring the King William Street-Whatley Crescent intersection and reducing Whatley Crescent to two lanes (one in each direction) through the town centre - Hamilton Street public space that follows the area's natural geography for pedestrian connections from lowered a Whatley Crescent to Hamilton Street - Removing Coode Street-Railway Parade signalised intersection and reconfiguring the King William Street-Whatley Crescent intersection to introduce pedestrian priorities - Two station entrances to reduce passengers crossing roads and provide alternative emergency exits - Integrating bus services with the local road network without requiring buses to turn in residential streets or operate from a large bus interchange within the town centre
Staging of Works	To be confirmed and detailed from Construction methodologies and against program.
Project Dates	2020 to 2023
Hours/Days of Works	Monday to Saturday 7am to 7pm
Traffic Management Implementation	TBC
Project Duration	142 weeks
Site Constraints	The following constraints have been taken into consideration in the design of this TTMP: - Volumes of traffic on existing routes (including effects from local schools, town centre, shopping centres, and recreational and community facilities) - Site access to rail corridor - Construction activity requirements - Project-specific requirements from Specification 202 and SWTC - Maintenance of pedestrian and cycle facilities including network PShP.

	- Maintenance of functional access for local residential properties, town centre commercial properties and cross network movements. - Works in proximity to active railways. - Maintenance of safe pedestrian high capacity access to the Bayswater Station. - Closure of network roads to facilitate high risk construction activities such as Bridge beam installation or Bridge demolition where located over active roads
Concurrent/Adjacent Works or Projects	Forrestfield Airport Link project: is currently underway immediately east of the Bayswater Station. This work is progressing toward completion, however there will likely be overlap between the projects initially. Tonkin Hwy Gap Project: This road and tunnel project will potentially result in some interface of works or major closure management systems. Morley Ellenbrook Line Project: Project will connect to the east of the Bayswater Station and is likely to commence during the period of this project. Evolve Bayswater will maintain contact with Main Roads RNOC throughout the project to ensure interactions with adjacent works can be managed.

3.3 Existing Traffic and Road Environment

Item	Description
Traffic Volume and Composition	King William St: 12,800 vpd, 6.5% heavy Coode St (at Underpass): 32,827 vpd Coode St (north of Beechboro Rd S): 12,458 vpd, 6.9% heavy vpd Railway Pde (East of Coode St): 12,060 vpd, 8.2% heavy Railway Pde (West of Coode St): 823 vpd, 8.6% heavy Whatley Crescent (East of King William St): 3,287vpd, 6.7% heavy Whatley Crescent (West of King William St): 18,686 vpd
Existing road configuration	King William St: Single carriageway – single lane per direction Coode St (north of Beechboro Rd S): Single carriageway – single lane per direction Railway Pde (East of Coode St): Single carriageway – single lane per direction Railway Pde (West of Coode St): Single carriageway – single lane per direction (Local Street) Whatley Crescent (East of King William St): Single carriageway – single lane per direction Whatley Crescent (West of King William St): carriageway – two-lanes per direction
Existing pedestrian / cyclist facilities	Pedestrian facilities are in typically below standard condition, old legacy town centre “High St” style facilities. A High standard PShP is provided on the south side of the Railway line carrying approximately 600 cyclist per day.

3.4 Overview of Proposed TTMP

Item	Description
Temporary Traffic Management Descriptions	Separate TCPs will be developed as addendums to this Traffic and Transport Management Plan for implementation of individual traffic management scenarios. These will include both complex and non-complex plans.
Speed zone dates and times	Speed reductions shall be detailed within the individual works specific TCPs
Lane Closures dates and times	Details of lane closure dates and times will be detailed in individual works specific TCPs.
Road Closures dates and times	Details of road and/or PShP closures/detours, dates and times will be detailed in individual TCPs.
Signal modifications description	Details of signal modifications will be detailed in individual TCPs, where required and designed by a suitably experienced designer.
Proposed lane widths	3.1m minimum
Road Safety Barrier	To be detailed within individual TCPs.
Sweep Paths	Sweep paths of all vehicle classes at relocated lanes will be detailed in works specific TCPs.
Incidents / Events	Contingencies for incidents/events that may impact traffic flows will be detailed in works specific TCPS.

3.5 Project Representatives

Position	Name	Contact Details
Road Authority Representative	Name **Main Roads Western Australia**	**Address:** Waterloo Crescent, EAST PERTH WA 6004 **Phone:** 138 138 **Fax:** - **Mobile:** TBC **Email:**
Local Government	**City of Bayswater**	**Address:** 61 Broun Avenue, Morley **Phone:** (08) 9272 0665 **Fax:** **Email:** mail@bayswater.wa.gov.au
Construction Manager	Travis Tremain **Evolve Bayswater**	**Address: Suite 3, 3 Craig Street Burswood** **Phone:** - **Fax:** - **Mobile:** 0412 200 895 **Email: travis.tremain@evolvebayswater.com.au**
General Superintendent	Jonathan Cannon **Evolve Bayswater**	**Address: Suite 3, 3 Craig Street Burswood** **Phone:** - **Fax:** - **Mobile:** 0414 443 526 **Email: jonathan.cannon@evolvebayswater.com.au**
Traffic Manager	TBC **Strada Consultants**	**Address: Level 1, Suite 10, 2 Hardy Street, South Perth WA 6151** **Phone:** - **Mobile:** - **Email: TBC**
Traffic Management Implementation Provider	TBC **TBC**	**Address:** - **Phone:** - **Mobile:** - **Email:** -

Evolve Bayswater have engaged Strada Consultants to prepare this TTMP and associated controls for the works. Both TCPs and TGSs will be developed together with Strada Consultants involvement.

The organisation and resource who will be implementing the TTMP is yet to be confirmed. They will be registered for TTMP implementation on state-controlled roads. Once the Traffic Management Implementation Provider has been confirmed, TTMP and TCPs will be updated accordingly.

4.0 Risk Management

The following details the preliminary assessment of site hazards likely to be encountered, the level of risk associated with each and the control proposed. Note that the risk level is the level of assessed risk *without* the controls in place. The controls listed have been determined as being appropriate in reducing the risk to a level that is acceptable.

The hierarchy of control has been utilised to ensure that the highest practicable level of protection and safety is selected:

- Elimination
- Substitution
- Isolation
- Engineering
- Administration
- Personal Protection Equipment

In evaluating the risks, a key consideration is whether there is an option to take the traffic around, through or past the worksite.

4.1 Risk Classification Tables

4.1.1 Qualitative Measures Of Consequence Or Impact

Level	Consequence	Description
1	**Insignificant**	Mid-block hourly traffic flow per lane is equal to or less than the allowable lane capacity detailed in AS1742.3. No impact to the performance of the network. Affected intersection leg operates at a Level of Service (LoS) of A or B. No property damages.
2	**Minor**	Mid-block hourly traffic flow per lane is greater than the allowable road capacity and less than 110% of the allowable road capacity as detailed in AS1742.3. Minor impact to the performance of the network. Intersection performance operates at a Level of Service (LoS) of C. Minor property damage.
3	**Moderate**	Midblock hourly traffic flow per lane is equal to and greater than 110% and less than 135% of allowable road capacity as detailed in AS1742.3. Moderate impact to the performance of the network. Intersection performance operates at a Level of Service (LoS) of D. Moderate property damage.
4	**Major**	Midblock hourly traffic flow per lane is equal to and greater than 135% and less then170% of allowable road capacity as detailed in AS1742.3. Major impact to the performance of the network. Intersection performance operates at a Level of Service (LoS) of E. Major property damage.
5	**Catastrophic**	Midblock hourly traffic flow per lane is equal to and greater than 170% of allowable road capacity as detailed in AS1742.3. Unacceptable impact to the performance of the network. Intersection performance operates at a Level of Service (LoS) of F. Total property damage.

4.1.2 OSH Qualitative Measures Of Consequence Or Impact

Level	Consequence	Description
1	**Insignificant**	No treatment required
2	**Minor**	First aid treatment required.
3	**Moderate**	Medical treatment required or Lost Time Injury
4	**Major**	Single fatality or major injuries or severe permanent disablement
5	**Catastrophic**	Multiple fatalities.

4.1.3 Qualitative Measures Of Likelihood

Level	Likelihood	Description
A	**Almost Certain**	The event or hazard: is expected to occur in most circumstances, will probably occur with a frequency in excess of 10 times per year.
B	**Likely**	The event or hazard: Will probably occur in most circumstances, will probably occur with a frequency of between 1 and 10 times per year.
C	**Possible**	The event or hazard: might occur at some time, will probably occur with a frequency of 0.1 to 1 times per year (i.e. once in 1 to 10 years).
D	**Unlikely**	The event or hazard: could occur at some time, will probably occur with a frequency of 0.02 to 0.1 times per year (i.e. once in 10 to 50 years).
E	**Rare**	The event or hazard: may occur only in exceptional circumstances, will probably occur with a frequency of less than 0.02 times per year (i.e. less than once in 50 years).

IMPORTANT NOTE: The likelihood of an event or hazard occurring shall first be assessed over the duration of the activity (i.e. "period of exposure"). For risk assessment purposes the assessed likelihood shall then be proportioned for a "period of exposure" of one year.

Example: An activity has a duration of 6 weeks (i.e. "period of exposure" = 6 weeks). The event or hazard being considered is assessed as likely to occur once every 20 times the activity occurs (i.e. likelihood or frequency = 1 event/20 times activity occurs = 0.05 times per activity). Assessed annual likelihood or frequency = 0.05 times per activity x 52 weeks/6 weeks = 0.4 times per year. Assessed likelihood = Possible.

4.1.4 Qualitative Risk Analysis Matrix – Risk Rating

	CONSEQUENCE				
Likelihood	**Insignificant (1)**	**Minor (2)**	**Moderate (3)**	**Major (4)**	**Catastrophic (5)**
Almost certain (A)	**Low 5**	**High 10**	**High 15**	**Very High 20**	**Very High 25**
Likely (B)	**Low 4**	**Medium 8**	**High 12**	**Very High 16**	**Very High 20**
Possible (C)	**Low 3**	**Low 6**	**Medium 9**	**High 12**	**High 15**
Unlikely (D)	**Low 2**	**Low 4**	**Low 6**	**Medium 8**	**High 10**
Rare (E)	**Low 1**	**Low 2**	**Low 3**	**Low 4**	**Medium 7**

4.1.5 Management Approach For Residual Risk Rating

Residual Risk Rating	Required Treatment
Very High	Unacceptable risk. **HOLD POINT**. Work cannot proceed until risk has been reduced
High	High priority, OSH MR and Roadworks Traffic Manager (RTM) must review the risk assessment and approve the treatment and endorse the TGS prior to its implementation.
Medium	Medium Risk, standard traffic control and work practices subject to review by accredited AWTM personnel prior to implementation.
Low	Managed in accordance with the approved management procedures and traffic control practices.

4.2 Risk Register

Item	Risk	Consequence	Pre-treatment Risk Rating			Treatment	Residual Risk Rating		
			L	C	Rating		L	C	Rating
1.	Traffic flows during construction (speed and volumes) may create a risk of collision with other vehicles on the road, pedestrians, construction vehicles and construction personnel.	Injury to road users and work personnel.	C	4	**H 12**	Temporary speed zones to be implemented approaching and passing the works where existing speed zones exceed 60km/h. • Substitution	D	3	**L 6**
2.	Incorrectly designed and / or installed traffic control may result in inadequate protection of the worksite with a subsequent increased potential for crashes and injury.	Injury to road users and work personnel	C	3	**M 9**	Qualified and experienced personnel have been employed in the preparation of the TTMP and associated TGSs and experienced personnel will be used to implement and maintain the traffic control onsite. • Elimination • Administration	E	3	**L 3**
3.	Weather conditions may result in a decreased readability of the traffic control delineation and signage and may increase the potential for crashes.	Injury to road users.	D	3	**L 6**	The TTMP requires that the Alliance undertakes a daily inspection of the traffic control and make adjustments as are necessary to ensure effectiveness is maintained. Experienced personnel specialising in the erection and maintenance of traffic control will be used. All signage shall be Class 1 retro-reflective. • Administration	E	3	**L 3**
4.	Construction activities necessitating lane closures resulting in congestion	Unacceptable delays to road users, resulting in damages to client and contractor reputation.	B	4	**VH 16**	Lane closures will only be implemented at times when existing traffic volumes are low enough to support them and minimise impact to the local community • Substitution	D	4	**M 8**

Item	Risk	Consequence	Pre-treatment Risk Rating			Treatment	Residual Risk Rating		
			L	C	Rating		L	C	Rating
5.	Excavations and hazards associated with the works being inadequately protected causing property damage / injury to workers.	Injury to road users	B	4	**VH 16**	Temporary road safety barriers will be installed to protect road users from excavations. Excavations that are not protected by a barrier will be protected and delineated as per Table D1 of AS1743.2. • Isolation	D	4	**M 8**
6.	Congestion resulting from roadworks creates increased traffic flows in adjacent local network resulting in adverse public feedback.	Damage to PTA and Alliance reputation.	B	3	**H 12**	Stakeholder communications will keep stakeholders informed of likely impacts. Alternative routes and access will also be designed and communicated. • Substitution • Administration	C	3	**M 9**
7.	Workman may be struck by errant vehicles during the setting out of traffic management control devices.	Resulting in injury to works personnel.	C	4	**H 12**	Traffic control devices are set out in accordance with AS1742.3. 2.5.3 and approved safety procedures. • Administration • Isolation	D	4	**M 8**
8.	Temporary lane alignments may restrict passage width for Heavy and Oversized vehicle routes.	Property damage and injury to road users.	B	3	**H 12**	Where possible all existing vehicle classes shall be accommodated within temporary alignments. The details of trafficable width restriction of each site specific TTMP shall be communicated to MRWA HVO and local industry. • Administration	D	3	**L 3**

Item	Risk	Consequence	Pre-treatment Risk Rating			Treatment	Residual Risk Rating		
			L	C	Rating		L	C	Rating
9.	Road Safety Barrier segment ends installed within clear zone.	Injury to road users.	B	4	**VH 16**	All barrier ends located within clear zones are fitted with appropriate crash rated end-treatments to reduce the consequences associated with impact by an errant vehicle. • Engineering	D	4	**M 8**
10.	Construction activity causing an obstruction to or requiring Emergency Services.	Delays and failure to respond to emergencies in times and fatalities.	C	4	**H 12**	The site specific TMP will outline the consultation and communication mechanisms undertaken with emergency services and how these services will be managed. • Administration	D	4	**M 8**
11.	Traffic vehicle struck by approaching vehicle during setup of lane closures or while works are taking place resulting in risk of injury to workers or traffic management personnel from moving struck vehicle.	Injury to work personnel.	C	4	**H 12**	Traffic Vehicle to be positioned 5-10m in advance of personnel and work area as per the TGSs. • Substitution	D	4	**M 8**
12.	Undertaking works at night time increase the risk for TC to suffer of fatigue due to changes on natural clock, reducing their performance and attention.	Attention and response reduction may create hazard for themselves and road users.	C	3	**M 9**	TC to be instructed and informed in advanced in regards to the night shift. TC to be prepared, well rested and fit to work. • Administration	D	3	**L 3**

Item	Risk	Consequence	Pre-treatment Risk Rating			Treatment	Residual Risk Rating		
			L	C	Rating		L	C	Rating
13.	Undertaking works at night time will reduce TC visibility for upcoming traffic and may be getting hit by vehicles.	Serious injury to Traffic Controllers.	C	4	**H 12**	Traffic Controllers to have luminous wands on hand. All personnel are to wear hi-vis clothing. At all times Traffic Controllers shall be well illuminated by portable floodlights, street lighting or car headlights. The light source must be angled or shielded to minimize glare to approaching traffic. All signs to be Class1 retro reflective. Workers to wear high vis vests. If work area in sot sufficiently illuminated, lighting towers shall be used. • Elimination • PPE	E	4	**L 4**
14.	Drivers may be distracted and run off the road if trying to read Variable Message Signs (VMS) with too much information showing on several screens.	Causing injury to driver.	D	4	**Medium**	Use two (2) alternating screens only, with a maximum of four (4) words per screen. VMS Boards to be placed in strategic locations to ensure they can be clearly visible to the oncoming vehicles. • Substitution	E	4	**L 4**
15.	Traffic may not see Merge Tapers on higher speed roads with high traffic volumes (metro) regardless of the speed of the road.	Causing injury to driver.	C	4	**H 12**	Use 700mm traffic cones (minimum) and a Flashing Arrow Board on high speed roads with high traffic counts. Ensure all well illuminated or fitted with a white retro-reflective sleeve. • Substitution • Engineering	E	4	**L 4**

Item	Risk	Consequence	Pre-treatment Risk Rating			Treatment	Residual Risk Rating		
			L	C	Rating		L	C	Rating
16.	Drivers may not see speed signs if on one side of the road only and may not reduce speed putting workers at risk	Causing injury to workers.	C	4	**H 12**	Place any speed signs used to change the speed of the road on both sides of the road. Where barriers may conflict with sign spacing, signs are to be placed on high legs allowing clear view to motorists. • Elimination	E	4	**L 4**
17.	Traffic Controllers may install insufficient signage and/or devices to the meet the standards for the specific worksite.	Resulting in driver confusion and injury to workers.	D	4	**Medium**	All sites to have a Traffic Control Plan (TCP) that is relevant to the works and meets the standards. • Administration	E	4	**L 4**
18.	The interaction of work personnel with through traffic may result in increased potential for conflict and serious injury.	Injury to work personnel.	B	4	**VH 16**	The TTMP provides for temporary traffic controls to be installed around the work site which will eliminate conflict. Traffic Control is to be installed and maintained by appropriately qualified and experienced personnel. • Isolation • Elimination	D	3	**L 3**
19.	Community complaints due to noisy night works.	Adverse public reaction and reputation damage.	C	2	**Low**	Apply for and obtain approval of Noise Permit from LGA for the works. Refer to relevant Community engagement and noise management project plans. Where possible minimise noisy works at night. • Administration • Substitution	D	2	**L 4**

Item	Risk	Consequence	Pre-treatment Risk Rating			Treatment	Residual Risk Rating		
			L	C	Rating		L	C	Rating
20.	Site access gates have a high angle approach resulting in slow entry and exit movements which may lead to a traffic accident	Personal injury Property damage	C	4	**H** **12**	Suitable width to be provided for gate entry to enable a slow speed entry and exit. Vehicles entering reduce speed gradually with indicator on and rotating beacon on. Drivers approaching the gate are advised of the trucks entering (and exiting) as well as the construction gate identifier prior to the gate. Vehicles entering site at a slow speed reduces the risk of the causing a collision on entry with changing surfaces or interaction with onsite plant and machinery. Vehicles exiting site at a high angle of approach (close to perpendicular) have an increased field of vision and can adequately sight approaching vehicles prior to entering the carriageway (similar to the principles of a Give Way entry) Procedures for entering the gates will be communicated to all workers to ensure the appropriate measures are taken to reduce the likelihood of rear-end collisions as work vehicles slow down to enter the gate. • Administration	D	4	**M** **8**
21.	Vehicles travelling through work site do not adhere to the reduced speed limit.	Injury to road users Injury to workers	C	4	**H** **12**	Lane width will be reduced to 3.2m to improve compliance through enforcing more cautious driver behaviour. Offset to temporary barrier will be reduced to 0.3m (from 0.5m) to enforce more cautious driver behaviour. Once changes are in place, vehicle behaviour will be monitored. If the reduced	D	4	**M** **8**

Item	Risk	Consequence	Pre-treatment Risk Rating			Treatment	Residual Risk Rating		
			L	C	Rating		L	C	Rating
						speed limit is not being adhered to, police surveillance will be considered to improve compliance. • Substitution • Administration			
22.	**Variation to Standards** As a part of implementing these works, the number of lanes open on network roads may be reduced. Or high volumes of vehicles may be redirected by road closures.	Unacceptable network delays and congestion.	B	4	**VH** **16**	Work scope has been selected such that the requirement to reduce to one lane is only when there is no other possible set-up to facilitate the works. Detailed assessment of the suitability of the proposal to reduce available lane numbers will be detailed individual works specific TCPs • Substitution • Administration	E	4	**L** **4**
23.	During works on the road, an errant vehicle may breach temporary traffic management delineation at speed, entering the work area.	Injury to road users Injury to workers	B	4	**VH** **16**	During temporary traffic management set ups, traffic work vehicle will be used to shadow the workers, providing a physical protection to workers. • Substitution	D	4	**M** **8**
24.	Workers driving their vehicles into and parking in the work area may have interactions with mobile plant equipment and/or other road users.	Injury to workers	C	3	**M** **9**	Vehicles permitted to access site will be minimised and authorised to enter. Parking at work sites will be minimised, with most workers parking at the project office, then being driven to the specific work area. • Substitution • Administration	D	3	**L** **3**

Item	Risk	Consequence	Pre-treatment Risk Rating			Treatment	Residual Risk Rating		
			L	C	Rating		L	C	Rating
24.	Weather and/or errant drivers may knock over temporary traffic management including cones/bollard and signs.	Confusion for drivers Injury to road users	B	3	**H** **12**	Any long-term traffic controls (longer than 24 hours) will be weighed down with sandbags (or addition bases for bollards/cones). Traffic crews will do routine maintenance drive through with aftercare drawings to ensure all devices are in good condition and positioned correctly. Where possible, devices in areas that are hard to maintain will be permanently fixed in place (eg. bolt-down bollards or post-mounted signs) • Engineering • Administration	D	3	**L** **3**
26.	Construction activities creating dust may reduce visibility for road users	Injury to road users. Property Damage	B	4	**VH** **16**	Dust control practices will be adhered to, to ensure visibility on the road is not reduced. • Substitution	D	4	**M** **8**
27.	Work in proximity to signalised intersections and pedestrian crossings may result in distractions and interface between work equipment and road users or pedestrians.	Injury to road users Injury to workers	B	3	**H** **12**	Traffic Guidance Schemes will be developed to ensure visibility at intersection is maintained for road users. If required, containment fencing will be used to ensure pedestrians will not be able to enter work area. Evolve Bayswater will liaise with MRWA RNOC if any modifications to the phasing or timing of signals is required. • Administration • Isolation	D	3	**L** **3**

Item	Risk	Consequence	Pre-treatment Risk Rating			Treatment	Residual Risk Rating		
			L	C	Rating		L	C	Rating
28.	Temporary road alignments may result in work areas underneath existing services or structures.	Property Damage Potential injury to worker	B	4	**VH** **16**	Exclusion zones will be established where required under above ground hazards and will be signposted as required. • Isolation • Administration	D	4	**M** **8**

5.0 Traffic Management Planning and Assessment

5.1 Traffic and Speed Data

A summary of recent traffic data is provided below:

Location	Vehicles per day (% heavy vehicles)	Date	Source
King William St	12,800 vpd (6.5%)	2018/19	MRWA Traffic Map
Coode St (at Underpass)	32,827 vpd	2016/17	MRWA Traffic Map
Coode St (north of Beechboro Rd S)	12,458 vpd (6.9%)	2018/19	MRWA Traffic Map
Railway Pde (East of Coode St)	12,060 vpd (8.2%)	2018/19	MRWA Traffic Map
Railway Pde (West of Coode St)	823 vpd (8.6%)	2018/19	MRWA Traffic Map
Whatley Crescent (East of King William St)	3,287vpd (6.7%)	2018/19	MRWA Traffic Map
Whatley Crescent (West of King William St)	18,686 vpd	2018/19	MRWA Traffic Map

Location	Posted Speed (km/h)	85th Percentile Speed (km/h)	Date	Source
King William St	60	50-55	2018/19	MRWA Traffic Map
Coode St (north of Beechboro Rd S)	60	56	2018/19	MRWA Traffic Map
Railway Pde (East of Coode St)	50	42-45	2018/19	MRWA Traffic Map
Whatley Crescent (East of King William St)	50	38-43	2018/19	MRWA Traffic Map

Detailed traffic and speed data (where available) analysis will be done for each location/stage within the site-specific TCPs which will include anticipated traffic volumes. Details of how construction traffic will be managed at the site location and minimization of interference to traffic flow in the vicinity of the construction site will be provided in the TCPs.

5.1.1 Rail Crossings

There is no railway crossing in the vicinity of the work area that will be affected by these project works.

5.1.2 School Crossings

There are no school crossings located within the vicinity of the works.

5.2 Site Specific Planning Procedures

5.2.1 Identification of Traffic Control Requirements

Construction teams identify the need for traffic control to be implemented in order for constructions activities to be undertaken. In identifying the need for traffic control the construction teams shall present their requests to the Traffic Manager.

Once the request is received the Traffic Manager will assess and determine whether it requires a Traffic Control Plan and/or Temporary Road Design.

A sample TCP document is included as Appendix H.

5.2.2 Traffic Control Plan Requirements

Evolve Bayswater will develop site specific TCP's for each area identified in need of traffic control. Traffic Control plans will either be complex or non-complex as determined by Main Roads COP for traffic management at worksites. All specific TCPs shall at a minimum cover the following items.

5.2.3 General

5.2.3.1 Title Page

The title block and cover pages shall include:

- Evolve Bayswater Name
- Works Description
- Works Location
- Identifying TCP number
- Classification of TCP complex or non-complex
- Confirmation a site visit has been undertaken
- Revision details
- Approvals and sign off block.

5.2.3.2 Location and Scope

An overview location map and brief detail of works that will be undertaken in conjunction with the TCP. Detail of work shall include type, machinery and impact on local roads. The location description shall define the boundaries of the TCP.

5.2.4 Traffic Impacts

TCPs will meet the requirements of the Australian Standard Manual of Uniform Traffic Control Devices AS 1742 using Australian Standard Part 3: Traffic Control Devices to Works on Road AS 1742.3, when site activities impact a public road.

5.2.4.1 Site Constraints / Impacts

All impacts that implementation of TCP will have on all road users must be clearly defined in this section. Any constraints that have been considered during the design must clearly be noted here, this will enable the users of the TCP to ensure correct measures are implemented to avoid any traffic or construction incident.

Typical restraints may be:

- Access / egress times
- Defined work areas
- Traffic volume details and subsequent enforcement/relaxing of lane closure times.

5.2.4.2 Traffic Speed

Traffic speed shall be clearly defined on the TCP & TGS; considerations shall be taken in regard to the safety and welfare of construction workers and road users, to existing traffic flows, retaining speed after hours, public perception of lowered speed limits.

5.2.4.3 Traffic Flows and Volumes

When developing TCP's, consideration of traffic flows will be in accordance with AS1742.3 and MRWA Specification 202. The TCP must include relevant traffic flow volumes, which will indicate Main Roads' acceptance of any variation in lane closure times.

5.2.4.4 Traffic Flow Analysis

It is vital to determine the traffic volumes and composition of the impacted network before implementing any traffic management to ensure all road users (including pedestrians, cyclists, buses, heavy vehicles, etc.) are catered for with minimum inconvenience.

Volumes used in the development of site specific TCP's shall be based on average Monday to Friday traffic figures derived from historical counts, SCATS data or where necessary onsite traffic surveys.

Detailed traffic analysis will be done for each location/stage concerned with the works within this PTMP and its sub-section TCPs.

The minimum number of lanes open to traffic outside these hours must be based on a mid-block lane capacity of 1000vph per lane.

TABLE 4.10

DESIRABLE NUMBER OF LANES FOR EACH DIRECTION

Mid-block Vehicles per hour, one direction	Within 200 m of an intersection (upstream or downstream) Vehicles per hour, one direction	Desirable number of lanes for direction considered
Up to 1000	Up to 500*	1
1100 to 2000	600 to 1000	2
2100 to 3000	1100 to 1500	3
3100 to 4000	1600 to 2000	4

Guidelines: Based on Table 4.10 of the AS 1742.3, up to 1000vph will be desirable for 1 lane of traffic which is in a Mid-Block situation and up to 500vph will be desirable for 1 lane within 200m of an intersection.

Refer to above table for each location, considering the number of lanes available & situation (Mid-Block / within 200m of an intersection) and relative vph allowed.

5.2.4.5 Capacity Analysis

A detailed brief of the expected effect on traffic the implementation of the TCP will have has to be outlined in the TCP. Reference to data and previous experience of Evolve Bayswater are suitable points of reference. All considerations on the effect must be outlined and any measures that need to be implemented to minimise the effect on the network operations.

5.2.4.6 Working Hours

Working hours shall be as detailed within the specific work package TCP documents and on individual TGSs

5.2.4.7 Temporary Lane Alignments

The redirection of vehicles from existing travel paths must be clearly outlined with durations of re-direction provided. This shall include the short term and long term works. Details of the method/s used

to redirect traffic must be considered for each TCP with varying methods to be used. Each TCP shall outline methods for re-direction and ensure that it is a suitable method for the time, duration and pavement type.

5.2.4.8 Temporary Lane Closures

All temporary lane closure shall be detailed with the extents of the closure detailed. Considerations for temporary lane closure should include side roads, access and egress for road users to adjoining properties.

5.2.4.9 Lighting

Existing levels of lighting must be retained at all times. Existing street lighting will be retained where possible until the installation of the permanent lighting. Where permanent lighting cannot be installed, temporary lighting shall be installed prior to the removal of existing lighting where physically possible. If the works activities require removal of or temporary shutting down of lights and these cannot be replaced with a suitable temporary light a detailed risk assessment to determine the lowest risk scenario practicable shall be undertaken and documented as an addendum to the Site Specific TCP.

At areas where adjacent lighting is insufficient to illuminate hazards to non-motorised road users, appropriate temporary lighting shall be installed as per AS 1742.3—2009 Section 2.3.6 Night Conditions.

Lighting towers that may be used to illuminate the work area shall be angled away from oncoming traffic to eliminate glare conditions that may temporarily 'blind' drivers.

5.2.4.10 Emergency and Special Vehicles

The TCP will address any special requirements for continued access by emergency vehicles and special vehicles. If detours are put in place emergency services must be appropriately notified.

Traffic personnel shall assist emergency vehicles requiring entering and/or travelling through the worksite. Emergency services shall be notified via the Notification of Road Works form, as found in Appendix A, this will include details of the proposed works nature, location, date and times as well as contact details for the site supervisor.

Vehicle breakdown and/or crashes can cause considerable delay and congestion. Police communications will be requested to render assistance where required. The contractor will also render assistance where possible to ensure the impact of crashes and breakdown on the network is minimised.

5.2.4.11 Main Roads Heavy Vehicles Services

All TCPs will consider the operation of heavy vehicles, if it is deemed they will be affected, contact must be made with Main Roads Heavy Vehicles Services and adequate contingency plans put in place for all restricted vehicles that have access to sections of road affected.

In accordance with the requirements of Main Roads Traffic Management for Works on Roads Code of Practice – April 2011 section 5.4 the Notification of Road Works form will be distributed to Main Roads HVO a minimum of 14 days prior to the date of the works.

If required traffic control signs and devices are to be temporarily laid down to allow for the passage of high/wide load vehicles.

5.2.4.12 Special Events and/or Public Holidays

Where it is known that special events will run through the site, Evolve Bayswater will do its utmost to ensure such events can be held as though existing road conditions are maintained. Where it is known that special events exist they shall be outlined in the TCP with the measures that will be put in place during such special events.

5.2.5 Stakeholder Approvals

The TCP must provide evidence of consultation with road, utility and service providers. Approval will be required from the delegated authority of the road reserve to implement traffic controls. Approval must be obtained prior to TCP being implemented.

Further additional approvals from stakeholders such as out of hour's works or land access shall be obtained by the relevant works area team prior to any works commencing. Proof is not required for the TCP; however, they must be included in any request for implementing a TCP. Refer to Section 10.3 for list of stakeholders.

Stakeholders will be communicated with as per the Stakeholder Interface Management Plan.

5.2.6 Advertising and Public Notification and Awareness

Public awareness campaign shall be in accordance with the Stakeholder Interface Management Plan and Community Engagement Plan requirements as specified by the delegated authority of the road reserve. Refer to Section 5.7.2 for methods of communication to the public.

5.2.7 Notification of Road Works

The Traffic Manager shall submit notification of works prior to the implementation of any TCP; they must also be re-submitted where notification period expires. This must be done a minimum 7 days prior to works being undertaken using Notification of Road Works form.

Notification of works must occur when any of the following are deemed to be affected by the implementation of the TCP.

- Works on primary and distributor roads of more than for (4) hours duration where it is expected that major traffic delays and congestion will occur.
- Works on any roads where speed restrictions and lane closures will be in place more than five (5) days, but major delays are not expected.
- Traffic management activities resulting in any direct or indirect changes to traffic flows and/or traffic composition on bridges, including situations where such changes are a result of lane closures or traffic detours.
- Works on any primary or district distributor road where construction activities will make it difficult or impossible for the passage of general access or oversize vehicles and traffic control devices cannot be easily shifted on a temporary basis to allow the vehicle to pass.
- Mains Roads Heavy Vehicles Services section to receive notification of changes in advance of intended implementation.

Anything outside of this should it should be carefully considered as to whether notification must occur. If notifications are not to be sent justification for this must be noted in the TCP.

5.2.8 Site Specific Traffic Guidance Schemes

Evolve Bayswater shall identify all Traffic Guidance Schemes (TGSs) necessary to address all risks identified when planning the works. TGSs shall satisfy the following requirements and following processes:

- Detailed drawings depicting the layout and type of traffic control devices to be used for all situations likely to be encountered during the works shall be drawn to scale
- The drawings shall be developed so that they mirror and expand upon the written component of the TCPs.
- TGSs shall be sufficiently detailed to enable them to be given to a third party to install without constant referral for additional information or interpretation.

- TGSs shall show the precise type and location (by chainage or spacing's related to a clear datum point) of the devices.
- Spacing for devices relative to a key feature of the site shall also be provided in accordance with the provisions of AS/NZS 1742.3.
- The TGSs shall include document control details (drawing and revision numbers, TMP document number), north point, scale, traffic controllers, posted and proposed speed zones, locations (chainages, where appropriate) and legend of all devices to be used, abutting development and access provisions, road layout/dimension details during works, provisions for other road users, site peculiarities (topography, geometry etc.), and pavement marking changes.
- TGS's shall be certified by the person preparing it, clearly showing their name and any accreditation details.

5.2.9 Hazard Identification Risk Assessment

Site specific Traffic Control Plans shall be developed out of a risk management process based on Australian Standard AS/NZS/ISO 31000; Risk Management.

Traffic Management planners shall undertake hazard identification and risk assessment and shall consider all impacts to work personnel and motorised and non-motorised road users.

The outcome of the assessment shall be recorded in the TCP.

Hazards assessed as posing unacceptable risks shall be managed by appropriate traffic control initiatives.

A TCP shall not contain a "residual risk" rating "VH" (Very High).

5.2.10 Modifications and Revisions to TCP

Changes to TCP's can be separated into Major and Minor changes.

5.2.10.1 Minor Changes

Minor Changes will be changes to the TCP which will not have any perceived change in affect to traffic flow or operations and do not differ from the original intent of the TCP. Where it is deemed a minor change an AWTM will make a red pen mark-up of the TGS and TCP and the controls implemented, Main Roads or the City of Bayswater must be notified in writing of the changes within 24hrs. The Main Roads or City of Bayswater representative may request that a TCP be revised if changes are deemed to be Major.

Minor changes may include but not be limited to, change in location of signs, lengthening / shortening of closure, minor change to location, no additional signs or devices.

5.2.10.2 Major Changes

Major changes are those which are short of a request for a new TCP but differ from the original intent and/or will have a perceived change in the flow and operation of traffic. Major Changes must be approved by Main Roads prior to implementing through the issuing of an approved TCP revision.

5.2.11 Road Safety Audits

Desktop road safety audits are to be undertaken for all non-complex TCPs prior to submission for approval if they have not been RTM endorsed, and mandatory for all complex TCPs which include long term modification to the road geometry.

Where an audit has been undertaken, a corrective action report will be completed by the auditor and the developer of the TCP. This will be attached to the TCP at the time of submission.

5.3 Temporary Design

Where determined by the Traffic Manger and RTM that a TCP will require Temporary Design Services, temporary design works cover the following elements which will be designed and constructed in accordance to the standards:

5.3.1 Temporary Pavement and Pavement Marking Alignments

Where required all temporary pavements and associated marking alignments shall be geometrically designed by a suitably experienced designer.

All on-ground alignments shall be set out by surveyors who will be provided with a CAD file or Genio File containing the necessary alignments.

For any temporary pavement alignment changes, approval will be required from MRWA, City of Bayswater and PTA prior to implementation.

5.3.2 Road Safety Barrier Design

All temporary Road Safety Barriers shall be designed or endorsed by the project RTM. All barrier designs shall specify the following details:

- Length and type of barriers, including start and termination locations
- Approach flare rates, lengths and traffic offsets
- End terminal protection requirements
- Offset of barrier to adjacent traffic lanes.
- Delineation alignment of travelled path past road safety barriers.
- Application of RRPMs on top of barriers.

The alignment of all temporary Road Safety Barriers and end terminals shall be set out by surveyors who will be provided with a CAD file containing the necessary alignments.

When installing barriers, traffic shall not be exposed to barrier terminations that do not have approved attenuation terminals fitted when located within the clear zone of active traffic lanes. As such all temporary installations shall be commenced from the approach end and where required end terminals shall be installed first.

5.3.3 Temporary Traffic Signals

Temporary signals may be implemented in place of traffic controllers in reversible flow scenarios where controls are required to operate for extended periods. All temporary traffic signals will be in compliance with MRWA specifications and designed by the project RTM. In the event that portable or temporary traffic signal are required and fail to operate correctly, Traffic Controllers shall be deployed immediately to control traffic movements.

5.3.4 Temporary Speed Zones

Temporary Speed zoning shall be implemented on an as needs basis and all speed controls shall be detailed within the individual works specific TCPs. Prior to the implementation of temporary / modified speed zones, approval from MRWA and other relevant authorities will be required.

5.3.5 Existing Traffic Signals

Existing traffic signals are currently installed adjacent to the Bayswater Subway. These signals shall be maintained in operational form for the duration of the operation of the subway. Local modifications shall be applied as required and designed to MRWA requirements.

5.3.6 Impact to Adjoining Network

Should congestion arise due to Temporary traffic arrangements implemented by the alliance, the Construction Manager and / or General Superintendent and the crew leader on duty will assess the impact. If the impact is considered not acceptable, as a contingency, work operations will be ceased allowing suitable time to set up aftercare scenario for any unfinished works, removing all traffic control measures from the roadway until congestion cleared or arrangements are made to complete the works at a different date/time.

5.3.7 End of Queue Treatment

End of queue treatment shall be provided whenever a stationary queue is likely to extend to a point less than D beyond the Prepare to Stop sign associated with the active control and either or both of the following apply:

- Speed of traffic is greater than 70km/h;
- Sight distance to the end of the queue for approaching traffic is likely to be less than 2D on open road areas or 1.5D on built-up areas.

At the location of the works, speed of traffic approaching the traffic controller position is determined to be less than 71km/h and/or the sight distance to the expected end of queue location for approaching traffic is greater than 1.5D, additional end of queue treatments are not required to be implemented.

However, if an onsite assessment deems additional end of queue treatments necessary, the 'Traffic Controller Symbolic' & 'Prepare to Stop' Signs are to be relocated to ensure that the distance from these signs to the end of the queue is never likely to be less than D.

5.3.8 Temporary Road Closures

Any temporary road closures, when and if required, will be carried out in accordance with section 3.50 of the Local Government Act 1995 (WA)

5.4 Road Users

5.4.1 Pedestrians

Pedestrian access to all surrounding residential properties, the operating Rail Station, the Bayswater Town Centre and commercial areas shall be maintained at all times

If as part of the Project, part of the existing PShP running parallel to the railway line is required to be modified, detoured or temporarily closed to general public, a TCP will be developed accordingly. TCPs will outline details on the maintenance required to ensure safe pedestrian conditions.

All measures taken to ensure safe pedestrian conditions will comply with "AustRoads Guide to Traffic Engineering Practice - Part 15 – Pedestrians." Any temporary or modified PShP will comply with all requirements of relevant Government Agencies and will be to the same standard as the existing PShP it is replacing.

5.4.2 Cyclists

See section 5.4.1. All measures taken to ensure safe cycling conditions will comply with "AustRoads Guide to Traffic Engineering Practice - Part 14 – Bicycles."

5.4.3 Public Transport

Notification to public transport shall be undertaken when traffic management measure will have an effect to the bus services. Approval from PTA is required for any changes to existing bus services or implementation of additional bus services due to rail closure/detours.

Public pedestrian access to the Bayswater Station is a critical feature to the transport management strategy for this project. Safe pedestrian access to rail and bus services will be maintained at all times during service operation.

Some works will likely require stoppages to rail services, all such closures shall be planned and undertaken through liaison with and approval from the PTA.

5.4.4 Heavy and Oversized Vehicles

There are no existing heavy haulage routes on the project affected road network. Where rerouting of larger vehicles that do not fit beneath the existing King William / Coode Street bridge is required, TCP's will be developed for rerouting. Best effort shall be made to not affect turning paths and to keep a remaining minimum of 3.5m road width will remain allowable at all times.

If a heavy/ oversized vehicle or load whose speed or size might constitute a safety threat to workers on foot, the traffic controllers shall warn the site supervisor who will instruct all workers/machinery to move away from the heavy vehicle passage.

Traffic controllers shall operate on a designated channel at all times to communicate with Heavy or oversized vehicles whom may be bypassing the works. Heavy vehicles will be assisted via the worksite if required by Traffic Controllers when safe to do so. If required delineation will be removed to allow passage and all works crews will be informed to halt works until large vehicles have bypassed the works. Communication between works crew and Traffic controllers is to be held consistently for the duration of the works.

Main Roads Heavy Vehicle Services will be notified of the works through the 'Notifications of Roadworks Form' or via phone at the earliest possible time. All heavy vehicle movements will be executed in accordance with the MRWA Heavy Vehicle Services requirements and approved TCPs.

5.4.5 Existing Parking Facilities

On-road parking facilities in the Bayswater Town Centre will be affected by project works and controls. These shall be maintained as far as practicable with proposed modifications detailed within site specific TCPs.

5.4.6 Access to Adjoining Properties / Business

There are numerous residential and commercial properties affected by the works, local access will be maintained throughout all hours (as far as practicable) and where required provided through or within work sites with Traffic Controller assisting any property owners entering/exiting at all times.

5.4.7 Special Events and Other Works

It has been identified that there are existing roadworks occurring within the vicinity of these works **(Current Forrestfield Airport Link and the future Tonkin Hwy Gap Project and Morley Ellenbrook Line).** Communications are to be made to ensure conflicting traffic management set ups do not occur.

These works shall not be implemented when major events are occurring.

Some of these major events may include:

- Public Holidays, and
- The day before and last day of long weekends.

Discussions should be had with the dedicated Main Roads RPI representative to ensure no conflicting Special Events and/or Other Works will be occurring during the time this Traffic Management is implemented.

5.4.8 Emergency Vehicle Access

Emergency services will have continual access to all properties and the worksite; hence no specific facilities are required. A Traffic Controller shall assist emergency vehicles requiring entering and/or

travelling through the Worksite. Emergency services shall be notified of the proposed crosswalks grinding off and remarking, location, date and times as well as contact details for the site supervisor.

Police communications will be requested to render assistance where required.

5.5 Night Work Provisions

Night works will be undertaken for the works concerned with this TTMP.

When night works are required, all personnel on site shall be well illuminated by street lights, car headlights or portable floodlights ensuring the lights light source is angled or shielded to minimize glare to approaching traffic.

Traffic controllers to have luminous wands on hand at all times and all personnel are to wear hi-vis clothing.

All signs used at night are to be Class 1 Retro-reflective material and delineation will be either retro-reflective or be sufficiently illuminated. Flashing lamps shall be used to draw attention to signs and all personnel engaged on night work shall wear high visibility retro-reflective jackets.

5.6 Road Safety Barriers

Temporary traffic barriers providing full containment will be installed for high risk works as required to adequately separate traffic from construction activities. Barrier types and end treatments shall be specified and designed as part of the site specific TCPs.

5.7 Consultation and Communication / Notification

5.7.1 Other Agencies

In accordance with Section 5.4 of the MRWA CoP, notification is required to be provided to all the agencies involved as per distribution list provided into the Notification of Roadworks form.

Notification form will be provided for each stage of works that will be undertaken.

5.7.2 Public Notification

Any form of advertising and communication of traffic changes to the public, as deemed necessary by Evolve Bayswater, will be undertaken in accordance with the Community Engagement Plan.

This can include, but is not limited to:

- Notice to Motorists in the weekend West Australian and/or local newspaper(s)
- Letter drop to all residents and businesses within the traffic control zone
- VMS boards
- Radio advertising
- Project website and PTA/Metronet social media

5.8 Site Assessment

5.8.1 Adverse Weather

Weather is not expected to adversely impact on the effectiveness of the traffic control detailed on the TGS's. Notwithstanding this, should adverse weather conditions be encountered during the works, the following contingency plans should be activated. Note: any adjustments to the plan shall be risk assessed and approved by someone holding a WTM or AWTM accreditation. Major changes will require road authority approval.

5.8.1.1 Rain

In the event of rain, an on-site assessment shall be made and sign spacing and tapers may be extended by 25% to account for increased stopping distances. Slippery (T3-3) signs may be placed as required and all changes shall be recorded in the daily diary.

If rain occurs, Traffic Management Personnel shall inspect the site and where signage and / or devices are not clearly visible, signage may need to be adjusted to improve visibility or if necessary provide additional signage and delineation. Where stopping distances are adversely affected by wet surfaces, spacing between signs may need to be adjusted to provide increased reaction time for drivers. In cases where it is determined that the rain is so heavy that the risk is considered unacceptable, all work shall cease until rain has cleared. All changes shall be noted in the daily diary.

5.8.1.2 Floods

Should works be affected by flooding to the extent that the worksite becomes impassable or risk is considered unacceptable, all work shall cease immediately and Traffic Controllers (and other personnel if necessary) shall be deployed immediately to close the site and direct traffic around the flooded area (under the direction of the project manager or traffic manager). Emergency services and the Road Authority shall be notified immediately and Traffic Controllers shall remain onsite until emergency services and the Road Authority personnel arrive and take control of the site.

5.8.1.3 Other adverse weather (strong winds, thunder storms, etc.)

When adverse weather such as strong winds and/or thunder storms, is identified as adversely affecting the works and work site safety, weights on signs and delineations to be used to contrast strong winds effect; in case of thunder storms all powered equipment shall be turned off and shelter to be sought after.

Should works be affected to the extent that the worksite becomes impassable or risk is considered unacceptable, all work shall cease immediately and Traffic Controllers (and other personnel if necessary) shall be deployed immediately to close the site and remove TM arrangements.

All changes are to be noted in the daily diary.

5.8.2 Sun Glare

Where sun glare is identified as adversely affecting a driver's ability to sight signage and / or traffic control devices, sign locations may need to be adjusted and additional delineation and/or traffic control devices provided to address the risk from glare. Additionally, in the event that traffic control is adversely affected by glare at sunset and sunrise, traffic controllers may need to assist in maintaining low traffic speeds.

All changes are to be noted in the daily diary.

5.8.3 Fog, Dust and Smoke

Where fog, dust or smoke is identified as adversely affecting a driver's ability to sight signage and / or traffic control devices, sign locations may need to be adjusted and additional delineation and/or traffic control devices provided to address the risk. All changes are to be noted in the daily diary.

Should works be affected by fog, dust or smoke to the extent that risk is considered unacceptable, all work shall cease immediately and Traffic Controllers (and other personnel if necessary) shall be deployed immediately to close the site.

5.8.4 Road Geometry, Terrain, Vegetation and Structures

All existing vegetation surrounding the location of the works shall be maintained. Site assessment to be conducted prior to signs being erected on site. Should any existing landscape create obstruction and/or decreases the visibility of advanced warning signage prior to the work area, signs are to be moved accordingly. Traffic Controllers shall adjust sign locations and provide additional delineation and traffic control devices necessary to address the risk from existing vegetation. All changes are to be noted in the daily diary.

There are no structures affecting sight lines or access. The surrounding environment is built-up and/or landscaped.

5.9 Existing Traffic and Adverting Signs

All speed signs located within the vicinity of the works that would conflict with the proposed temporary speed limit shall be covered for the duration of the works.

6.0 Safety Plan

6.1 Occupational Safety and Health

All persons and organisations undertaking these works or using the roadwork site have a duty of care under statute and common law to themselves, their employees and all site users, lawfully using the site, to take all reasonable measures to prevent accident or injury.

This TTMP forms part of the overall project Safety Management Plan and provides details on how all road users considered likely to pass through, past, or around the worksite will be safely and efficiently managed for the full duration of the site occupancy and works.

6.2 Legal Requirements

The current editions of the following documents shall be maintained at the site office for the period of the works:

- Traffic Management for Works on Roads Code of Practice
- Standards – AS1742.3 – Traffic Control Devices for Works on Roads
- Traffic Management at Roadworks on State Roads Policy
- Guidance Notes – Safe Movement of Vehicles in the Workplace

6.3 Roles and Responsibilities

6.3.1 Responsibilities

The Construction Manager has the ultimate responsibility to ensure the TTMP is implemented for the prevention of injury and property damage to employees, contractors, sub-contractors, road users and all members of the public.

The Construction manager will ensure all site personnel are fully aware of their responsibilities, and that Traffic Controllers are appropriately trained and accredited and that sufficient Traffic Controllers are available to ensure appropriate breaks are taken.

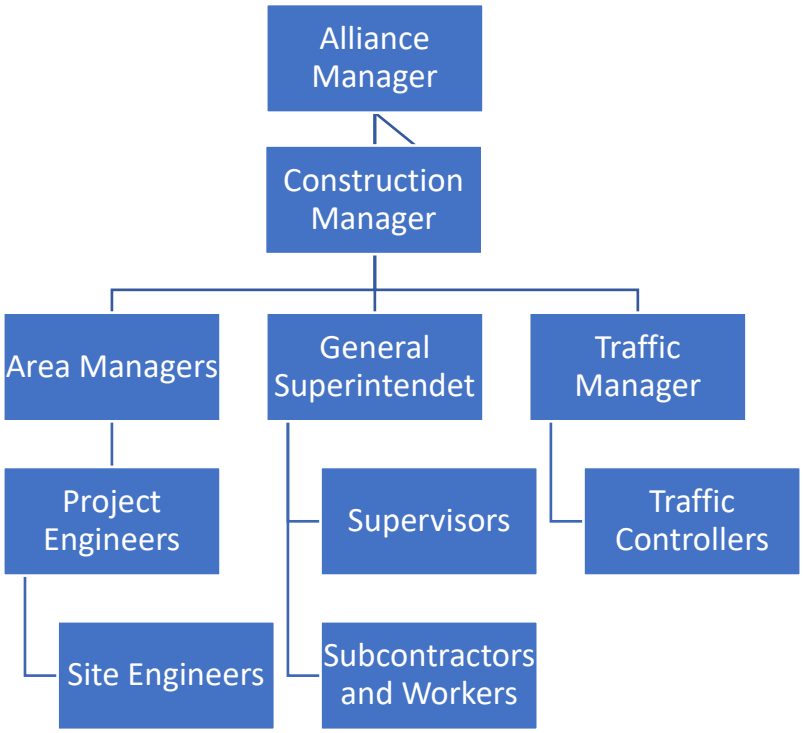
All personnel engaged in the field activities will follow the correct work practices as required by the CoP and AS1742.3.

All personnel will not commence or continue work until all signs, devices and barricades are in place and operational in accordance with the requirements of the TTMP and the appropriate TCP.

All personnel responsible for temporary traffic management shall ensure that the number, type and location of signs, devices and barricades are to a standard not less than Appendix F of this plan, CoP and AS1742.3 (except where specifically detailed in this TTMP or relevant TCP with reasons for the variations). Should a situation arise that is not covered by this TTMP, CoP or AS1742.3, the Road Authority Representative shall be notified.

6.3.2 Roles

The following diagram outlines the responsibility hierarchy of the Alliance.



6.3.2.1 Alliance Manager

The Alliance Manager shall:

- Ensure all traffic control measures of this TTMP are placed and maintained in accordance with this plan and the relevant Acts, Codes, Standards and Guidelines;
- Ensure suitable communication and consultation with the affected stakeholders is maintained at all times; and
- Participate in incident investigations.

6.3.2.2 Construction Manager

The Construction Manager shall:

- Ensure inspections of the Traffic Controls are undertaken in accordance with the PTMP, and results recorded. Any variations shall be detailed together with reasons;
- Review feedback from field inspections, worksite personnel and members of the public, and take action to amend the traffic control measures as appropriate following approval from the Road Authority's Representative; and
- Arrange and/or undertake any necessary audits and incident investigations.

6.3.2.3 General Superintendent

The General Superintendent shall:

- Facilitate the induction of all workers on site;

- Assist with the development of WMS's and JSA's relevant to the works being undertaken;
- Provide advice and guidance to site personnel to ensure compliance with the project Safety Management Plan; and
- Facilitate prestart and toolbox meetings in conjunction with the site supervisor.

6.3.2.4 Site Supervisor

The Site Supervisor is responsible for overseeing the day-to-day activities, and is therefore responsible for the practical application of the TTMP, and shall:

- Instruct workers on the relevant safety standards, including the correct wearing of high visibility safety vests
- Ensure traffic control measures are implemented and maintained in accordance with the TTMP
- Undertake and submit the required inspection and evaluation reports to management
- Render assistance to road users and stakeholders when incidences arising out of the works affect the network performance or the safety of road users and workers
- Take appropriate action to correct unsafe conditions, including any necessary modifications to the TTMP.

6.3.2.5 Project/Site Engineer

The Project/Site Engineer shall:

- Assist the Site Supervisor in the planning, development and delivery of the long-term and short-term traffic management systems;
- Be at least accredited in Basic Worksite Traffic Management, and shall have the responsibility of ensuring the traffic management devices are set out in accordance with the TTMP
- Communicate with the traffic control contractor to ensure the correct traffic control resources are available on site to suit the progression of the works;
- Liaison with and direction of the Traffic Management Consultant;
- Collect, collate and recording of all site documentation and records of inspections and audits.

6.3.2.6 Traffic Manager

The Traffic Manager will be an external consultant who will be an Accredited RTM and shall be responsible for the following:

- Preparation and review of all complex and non-complex TCPs.
- Review and Endorsement of all complex and non-complex TCPs
- Shall make at least one support person accredited in Advanced Worksite Traffic Management available to attend the site at short notice at all times to manage variations, contingencies and emergencies, and to take overall responsibility for traffic management.
- The RTM shall undertake audits / compliance checks of all major TM implementations as shown in section 9.2.2

6.3.2.7 Traffic Controllers

Traffic Controllers shall be used to control road users to avoid conflict with plant, workers, traffic and pedestrians, and to stop and direct traffic in emergency situations.

Traffic Controllers shall:

- Operate in accordance with the Traffic Controller Handbook
- Be accredited in Basic Worksite Traffic Management
- Hold a current Traffic Controller's accreditation
- Take appropriate breaks as required by AS1742.3 and/or OS&H Regulations.

6.3.2.8 Workers and Subcontractors

Workers and Subcontractors shall

- Correctly wear high visibility vests, in addition to other protective equipment required (e.g. footwear, eye protection, helmet sun protection etc.), at all times whilst on the worksite
- Comply with the requirements of the TMP and ensure no activity is undertaken that will endanger the safety of other workers or the general public
- Enter and leave the site by approved routes and in accordance with safe work practices

6.4 PPE

All personnel entering the work site shall correctly wear high visibility vests to AS/NZS 4602, in addition to other protective equipment required on a site-by-site basis (e.g. protective footwear, eye protection, helmet, sun protection, respiratory devices etc.) at all times whilst on the worksite.

6.5 Plant and Equipment

All plant and equipment at the workplace shall meet statutory requirements and have the required registration, licenses or certification where required. All mobile equipment shall be fitted with suitable reversing alarms. All mobile plant and vehicles shall be fitted with a pair of rotating flashing yellow lamps in accordance with AS1742.3 clause 3.12.1. All workers will be made aware of the safe work practice at the time of the site induction.

6.6 Trip Hazards

The worksite and its immediate surroundings shall be suitably protected and free of hazards, which could result in tripping by cyclists or pedestrians. Hazards, which cannot be removed, shall be suitably protected to prevent injury to road users, including those with sight impairment. Where level differences are significant, suitable barriers, which preclude pedestrian access shall be used.

Where works extend beyond daylight hours and adjacent lighting is insufficient to illuminate hazards to cyclists or pedestrians, appropriate temporary lighting shall be installed.

The worksite shall be kept tidy to reduce the risk to workers.

7.0 Implementation

7.1 Traffic Guidance Schemes

Refer to each TCP for TGSs.

7.2 Sequence and Staging

The sequence of temporary traffic management installation, work activities and temporary traffic management removal are shown in the table below.

Step	Details
1	Advanced warning signage implementation Worksite delineation
2	Ensure roads are safe for work
3	Commence works; traffic controllers on work site to assist and facilitate plant access/egress where necessary. Property accesses to be monitored.
4	Traffic control measures to be removed, ensuring all roads, driveways and footpaths are cleared from any hazard and trafficable as normal.
5	Aftercare installation if required

7.3 Traffic Control Devices

7.3.1 Sign Requirements

All signs used shall conform to the designs and dimensions as shown in Australian Standard AS 1742.3 and the CoP.

Prior to installation, all signs and devices shall be checked by the Site Supervisor or a suitably qualified person to ensure that they are in good condition and meet the following requirements:-

- Mechanical condition - Items that are bent, broken or have surface damage shall not be used.
- Cleanliness - Items should be free from accumulated dirt, road grime or other contamination.
- Colour of fluorescent signs - Fluorescent signs whose colour has faded to a point where they have lost their daylight impact shall be replaced.
- Retroreflectivity. - Signs for night-time use whose retroreflectivity is degraded either from long use or surface damage and does not meet the requirements of AS 1906 shall be replaced.
- Battery operated devices - shall be checked for lamp operation and battery condition.

Where signs do not conform either to the requirements of AS 1742.3 or would fail to pass any of the above checks, they shall be replaced on notice.

Signs and devices shall be positioned and erected in accordance with the locations and spacing's shown on the drawings. All signs shall be positioned and erected such that:

- They are properly displayed and securely mounted;
- They are within the driver's line of sight;
- They cannot be obscured from view;
- They do not obscure other devices from the driver's line of sight;

- They do not become a possible hazard to workers or vehicles; and
- They do not deflect traffic into an undesirable path.

Signs and devices that are erected before they are required shall be covered by a suitable opaque material. The cover shall be removed immediately prior to the commencement of work.

Where there is a potential for conflict of information between existing signage and temporary signage erected for the purpose of traffic control, the existing signs shall be covered. The material covering the sign shall ensure that the sign cannot be seen under all conditions i.e. day, night and wet weather. Care will be taken to ensure existing signs are not damaged by the covering material or by adhesive tape.

7.3.2 Tolerances on positioning of signs and devices

Where a specific distance for the longitudinal positioning of signs or devices with respect to other items or features is stated, for the spacing of delineating devices or for the length of tapers or markings, the following tolerances may be applied: -

(a) Positioning of signs, length of tapers or markings:

(i) Minimum, 10% less than the distances or lengths given.

(ii) Maximum, 25% more than the distances or lengths given.

(b) Spacing of delineating devices:

(i) Maximum, 10% more than the spacing shown.

(ii) No minimum.

These tolerances shall not apply where a distance, length or spacing is already stated as a maximum, a minimum or a range.

7.3.3 Flashing Arrow Signs

Flashing arrow signs are required for each lane closure implemented for the works concerned with this TTMP.

Where flashing arrow signs are required to better delineate lane tapers, these signs will comprise a matrix of lamps or light emitting elements in the form of an arrow that is flashed in a cyclical manner to provide advance warning. The sign shall have a minimum dimension of 2400 mm. x 1200 mm. and conform to the requirements of AS/NZS 4192. The Project Site Supervisor shall ensure that all equipment used meets the Australian Standard.

7.3.4 Delineation

Cones shall be used for delineation unless other treatment is specified in the Traffic Management Plan or on the Traffic Guidance Schemes. All cones shall be at least 700 millimetres in height and constructed from fluorescent orange or red material that is resilient to impact and will not damage vehicles when hit at low speed. Cones will be fitted with suitable white retro-reflective tape placed in accordance with AS 1742.3.

Cones shall be designed to be stable under reasonably expected wind conditions and air turbulence from passing traffic.

The base of the cones will be secured so that they are not dislodged by traffic. Cones will be inspected at intervals necessary to ensure any misalignment or displacement is identified and corrected prior to this causing disruption to traffic.

Where specified, temporary frangible or otherwise non-hazardous delineator posts or bollards may be used for edge protection and taper delineation. Posts or bollards shall have a maximum dimension of 60 millimetres when measured along the longest side of a square or rectangular section or across the diameter of a circular section. Base design shall permit easy fixing to either sealed or unsealed surfaces and not intrude into traffic lanes greater than 50 millimetres from the face of the post or bollard.

Posts and bollards shall be fitted with suitable white retro-reflective tape placed in accordance with AS 1742.3.

All posts or bollards will be inspected daily and where displaced or missing made good immediately. All delineator posts are to be completely removed at the completion of all stages of construction and prior to the placement of asphalt surfacing. If adhesive is used to affix the posts this shall be completely removed from the road surface so that a flush surface is obtained.

Temporary pavement markings shall be installed after each individual stage of works prior to the application of the ultimate pavement marking in accordance with the following:

- After profiling works lanes shall be delineated by temporary RRPMs.
- After asphalt works have been carried out lanes shall be delineated by either ultimate pavement markings, temporary RRPMs or temporary painted pavement markings.
- Temporary RRPMs shall be installed at not less than 4m spacing and not greater than 12m spacing.

7.3.5 Site Access for Work Vehicles

Construction and/or traffic management vehicles entering and exiting the traffic stream shall be mindful of the conditions that may affect the safety of these movements.

Access points shall be noted on the TGS and traffic controllers, work personnel and suppliers notified. Traffic Controllers may assist work vehicles enter and exit the work area.

All entry and exit movements will be in accordance with the Road Traffic Code and shall be undertaken in the following manner:

Vehicles shall:

- Decelerate slowly and signal their intention by indicator to leave the traffic stream;
- Activate the vehicle's rotating yellow lamp, where fitted, once a speed of 20 km/h. has been reached and at least 50m prior to the exit location.
- Switch on the vehicle hazard lights once the vehicle is stationary.
- Where risks associated with unassisted exit or entry to or from the traffic stream are high, Traffic Controllers should be used to assist entry and exit movements.

Vehicles fitted with rotating amber lamps shall have the vehicle's rotating lamp activated prior to entering the traffic stream and shall undertake the following.

- Switch off the vehicle hazard lights;
- Indicate intention to enter the traffic stream using direction indicators;
- Ensure there is a suitable gap from oncoming traffic to allow for a safe entry manoeuvre; and,
- Turn off the rotating yellow lamp(s) once a speed of 40 km/h is reached.

Entry and exit manoeuvres shall be avoided in close proximity to intersections. Work personnel shall not cross traffic streams on foot unless absolutely necessary.

Construction or traffic management vehicles shall only be parked where indicated on the Traffic Guidance Scheme. Vehicles shall not obstruct paths and be parked an adequate distance from intersections or driveways to ensure clear sight lines remain for all road users.

7.3.6 Communicating TTMP Requirements

Works requirements shall be communicating to all personnel on site and TC during the pre-start meeting. Where required, on site communications, are to be undertaken via two ways radios and channel advised during the pre-start. All personnel attending the site, shall undertake all the necessary inductions, if required.

8.0 Emergency Arrangements and Contingencies

8.1 Traffic Incident Procedures

In the event of an incident or accident, whether or not involving traffic or road users, all work shall cease, and traffic shall be stopped as necessary to avoid further deterioration of the situation. First Aid shall be administered as necessary, and medical assistance shall be called for if required.

Road plant within the work area that may impact on any services requiring access to a crash site will be cleared from the area quickly as necessary.

The Alliance Incident Response Process is outlined in the Emergency Management Plan (EMP). An excerpt is found below:

Action Plan H – Motor Vehicle Accident

WORKER OBSERVING

- Ascertain if any person(s) have been injured - if yes, request Ambulance / Police attendance.
- Determine if vehicle (s) pose a hazard to persons nearby (e.g. leaking fuel) - if yes, request appropriate emergency services (e.g. Fire Brigade) and evacuate persons from immediate danger area.
- If accident poses a danger or hazard or a person has been injured, inform the Evolve Bayswater Safety Manager and *'On Scene Commander'*.
- If no person injured and no danger, determine if vehicle/s pose/s an obstruction to normal vehicular traffic flow. If yes, request driver/s to move vehicles - if vehicle unable to be moved, request driver to immediately obtain tow truck assistance – towing allocation through (000).
- Obtain particulars from driver(s) & witness(s) involved:
  - Names
  - Addresses
  - Telephone Numbers (Home & Work)
  - Driver's License Details
  - Details of registered owner/s of vehicles involved (if different from driver/s)
  - Vehicle details (Reg. No., type, make, colour)
  - Brief description of events
  - Confirm if driver/s require Police to be called (note - if persons injured, Police must attend)
- Complete Incident Notification and Investigation Report.

The site emergency contacts are listed below:

First Name	*Last Name*	*Position*	*Contact Number*
Travis	*Tremain*	*Alliance Manager*	*0412 200 895*
Iain	*Lawrence*	*Construction Manager (On scene commander)*	0439 642 347
Tamara	*Dunsire*	*HSEQ Manager*	*0432878083*

8.1.1 Serious Injury or Fatality

In the case of serious injury or fatality occurring within the traffic management site all work shall cease immediately, machinery and vehicles turned off and the area cleared of personnel as soon as possible. Traffic Controllers (and other personnel if necessary) shall be deployed immediately to ensure no traffic or other road users approach the area.

An Ambulance and Police shall be called on telephone number 000 where life threatening injuries are apparent.

All road workers and traffic management personnel shall preserve the scene leaving everything in situ, until direction is given by Police or WorkSafe.

A site specific detour route and/or road closure point will be determined, signed and controlled by traffic management personnel and advised to Police, who will take charge of the site upon arrival. Detour routes will be determined so as to cater for all types of vehicles required to use them. An example of how to manage an emergency can be found in Appendix B of AS1742.3.

All site personnel shall be briefed on control procedures covering incidents and crashes that result in serious injury or fatalities.

8.1.2 Minor Incident or Vehicle Break Down within Site

Broken down vehicles and vehicles involved in minor non-injury crashes shall be temporarily moved to the verge as soon as possible after details of the crash locations have been gathered and noted. Where necessary to maintain traffic flow, vehicles shall be temporarily moved into the closed section of the work area behind the cones, providing there is no risk to vehicles and their occupants or workers. Suitable recovery systems shall be used to facilitate prompt removal of broken down or crashed vehicles. Assistance shall be rendered to ensure the impact of the incident on the network is minimised.

Any traffic crash resulting in non-life threatening injury shall be reported to the WA Police Service on 131 444.

Details of all incidents and accidents shall be reported to the Site Supervisor and Project Manager using the incident report form at Appendix “C” (or similar).

8.2 Emergency Services

Emergency services shall be notified of the proposed works nature, location, date and times as well as contact details for the site supervisor.

On-site traffic controllers will be equipped with mobile communications to advise and/or liaise with emergency services to ensure a prompt response should the need arise.

8.3 Dangerous Goods

Should any incident arise involving vehicles transporting dangerous goods, all work shall cease immediately, machinery and vehicles turned off and the area cleared of personnel as soon as possible. Traffic Controllers (and other personnel if necessary) shall be deployed immediately to ensure no traffic or other road users approach the area.

Emergency services shall be notified of the proposed works nature, location, date and times as well as contact details for the site supervisor. All site personnel shall be briefed on evacuation and control procedures.

8.4 Damage to Services

In the event that gas services are damaged, all work shall cease immediately, machinery and vehicles turned off and the area cleared of personnel as soon as possible. Traffic Controllers (and other personnel if necessary) shall be deployed immediately to ensure no traffic or other road users approach the area. The Police Service and relevant supply authority shall be called immediately. Damage to any other services shall be treated in a similar manner except machinery may remain operational and access may be maintained where it is safe to do so.

All site personnel shall be briefed on evacuation and control procedures.

8.5 Failure of Services

8.5.1 Failure of Traffic Signals

In the event that traffic signal infrastructure near the worksite is damaged or fails to operate correctly, all work shall cease immediately and Main Roads WA Road Network Operation Centre (RNOC) shall be notified immediately (phone 138 111).

8.5.2 Failure of Street Lighting

In the event that street lighting is damaged and fails to operate or operates incorrectly, Traffic Controllers (and other personnel if necessary with appropriate temporary lighting) shall be deployed immediately if the lighting failure adversely affects road user safety to control traffic movements as required. Western Power shall be notified immediately.

8.5.3 Failure of Power

In the event that power infrastructure is damaged and poses a risk through live current, Traffic Controllers (and other personnel if necessary) shall be deployed immediately to secure the site and prevent entry to the area affected by live power. Western Power shall be notified immediately (phone 13 13 51).

8.6 Legal Order

Any order given by the Australian Federal Police, the WA Police Service, a relevant Government Agency or the PTA in respect of traffic and transport management, such as ordering to re-open a track, lane, shoulder, footpath and/or shared path without delay, Evolve Bayswater will immediately comply regardless of time and prior arrangements.

8.7 Emergency Contacts

In the event of an emergency the following relevant authorities must be contacted and advised of the nature of works, location and type of emergency and contact details for the site supervisor.

Emergency Service	Email/Website	Phone (Emergency)
WA Police Service	State.Traffic.Intelligence.Planning.&.Coordination.Unit@police.wa.gov.au	000
St John Ambulance	MMOGroup@stjohnambulance.com.au ManagerSOC@stjohnambulance.com.au	000
DFES	dfes@dfes.wa.gov.au	000
Power	http://www.westernpower.com.au/contactus/pages/dfesoffices.aspx	13 13 51
Gas	enquiries@atcogas.com.au	13 13 52
Main Roads Customer Call Centre	enquiries@mainroads.wa.gov.au	(08) 9323 4430
Main Roads Real Time Traffic Operations	RNOC.Control.Room.Information.Desk@mainroads.wa.gov.au	(08) 9428 2220
Main Roads Heavy Vehicle Operations	htv@mainroads.wa.gov.au	(08) 9311 8455
Water Corporation	https://www.watercorporation.com.au/faults/report-a-fault	13 13 75
Public Transport Authority	www.pta.wa.gov.au/AboutUs/ContactUs/tabid/124/Default.aspx	
City of Bayswater	mail@bayswater.wa.gov.au	(08) 272 0665

9.0 Monitoring and Measurement

9.1 Daily Inspections

Prior to works commencing the Site Supervisor shall undertake to communicate the Transport and Traffic Management Plan to all key stakeholders and affected parties.

On completion of setting out the traffic control measures, the site is to be monitored for a suitable period of time. If traffic speeds on the approaches to the work site are assessed as being above the temporary posted speed zone for the work site, the Site Supervisor is to initiate action to modify the approach signage and tapers in accordance with the requirements of AS1742.3. All such actions are to be recorded in the Daily Diary. Should road users be observed to continue to travel in excess of the posted speed limit, the police may be requested to attend the site to enforce the temporary posted speed limit.

The Advanced Worksite Traffic Management accredited supervisory person at the worksite may conditionally approve changes made to a complex traffic management plan subject to review and endorsement of the change by an RTM as soon as practicably possible.

The Traffic Management Contractor shall ensure that all temporary signs, devices and controls are maintained at all times. To achieve this, procedures in line with the requirements outlined in AS1742.3 Appendix A will be instituted. The monitoring program shall incorporate inspections:

- Before the start of work activities on site,
- During the hours of work,
- Closing down at the end of the shift period, and
- After hours.

A daily record of the inspections shall be kept indicating

- When traffic controls where erected,
- When changes to controls occurred and why the changes were undertaken,
- Any significant incidents or observations associated with the traffic controls and their impacts on road users or adjacent properties.

The Traffic Management Contractor shall ensure that personnel are assigned to monitor the traffic control scheme. Inspections shall at least satisfy the following requirements.

9.1.1 Before works start

- Confirm TCP and TGS are suitable for the day's activities;
- Inspect all signs and devices to ensure they are undamaged, clean and comply with the requirements depicted on the TGS;
- All lamps should be checked and cleaned as necessary;
- After any adjustments have been made to the signs and devices, conduct a drive through inspection to confirm effectiveness.

9.1.2 During work hours

- Designate and ensure that appropriate work personnel drive through the site periodically to inspect all signs and devices and ensure they are undamaged and comply with the requirements depicted on the Traffic Guidance Schemes;

- Attend to minor problems as they occur;
- Conduct on the spot maintenance/repairs as required;
- When traffic controllers are on the job, ensure they remain in place at all times. Relieve controllers as necessary to ensure attentiveness is retained;
- During breaks or changes in work activities remove or cover any signs that do not apply (e.g. PREPARE TO STOP, Workers symbolic);
- Re-position signs and devices as required by work processes throughout the day and keep records of any changes.

9.1.3 Closing down each day

- Conduct a pre-close down inspection, allowing time for any appropriate maintenance works;
- Remove any unnecessary signage (e.g. Prepare to Stop, Symbolic Workers);
- Replace any unnecessary signage with appropriate delineation;
- Install barriers and lights where required;
- Drive through site and confirm all signs and devices are operating correctly with no misleading visual cues;
- Record details of inspection and any changes made to layout.

9.1.4 After hours

- Appoint personnel to conduct after dark checks. Replace any signs / devices not working, missing or damaged and record in diary.
- Appoint personnel to conduct checks on non-work days (e.g. weekends). Replace any signs / devices not working, missing or damaged and record in diary.
- The frequency of inspections needs to align with the amount of traffic management on site, weather conditions, vehicle types and volumes, road user behaviour and site specific risks.

9.2 TTMP Review, Audits and Inspections

The following review, inspection and auditing requirements shall be applied for the duration of the project.

Audit findings, recommendations and actions taken shall be documented and copies forwarded to the Alliance Manager and the Road Authority's Representative.

9.2.1 Planning and Design Phase: Review and Audit requirements

Traffic Management Level	Desktop Review	RTM Endorsement	Desktop RSA (Independent Auditor)
Short Term works Non-Complex Controls	By Second AWTM		
Short Term Works Complex Controls			
Short Term Works Major Closure and Detour			
Long Term Temporary control implementation			
Temporary Road Geometry or intersection modifications			Corrective Actions to be undertaken prior to activation Documented within TMP Prior to approval to implement.
Temporary Traffic Signal Modification	To be undertaken by External Traffic Signal Consultant prior to MRWA Approval		Corrective Actions to be undertaken prior to activation Documented within TMP Prior to approval to implement.

9.2.2 Implementation Phase: Inspection and Audit requirements

Traffic Management Level	Pre Opening Audit	Post installation Check	Post Implementation Compliance Check (RTM)	Post Implementation Audit (Independent RSA)
Short Term works Non-Complex Controls		By Site Traffic Personnel (BWTM Accreditation minimum)		
Short Term Works Complex Controls		By Site Traffic Personnel (BWTM Accreditation minimum)		
Short Term Works Major Closure and Detour		By Site Traffic Personnel (AWTM Accreditation minimum)	To be undertaken within 2 hours of activation, findings to be presented as marked up plans with detailed corrections **Action Immediately**	
Long Term Temporary control implementation Intersection and geometry	By Project RTM Corrective Actions to be undertaken prior to activation		To be undertaken within 2 hours of activation, findings to be presented as marked up plans with detailed corrections **Action Immediately**	Undertaken within 3 days following implementation **High risk** issues to be issued on email immediately, **Action immediately**. **Low Risk** items to be provided in report within 3 days. **Action within 1 week**
Temporary Traffic Signal Modification	By Project RTM Corrective Actions to be undertaken prior to activation		To be undertaken within 2 hours of activation, findings to be presented as marked up plans with detailed corrections **Action Immediately**	Undertaken within 3 days following implementation **High risk** issues to be issued on email immediately, **Action immediately**. **Low Risk** items to be provided in report within 3 days. **Action within 1 week**

9.3 Records

A daily diary recording all inspections including variations to the approved TTMP shall be kept using the Daily Diary.

The Traffic Supervisor is to record all inspections made on a daily basis and at those times prescribed by the Traffic Management Implementation Standards. Upon completion of each day the Traffic Supervisor shall provide copies of the daily diary record to the Project Manager.

The Traffic Supervisor is to record all variations made to the approved TTMP on a daily basis and indicate clearly the nature of the variations and the reason for the variations. Upon completion of each day the Traffic Supervisor shall provide copies of the variation record to the Project Manager.

9.4 Public Feedback

All public feedback received is to be recorded and proper action taken accordingly with the nature of each comment.

10.0 Management Review and Approvals

10.1 TTMP Review and Improvement

The Alliance Manager will undertake a review of the efficacy of this TTMP. Any improvements shall be noted to determine if a TTMP review is needed.

10.2 Variations

Departures from the requirements of AS 1742.3 2009 or MRWA Traffic Management for Works on Roads Code of Practice will be detailed and recorded into sub-sections TCPs, where required.

Any incidents arising from the works or changes in approach to construction that would influence traffic management arrangements will be detailed and recorded into sub-sections TCPs, where required. endorsement

10.3 Approvals

Before works commence it is necessary to seek approval from the following (where applicable):

Stakeholder Approval	Comments
MRWA	TM Hold Point Release, Road Planned Interventions, HVS
City of Bayswater	Approval for sign erection on LGA road infrastructure
Public Transport Authority	When impacting bus routes, train stations

11.0 Appendix A – Notification of Roadworks

evolve bayswater
connecting people + places

NOTIFICATION OF ROADWORKS

Notifications are to be distributed at least one (1) week in advance of works
Where Police attendance is required at least three (3) weeks' notice shall be given (except in an emergency)
Where the traffic management is to interfere with traffic signal operation, prior approval is required 3wks in advance by MRWA RNOC.

TMP reference		Communication plan sent to MRWA	Yes ☐	No ☐	N/A ☐
			If No provide reason. If Yes provide email contact		
Anticipated start date:		Anticipated finish date:			
Daily work hours:		Is weekend work applicable?:	Yes ☐	No ☐	
Location of works (Road/Street, Suburb):					
Description of works:					
Description of traffic management arrangements:					
Posted Speed Limit:		Worksite speed limit:		After hours speed limit:	

What is the anticipated effect on traffic flows?:							
Are lanes closed at signals?:	Yes ☐	No ☐	N/A ☐	Are signal loops or hardware affected?	Yes ☐	No ☐	N/A ☐
Will signal phases need time changes?	Yes ☐	No ☐	N/A ☐	Will signals need to revert automatically?	Yes ☐	No ☐	N/A ☐
Date of signal "black out":				Times of signal "black out":			
Will Police attendance be required?:	Yes ☐	No ☐		Dates for Police attendance :			
Are bridges located in area of works, (inc detours)?:	Yes ☐	No ☐		Will changes to traffic flows/composition occur on bridges?	Yes ☐	No ☐	
Are the works located within a School Zone?:	Yes ☐	No ☐		Will children's crossings be altered during works?	Yes ☐	No ☐	

Will there be a width restriction for oversize vehicles exceeding 2.5m in width?	Yes ☐	No ☐	Will there be a height restriction for oversize vehicles exceeding 4.3m in height?	Yes ☐	No ☐
If yes, what width limit is to be imposed on oversize vehicles travelling through the site?			If yes, what is the minimum height of the structure causing the restriction?		
Can the width restrictions be removed if operators provide prior notice?	Yes ☐	No ☐	If the width restrictions are fixed in place, are operators able to have a wider oversize combination if a 1.2m ground clearance can be achieved?	Yes ☐	No ☐
If yes, how much notice will be required? (i.e. 24/48 hours' notice).			If yes, how much notice will be required? (i.e. 24/48 hours' notice).		
Please provide the name and phone number of the best contact for further details in relation to these works.	Name: Contact number (mobile):				
Please provide the name and phone number of the contact for prior notification of movements.	Name: Contact number (mobile):				
Will the work result in a road closure that will impact on Restricted Access Vehicles?	Yes ☐	No ☐	If yes, have discussions been held with Main Roads Heavy Vehicle Services (HVS) in regards to a suitably approved RAV network detour. If no, please contact HVS Route Assessments on 138 486 for assistance. Note: an assessment request for a proposed detour may take up to a week to be processed.	Yes ☐	No ☐

Road Authority:					
Postal Address:					
Telephone:		Email:		Facsimile:	
Contact:					
Telephone:		Email:		Mobile:	

Construction Contractor:	

Postal Address:					
Telephone:		Email:		Facsimile:	
Contact:					
Telephone:		Email:		Mobile:	
After hours contact:		Telephone:		Mobile:	

Traffic Management Contractor:					
Postal Address:					
Telephone:		Email:		Facsimile:	
Contact:					
Telephone:		Email:		Mobile:	
After hours contact:		Telephone:		Mobile:	

Distribution List	Email/Website
WA Police State Traffic Coordination	State.Traffic.Intelligence.Planning.&.Co-ordination.Unit.SMAIL@police.wa.gov.au
WA Police Student Pedestrian Policy Unit	childrenscrossingsunitsmail@police.wa.gov.au
MRWA Customer Information Centre	enquiries@mainroads.wa.gov.au
MRWA Road Network Operations Centre (previously TOC)	RNOC.Control.Room.Information.Desk@mainroads.wa.gov.au
MRWA Heavy Vehicle Operations	hvo@mainroads.wa.gov.au
MRWA Engineer Bridge Loading	DLSEHeavyLoadsGroup@mainroads.wa.gov.au
MRWA Real Time Media	roadworks@mainroads.wa.gov.au
St John's Ambulance	ambulanceoperations@stjohnambulance.com.au
Fire & Emergency Services	For relevant contact details see website: www.dfes.wa.gov.au/contactus/pages/dfesoffices.aspx
Public Transport Authority	For relevant contact details see website: www.pta.wa.gov.au/AboutUs/ContactUs
Arc Infrastructure (previously Brookfield Rail)	thirdparty.notifications@arcinfra.com
MRWA Digital Communications	communications@mainroads.wa.gov.au
Local Government	For contact details see local government website

Note: the above distribution list is an example and should be modified as required. See section 5.4 of the Code of Practice for more information.

12.0 Appendix B – Variation to Standards

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APPLICATION FOR APPROVAL TO VARY REQUIREMENTS OF AUSTRALIAN STANDARDS AS1742.3 OR MRWA TRAFFIC MANAGEMENT CODES OF PRACTICE

Form Instruction

1. **Section A** – Identify the Principal Agency / person commissioning the activity. (Does not include contractors, subcontractors or **traffic** management company/traffic planners etc).
2. **Section B** – Identify activity location, start / finish date and time, type of traffic management, description location of activity.
3. **Section C** – Identify the person that has prepared the Traffic Management Plan, this person shall have AWTM accreditation.
4. **Section D** – For Works undertaken on a State road or on behalf of Main Roads Western Australia the details of the risk assessment process identified in this application form must be documented and endorsed by an accredited Roadworks Traffic Manager[1].

   All applications to be addressed to the applicable Main Roads Regional office. For contact information please refer to the online Application kits and guidelines to undertake works. (www.mainroads.wa.gov.au >Our Roads > Conducting Works on Roads).

   For all other applications the details of the risk assessment process identified in this application form must be documented and endorsed[1] by the person responsible for approving the traffic management plan.

   Contact with the appropriate road authority should be made prior to lodgement of this application to determine its suitability and for any additional requirements.
5. **Section E** - Risk implication, identification and assessment process must be undertaken in accordance with Risk Management – Principles and Guidelines AS/NZS ISO 31000. The likelihood and consequences should be rated after the application of any additional counter measures taken utilising Tables from Annexure's 202B and 203B, Main Roads WA - Specification 202 and 203 respectively.
6. **Incomplete or applications not signed** by the RTM[1] will not be processed.

A

Applicant (Principal for the Works)					
Postal address					
Suburb		State		Postcode	
Project Manager				Telephone	
Email				Facsimile	

B

Anticipated start date				Anticipated finish date	
Daily work hours; From		To		Weekend work applicable	Yes ☐ Sat ☐ Sun No ☐
Location of works (Road/Street Suburb),					
Road type (eg undivided, two lane)					
Description of works					
Are alterations to permanent traffic signals required?	Yes ☐	No ☐	N/A ☐		
Posted Speed Limit		Worksite speed limit		After hours speed limit	

C

TMP Designer					
Accreditation Number					
Postal address					
Suburb		State		Postcode	
Email		Telephone		Facsimile	
Endorsement signature				Date	

RTM Endorsing Variation[1]					
Accreditation Number					
Postal address					
Suburb		State		Postcode	

[1] A person with AWTM accreditation is permitted to endorse a variation of less than 135 % of the allowable lane capacity as outlined in table 4.10 of AS 1742.3. See section 5.6 of the Code of Practice.

Request for Approvals to variations to be submitted at least one week in advance, except in an emergency
This Approval for Variation shall be attached as a supplement to the Traffic Management Plan (TMP)

APPLICATION FOR APPROVAL TO VARY REQUIREMENTS OF AUSTRALIAN STANDARDS AS1742.3 OR MRWA TRAFFIC MANAGEMENT CODES OF PRACTICE

D						
	Email		Telephone		Facsimile	
	Endorsement signature		Date			

For Internal Use Only							
Approving Road Authority							
Approving Officer Position							
Application Approved	Yes ☐ No ☐	If Not Why Not					
Additional Conditions							
Approved By:		Title		Date		File	

Request for Approvals to variations to be submitted at least one week in advance, – except in an emergency
This Approval for Variation shall be attached as a supplement to the Traffic Management Plan (TMP)

13.0 Appendix C – Record Forms

Daily Diary

Daily Traffic Management Diary

Location: **Client:** **Date:**

TMP No: **TCD No:** **Weather Conditions:** **Diary Sheet:** **of**

Start Time at Depot: **Time Arrive Onsite:** **Commencement of Site Setup:** **Site Setup and Operational:**

Site Pulled Down at: **Time Aftercare signs setup:** **TCD No:** **Time left site:** **Finish time at Depot:**

☐ **Day Works** ☐ **Night Works** ☐ **Emergency Response** **Site Setup as per TCD ☐ Yes ☐ No (if not comment on next page)**

☐ **Attendance at Pre-Start Meeting** **Did an incident occur (if yes complete incident report form) ☐ Yes ☐ No**

I confirm that the above times of 'setup' and 'pulldown' of traffic management signs and devices are a true and correct

Name (Site Supervisor): Signed:

Drive Through Checks (Checks must be conducted at least every 2 hours)

Time of check entered. Rule off and leave blank if the check does not apply to the site. Make a note of any issues on the next page.

Traffic Management Site Checks	1	2	3	4	5	6	7	8	9	10
Time										
Are signs upright, clean, visible, level & stable										
Are taper lengths correct										
Are speed limit signs correct and doubled up										
Are sign spacings correct										
Are cone/bollard alignments straight & spaced correctly										
Are devices operating correctly										
Have pedestrians been catered for										
Are lane widths adequate										
Are vehicle queue lengths acceptable										
Is road surface condition adequate										

No. of Traffic Management Vehicles Onsite: **No. of Traffic Management Personnel Onsite:**

Traffic Management Personnel Names & Accreditations:

Position	**Name**	**Accreditation Details**	**Time of Break from Stop/Slow** (Traffic controllers must have a 15 minute break every two hours of constant stop/slow operation)							
			On	Off	On	Off	On	Off	On	Off

Crew Leader:			:	:	:	:	:	:	:	:
Traffic Controller:			:	:	:	:	:	:	:	:
Traffic Controller:			:	:	:	:	:	:	:	:
Traffic Controller:			:	:	:	:	:	:	:	:
Traffic Controller:			:	:	:	:	:	:	:	:
Traffic Controller:			:	:	:	:	:	:	:	:

Additional Comments _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

I confirm that the details contained herein are true and correct

Name: (Traffic Management Crew Leader): _____ Signed: _____

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TRAFFIC INCIDENT REPORTING FORM

Region: Contract No.:	Incident Report No.: Contractor:

Major Incident Reports must be forwarded to the Superintendent within 48 hours of the incident occurring or becoming apparent.

Contractors shall use this Form for reporting of traffic Incidents on works under Contract and this form supplements the Safety Incident Report Form.

1.0 Details of Incident	Reported to: ☐ Supervisor ☐ TMR ☐ Other		
Safety Incident Report No Fatality ☐ Injury ☐ Property Damage ☐ Police Attended Yes/No	Road Surface Unsealed ☐ Sealed ☐	Atmospheric Conditions Clear ☐ Overcast ☐ Raining ☐ Fog/Smoke/Dust ☐	Light Conditions Day Light ☐ Night Time ☐ Dawn/Dusk ☐ Street Lighting On ☐ Off ☐ Not Provided ☐
Time and Date of Incident AM / PM Day Month Year		Road Condition Wet ☐ Dry ☐	

Other relevant details, (Last maintenance grade, watering and dust conditions):

2.0 Details of Traffic Management in place:			
TCD No:		Name of individual that prepared the TCD	
Time last inspected:		Accreditation No:	
TCD Approved:	Day Month Year	TMP Approved:	Day Month Year

3.0 Descriptions of Vehicles:			
Detail (make, model/ped/cyclist/VRU)	Registration No	Direction of Travel	Age of Driver
3.1 Vehicle 1			
3.2 Vehicle 2			
3.3 Vehicle 3			
Comments:			

4.0 Description of Incident:

Draw the Incident including the direction of travel, traffic control signs, fixed structures and north point.



5.0 Attachments: The following copies MUST be submitted with this Incident Report.

Approved TMP ☐ Approved TCD ☐ Approvals for temporary speed restrictions ☐ Daily Diary ☐

6.0 Police Report:

Accident reported to Police: ☐ YES ☐ NO

Report made by ☐ Phone ☐ Fax ☐ Mail or E-mail

Date Report Made Day Month Year

Police WA Reference Number

7.0 Details of Person Completing this Incident Form:

Name: Contractor Name:

Position:

Date: Signature:

14.0 Appendix D – Barrier Design Sheets

ABSORB 350 CRASH ATTENUATOR

REVISION REGISTER

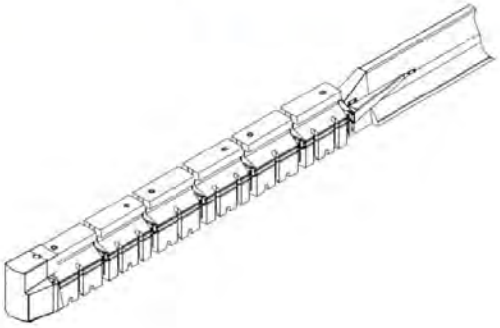
Issue & Revision	Description	Date
1	Issued for use.	23/02/2004
1 A	Minor editorial revisions and stipulation that system is not to be used in a permanent application.	3/03/2006
1 B	Supplier details amended.	12/06/2007
1 C	Approval for TL 3 version removed	23/11/2012
1 D	Updated Supplier Updated I&M details	23/02/2016

Absorb 350 is a plastic water filled non-redirective, gating crash attenuator that attaches to temporary workzone barriers with a steel transition piece.

Images:







Isometric View: Absorb 350 TL 2 (70km/h), Six Element System



Elevation: Absorb 350 TL 2 (70km/h), Six Element System

ABSORB 350 CRASH ATTENUATOR

Ownership: Barrier Systems Inc 180 River Road, Rio Vista CA94571
www.barriersystemsinc.com

Supplier: Australian Construction Products (ACP)
339 Horsley Rd, Milperra NSW 2214
Ph: 02 8708 4400 Fax: 02 9792 6272
http://www.acprod.com.au

Test Level: Accepted by Main Roads WA to NCHRP 350 test level TL 2.
Accepted by Main Roads WA for use where design speed does not exceed 70km/h (i.e. posted speed up to 60km/h).

Design:

- Design to be in accordance with the Absorb 350® Installation and Maintenance Manual (Jan 2016) by ACP.

  Note that Main Roads requires the speed stated in the Installation and Maintenance Manual (Jan 2016) to be taken as the design speed and not the posted speed.

Design Speed (km/h)	Number of Elements*	System Length (m)**
40	2	3.0
50	3	4.0
55	4	4.9
60	5	5.9
70-TL2	6	6.9

* Excluding nose piece
** From front of nose piece to front of barrier

- As the system is gating, a flat hazard free area of 22.5m x 6m should be provided. Refer to AS / NZS 3845 Figure F11.
- The system is comprised of two types of elements (Type A and Type B). The effective length of each element is 1000mm and the effective width is 610mm. The system is also comprised of a steel nose piece (PCB type) and a steel transition piece that connects to the barrier.
- All kerbs, islands and elevated objects greater than 100mmm high that would be beneath, beside or less than 15m in front of the unit or along the length of the unit should be removed.

Limitations:

- As the system is non-redirective if used to shield a hazard or a worksite under side impacts, a vehicle may penetrate the system.
- Shall not be used in a permanent application.
- Not to be used on longitudinal slopes or crossfalls greater than 10%

ABSORB 350 CRASH ATTENUATOR

Installation and Maintenance Requirements:

The product shall be installed and repaired after impact in accordance with the Absorb 350® Installation and Maintenance Manual (Jan 2016) by ACP.

Typical Parts to be Replaced After Impact:

Damaged cartridges (elements) and nose piece cover.

Parts Typically Re-Useable After Impact:

Some undamaged cartridges (elements), transition and steel nose piece.

References:

Relevant FHWA Approval Letters
Refer to website

http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/listing.cfm

Code	Description
CC66	TL3 9 element when attached to permanent concrete barriers or to temporary concrete barriers with minimum length of segments of 6.1m.
CC66A	TL2 5 elements plus a nosepiece and reduction in minimum 6.1m length for temporary concrete barrier to 3m providing adapter shown on Drawing Number B000520 is used.

Bayswater S

ARMORZONE

REVISION REGISTER

Revision	Description	Date
1	Issued for use.	4/12/2012
1 A	Updated Ownership, Supplier contact details and current Product Manual	21/11/2016

The Armorzone Barrier is a portable water filled longitudinal temporary barrier. It can be used in worksites with design speeds up to 70 km/h (i.e. posted speed up to 60 km/h). The barrier units are orange in colour, while the end treatments (which are empty) are yellow.

Images / Drawings.



Figure 1: Photographs of Armorzone Barrier and Terminal units

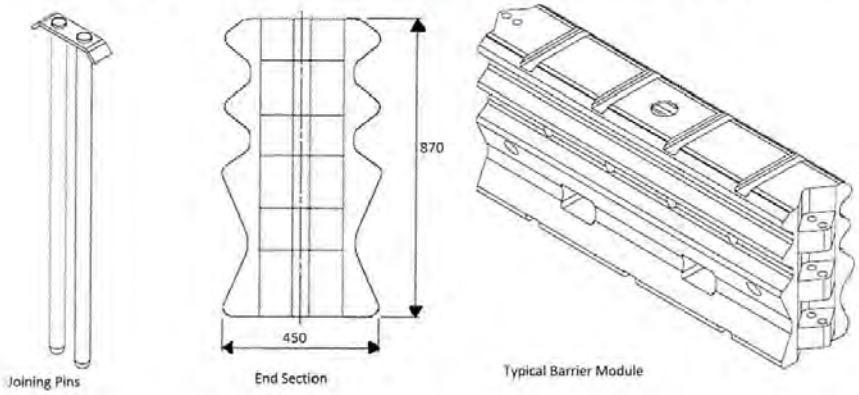


Figure 2: Typical Details of Armorzone Barrier

Ownership: Valmont Highway Distribution Ltd

Supplier: Australian Construction Products (ACP)
339 Horsley Rd, Milperra NSW 2214
Ph: 02 8708 4400 Fax: 02 9792 6272
http://www.acprod.com.au

Test Level: Tested in accordance with NCHRP 350 to TL2.

Configuration:
Units must be interconnected and requires a sufficient length to resist impact.

Bayswater S

ARMORZONE

Design:

- Design to be in accordance with the Armorzone Plastic Barrier & End Treatment Product Manual (version November 2016).
- Barrier should be placed a minimum of 250 mm from the edge of travelled way to avoid nuisance impacts.
- Amount of deflection to be allowed depends on whether traffic is un-directional or bi-directional and offset to barrier and speed.
- The barrier has its own end terminals which must be installed.
- Barrier length must be sufficient to adequately protect the hazard. The minimum length of barrier to be installed is 50 m (between points of need).
- Plant, personnel or roadside hazards should not be located within the hazard free and deflection area as shown in Figure 3.

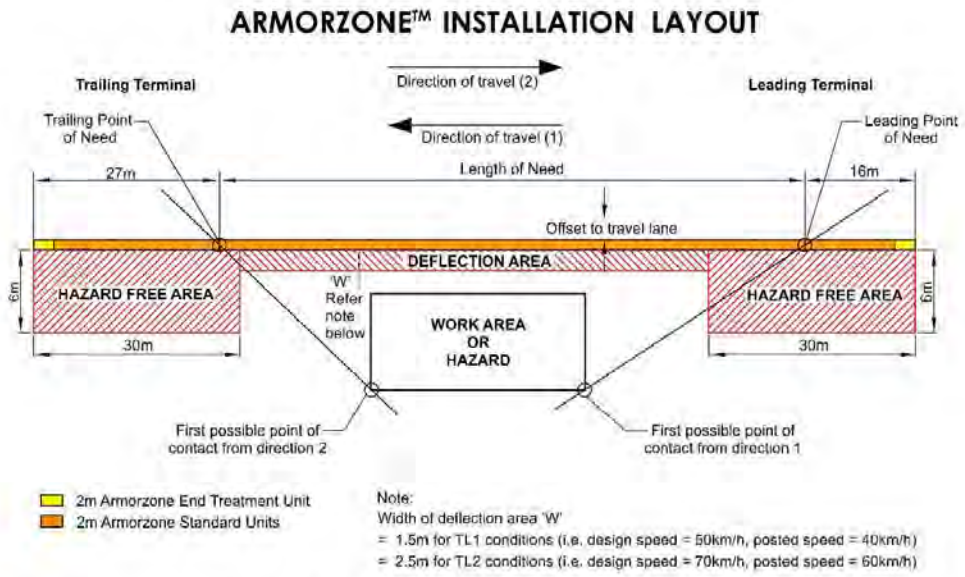


Figure 3: Armorzone Layout Diagram

(Not to Scale)

Limitations:

- Not to be used on longitudinal slopes or crossfalls greater than 5%.
- Cannot be used on radii smaller than 28m.
- Cannot be placed adjacent to kerbs or other objects which may prevent lateral displacement.

Installation and Maintenance Requirements:

In accordance with the Armorzone Plastic Barrier & End Treatment Product Manual (version November 2016).

Parts to be Replaced after Impact:

Units may need to be repaired after impact or replaced depending on the extent of damage.

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ARMORZONE

Parts Typically Re-Useable after Impact:
Undamaged units.

References:

Item	Description
1	Barrier system tested to NCHRP 350 Test Level TL 2. A copy of the test reports can be found on Main Roads file 11/4154.
2	Terminal tested to NCHRP 350 Test Level TL 2. A copy of this testing can be found on Main Roads file 11/4154.

ARMORZONE MASH

REVISION REGISTER

Revision	Description	Date
1	Issued for use.	22/05/2019

The ArmorZone MASH Barrier is a portable water filled longitudinal temporary barrier. It can be used in worksites with design speeds up to 70 km/h (i.e. posted speed up to 60 km/h). The barrier units are orange in colour, while the end treatments (which are empty) are yellow.

The ArmorZone MASH Barrier shall NOT be installed with the ArmorZone Barrier units (which are rated to NCHRP 350 TL-2) due to their different crash rating and performance.

To differentiate from ArmorZone barrier, the ArmorZone MASH barrier units have a white filler lid, a steel connector bar (visible at the ends of units) and "MASH TL2" text moulded into the top of the barrier.

The ArmorZone MASH barrier uses the same yellow end unit (not filled with water) as the ArmorZone barrier.

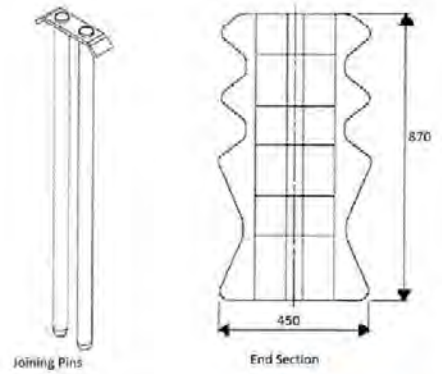
Images / Drawings.



Figure 1: Photographs of ArmorZone MASH Barrier and Terminal units

Bayswater S

ARMORZONE MASH





Typical Barrier Module

Figure 2: Typical Details of ArmorZone MASH Barrier

Ownership: Valmont Highway Distribution Ltd

Supplier: Ingal Civil Products
3 Temperley Close, Welshpool WA 6106
Ph: (08) 9452 9111 Fax: (08) 9358 9111
Website - http://www.ingalcivil.com.au/

Test Level: Tested in accordance with MASH to TL2.

Test Deflection: 4.10 m under MASH TL2 conditions
(i.e. design speed = 70 km/h, posted speed = 60 km/h)

Note that these deflections were measured in crash tests performed under controlled conditions. The deflections recorded are the horizontal offset between the face of the barrier units measured prior to and following vehicle impact. Designers should be aware that the deflection published as a test result may not be the deflection value achieved in the field for all impacts by errant vehicles.

Working Width: 4.6 m under NCHRP 350 TL2 conditions
(i.e. design speed = 70 km/h, posted speed = 60 km/h)

Note that the working widths above are equivalent to the test deflections plus the width of the system.

ARMORZONE MASH

Configuration:

Units must be interconnected and requires a sufficient length to resist impact.

Design:

- Design to be in accordance with the ArmorZone MASH TL2 Temporary Safety Barrier Product Manual (Release 03/19 (Australia)).
- Barrier should be placed a minimum of 250 mm from the edge of travelled way to avoid nuisance impacts.
- Amount of deflection to be allowed depends on whether traffic is un-directional or bi-directional and offset to barrier and speed.
- The barrier has its own end terminals which must be installed.
- Barrier length must be sufficient to adequately protect the hazard. The minimum length of barrier to be installed is 46 m (between terminal units).
- Plant, personnel or roadside hazards should not be located within the hazard free and deflection area as shown in Figure 3.

ARMORZONE™ MASH TL2 INSTALLATION LAYOUT

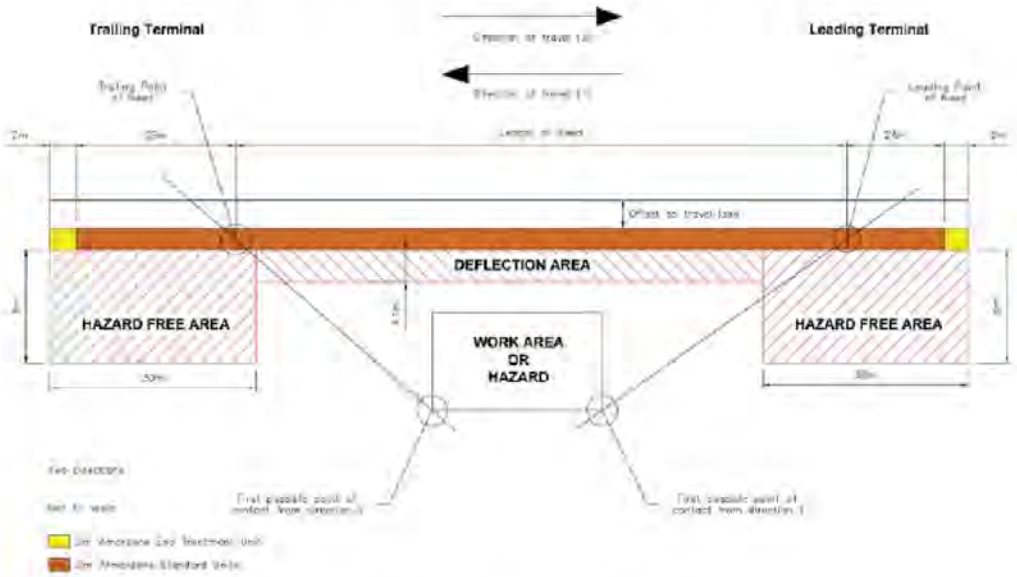


Figure 3: ArmorZone MASH Layout Diagram

(Not to Scale)

Limitations:

- Not to be used on longitudinal slopes or crossfalls greater than 5%.
- Cannot be used on radii smaller than 28m.
- Cannot be placed adjacent to kerbs or other objects which may prevent lateral displacement.

Installation and Maintenance Requirements:

In accordance with the ArmorZone MASH TL2 Temporary Safety Barrier Product Manual (Release 03/19 (Australia)).

Bayswater S

ARMORZONE MASH

Parts to be Replaced after Impact:

Units may need to be repaired after impact or replaced depending on the extent of damage.

Parts Typically Re-Useable after Impact:

Undamaged units.

References:

Item	Description
1	Barrier system information can be found on Main Roads file 19/1574.

Barrierguard Deflection Chart

Displacement table: N2 system (1500Kg Car)

Impact Speed (km/h)	Impact Speed (mph)	Deflection (m)			
		5°	10°	15°	20°
40	25	0.01	0.03	0.08	0.13
50	31	0.01	0.05	0.12	0.21
65	*40*	*0.02*	*0.09*	*0.20*	*0.36*
70	43	0.03	0.11	0.24	0.41
80	*50*	*0.03*	*0.14*	*0.31*	*0.54*
90	56	0.04	0.18	0.39	0.68
100	62	0.05	0.22	0.48	0.84
110	68	0.07	0.26	0.58	1.02

Displacement table: H2 system (13000Kg Bus)

Impact Speed (km/h)	Impact Speed (mph)	Deflection (m)			
		5°	10°	15°	20°
40	25	0.04	0.17	0.38	0.67
50	31	0.07	0.27	0.6	1.04
65	*40*	*0.11*	*0.44*	*0.99*	*1.73*
70	43	0.13	0.53	1.17	2.04

T-Lok Deflection Chart

Table 2 T-Lok Deflections for 2000 kg impacting vehicle

Angle of Impact	5°	10°	15°	20°	25°
Design speed (km/h)	Deflection (m)	Deflection (m)	Deflection (m)	Deflection (m)	Deflection (m)
50	0.01	0.05	0.11	0.20	0.30
60	0.02	0.07	0.16	0.28	0.43
70	0.03	0.10	0.22	0.39	0.59
80	0.03	0.13	0.29	0.50	0.77
90	0.04	0.16	0.36	0.64	0.97
100	0.05	0.20	0.45	0.79	1.20

Angle of Impact	5°	10°	15°	20°	25°
Design speed (km/h)	Working Width (m)	Working Width (m)	Working Width (m)	Working Width (m)	Working Width (m)
50	0.62	0.66	0.72	0.81	0.91
60	0.63	0.68	0.77	0.89	1.04
70	0.64	0.71	0.83	1.00	1.20
80	0.64	0.74	0.90	1.11	1.38
90	0.65	0.77	0.97	1.25	1.58
100	0.66	0.81	1.06	1.40	1.81

BARRIERGUARD 800

REVISION REGISTER

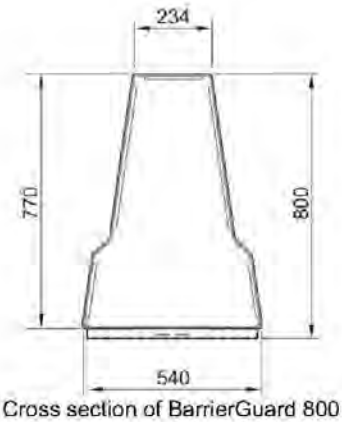
Revision	Description	Date
1	Issued for use.	11/11/2005.
1 A	Supplier details amended	15/06/2012
1 B	Requirement for intermediate anchors added. List of terminals permitted added.	23/11/2012
1 C	Details for additional Owner / Supplier added. Conditions updated.	6/11/2018

BarrierGuard 800 is a portable steel barrier, which is anchored to the pavement at the ends (and at intermediate anchors if required) and is considered a semi rigid system that was developed for temporary applications.

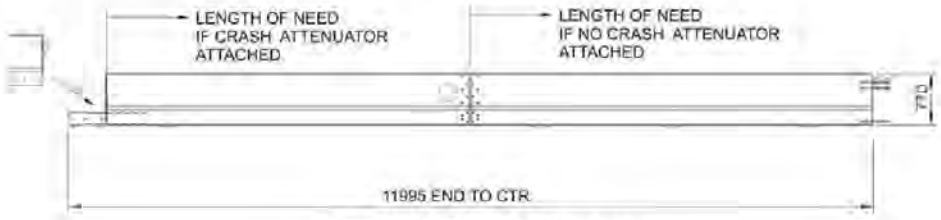
BarrierGuard 800 is approved for use in temporary applications

BarrierGuard 800 may be considered for permanent installation. However, approval is required from MRWA Road & Traffic Engineering Branch prior to specifying this application.

Images:



Cross section of BarrierGuard 800



Elevation of Full Height Anchor

BARRIERGUARD 800



Photograph from BarrierGuard 800 installation

Ownership:

Details for two owners and suppliers are provided:

Ownership
Highway Care International 3 Bullace Lane, Dartford, Kent DA1 1BB, United Kingdom
Supplier
Highway Care International Ph: 0428 492 204 www.highwaycare.com

Ownership
Laura Metaal Eygelshoven BV Rimburgerweg 40 6471 XX Kerkrade, The Netherlands
Supplier
Boylan Group 198 Power Street, Glendenning NSW 2761 www.boylan.net.au

Test Level: Approved to MASH TL 3 and NCHRP 350 TL 4.

Accepted Configuration:

- The BarrierGuard 800 system consists of 6 or 12m long units. Other components include 600mm long 5° and 10° radius sections and a Full Height Terminal End (6m or 12m long).
- As the barrier is designed to resist loadings by deflecting the units should be free to move but the system must be anchored at each end with 8 x 500 mm long by 32 mm dia pins and if required at intermediate locations.
- The location of pinned intermediate anchors shall be at intervals not greater than 60m.

Bayswater S

BARRIERGUARD 800

Design Considerations:

Design should be undertaken in accordance with relevant manual provided by the Supplier as listed below:

Supplier
Highway Care International
Manual
BarrierGuard 800 Temporary Applications Product Manual Australia & New Zealand Revision 2c July 2016 BarrierGuard 800 Permanent Applications Product Manual Australia & New Zealand Revision 5c July 2016

Supplier
Boylan Group
Manual
Laura Metaal Road Safety Barrier Guard 800 Installation Manual, Version 2.6

Products from the different suppliers shall be identifiable and traceable with markings prescribed in AS/NZS 3845.1 *Road Safety Barrier Systems*.

Deflections:

Note that the deflections were measured in crash tests performed under controlled conditions. The deflections measured are the horizontal offset between the face of the barrier measured prior to and following vehicle impact. Designers should be aware that the deflection figures published as a test result may not be the deflection value achieved in the field for all impacts by errant vehicles.

1.70m under MASH TL 3 conditions (2270kg vehicle at 100km/h impacting at 25°)

1.74m under NCHRP 350 TL 4 conditions (8000kg vehicle at 80km/h impacting at 15°)

1.60m under NCHRP 350 TL 3 conditions (2000kg vehicle at 100km/h impacting at 25°)

1.36m under NCHRP 350 TL 2 conditions (2000kg vehicle at 70km/h impacting at 25°)

In addition, allowance shall be made for the working width of the BarrierGuard 800 system.

Minimum Length:

60 m (i.e. minimum length tested)

The barrier length should be determined by "Length of Need" requirements and should be sufficient to adequately protect the hazard.

Length of Need:

The beginning of the length of need depends on the end configuration used and is illustrated in the "Elevation of Full Height Anchor" figure.

BARRIERGUARD 800

Terminals permitted:

- Tau-II crash cushion
- Quadguard crash cushion (including CZ version)
- SMART crash cushion
- Absorb 350 (suitable for TL 2 conditions only)

Limitations:

- The connection of units from different Owners / Suppliers is not permitted.
- It is recommended that the barrier should be offset from the edge of traffic lane by:
  - 0.3m for roads with posted speed < 70km/h
  - 0.6m for roads with 70km/h ≤ posted speed ≤ 90km/h
  - 1.0m for roads with posted speed > 90km/h.
- The ends of the barrier should be shielded with a suitable end treatment (refer to the Product or Installation Manuals for more information) or by an overlapping barrier.
- The cross slope shall be not greater than 10% for the area immediately behind the barrier for the width of the deflection.
- Cannot be placed adjacent to kerbs or other objects within the deflection limits of the barrier, which may prevent lateral displacement.
- Not to be used on longitudinal slopes or crossfalls greater than 8%.
- To be used where pavement thickness is at least 350 mm and with an asphalt surfacing of 30 mm. For pavements not meeting these requirements design advice shall be sought from the Supplier.
- Cannot be used on radii less then 20 m and these smaller radii require 600 mm long special units.

Installation and Maintenance Requirements:

In accordance with the relevant Product or Installation Manual. The holes in the pavement for the anchors made to accommodate the anchor pins must be repaired to the satisfaction of the road authority.

Parts to be Replaced after Impact:

Units may need to be repaired after impact or replaced depending on the extent of damage.

Parts Typically Re-Useable after Impact:

Undamaged units.

BARRIERGUARD 800

References:

Highway Care International, BarrierGuard 800 Temporary Applications Product Manual, Australia & New Zealand, Revision 2c July 2016

Highway Care International, BarrierGuard 800 Permanent Applications Product Manual, Australia & New Zealand, Revision 5c July 2016

Laura Metaal Road Safety, Barrier Guard 800 Installation Manual, Version 2.6

Relevant FHWA Approval Letters:

Refer to website

http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/listing.cfm

Code	Description
B131	TL 4 approval.

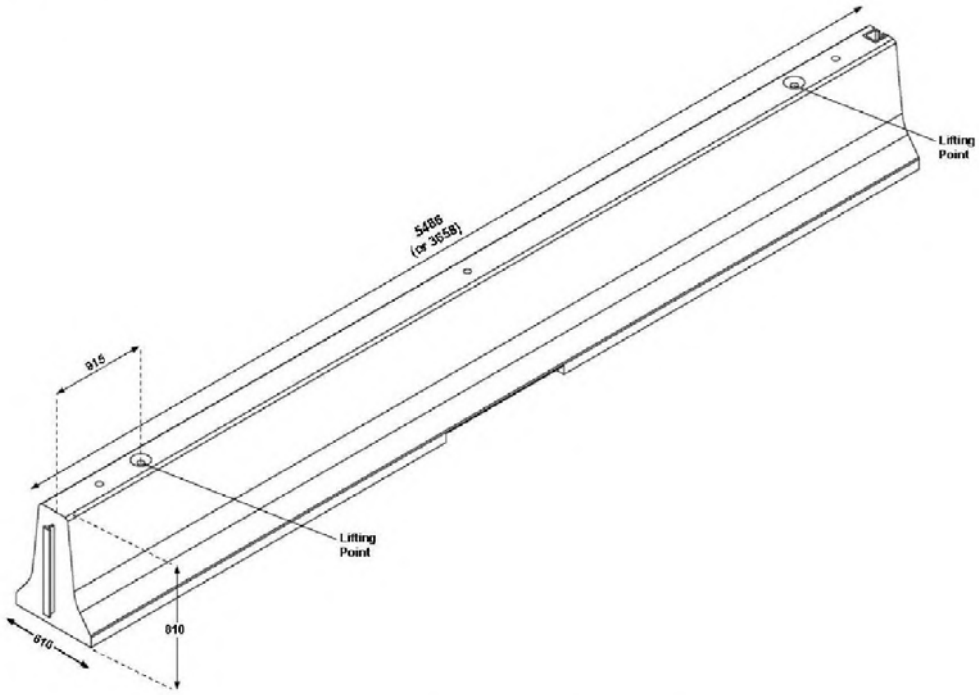
T-LOK TYPE F BARRIER

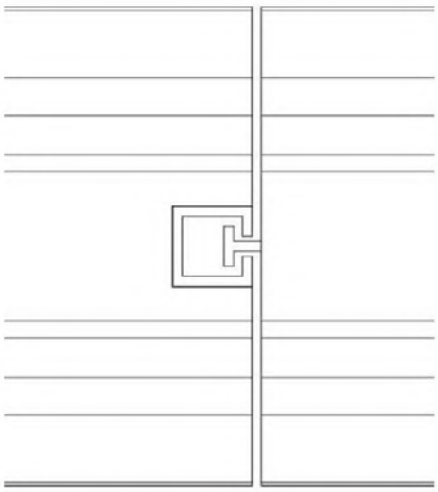
REVISION REGISTER

Revision	Description	Date
1	Issued for use.	1/10/2008

T-Lok is a semi-rigid temporary concrete barrier system which has a Type F profile.

Drawing:





T-Lok connection

T-LOK TYPE F BARRIER

Ownership:
Rockingham Pre-Cast
http://www.t-lok.com/

Supplier:
Units can be hired from many of the hire companies. Saferoads sells the units and contacts details are:
Saferoads PO Box 340 Drouin, Victoria 3818.
Ph 1800 060 672 Fax 1800 060 673
www.saferoads.com.au

Test Level:
NCHRP TL 3.

Configuration:
Units must be interconnected using T connection and requires a sufficient length to resist impact. The approved system configuration is shown in Table 1.

Table 1 Approved Configurations

	System Anchorage		
Item	Freestanding	Tethered to anchored Quadguard CZ	Triton CET
Point of Need TL 3	18 m. (Refer to Figure 2 of the T-Lok Installation Manual).	Point of need commences at the start of the Quadguard. (Refer to Figure 3 of the T-Lok Installation Manual).	20 m from the start of the Triton CET. (Refer to Figure 4 of the T-Lok Installation Manual).
Minimum length of barriers excluding terminals	48 m.	20 m.	20 m.
Terminal conditions	End of the unit shall be placed beyond the clear zone.	Quadguard CZ terminal with the last T-Lok unit prior to the Quadguard anchored at three locations.	Triton Concrete End Terminal which is a gating end terminal and therefore requires the use of a hazard free area 22.5 m x 6 m.
Deflections	Refer to Table 2.		
Units	Both 3.65 m and 5.4 m nominal units are acceptable but shall not be used in conjunction other than for curve applications.		

Note all references to figures in the T-Lok installation manual are to correct for Version 4.1.2 dated October 2008.

T-LOK TYPE F BARRIER

Design Considerations:

Deflection:
Refer to Table 2. As the barrier is designed to resist loadings by deflection the units should be free to move, therefore the barrier shall not be placed onto a mortar or a concrete blinding as this may overload the connections between the units.

Table 2 T-Lok Deflections for 2000 kg impacting vehicle

Angle of Impact	5°	10°	15°	20°	25°
Design speed (km/h)	Deflection (m)	Deflection (m)	Deflection (m)	Deflection (m)	Deflection (m)
50	0.01	0.05	0.11	0.20	0.30
60	0.02	0.07	0.16	0.28	0.43
70	0.03	0.10	0.22	0.39	0.59
80	0.03	0.13	0.29	0.50	0.77
90	0.04	0.16	0.36	0.64	0.97
100	0.05	0.20	0.45	0.79	1.20

Angle of Impact	5°	10°	15°	20°	25°
Design speed (km/h)	Working Width (m)	Working Width (m)	Working Width (m)	Working Width (m)	Working Width (m)
50	0.62	0.66	0.72	0.81	0.91
60	0.63	0.68	0.77	0.89	1.04
70	0.64	0.71	0.83	1.00	1.20
80	0.64	0.74	0.90	1.11	1.38
90	0.65	0.77	0.97	1.25	1.58
100	0.66	0.81	1.06	1.40	1.81

Notes:
1. Deflections have been interpolated from the TL 3 crash test based on the impact severity formula contained within NCHRP 350.
2. Impacts near the start / end of the barrier will result in greater deflections.
3. The working width includes the width of the system.

Minimum Length:
The minimum length is a function of the end anchorage provided refer to Table 1.

Offset from Kerbing:
Kerbing is not to be placed in front of the barrier. Refer to Clause 3.9 of AS / NZS 3845. Kerbing should not be placed behind the barrier within the deflection limits of the system. Barrier shall not be placed on top of kerbing as this negates the effects of the profile.

Approach to barrier:
The approach to the barrier should be a trafficable running surface at a slope of 1 in 10 or flatter clear of objects and grade changes to allow an errant vehicle to hit the barrier at an appropriate height.

Vehicle Roll:
Where the hazard being protected by a barrier extends above the height of the barrier the Designer should ensure that adequate separation from the face of the barrier to the hazard is provided to allow for the roll of high vehicles (such as trucks) hitting the hazard. Refer to Table 4.5 of the Assessment of Roadside Hazards.

T-LOK TYPE F BARRIER

End Treatments:
As per Table 1.

Limitations:

- The use of T-Lok is limited to work site situations and units shall be interconnected using the T-Lok connections.
- Objects should not be placed on top of the barrier as they are designed to move under impact. "Gawk" screens are not acceptable.
- Although the barrier is considered semi-rigid, flare rates and shy line distances used for T-Lok shall be those applicable to rigid barriers.
- When designing a T-Lok barrier the flare rates used shall be those for a rigid barrier so as to minimise impact angles.
- The tightest radius that the barrier can be installed in is 30 m.

References:
Relevant FHWA Approval Letters:
(Refer to website http://safety.fhwa.dot.gov/roadway_dept/road_hardware/listing.cfm Temporary Concrete/Steel Barriers)

Code	Description
B-42	TL3 Approval.

Drawings:
Not applicable.

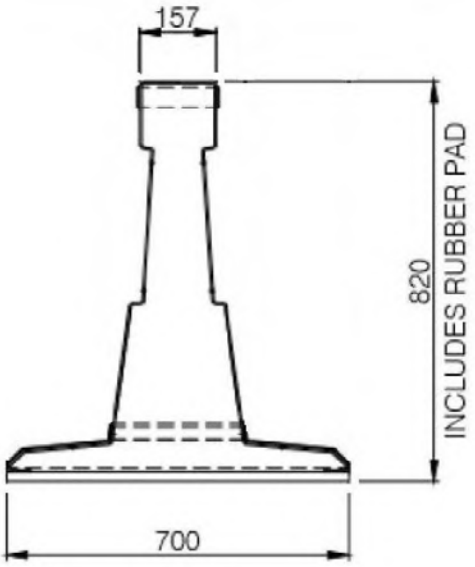
ZONEGUARD

REVISION REGISTER

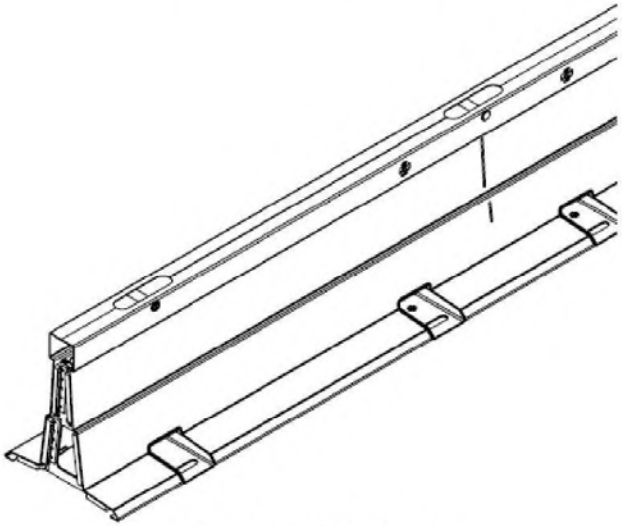
Revision	Description	Date
1	Issued for use.	28/08/2014.

Zoneguard is a portable steel barrier, which is anchored to the pavement at the ends (and at intermediate anchors if required) and is considered a semi rigid system that is to be used for temporary applications only.

Images:

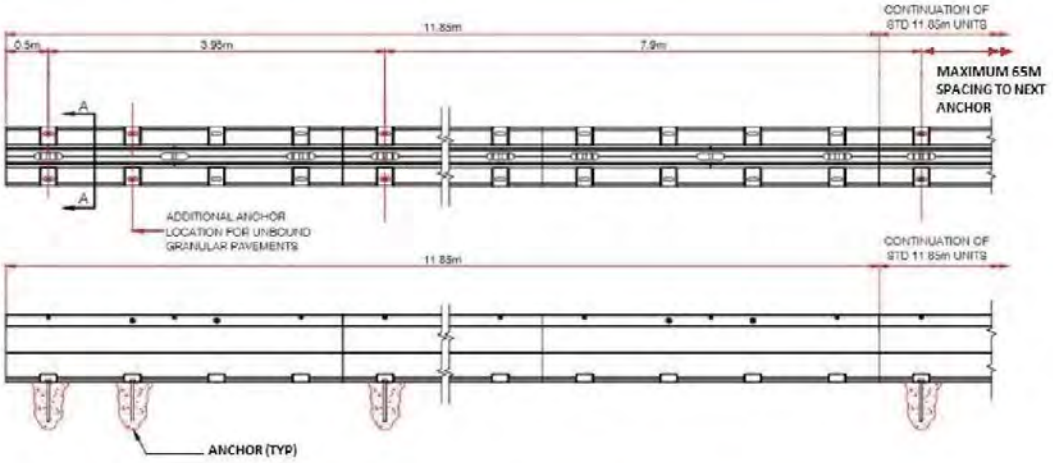


Typical cross section of Zoneguard



Oblique view of Zoneguard

ZONEGUARD



Plan and Elevation of Anchored Zoneguard End Unit



Photograph of Zoneguard installation

Ownership: Hill & Smith UK

Supplier: Hill and Smith Pty Ltd
10/65 Business Street
Yatala Brisbane QLD 4207
Email: casey.lee@hsroads.com
Phone: (07) 3807 8050

Website - http://hillandsmith.com.au/

ZONEGUARD

Test Level: Approved to MASH TL3 and to NCHRP TL 4.

Test Level	Test Description	Deflection (measured at base of units)
NCHRP350 - TL3	2000kg vehicle at 100km/h, 25° impact angle	1.65m
MASH - TL3	2270kg vehicle at 100km/h, 25° impact angle	1.88m
NCHRP350 - TL4	8000kg vehicle at 80km/h, 15° impact angle	1.27m

Configuration:

- Standard 11.85m long units are to be used.
- As the barrier is designed to resist loadings by deflecting the units should be free to move but the system **must** be anchored with each end unit anchored and, if required, at intermediate locations.
- Intermediate units should also be anchored, with a maximum spacing of 65m between intermediate anchors.
- Suitable for unbound granular pavements with a minimum thickness of 350 mm (i.e. 150 mm basecourse on 200 mm subbase), where anchoring shall consist of 8 x 500 mm long by 30 mm dia pins.
- For other pavement types, refer to Supplier for anchoring details.
- Custom fabricated radii units in 2.5°, 5.0° and 7.5° angles may be used.

Design:

- Design to be in accordance with the ZoneGuard Specification Manual Metric Australian Version May 2014, Rev 7, by Hill & Smith.
- Barrier should be placed a minimum of 250 mm from the edge of travelled way to avoid nuisance impacts.
- Barrier length must be sufficient to adequately protect the hazard.
- The ends of the barrier must be protected with a suitable end treatment.
- Minimum offset between the edge of barrier and the edge of an excavation is 1.9 m.

Minimum Length:
75m (including anchored end units).

Terminals permitted:

- Tau-II crash cushion
- Absorb 350 (suitable for TL 2 conditions only – i.e. maximum design speed = 70 km/h, maximum posted speed = 60 km/h)

Length of Need:
The beginning of the length of need shall be at the leading end of the crash cushion (for TL3 and TL4 conditions). If an Absorb 350 terminal is used (for TL2 conditions) the beginning of the length of need shall be at the leading end of the Zoneguard anchored unit.

Limitations:

- The cross slope shall be not greater than 7% for the area between the edge of travelled way and the barrier, and the area immediately behind the barrier for the width of the deflection.

Bayswater S

ZONEGUARD

- Cannot be placed adjacent to kerbs or other objects within the deflection limits of the barrier, which may prevent lateral displacement.
- Not to be used on longitudinal slopes greater than 8%.
- Standard 11.85m long units cannot be used on radii less than 200 m.
- Custom fabricated radii units in 2.5°, 5.0° and 7.5° angles may be used on radii between 200 m and 14 m.
- Cannot be used on radii less than 14 m.
- A Minimum Deflection System, with continuous anchoring requirements is currently not approved for use by Main Roads WA.
- Objects should not be placed on top of the barrier as they are designed to move under impact. "Anti-Gawk" screens are not to be attached.

Installation and Maintenance Requirements:

In accordance with the ZoneGuard Specification Manual. The holes for the anchors made to accommodate the anchor pins must be repaired.

Parts to be Replaced after Impact:

Units may need to be repaired after impact or replaced depending on the extent of damage.

Parts Typically Re-Useable after Impact:

Undamaged units.

References:

Relevant FHWA Approval Letters
Refer to website

http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/listing.cfm

Code	Description
B176	TL 3 and TL 4 approval.

15.0 Appendix E - Sample Traffic Control Plan

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PTA

BAYSWATER STATION AND TURNBACK

PTA190037

BAYSWATER STATION EARLY WORKS PACKAGE SITE EXPLORATION WORKS

Ref: EV-BS-TMP-EW-001

AUTHORISED TO USE: _____(ALLIANCE MANAGER), DATE: _____

Submit to Client for Review and Approval where required in the Contract (Client to complete one box only):				
❑	Rejected, resubmit	Name:	Sign:	Date:
❑	Endorsed, with comments to add or change	Name:	Sign:	Date:
❑	Endorsed	Name:	Sign:	Date:

Rev	Date	Reason for Issue	Prepared	Checked	Approval
A	07/09/20	For Stakeholder Review	D.Schmidt	T.Green	

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Abbreviations and Acronyms

Term	Definition
AWTM	Advanced Worksite Traffic Management
BWTM	Basic Worksite Traffic Management
CAH	Controlled Access Highway
CAR	Corrective Action Report
CIC	Customer Information Centre
COB	City of Bayswater
COP	Code of Practice
FWY	Freeway
TGS	Traffic Guidance Scheme
HVO	Heavy Vehicle Operations
HVS	Heavy Vehicle Services
HWY	Highway
IFC	Issued For Construction
LGA	Local Government Authority
MRWA	Main Roads Western Australia
OS&H	Occupational Safety and Health
OSH MR	Occupational Safety and Health Main Roads Representative
PShP	Principal Shared Path
RNOC	Road Network Operations Centre
RSA	Road Safety Audit(or)
RTM	Roadworks Traffic Manager
SCATS	Sydney Co-ordinated Adaptive Traffic System
SIDRA	Signalised and un-signalised Intersection Design and Research Aid
SWTC	Scope of Work and Technical Criteria
TC	Traffic Controller
TCP	Traffic Control Plan
TGS	Traffic Guidance Scheme
TMA	Truck/Trailer Mounted Attenuator
TRD	Temporary Road Design
TTM	Temporary Traffic Management
TTMP	Traffic and Transport Management Plan
VMS	Variable Message Sign
WTM	Worksite Traffic Management

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1 Introduction

1.1 Purpose and Scope

This Traffic Management Plan (TMP) outlines the traffic control and traffic management procedures to be implemented by the Project Manager to manage potential hazards associated with the traffic environment during the project.

The scope of works documented in this TMP addresses the traffic control and traffic management procedures to be implemented by Evolve Bayswater to manage potential hazards associated with the traffic environment during the works.

Works will include (but not be limited to) feature surveying, pavement dipping, pot holing and geotechnical testing and service locating. The work locations have been assessed and site specific or generic controls have been developed for works in close proximity to traffic. In order to undertake these works, traffic control devices will need to be implemented on the affected roads to provide advance warning to motorists.

Traffic management will enable the Contractor to establish a safe working environment for workers, plant and equipment while undertaking the works, without conflicting with traffic on the roads. The purpose of the Traffic Management Plan outlines the procedures and processes that will be engaged by Evolve Bayswater and contractors to safely guide / direct road users, cyclists and pedestrians past the work site.

1.2 Objectives and Strategies

The objectives of the Traffic Management Plan are to ensure:

- The safety of the road workers.
- All road users, including vulnerable road users, are safely guided around, through or past the work site.
- The performance of the road network is not unduly impacted and the disruption and inconvenience to all road users are minimised for the duration of the works.
- Impacts on users of the road reserve and adjacent properties and facilities are minimised.

In an effort to meet these objectives the Traffic Management Plan will incorporate the following strategies:

- Providing a sufficient number of traffic lanes to accommodate vehicle volumes.
- Ensuring delays are minimised by only implementing lane closures in accordance with A.S 1742.3 and MRWA Code of Practice requirements.

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- Ensuring all road users are managed including motorists, pedestrians, cyclists, people with disabilities and people using public transport.
- Ensuring property access is maintained and changed conditions communicated to appropriate stakeholders.
- Ensuring work activities are carried out sequentially to minimise adverse impacts.
- Provision will be made for works personnel to enter the work area in a safe manner in accordance with safety procedures.
- All entry and exit movements to and from traffic streams shall be in accordance with the requirements of safe working practices.

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2 Project Overview

2.1 Project Location

The Bayswater Station is located at the Bayswater Town Centre and adjacent area.



Figure 1 – Site Location

The works outlined in this TCP are highlighted in the area shown in red in Figure 1 above

2.2 Project Details, Site Assessment and Site Constraints/Impacts

ITEM	DESCRIPTION
Project	Bayswater Station and Turnback Project
Location	Bayswater: - King William Street/Coode Street/Whatley Crescent intersection
Road Classification, Existing Speed Limit	Based on data from MRWA Road Information Mapping System: • King William Street – Distributor A, 60/40km/h • Coode Street- Distributor A- 60km/h • Whatley Crescent (East of King William Street) Local Distributor, 50km/h (currently 30km/h temporary road works zone is in operation) • Whatley Crescent (West of King William St): Distributor A, 60 km/h
Road Authority	Main Roads WA
Local Government	City of Belmont, City of Bayswater, City of Swan
Client	Main Roads WA
Prime Contractor	Various
Sub-Contractor	N/A
Scope of Works	Site exploration: • Feature survey

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ITEM	DESCRIPTION
	• Pavement dipping • SPT testing • Potholing • Service locating • Other site verification other activities as required.
Staging of Work / Temporary Traffic Management	To be confirmed and detailed from Construction methodologies and against program.
Project Date	Ongoing starting late September 2020
Hours / Days of Work	Monday to Saturday 7am to 7pm
Duration of Work	20-30 minutes
Other Constraints	The following site constraints / impacts have been taken into consideration in the design of the traffic guidance schemes: • Volumes of traffic on existing routes (including effects from local schools, town centre, shopping centres, and recreational and community facilities) • Existing traffic speed • Impact to pedestrians and cyclists • Impact to residents and businesses
Concurrent/adjacent Works or Projects	Forrestfield Airport Link project: is currently underway immediately east of the Bayswater Station. This work is progressing toward completion, however there will likely be overlap between the projects initially. Tonkin Hwy Gap Project: This road and tunnel project will potentially result in some interface of works or major closure management systems. Morley Ellenbrook Line Project: Project will connect to the east of the Bayswater Station and is likely to commence during the period of this project. Evolve Bayswater will maintain contact with Main Roads RNOC throughout the project to ensure interactions with adjacent works can be managed.

2.3 Existing Traffic and Road Environment

ITEM	DESCRIPTION
Traffic Volume and Composition	King William St: 12,800 vpd, 6.5% heavy Coode St (at Underpass): 32,827 vpd Coode St (north of Beechboro Rd S): 12,458 vpd, 6.9% heavy vpd Railway Pde (East of Coode St): 12,060 vpd, 8.2% heavy Railway Pde (West of Coode St): 823 vpd, 8.6% heavy Whatley Crescent (East of King William St): 3,287vpd, 6.7% heavy Whatley Crescent (West of King William St): 18,686 vpd
Existing Road Configuration	King William St: Single carriageway – single lane per direction (two lanes at the intersection) Coode St (north of Whatley Cres): Single carriageway – single lane per direction (two lanes at the intersection)

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ITEM	DESCRIPTION
	Railway Pde (East of Coode St): Single carriageway – single lane per direction Railway Pde (West of Coode St): Single carriageway – single lane per direction (Local Street) Whatley Crescent (East of King William St): Single carriageway – single lane per direction (two lanes at the intersection) Whatley Crescent (West of King William St): carriageway – two-lanes per direction
Existing Pedestrian / Cyclist Facilities	All pedestrian paths shall be maintained throughout the work activities. Suitable containment will be erected around the work area to prevent conflict between cyclists/pedestrians and workers/equipment if required. Where needed site personal will escort pedestrians through work site. Pedestrians Watch Your Step signs will be erected on both sides of the road at the crossing.

2.4 Overview of Proposed TTM

ITEM	DESCRIPTION
Temporary Traffic Management Descriptions	Temporary speed reduction to 40km/h with delineation of traffic around the work site. Traffic Controller will be used as a spotter during the works.
Speed Zone dates and times	A temporary 40km/h speed zone will be implemented on all approaches to the intersection on the date of the works. Works will commence in late September. As no lanes will be closed during the works, no time restriction will be enforced.
Lane Closures dates and times	No lane closures are required for this stage of the works. Lane closure details will be provided in future revisions of this TCP as the works progresses.
Road Closures dates and times	N/A
Signal modifications description	N/A
Proposed lane widths	Test pit location east of the Whatley Crescent/Coode Street/ King William Street intersection will require delineation of traffic leaving a 3.5m lane width at the north eastern corner of the intersection.
Road Safety Barrier	N/A

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2.5 Project Representatives

Position	Name	Contact Details
Road Authority Representative	Name **Main Roads Western Australia**	**Address:** Waterloo Crescent, EAST PERTH WA 6004 **Phone:** 138 138 **Fax:** - **Mobile:** TBC **Email:**
Local Government	**City of Bayswater**	**Address:** 61 Broun Avenue, Morley **Phone:** (08) 9272 0665 **Fax:** **Email:** mail@bayswater.wa.gov.au
Construction Manager	Travis Tremain **Evolve Bayswater**	**Address: Suite 3, 3 Craig Street Burswood** **Phone:** - **Fax:** - **Mobile:** 0412 200 895 **Email: travis.tremain@evolvebayswater.com.au**
General Superintendent	Jonathan Cannon **Evolve Bayswater**	**Address: Suite 3, 3 Craig Street Burswood** **Phone:** - **Fax:** - **Mobile:** 0414 443 526 **Email: jonathan.cannon@evolvebayswater.com.au**
Traffic Manager	TBC **Strada Consultants**	**Address: Level 1, Suite 10, 2 Hardy Street, South Perth WA 6151** **Phone:** - **Mobile:** - **Email: TBC**
Traffic Management Implementation Provider	TBC **TBC**	**Address:** - **Phone:** - **Mobile:** - **Email:** -

Evolve Bayswater have engaged Strada Consultants Pty Ltd to prepare this Traffic Management Plan and associated controls for the works.

The TMP will be implemented by TM Contractor - TBC.

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3 Risk Management

The following details the preliminary assessment of site hazards likely to be encountered, the level of risk associated with each and the control proposed. Note that the risk level is the level of assessed risk *without* the controls in place. The controls listed have been determined as being appropriate in reducing the risk to a level that is acceptable.

The hierarchy of control has been utilised to ensure that the highest practicable level of protection and safety is selected:

- Elimination
- Substitution
- Isolation
- Engineering
- Administration
- Personal Protection Equipment

In evaluating the options, a key consideration is whether the option takes traffic around, through or past the worksite.

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3.1 Project Representatives

QUALITATIVE MEASURES OF CONSEQUENCE OR IMPACT

Level	Consequence	Description
1	**Insignificant**	Mid-block hourly traffic flow per lane is equal to or less than the allowable lane capacity detailed in AS1742.3. No impact to the performance of the network. Affected intersection leg operates at a Level of Service (LoS) of A or B. No property damages.
2	**Minor**	Mid-block hourly traffic flow per lane is greater than the allowable road capacity and less than 110% of the allowable road capacity as detailed in AS1742.3. Minor impact to the performance of the network. Intersection performance operates at a Level of Service (LoS) of C. Minor property damage.
3	**Moderate**	Midblock hourly traffic flow per lane is equal to and greater than 110% and less than 135% of allowable road capacity as detailed in AS1742.3. Moderate impact to the performance of the network. Intersection performance operates at a Level of Service (LoS) of D. Moderate property damage.
4	**Major**	Midblock hourly traffic flow per lane is equal to and greater than 135% and less then170% of allowable road capacity as detailed in AS1742.3. Major impact to the performance of the network. Intersection performance operates at a Level of Service (LoS) of E. Major property damage.
5	**Catastrophic**	Midblock hourly traffic flow per lane is equal to and greater than 170% of allowable road capacity as detailed in AS1742.3. Unacceptable impact to the performance of the network. Intersection performance operates at a Level of Service (LoS) of F. Total property damage.

OSH Qualitative Measures Of Consequence Or Impact

Level	Consequence	Description
1	**Insignificant**	No treatment required
2	**Minor**	First aid treatment required.
3	**Moderate**	Medical treatment required or Lost Time injury
4	**Major**	Single fatality or major injuries or severe permanent disablement
5	**Catastrophic**	Multiple fatalities.

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Qualitative Measures Of Likelihood

Level	Likelihood	Description
A	**Almost Certain**	The event or hazard: is expected to occur in most circumstances, will probably occur with a frequency in excess of 10 times per year.
B	**Likely**	The event or hazard: Will probably occur in most circumstances, will probably occur with a frequency of between 1 and 10 times per year.
C	**Possible**	The event or hazard: might occur at some time, will probably occur with a frequency of 0.1 to 1 times per year (i.e. once in 1 to 10 years).
D	**Unlikely**	The event or hazard: could occur at some time, will probably occur with a frequency of 0.02 to 0.1 times per year (i.e. once in 10 to 50 years).
E	**Rare**	The event or hazard: may occur only in exceptional circumstances, will probably occur with a frequency of less than 0.02 times per year (i.e. less than once in 50 years).

IMPORTANT NOTE: The likelihood of an event or hazard occurring shall first be assessed over the duration of the activity (i.e. "period of exposure"). For risk assessment purposes the assessed likelihood shall then be proportioned for a "period of exposure" of one year.

Example: An activity has a duration of 6 weeks (i.e. "period of exposure" = 6 weeks). The event or hazard being considered is assessed as likely to occur once every 20 times the activity occurs (i.e. likelihood or frequency = 1 event/20 times activity occurs = 0.05 times per activity). Assessed annual likelihood or frequency = 0.05 times per activity x 52 weeks/6 weeks = 0.4 times per year. Assessed likelihood = Possible.

Qualitative Risk Analysis Matrix – Risk Rating

	CONSEQUENCE				
Likelihood	Insignificant (1)	Minor (2)	Moderate (3)	Major (4)	Catastrophic (5)
Almost certain (A)	Low 5	High 10	High 15	Very High 20	Very High 25
Likely (B)	Low 4	Medium 8	High 12	Very High 16	Very High 20
Possible (C)	Low 3	Low 6	Medium 9	High 12	High 15
Unlikely (D)	Low 2	Low 4	Low 6	Medium 8	High 10
Rare (E)	Low 1	Low 2	Low 3	Low 4	Medium 7

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Management Approach For Residual Risk Rating

Residual Risk Rating	Required Treatment
Very High	Unacceptable risk. **HOLD POINT**. Work cannot proceed until risk has been reduced
High	High priority, OSH MR and Roadworks Traffic Manager (RTM) must review the risk assessment and approve the treatment and endorse the TGS prior to its implementation.
Medium	Medium Risk, standard traffic control and work practices subject to review by accredited AWTM personnel prior to implementation.
Low	Managed in accordance with the approved management procedures and traffic control practices.

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3.2 Risk Register

Item	Risk	Consequence	Pre-treatment Risk Rating			Treatment	Residual Risk Rating		
			L	C	Rating		L	C	Rating
1.	Traffic flows during construction (speed and volumes) may create a risk of collision with other vehicles on the road, pedestrians, construction vehicles and construction personnel.	Injury to road users and work personnel.	C	4	H 12	Temporary 40km/h speed zones to be implemented approaching and passing the works	D	4	M 8
2.	Incorrectly designed and / or installed traffic control may result in inadequate protection of the worksite with a subsequent increased potential for crashes and injury.	Injury to road users and work personnel	C	3	M 9	Qualified and experienced personnel have been employed in the preparation of this TCP and associated TGS's and experienced personnel will be used to implement and maintain the traffic control onsite.	E	3	L 3
3.	Weather conditions may result in a decreased readability of the traffic control delineation and signage and may increase the potential for crashes.	Injury to road users.	D	3	L 6	The TCP requires that the Alliance undertakes a daily inspection of the traffic control and make adjustments as are necessary to ensure effectiveness is maintained. Experienced personnel specialising in the erection and maintenance of traffic control will be used. All signage shall be Class 1 retro-reflective.	E	3	L 3

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Item	Risk	Consequence	Pre-treatment Risk Rating			Treatment	Residual Risk Rating		
			L	C	Rating		L	C	Rating
4.	Excavations and hazards associated with the works being inadequately protected causing property damage / injury to workers.	Injury to road users	B	4	VH 10	Excavations that are not protected by a barrier will be protected and delineated as per Table D1 of AS1743.2. Containment will be installed around the testing pit preventing access by the general public.	D	4	M 8
5.	Congestion resulting from roadworks creates increased traffic flows in adjacent local network resulting in adverse public feedback.	Damage to PTA and Alliance reputation.	B	3	H 12	No closure of lanes required at the intersection. Delineation and lane narrowing east of the intersection will allow traffic to remain free flowing.	D	3	L 3
6.	Workman may be struck by errant vehicles during the setting out of traffic management control devices.	Resulting in injury to works personnel.	C	4	H 12	Traffic control devices are set out in accordance with AS1742.3. 2.5.3 and approved safety procedures.	D	4	M 8
7.	Construction activity causing an obstruction to or requiring Emergency Services.	Delays and failure to respond to emergencies in times and fatalities.	C	4	H 12	This site-specific TCP outlines the consultation and communication mechanisms undertaken with emergency services and how these services will be managed. Emergency services will be provided with priority access past the work site with all works ceased until they have passed if necessary.	D	4	M 8

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Item	Risk	Consequence	Pre-treatment Risk Rating			Treatment	Residual Risk Rating		
			L	C	Rating		L	C	Rating
8.	Undertaking testing works at night time will reduce TC visibility for upcoming traffic and increases the risk of getting hit by vehicles.	Serious injury to Traffic Controllers.	C	4	H 12	Traffic Controllers to have luminous wands on hand. All personnel are to wear hi-vis clothing. Existing street lighting is present on site which will sufficiently illuminate the Traffic Controller position and the works. All signs to be Class1 retro reflective. Workers to wear high vis vests.	E	4	L 4
9.	Drivers may not see speed signs if on one side of the road only and may not reduce speed putting workers at risk	Causing injury to workers.	C	4	H 12	Speed signs are to be placed on both sides of the road. Due to space constraints in the area, multimessage signs may be used. Where barriers may conflict with sign spacing, signs are to be placed on high legs allowing clear view to motorists.	E	4	L 4
10.	The interaction of work personnel with through traffic may result in increased potential for conflict and serious injury.	Injury to work personnel.	B	4	VH 16	The TCP provides for temporary traffic controls to be installed around the work site which will eliminate conflict. Traffic Control is to be installed and maintained by appropriately qualified and experienced personnel.	D	3	L 3
11.	Vehicles travelling through work site do not adhere to the reduced speed limit.	Injury to road users Injury to workers	C	4	H 12	Lane width can be reduced to 3.2m to improve compliance through enforcing more cautious driver behaviour. Changes can be made on site by an accredited AWTM until driver compliance is reached.	D	4	M 8

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Item	Risk	Consequence	Pre-treatment Risk Rating			Treatment	Residual Risk Rating		
			L	C	Rating		L	C	Rating
12.	During setup, an errant vehicle may breach temporary traffic management delineation at speed, entering the work area.	Injury to road users Injury to workers	B	4	VH 10	During traffic management set up, traffic work vehicle will be used to shadow the workers, providing a physical protection to workers.	D	4	M 8
13.	Test pit work at the Whatley Crescent/Coode Street/King William Street signalised intersection and pedestrian crossing may result in distractions and interface between road users or pedestrians.	Injury to road users Injury to workers	B	3	H 12	Traffic Guidance Scheme has been designed to ensure visibility at intersection is maintained for road users. Traffic Controller placed near test pit as a spotter and to help pedestrians past the work site. Evolve Bayswater will liaise with MRWA RNOC if any modifications to the phasing or timing of signals is required. • Administration • Isolation	D	3	L 3

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4 Traffic Management Planning & Assessment

4.1 Traffic Assessment and Analysis

4.1.1 Traffic and Speed Data

A summary of recent traffic data is provided below:

(For detailed traffic volumes refer to Appendix D)

Location	Vehicles per day (% heavy vehicles)	Date	Source
King William St	12,800 vpd (6.5%)	2018/19	MRWA Traffic Map
Coode St (at Underpass)	32,827 vpd	2016/17	MRWA Traffic Map
Coode St (north of Beechboro Rd S)	12,458 vpd (6.9%)	2018/19	MRWA Traffic Map
Railway Pde (East of Coode St)	12,060 vpd (8.2%)	2018/19	MRWA Traffic Map
Railway Pde (West of Coode St)	823 vpd (8.6%)	2018/19	MRWA Traffic Map
Whatley Crescent (East of King William St)	3,287vpd (6.7%)	2018/19	MRWA Traffic Map
Whatley Crescent (West of King William St)	18,686 vpd	2018/19	MRWA Traffic Map

A summary of recent speed data is provided below:

Location	Posted Speed (km/h)	85th Percentile Speed (km/h)	Date	Source
King William St	60	50-55	2018/19	MRWA Traffic Map
Coode St (north of Beechboro Rd S)	60	56	2018/19	MRWA Traffic Map
Railway Pde (East of Coode St)	50	42-45	2018/19	MRWA Traffic Map
Whatley Crescent (East of King William St)	50	38-43	2018/19	MRWA Traffic Map

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4.1.2 Traffic Flow Analysis

Traffic flow will be maintained by means of the prescribed traffic control arrangements outlined in this TCP. Traffic volumes and movements will be analysed against the requirements detailed in clause 4.13.1 of AS1742.3 table 4.10 and MRWA risk tables (see section 6) to ensure levels of service are acceptable to the Road Authority.

Hourly Volume

2018/19
Monday to Sunday

Coode St (1120010)

North of Railway Pde (SLK 2.91)

	All Vehicles			Heavy Vehicles			
	NB	SB	Both	NB	SB	Both	%
00:00	25	50	75	1	1	2	2.6
01:00	16	27	43	1	0	1	2.3
02:00	14	22	36	0	1	1	2.8
03:00	18	11	29	1	0	1	3.4
04:00	45	25	70	4	1	5	7.1
05:00	122	54	176	12	4	16	9.1
06:00	233	100	333	27	9	36	10.8
07:00	387	170	557	37	16	53	9.5
08:00	406	297	703	24	20	44	6.3
09:00	355	374	729	29	29	58	8.0
10:00	395	429	824	31	26	57	6.9
11:00	428	469	897	26	30	56	6.2
12:00	450	452	902	31	23	54	6.0
13:00	451	466	917	34	29	63	6.9
14:00	436	480	916	28	26	55	6.0
15:00	444	499	943	28	29	57	6.0
16:00	468	549	1017	25	25	50	4.9
17:00	433	548	981	19	27	46	4.7
18:00	313	380	693	17	18	35	5.1
19:00	215	235	450	9	10	19	4.2
20:00	177	177	354	6	7	13	3.7
21:00	134	139	273	3	3	6	2.2
22:00	79	97	176	3	3	6	3.4
23:00	43	66	109	3	1	4	3.7
TOTAL	6088	6116	12204	400	338	738	6.0

Peak Statistics

AM	TIME	11:45	11:30	11:30	06:30	10:45	09:30
	VOL	445	478	917	37	30	61
PM	TIME	16:00	16:15	16:15	13:00	14:30	13:00
	VOL	468	564	1023	34	38	63

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Hourly Volume

Whatley Cr (1120013)

East of King William St (SLK 1.25)

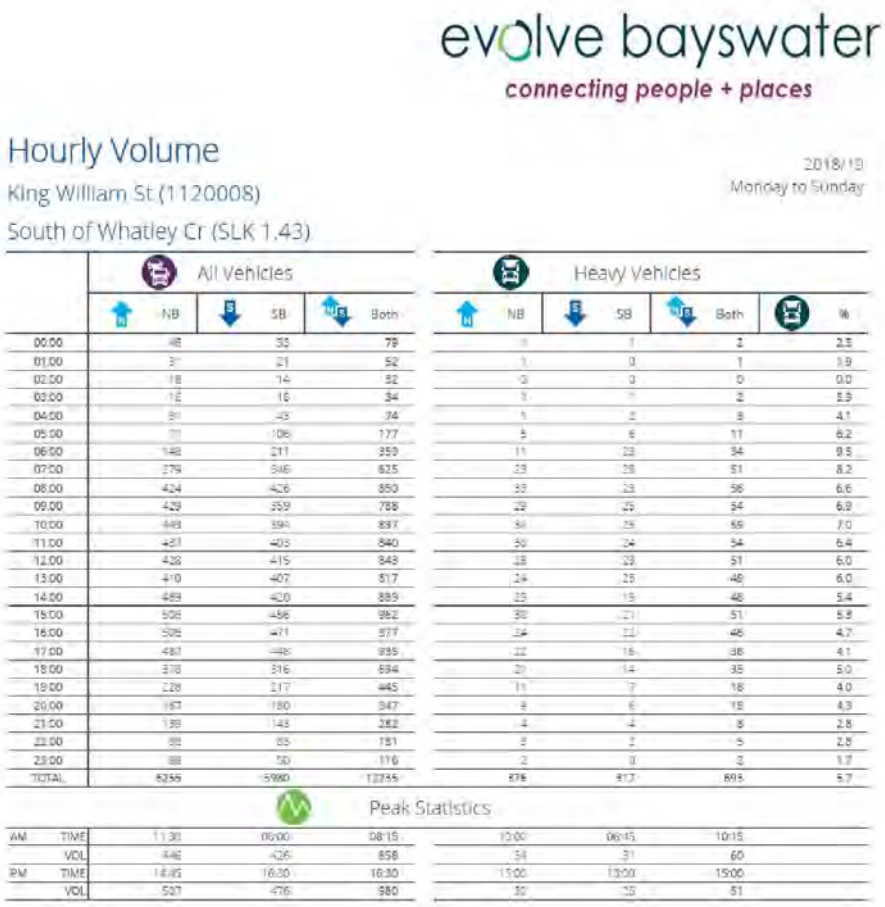
2018/19
Monday to Sunday

	All Vehicles			Heavy Vehicles			
	EB	WB	Both	EB	WB	Both	%
00:00	7	5	12	0	0	0	0.0
01:00	4	4	8	0	0	0	0.0
02:00	2	2	4	0	1	1	25.0
03:00	3	5	8	0	1	1	12.5
04:00	2	4	6	0	1	1	16.7
05:00	7	18	25	0	2	2	8.0
06:00	18	42	60	2	2	4	6.7
07:00	55	102	157	8	8	16	10.2
08:00	77	132	209	5	9	14	6.7
09:00	97	117	214	7	8	15	7.0
10:00	94	132	226	9	8	17	7.5
11:00	112	143	255	7	8	15	5.9
12:00	120	123	243	6	8	14	5.8
13:00	122	133	255	7	5	12	4.7
14:00	108	109	217	5	5	10	4.6
15:00	121	118	239	7	5	12	5.0
16:00	133	130	263	9	6	15	5.7
17:00	123	123	246	6	6	12	4.9
18:00	78	79	157	3	2	5	3.2
19:00	45	42	87	2	3	5	5.7
20:00	36	29	65	1	1	2	3.1
21:00	30	21	51	0	0	0	0.0
22:00	18	17	35	0	0	0	0.0
23:00	11	10	21	1	1	2	9.5
TOTAL	1423	1640	3063	85	90	175	5.7

Peak Statistics

AM	TIME	11:45	11:00	11:45	06:45	07:30	07:30
	VOL	127	143	258	10	11	18
PM	TIME	16:30	13:00	16:00	16:45	16:15	16:15
	VOL	134	133	263	9	8	16

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Hourly Volume

King William St (1120008)

South of Whatley Cr (SLK 1.43)

2018/19
Monday to Sunday

	All Vehicles			Heavy Vehicles			
	NB	SB	Both	NB	SB	Both	%
00:00	46	33	79	1	1	2	2.5
01:00	31	21	52	1	0	1	1.9
02:00	18	14	32	0	0	0	0.0
03:00	16	18	34	1	1	2	5.9
04:00	31	43	74	1	2	3	4.1
05:00	71	106	177	5	6	11	6.2
06:00	148	211	359	11	23	34	9.5
07:00	279	346	625	23	28	51	8.2
08:00	424	426	850	33	23	56	6.6
09:00	429	359	788	29	25	54	6.9
10:00	448	394	837	30	29	59	7.0
11:00	437	403	840	30	24	54	6.4
12:00	428	415	843	28	23	51	6.0
13:00	410	407	817	24	25	49	6.0
14:00	469	420	889	25	19	48	5.4
15:00	506	456	962	30	21	51	5.3
16:00	506	471	977	24	22	46	4.7
17:00	487	448	935	22	16	38	4.1
18:00	378	316	694	21	14	35	5.0
19:00	228	217	445	11	7	18	4.0
20:00	187	160	347	9	6	15	4.3
21:00	139	143	282	4	4	8	2.8
22:00	86	65	151	3	2	5	3.3
23:00	88	30	118	2	0	2	1.7
TOTAL	6255	5980	12235	316	317	633	5.2

Peak Statistics

AM	TIME	11:30	06:00	08:15	10:00	06:45	10:15
	VOL	446	426	858	34	31	60
PM	TIME	14:45	16:30	16:30	15:00	13:00	15:00
	VOL	527	476	980	30	25	51

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Refer to Appendix D for detailed traffic volumes and assessment by location sourced from SCATS data provided by MRWA.

4.1.3 Temporary Speed Zones

A temporary 40 km/h speed zone will be imposed on all approaches to the intersection during implementation of the prescribed TGS.

4.1.4 Existing Traffic Signals

The works are located in close proximity to the traffic signals at Whatley Crescent/Coode Street/King William Street intersection. SCATS Data has been sourced for works at this locations and assessed detailing the allowable hours for implementation. As there are no lane closures at the signals, no restrictions have been enforced. Approvals for works at, or in close proximity to signals shall be sought from MRWA RPI branch.

4.1.5 Impact to Adjoining Network

No adverse impact to the adjoining network is expected.

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4.1.6 End of Queue Treatment

Not Applicable.

4.1.7 Temporary Traffic Signals

Not Applicable.

4.2 Road Users

4.2.1 Pedestrians

All pedestrian paths shall be maintained throughout the works. Suitable containment will be erected around the testing pit to prevent conflict between cyclists/pedestrians and workers/equipment if required. Where needed site personal will escort pedestrians through the work site. Pedestrian Watch Your Step signs are to be installed on both sides of the road at the crossing.

4.2.2 Cyclists

Cyclists will be expected to pass the works in the lane as part of the general traffic stream.

4.2.3 Public Transport

Bus services 48, 998 and 999 operate along King William Street and Coode Street between the hours of 4pm and 10pm. Minimal disruption is anticipated during the testing pit speed reduction and delineation works on Whatley Crescent at the signalised intersection.



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4.2.4 Heavy and Oversized Vehicles

Based on MRWA Restricted Access Vehicles Mapping System, Whatley Crescent; Coode Street and King William Street are not included in the Restricted Access Vehicle (RAV) Network.

4.2.5 Existing Parking Facilities

On-road parking facilities in the Bayswater Town Centre will be affected by project works and controls. These shall be maintained as far as practicable with proposed modifications detailed within site specific TCPs.

4.2.6 Access to Adjoining Properties / Business

There are numerous residential and commercial properties affected by the works, local access will be maintained throughout all hours (as far as practicable) and where required provided through or within work sites with Traffic Controller assisting any property owners entering/exiting at all times.

4.2.7 Rail Crossings

Not Applicable.

4.2.8 School Crossings

Not Applicable.

4.2.9 Special Events and Other Works

It has been identified that there are existing roadworks occurring within the vicinity of these works **(Current Forrestfield Airport Link and the future Tonkin Hwy Gap Project and Morley Ellenbrook Line).** Communications are to be made to ensure conflicting traffic management set ups do not occur.

No work will be permitted on public holidays, or during special events, except as permitted by Law and then only with the prior approval in writing from the road authority.

Link with list of Public holidays/events in Western Australia:

https://www.commerce.wa.gov.au/labour-relations/public-holidays-western-australia

https://www.bayswater.wa.gov.au/arts-and-leisure/events

4.2.10 Emergency Vehicle Access

The proposed works will be clearly signed. Emergency Vehicles will be given priority access at all times to the extent possible.

Traffic Personnel shall assist emergency vehicles requiring to enter and/or travel through the worksite. Vehicle breakdown and/or crashes can cause considerable delay and congestion. Police communications will be requested to render assistance where required. The Contractor will also render assistance where possible to ensure the impact of crashes and breakdown on the network is minimised.

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If required, the works are to momentarily halt and the emergency vehicle given access when it is safe for them to proceed.

4.3 Night Work Provisions

All signs used at night are to be Class 1 Retro-reflective material and delineation will be either retro-reflective or be sufficiently illuminated.

All personnel engaged on night inspections wear high visibility retro-reflective jackets. Lighting towers may be used if existing street lighting or vehicle lighting is deemed insufficient.

4.4 Road Safety Barriers

Temporary traffic barriers providing full containment will be installed for high risk works as required to adequately separate traffic from construction activities. Details of barrier types and end treatments shall be specified and designed in later revisions of this TCP as necessary.

4.5 Consultation and Communication / Notification

4.5.1 Other Agencies

In accordance with Section 5.4 of the MRWA CoP, notification is required to be provided to all the agencies involved as per distribution list provided into the Notification of Roadworks form.

Notification form will be provided for each stage of works that will be undertaken.

Notification to MRWA RNOC is required when works occur within 200m of traffic signals.

4.5.2 Public

No specific public notification campaign will be required for the works associated with this TMP. Any form of public advertising as deemed necessary by MRWA will be undertaken in accordance with policies.

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5 Site Assessment

5.1 Provision to Address Environmental Conditions

5.1.1 Adverse Weather

Weather is not expected to adversely impact on the effectiveness of the traffic control detailed on the TGS'S. Notwithstanding this, should adverse weather conditions be encountered during the works, the following contingency plans should be activated. Note: any adjustments to the plan shall be risk assessed and approved by someone holding a WTM or AWTM accreditation. Major changes will require road authority approval.

5.1.1.1 Rain

In the event of rain, an on-site assessment shall be made and sign spacing and tapers may be extended by 25% to account for increased stopping distances. "Slippery When Wet" signs may be placed as required and all changes shall be recorded in the daily diary.

If rain occurs, Traffic Management Personnel shall inspect the site and where signage and / or devices are not clearly visible, signage may need to be adjusted to improve visibility or if necessary, provide additional signage and delineation. Where stopping distances are adversely affected by wet surfaces, spacing between signs may need to be adjusted to provide increased reaction time for drivers. In cases where it is determined that the rain is deemed too heavy that the risk is considered unacceptable, all work shall cease until rain has cleared. All changes shall be noted in the daily diary.

5.1.1.2 Floods

Should works be affected by flooding to the extent that the worksite becomes impassable or risk is considered unacceptable, all work shall cease immediately and Traffic Controllers (or other personnel if necessary) shall be deployed immediately to close the site and direct traffic around the flooded area (under the direction of the project manager or traffic manager). Emergency services and the Road Authority shall be notified immediately and Traffic Controllers shall remain onsite until emergency services and the Road Authority personnel arrive and take control of the site.

5.1.1.3 Other adverse weather (strong winds, thunder storms, etc.)

When adverse weather such as strong winds and/or thunder storms, is identified as adversely affecting the works and work site safety, weights on signs and delineations to be used to contrast strong winds effect; in case of thunder storms all powered equipment shall be turned off and shelter to be sought after.

Should works be affected to the extent that the worksite becomes impassable or risk is considered unacceptable, all work shall cease immediately and Traffic Controllers (and other

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personnel if necessary) shall be deployed immediately to close the site and remove TM arrangements.

All changes are to be noted in the daily diary.

5.1.2 Sun Glare

Where sun glare is identified as adversely affecting a driver's ability to sight signage and / or traffic control devices, sign locations may need to be adjusted and additional delineation and/or traffic control devices provided to address the risk from glare. Additionally, in the event that traffic control is adversely affected by glare at sunset and sunrise, traffic controllers may need to assist in maintaining low traffic speeds.

Any changes required are to be noted in the daily diary.

5.1.3 Fog/Dust/Smoke

Where fog, dust or smoke is identified as adversely affecting a driver's ability to sight signage and / or traffic control devices, sign locations may need to be adjusted and additional delineation and/or traffic control devices provided to address the risk. All changes are to be noted in the daily diary.

Should works be affected by fog, dust or smoke to the extent that risk is considered unacceptable, all work shall cease immediately and Traffic Controllers (and other personnel if necessary) shall be deployed immediately to close the site. Emergency services and the Road Authority shall be notified immediately and Traffic Controllers shall remain onsite until emergency services and the Road Authority personnel arrive and take control of the site.

5.1.4 Road Geometry, Terrain, Vegetation and Structures

Prior to the commencement of works, the supervisor shall ensure sight distance to the work area is adequate and adheres to the requirements set out within AS1742.3. Road geometry and terrain has been taken into account in the design and layout of all traffic guidance schemes and is not expected to have an adverse effect on approaching traffic.

Where applicable traffic controllers are to place signage in locations that are clearly visible and easy to see. Where necessary distance between signs can be extended by 25% to allow a clear line of sight. Signs shall be erected on both sides of the roadway (where possible) to ensure that the control measures are noticed. Locations where this is not possible are detailed on the site specific TGS's.

Existing structures are not expected to obstruct line of sight visibility to traffic control signs and devices.

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5.2 Existing Traffic and Advertising Signage

Temporary traffic control signs are not expected to block visions of existing signs. These shall be displayed in conjunction with existing signs so as not to distract or block vision of existing signs.

Existing signs applicable to the temporary traffic control arrangements are shown on the site specific TGS's in Black & White.

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6 Safety Plan

6.1 Occupational Safety and Health

All persons and organisations undertaking these works or using the roadwork site have a duty of care under statute and common law to themselves, their employees and all site users, lawfully using the site, to take all reasonable measures to prevent accident or injury.

This TMP forms part of the overall project Safety Management Plan and provides details on how all road users considered likely to pass through, past, or around the worksite will be safely and efficiently managed for the full duration of the site occupancy and works.

6.2 Roles and Responsibilities

6.2.1 Responsibilities

The Project Manager has the ultimate responsibility to ensure the TMP is implemented for the prevention of injury and property damage to employees, contractors, sub-contractors, road users and all members of the public.

The Project Manager will ensure all site personnel are fully aware of their responsibilities, and that traffic controllers are appropriately trained and accredited and that sufficient controllers are available to ensure appropriate breaks are taken.

All personnel engaged in the field activities will follow the correct work practices as required by the CoP and AS1742.3.

All personnel will not commence or continue work until all signs, devices and barricades are in place and operational in accordance with the requirements of the TMP.

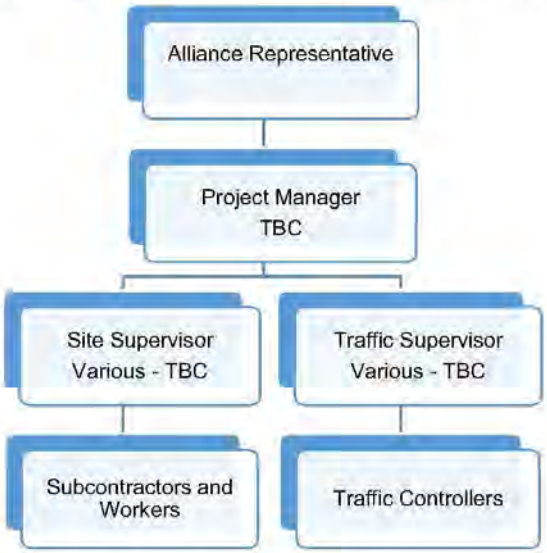
All personnel responsible for traffic control shall ensure that the number, type and location of signs, devices and barricades are to a standard not less than Appendix F of this plan, CoP and AS1742.3. Should a situation arise that is not covered by this TMP, CoP or AS1742.3, the Road Authority Representative shall be notified.

The Road Authority Representative may direct erection, relocation or removal of signs or devices, which, in the opinion of the Road Authority Representative, are not in accordance with the TMP and do not provide sufficient safety for road users. If such directions are not complied with, the Road Authority Representative may arrange for erection, relocation or removal by others at the cost of the Contractor.

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6.2.2 Roles

The following diagram outlines the responsibility hierarchy of this contract.



6.2.2.1 Project Manager

The Project Manager shall:

- Ensure all traffic control measures of this TMP are placed and maintained in accordance with this plan and the relevant Acts, Codes, Standards and Guidelines
- Ensure suitable communication and consultation with the affected stakeholders is maintained at all times
- Ensure inspections of the Traffic Controls are undertaken in accordance with the TMP, and results recorded. Any variations shall be detailed together with reasons
- Review feedback from field inspections, worksite personnel and members of the public, and take action to amend the traffic control measures as appropriate following approval from the Road Authority's Representative
- Arrange and/or undertake any necessary audits and incident investigations

6.2.2.2 Site Supervisor

The Site Supervisor is responsible for overseeing the day-to-day activities, and is therefore responsible for the practical application of the TMP, and shall:

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- Instruct workers on the relevant safety standards, including the correct wearing of high visibility safety vests
- Ensure traffic control measures are implemented and maintained in accordance with the TMP
- Undertake and submit the required inspection and evaluation reports to management
- Render assistance to road users and stakeholders when incidences arising out of the works affect the network performance or the safety of road users and workers
- Take appropriate action to correct unsafe conditions, including any necessary modifications to the TMP

6.2.2.3 Traffic Management Personnel

- At least one person on site shall be accredited in Basic Worksite Traffic Management, and shall have the responsibility of ensuring the traffic management devices are set out in accordance with the TMP
- At least one person accredited in Advanced Worksite Traffic Management shall be available to attend the site at short notice (or be available by phone on short notice at all times) to manage variations, contingencies and emergencies, and to take overall responsibility for traffic management

6.2.2.4 Traffic Controllers

Traffic Controllers shall be used to control road users to avoid conflict with plant, workers, traffic and pedestrians, and to stop and direct traffic in emergency situations.

Traffic Controllers shall:

- Operate in accordance with the Traffic Section 4.10 and Appendix C of AS1742.3
- Be accredited in Basic Worksite Traffic Management
- Hold a current Traffic Controller's accreditation
- Take appropriate breaks as required by AS1742.3 and/or OS&H Regulations.

6.2.2.5 Workers and Subcontractors

Workers and Subcontractors shall

- Correctly wear high visibility vests, in addition to other protective equipment required (e.g. footwear, eye protection, helmet sun protection etc), at all times whilst on the worksite
- Comply with the requirements of the TMP and ensure no activity is undertaken that will endanger the safety of other workers or the general public
- Enter and leave the site by approved routes and in accordance with safe work practices

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6.3 Personal Protective Equipment

All personnel entering the work site shall correctly wear high visibility vests to AS/NZS 4602, in addition to other protective equipment required on a site-by-site basis (e.g. protective footwear, eye protection, helmet, sun protection, respiratory devices etc) at all times whilst on the worksite.

6.4 Plant and Equipment

All plant and equipment at the workplace shall meet statutory requirements and have the required registration, licences or certification where required. All mobile equipment shall be fitted with suitable reversing alarms. All mobile plant and vehicles shall be fitted with a pair of rotating flashing amber lamps in accordance with AS1742.3 clause 3.12.1. All workers will be made aware of the safe work practice at the time of the site induction.

6.5 Trip Hazards

The worksite and its immediate surroundings shall be suitably protected and free of hazards, which could result in tripping by non-motorised road users. Hazards, which cannot be removed, shall be suitably protected to prevent injury to road users, including those with sight impairment. Where level differences are significant, suitable barriers, which preclude pedestrian access shall be used.

Where works extend beyond daylight hours and adjacent lighting is insufficient to illuminate hazards to non-motorised road users, appropriate temporary lighting shall be installed.

The worksite shall be kept tidy to reduce the risk to workers.

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7 Implementation

7.1 Traffic Guidance Schemes

The Traffic Guidance Schemes (TGS's) outlined in Appendix F and listed below have been provided for the following stages to demonstrate the type of controls that will be implemented throughout the term of the contract. All sign and device requirements are shown on each TGS. Should the use of additional (not shown on the TGS or listing of devices) or reduced number of devices be required due to unforeseen needs, they shall be recorded within the Daily Diary as a variation to the TMP, following prior approval.

TGS Number	Rev	Details
000 SERIES – GENERIC MOBILE WORKS		
EV-BS-TGS-001-01	A	Whatley Crescent- Testing Pit- Speed reduction and delineation- Traffic Management Layout

7.2 Sequence and Staging

The sequence of temporary traffic management installation, work activities and temporary traffic management removal are shown in the table below. All activities relating to installation, staging and removal of signage, lane closures and work activities shall be recorded in the Daily Diary detailing that the time at which they occur.

Step	Details
1	Advanced warning signage implementation Worksite delineation
2	Ensure roads are safe for work
3	Commence works; traffic controllers on work site to assist and facilitate plant access/egress where necessary. Property accesses to be monitored.
4	Traffic control measures to be removed, ensuring all roads, driveways and footpaths are cleared from any hazard and trafficable as normal.
5	Aftercare installation if required

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Before work commences, signs and devices at approaches to the work area shall be erected in accordance with the adopted TGS, in the following order:

- Advance warning signs.
- All intermediate advance warning and regulatory signs and devices required in advance of the taper or start of the work area.
- All delineating devices required to form a taper including flashing arrow signs or temporary hazard markers where required.
- Delineation past the work area
- Other warning signs or regulatory signs.

Delineation devices such as cones and bollards should be placed in the same sequence, i.e. those furthest in advance of the work placed first.

Signs and devices that are erected before they are required shall be covered by a suitable material. The cover shall be removed immediately prior to the commencement of work.

Removal of traffic control signs and devices should be undertaken in the reverse order of erection, progressing from the work area out toward the approaches.

7.3 Traffic Control Devices

7.3.1 Sign Requirements

All signs used shall conform to the designs and dimensions as shown in Australian Standard AS 1742.3 and the CoP.

Prior to installation, all signs and devices shall be checked by the Site Supervisor or a suitably qualified person to ensure that they are in good condition and meet the following requirements:

- Mechanical condition - Items that are bent, broken or have surface damage shall not be used.
- Cleanliness - Items should be free from accumulated dirt, road grime or other contamination.
- Colour of fluorescent signs - Fluorescent signs whose colour has faded to a point where they have lost their daylight impact shall be replaced.
- Retro reflectivity. - Signs for night-time use whose retro reflectivity is degraded either from long use or surface damage and does not meet the requirements of AS 1906 shall be replaced.
- Battery operated devices - shall be checked for lamp operation and battery condition.

Where signs do not conform either to the requirements of AS 1742.3 or would fail to pass any of the above checks, they shall be replaced on notice.

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Signs and devices shall be positioned and erected in accordance with the locations and spacing's shown on the drawings. All signs shall be positioned and erected such that:

- They are properly displayed and securely mounted.
- They are within the driver's line of sight.
- They cannot be obscured from view.
- They do not obscure other devices from the driver's line of sight.
- They do not become a possible hazard to workers or vehicles; and
- They do not deflect traffic into an undesirable path.

Signs and devices that are erected before they are required shall be covered by a suitable opaque material. The cover shall be removed immediately prior to the commencement of work.

Where there is a potential for conflict of information between existing signage and temporary signage erected for the purpose of traffic control, the existing signs shall be covered. The material covering the sign shall ensure that the sign cannot be seen under all conditions i.e. day, night and wet weather. Care will be taken to ensure existing signs are not damaged by the covering material or by adhesive tape.

7.3.2 Tolerances on positioning of signs and devices

Where a specific distance for the longitudinal positioning of signs or devices with respect to other items or features is stated, for the spacing of delineating devices or for the length of tapers or markings, the following tolerances may be applied:

(a) Positioning of signs, length of tapers or markings:

i. Minimum, 10% less than the distances or lengths given.
ii. Maximum, 25% more than the distances or lengths given.

(b) Spacing of delineating devices:

i. Maximum, 10% more than the spacing shown.
ii. No minimum.

These tolerances shall not apply where a distance, length or spacing is already stated as a maximum, a minimum or a range.

7.3.3 Flashing Arrow Signs

Where flashing arrow signs are required to better delineate lane tapers, these signs will comprise a matrix of lamps or light emitting elements in the form of an arrow that is flashed in a cyclical manner to provide advance warning. The sign shall have a minimum dimension of 2400 mm. x 1200 mm. and conform to the requirements of AS/NZS 4192. The Project Site Supervisor shall ensure that all equipment used meets the Australian Standard.

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7.3.4 Delineation

Cones shall be used for delineation unless other treatment is specified in the Traffic Management Plan or on the Traffic Guidance Schemes. All cones shall be at least 700 millimetres in height and constructed from fluorescent orange or red material that is resilient to impact and will not damage vehicles when hit at low speed. Cones will be fitted with suitable white retro-reflective tape placed in accordance with AS1742.3.

Cones shall be designed to be stable under reasonably expected wind conditions and air turbulence from passing traffic.

The base of the cones will be secured so that they are not dislodged by traffic. Cones will be inspected at intervals necessary to ensure any misalignment or displacement is identified and corrected prior to this causing disruption to traffic.

Where specified, temporary frangible or otherwise non-hazardous delineator posts or bollards may be used for edge protection and taper delineation. Posts or bollards shall have a maximum dimension of 60 millimetres when measured along the longest side of a square or rectangular section or across the diameter of a circular section. Base design shall permit easy fixing to either sealed or unsealed surfaces and not intrude into traffic lanes greater than 50 millimetres from the face of the post or bollard.

All posts or bollards shall be erected in accordance with the Traffic Guidance Schemes. Posts and bollards shall be a minimum of 1000 mm. high, capable of being fixed to the road pavement by a suitable road adhesive or by fastening bolts or spikes. Fixing shall be in accordance with manufacturer's recommendations.

Posts and bollards shall be fitted with suitable white retro-reflective tape placed in accordance with AS1742.3.

All posts or bollards will be inspected daily and where displaced or missing made good immediately. All delineator posts are to be completely removed at the completion of all stages of construction and prior to the placement of asphalt surfacing. If adhesive is used to affix the posts this shall be completely removed from the road surface so that a flush surface is obtained.

Delineation spacing - Cones or bollards will be used to delineate the work area and travel path of vehicles. They shall be spaced according to the table on each TGS applicable to the speed of traffic and works being performed – as per the requirements outlined in Table 3.7 of AS1742.3.

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7.4 Site Access for Work Vehicles

Construction and/or traffic management vehicles entering and exiting the traffic stream shall be mindful of the conditions that may affect the safety of these movements.

Access points shall be determined prior to works commencing and traffic controllers, work personnel and suppliers notified. Traffic Controllers may assist work vehicles enter and exit the work area.

All entry and exit movements will be in accordance with the Road Traffic Code and shall be undertaken in the following manner:

Vehicles shall:

- Decelerate slowly and signal their intention by indicator to leave the traffic stream;
- Activate the vehicle's rotating yellow lamp, where fitted, once a speed of 20 km/h. has been reached and at least 50m prior to the exit location.
- Switch on the vehicle hazard lights once the vehicle is stationary.
- Where risks associated with unassisted exit or entry to or from the traffic stream are high, Traffic Controllers should be used to assist entry and exit movements.

Vehicles fitted with rotating amber lamps shall have the vehicle's rotating lamp activated prior to entering the traffic stream and shall undertake the following.

- Switch off the vehicle hazard lights;
- Indicate intention to enter the traffic stream using direction indicators;
- Ensure there is a suitable gap from oncoming traffic to allow for a safe entry manoeuvre; and,
- Turn off the rotating yellow lamp(s) once a speed of 40 km/h is reached.

Entry and exit manoeuvres shall be avoided in close proximity to intersections. Work personnel shall not cross traffic streams on foot unless absolutely necessary.

Construction or traffic management vehicles shall not obstruct paths or traffic lanes and be parked an adequate distance from intersections or driveways to ensure clear sight lines remain for all road users.

7.5 Communicating TMP Requirements

TMP requirements shall be communicated to all relevant work personnel prior to the commencement of works, generally at the pre-start meeting.

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8 Emergency Arrangements and Contingencies

8.1 Traffic Incident Procedures

In the event of an incident or accident, whether or not involving traffic or road users, all work shall cease and traffic shall be stopped as necessary to avoid further deterioration of the situation. First Aid shall be administered as necessary, and medical assistance shall be called for if required.

Road plant within the work area that may impact on any services requiring access to a crash site will be cleared from the area quickly as necessary.

The Alliance Incident Response Process is outlined in the Emergency Management Plan (EMP). An excerpt is found below:

Action Plan H – Motor Vehicle Accident

WORKER OBSERVING

- Ascertain if any person(s) have been injured - if yes, request Ambulance / Police attendance.
- Determine if vehicle (s) pose a hazard to persons nearby (e.g. leaking fuel) - if yes, request appropriate emergency services (e.g. Fire Brigade) and evacuate persons from immediate danger area.
- If accident poses a danger or hazard or a person has been injured, inform the Evolve Bayswater Safety Manager and *'On Scene Commander'*.
- If no person injured and no danger, determine if vehicle/s pose/s an obstruction to normal vehicular traffic flow. If yes, request driver/s to move vehicles - if vehicle unable to be moved, request driver to immediately obtain tow truck assistance – towing allocation through (000).
- Obtain particulars from driver(s) & witness(s) involved:
  - Names
  - Addresses
  - Telephone Numbers (Home & Work)
  - Driver's License Details
  - Details of registered owner/s of vehicles involved (if different from driver/s)
  - Vehicle details (Reg. No., type, make, colour)
  - Brief description of events
  - Confirm if driver/s require Police to be called (note - if persons injured, Police must attend)
- Complete Incident Notification and Investigation Report.

The site emergency contacts are listed below:

First Name	Last Name	Position	Contact Number
Travis	*Tremain*	*Alliance Manager*	*0412 200 895*
Iain	*Lawrence*	*Construction Manager (On scene commander)*	0439 642 347
Tamara	*Dunsire*	*HSEQ Manager*	*0432878083*

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8.1.1 Serious Injury or Fatality

In the case of serious injury or fatality occurring within the traffic management site all work shall cease immediately, machinery and vehicles turned off and the area cleared of personnel as soon as possible. Traffic Controllers (and other personnel if necessary) shall be deployed immediately to ensure no traffic or other road users approach the area.

Ambulance and Police shall be called on telephone number 000 where life threatening injuries are apparent.

All road workers and traffic management personnel shall preserve the scene leaving everything in situ, until direction is given by Police or WorkSafe.

A site-specific detour route and/or road closure point will be determined, signed and controlled by traffic management personnel and advised to Police, who will take charge of the site upon arrival. Detour routes will be determined so as to cater for all types of vehicles required to use them. An example of how to manage an emergency can be found in Appendix B of AS1742.3.

All site personnel shall be briefed on control procedures covering incidents and crashes that result in serious injury or fatalities.

8.1.2 Minor Incident or Vehicle Break Down within Site

Broken down vehicles and vehicles involved in minor non-injury crashes shall be temporarily moved to the verge as soon as possible after details of the crash locations have been gathered and noted. Where necessary to maintain traffic flow, vehicles shall be temporarily moved into the closed section of the work area behind the cones, providing there is no risk to vehicles and their occupants or workers. Suitable recovery systems shall be used to facilitate prompt removal of broken down or crashed vehicles. Assistance shall be rendered to ensure the impact of the incident on the network is minimised.

Any traffic crash resulting in non-life threatening injury shall be reported to the WA Police Service on 131 444.

Details of all incidents and accidents shall be reported to the Site Supervisor and Project Manager using the incident report form at Appendix "C" (or similar).

MRWA RNOC shall be notified on the incident and details of any obstruction as soon as practicable.

8.2 Emergency Services

Emergency services shall be notified of the proposed works nature, location, date and times as well as contact details for the site supervisor.

On-site traffic controllers will be equipped with mobile communications to advise and/or liaise with emergency services to ensure a prompt response should the need arise.

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8.3 Dangerous Goods

Should any incident arise involving vehicles transporting dangerous goods, all work shall cease immediately, machinery and vehicles turned off and the area cleared of personnel as soon as possible. Traffic Controllers (and other personnel if necessary) shall be deployed immediately to ensure no traffic or other road users approach the area.

Emergency services shall be notified of the proposed works nature, location, date and times as well as contact details for the site supervisor. All site personnel shall be briefed on evacuation and control procedures.

8.4 Damage to Services

In the event that gas services are damaged, all work shall cease immediately, machinery and vehicles turned off and the area cleared of personnel as soon as possible. Traffic Controllers (and other personnel if necessary) shall be deployed immediately to ensure no traffic or other road users approach the area. The Police Service and relevant supply authority shall be called immediately. Damage to any other services shall be treated in a similar manner except machinery may remain operational and access may be maintained where it is safe to do so.

All site personnel shall be briefed on evacuation and control procedures.

8.5 Failure of Services

8.5.1 Failure of Traffic Signals

In the event that traffic signal infrastructure near the worksite is damaged or fails to operate correctly, all work shall cease immediately and Main Roads WA Road Network Operation Centre (RNOC) shall be notified immediately (phone 138 111).

8.5.2 Failure of Street lighting

In the event that street lighting is damaged and fails to operate or operates incorrectly, Traffic Controllers (and other personnel if necessary with appropriate temporary lighting) shall be deployed immediately if the lighting failure adversely affects road user safety to control traffic movements as required. Western Power shall be notified immediately.

8.5.3 Failure of Power

In the event that power infrastructure is damaged and poses a risk through live current, Traffic Controllers (and other personnel if necessary) shall be deployed immediately to secure the site and prevent entry to the area affected by live power. Western Power shall be notified immediately (phone 13 13 51).

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8.6 Emergency Contacts

In the event of an emergency the following relevant authorities must be contacted and advised of nature of works, location, type of emergency and contact details for the site supervisor.

Emergency Service	Email/Website	Phone (Emergency)
WA Police Service	State.Traffic.Intelligence.Planning.&.Coordination.Unit@police.wa.gov.au	000
St John Ambulance	MMOGroup@stjohnambulance.com.au ManagerSOC@stjohnambulance.com.au	000
DFES	dfes@dfes.wa.gov.au	000
Power	http://www.westernpower.com.au/contactus/pages/dfesoffices.aspx	13 13 51
Gas	enquiries@atcogas.com.au	13 13 52
Main Roads Customer Call Centre	enquiries@mainroads.wa.gov.au	(08) 9323 4430
Main Roads Real Time Traffic Operations	RNOC.Control.Room.Information.Desk@mainroads.wa.gov.au	(08) 9428 2220
Main Roads Heavy Vehicle Operations	htv@mainroads.wa.gov.au	(08) 9311 8455
Water Corporation	https://www.watercorporation.com.au/faults/report-a-fault	13 13 75
Public Transport Authority	www.pta.wa.gov.au/AboutUs/ContactUs/tabid/124/Default.aspx	
City of Bayswater	mail@bayswater.wa.gov.au	(08) 9272 0665

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9 Monitoring and Measurement

9.1 Daily Inspections

Prior to works commencing the Site Supervisor shall undertake to communicate the Traffic Management Plan to all key stakeholders and affected parties.

On completion of setting out the traffic control measures, the site is to be monitored for a suitable period of time. If traffic speeds on the approaches to the work site are assessed as being above the temporary posted speed zone for the work site, the Site Supervisor is to initiate action to modify the approach signage and tapers in accordance with the requirements of AS1742.3. All such actions are to be recorded in the Daily Diary. Should road users be observed to continue to travel in excess of the posted speed limit, the police may be requested to attend the site to enforce the temporary posted speed limit.

The Advanced Worksite Traffic Management accredited supervisory person at the worksite may conditionally approve changes made to a complex traffic management plan subject to review and endorsement of the change by an RTM as soon as practicably possible.

The Traffic Management Contractor shall ensure that all temporary signs, devices and controls are maintained at all times. To achieve this, procedures in line with the requirements outlined in AS1742.3 Appendix A will be instituted. The monitoring program shall incorporate inspections:

- Before the start of work activities on site,
- During the hours of work,
- Closing down at the end of the shift period, and
- After hours.

A daily record of the inspections shall be kept indicating

- When traffic controls where erected,
- When changes to controls occurred and why the changes were undertaken,
- Any significant incidents or observations associated with the traffic controls and their impacts on road users or adjacent properties.

The Traffic Management Contractor shall ensure that personnel are assigned to monitor the traffic control scheme. Inspections shall at least satisfy the following requirements.

9.1.1 Before works start

- Confirm TMP and TGS are suitable for the day's activities;

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- Inspect all signs and devices to ensure they are undamaged, clean and comply with the requirements depicted on the TGS;
- All lamps should be checked and cleaned as necessary;
- After any adjustments have been made to the signs and devices, conduct a drive through inspection to confirm effectiveness.

9.1.2 During work hours

- Designate and ensure that appropriate work personnel drive through the site periodically to inspect all signs and devices and ensure they are undamaged and comply with the requirements depicted on the Traffic Guidance Schemes;.
- Attend to minor problems as they occur;
- Conduct on the spot maintenance/repairs as required;
- When traffic controllers are on the job, ensure they remain in place at all times. Relieve controllers as necessary to ensure attentiveness is retained;
- During breaks or changes in work activities remove or cover any signs that do not apply (e.g. PREPARE TO STOP, Workers symbolic);
- Re-position signs and devices as required by work processes throughout the day and keep records of any changes.

9.1.3 Closing down each day

- Conduct a pre-close down inspection, allowing time for any appropriate maintenance works;
- Remove any unnecessary signage (e.g. Prepare to Stop, Symbolic Workers);
- Replace any unnecessary signage with appropriate delineation;
- Install barriers and lights where required;
- Drive through site and confirm all signs and devices are operating correctly with no misleading visual cues;
- Record details of inspection and any changes made to layout.

9.1.4 After hours

- Appoint personnel to conduct after dark checks. Replace any signs / devices not working, missing or damaged and record in diary.
- Appoint personnel to conduct checks on non-work days (e.g. weekends). Replace any signs / devices not working, missing or damaged and record in diary.

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- The frequency of inspections needs to align with the amount of traffic management on site, weather conditions, vehicle types and volumes, road user behaviour and site specific risks.

9.2 TMP Audits and Inspections

Traffic Management Level	Pre-Opening Audit	Post installation Check	Post Implementation Compliance Check (RTM)	Post Implementation Audit (Independent RSA)
Short Term works Non-Complex Controls		By Site Traffic Personnel (BWTM Accreditation minimum)		
Short Term Works Complex Controls		By Site Traffic Personnel (BWTM Accreditation minimum)		
Short Term Works Major Closure and Detour		By Site Traffic Personnel (AWTM Accreditation minimum)	To be undertaken within 2 hours of activation, findings to be presented as marked up plans with detailed corrections **Action immediately**	
Long Term Temporary control Implementation Intersection and geometry	By Project RTM Corrective Actions to be undertaken prior to activation		To be undertaken within 2 hours of activation, findings to be presented as marked up plans with detailed corrections **Action immediately**	Undertaken within 3 days following implementation **High risk** issues to be issued on email immediately, **Action immediately**. **Low Risk** items to be provided in report within 3 days. **Action within 1 week**
Temporary Traffic Signal Modification	By Project RTM Corrective Actions to be undertaken prior to activation		To be undertaken within 2 hours of activation, findings to be presented as marked up plans with detailed corrections **Action immediately**	Undertaken within 3 days following implementation **High risk** issues to be issued on email immediately, **Action immediately**. **Low Risk** items to be provided in report within 3 days. **Action within 1 week**

9.3 Records

A daily diary recording all inspections including variations to the approved TMP shall be kept using the Daily Diary.

The Traffic Supervisor is to record all inspections made on a daily basis and at those times prescribed by the Traffic Management Implementation Standards. Upon completion of each day the Traffic Supervisor shall provide copies of the daily diary record to the Project Manager.

The Traffic Supervisor is to record all variations made to the approved Traffic Management Plan on a daily basis and indicate clearly the nature of the variations and the reason for the variations. Upon completion of each day the Traffic Supervisor shall provide copies of the variation record to the Project Manager.

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9.4 Public Feedback

Any feedback received from the public will be directed back to the Project management team for action and follow up as required.

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10 Management Review and Approvals

10.1 TMP Review and Improvement

The traffic management team shall assess all results from measurement and evaluations and ensure that all CARs, NCRs, incidents and feedback are properly addressed and responded to timely and appropriately.

10.2 Variations

If applicable see Appendix B.

10.3 Approvals

Before works commence it is necessary to seek approval from the following:

Stakeholder Approval	Comments
MRWA	TM Hold Point Release, Road Planned Interventions, HVS
City of Bayswater	Approval for sign erection on LGA road infrastructure
Public Transport Authority	When impacting bus routes, train stations

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11 Appendix A - Notification of Road works

NOTE:

The Notification of Roadworks form shall be filled out and distributed if the works associated with this TMP meet any of the requirements outlined in MRWA Code of Practice section 5.4:

- Works involving the complete closure of any road.
- Works on primary and district distributor roads of more than four (4) hours duration where it is expected that major traffic delays and congestion will occur.
- Works on any road where speed restrictions and lane closures will be in place more than five (5) days, but major traffic delays are not expected.
- Traffic management activities involving the establishment of a contra-flow.
- Traffic management activities resulting in any direct or indirect changes to traffic flows and/or traffic composition on bridges, including situations where such changes are a result of lane closures or traffic detours.
- Works on any primary or district distributor road where construction activities will make it difficult or impossible for the passage of general access or oversize vehicles, and traffic control devices cannot be easily shifted on a temporary basis to allow the vehicle to pass.
- Works between hold-lines on signalised intersections where work will last longer than one (1) hour, or a lesser time if significant delay and congestion will occur.
- Works impacting on the operation of any Crossing Attended Warden controlled children's crossing.

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NOTIFICATION OF ROADWORKS

Notifications are to be distributed at least one (1) week in advance of works
Where Police attendance is required at least three (3) weeks' notice shall be given (except in an emergency)
Where the traffic management is to interfere with traffic signal operation, prior approval is required 3wks in advance by MRWA RNOC.

TMP reference		Communication plan sent to MRWA		Yes ☐	No ☐	N/A ☒	
				If No provide reason. If Yes provide email contact			
Anticipated start date:		Anticipated finish date:					
Daily work hours:		Is weekend work applicable?:		Yes ☐	No ☐		
Location of works (Road/Street, Suburb):							
Description of works:							
Description of traffic management arrangements:							
Posted Speed Limit:		Worksite speed limit:		After hours speed limit:			

What is the anticipated effect on traffic flows?:							
Are lanes closed at signals?:	Yes ☐	No ☐	N/A ☐	Are signal loops or hardware affected?	Yes ☐	No ☐	No ☐
Will signal phases need time changes?	Yes ☐	No ☐	N/A ☐	Will signals need to revert automatically?	Yes ☐	No ☐	N/A ☐
Date of signal "black out":				Times of signal "black out":			
Will Police attendance be required?:	Yes ☐	No ☐		Dates for Police attendance :			
Are bridges located in area of works, (inc detours)?:	Yes ☐	No ☐		Will changes to traffic flows/composition occur on bridges?	Yes ☐	No ☐	
Are the works located within a School Zone?:	Yes ☐	No ☐		Will children's crossings be altered during works?	Yes ☐	No ☐	

Will there be a width restriction for oversize vehicles exceeding 2.5m in width?	Yes ☐	No ☐	Will there be a height restriction for oversize vehicles exceeding 4.3m in height?	Yes ☐	No ☐
If yes, what width limit is to be imposed on oversize vehicles travelling through the site?			If yes, what is the minimum height of the structure causing the restriction?		
Can the width restrictions be removed if operators provide prior notice?	Yes ☐	No ☐	If the width restrictions are fixed in place, are operators able to have a wider oversize combination if a 1.2m ground clearance can be achieved?	Yes ☐	No ☐
If yes, how much notice will be required? (i.e. 24/48 hours' notice).			If yes, how much notice will be required? (i.e. 24/48 hours' notice).		
Please provide the name and phone number of the best contact for further details in relation to these works.	Name: Contact number (mobile):				
Please provide the name and phone number of the contact for prior notification of movements.	Name: Contact number (mobile):				
Will the work result in a road closure that will impact on Restricted Access Vehicles?	Yes ☐	No ☐	If yes, have discussions been held with Main Roads Heavy Vehicle Services (HVS) in regard to a suitably approved RAV network detour. If no, please contact HVS	Yes ☐	No ☐

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			Route Assessments on 138 486 for assistance. Note: an assessment request for a proposed detour may take up to a week to be processed.		

Road Authority:					
Postal Address:					
Telephone:		Email:		Facsimile:	
Contact:					
Telephone:		Email:		Mobile:	

Construction Contractor:					
Postal Address:					
Telephone:		Email:		Facsimile:	
Contact:					
Telephone:		Email:		Mobile:	
After hours contact:		Telephone:		Mobile:	

Traffic Management Contractor:					
Postal Address:					
Telephone:		Email:		Facsimile:	
Contact:					
Telephone:		Email:		Mobile:	
After hours contact:		Telephone:		Mobile:	

Distribution List	Email/Website
WA Police State Traffic Coordination	State.Traffic.Intelligence.Planning.&.Co-ordination.Unit.SMAIL@police.wa.gov.au
WA Police Student Pedestrian Policy Unit	childrenscrossingunitsmail@police.wa.gov.au
MRWA Customer Information Centre	enquiries@mainroads.wa.gov.au
MRWA Road Network Operations Centre (previously TOC)	RNOC.Control.Room.Information.Desk@mainroads.wa.gov.au
MRWA Heavy Vehicle Operations	hvo@mainroads.wa.gov.au
MRWA Engineer Bridge Loading	DLSEHeavyLoadsGroup@mainroads.wa.gov.au
St John's Ambulance	ManagerSOC@stjohnambulance.com.au
Fire & Emergency Services	www.dfes.wa.gov.au/contactus/pages/dfesoffices.aspx
Public Transport Authority	Transperth.ServiceDisruptions@pta.wa.gov.au
Arc Infrastructure (previously Brookfield Rail)	thirdparty.notifications@arcinfra.com
MRWA Digital Communications	communications@mainroads.wa.gov.au
Local Government –	

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12 Appendix B - Variation to Standards

APPLICATION FOR APPROVAL TO VARY REQUIREMENTS OF AUSTRALIAN STANDARDS AS1742.3 OR MRWA TRAFFIC MANAGEMENT CODES OF PRACTICE

Form Instruction

1. **Section A** – Identify the Principal Agency / person commissioning the activity. (Does not include contractors, subcontractors or **traffic** management company/traffic planners etc).
2. **Section B** – Identify activity location, start / finish date and time, type of traffic management, description location of activity.
3. **Section C** – Identify the person that has prepared the Traffic Management Plan, this person shall have AWTM accreditation.
4. **Section D** – For Works undertaken on a State road or on behalf of Main Roads Western Australia the details of the risk assessment process identified in this application form must be documented and endorsed[1] by an accredited Roadworks Traffic Manager.

   All applications to be addressed to the applicable Main Roads Regional office. For contact information please refer to the online Application kits and guidelines to undertake works. (www.mainroads.wa.gov.au >Our Roads > Conducting Works on Roads).

   For all other applications the details of the risk assessment process identified in this application form must be documented and endorsed[1] by the person responsible for approving the traffic management plan.

   Contact with the appropriate road authority should be made prior to lodgement of this application to determine its suitability and for any additional requirements.
5. **Section E -** Risk implication, identification and assessment process must be undertaken in accordance with Risk Management – Principles and Guidelines AS/NZS ISO 31000. The likelihood and consequences should be rated after the application of any additional counter measures taken utilising Tables from Annexure's 203B and 203B, Main Roads WA - Specification 202 and 203 respectively.

   Incomplete or applications not signed by the RTM[1] will not be processed.

A

Applicant (Principal for the Works)					
Postal address					
Suburb		State		Postcode	
Project Manager				Telephone	
Email				Facsimile	

B

Anticipated start date				Anticipated finish date	
Daily work hours: From		To		Weekend work applicable	Yes ☐ Sat ☐ Sun ☐ No ☐
Location of works (Road/Street Suburb)					
Road type (eg undivided, two lane)					
Description of works					
Are alterations to permanent traffic signals required?		Yes ☐	No ☐	N/A ☐	
Posted Speed Limit		Worksite speed limit		After hours speed limit	

[1] A person with AWTM accreditation is permitted to endorse a variation of less than 135 % of the allowable lane capacity as outlined in table 4.10 of AS 1742.3. See section 5.6 of the Code of Practice

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C						
	TMP Designer					
	Accreditation Number					
	Postal address					
	Suburb		State		Postcode	
	Email		Telephone		Facsimile	
	Endorsement signature			Date		

D						
	RTM Endorsing Variation[1]					
	Accreditation Number					
	Postal address					
	Suburb		State		Postcode	
	Email		Telephone		Facsimile	
	Endorsement signature[1]			Date		

For Internal Use Only							
Approving Road Authority							
Approving Officer Position							
Application Approved	Yes ☐ No ☐	If Not, Why Not					
Additional Conditions							
Approved By: Signature		Title		Date		File	

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E	Description of Variation Requested	Specify Point of Departure from Standard / Code of Practice (List section and page number)	Justification (Why is this necessary)	Additional Counter Measures To Be Taken (Identify additional counter measures to be used to negate the lesser treatment)	Residual Risk[2]		
					L	C	RR

[2] Note: the risk assessment in the TMP also needs to record the variation and include the risk event, pre-treatment risk, treatment and residual risk.

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13 Appendix C - Record Forms

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Daily Diary
Daily Traffic Management Diary

Location: _____ **Client:** _____ **Date:** _____

TMP No: _____ **TGS No:** _____ **Weather Conditions:** _____ **Diary Sheet:** _____ **of** _____

Start Time at Depot: _____ **Time Arrive Onsite:** _____ **Commencement of Site Setup:** _____ **Site Setup and Operational:** _____

Site Pulled Down at: _____ **Time Aftercare signs setup:** _____ **TGS No:** _____ **Time left site:** _____ **Finish time at Depot:** _____

☐ **Day Works** ☐ **Night Works** ☐ **Emergency Response** **Site Setup as per TGS** ☐ **Yes** ☐ **No (if not comment on next page)**

☐ **Attendance at Pre-Start Meeting** **Did an incident occur (if yes complete incident report form)** ☐ **Yes** ☐ **No**

I confirm that the above times of 'setup' and 'pulldown' of traffic management signs and devices are a true and correct

Name (Site Supervisor): _____ Signed: _____

Drive Through Checks (Checks must be conducted at least every 2 hours)

Time of check entered. Rule off and leave blank if the check does not apply to the site. Make a note of any issues on the next page.

Traffic Management Site Checks	1	2	3	4	5	6	7	8	9	10
Time										
Are signs upright, clean, visible, level & stable										
Are taper lengths correct										
Are speed limit signs correct and doubled up										
Are sign spacings correct										
Are cone/bollard alignments straight & spaced correctly										
Are devices operating correctly										
Have pedestrians been catered for										
Are lane widths adequate										
Are vehicle queue lengths acceptable										
Is road surface condition adequate										

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No. of Traffic Management Vehicles Onsite: _____ **No. of Traffic Management Personnel Onsite:** _____

Traffic Management Personnel Names & Accreditations:

		Accreditation Details	**Time of Break from Stop/Slow** (Traffic controllers must have a 15-minute break every two hours of constant stop/slow operation)							
Position	**Name**		On	Off	On	Off	On	Off	On	Off
Crew Leader:			:	:	:	:	:	:	:	:
Traffic Controller:			:	:	:	:	:	:	:	:
Traffic Controller:			:	:	:	:	:	:	:	:
Traffic Controller:			:	:	:	:	:	:	:	:
Traffic Controller:			:	:	:	:	:	:	:	:
Traffic Controller:			:	:	:	:	:	:	:	:

Additional Comments _____

I confirm that the details contained herein are true and correct

Name: (Traffic Management Crew Leader): _____ Signed: _____

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Incident Report Form

Any incident occurring onsite shall be reported using the following incident report format.

Region Contract Number	Incident Report No. Contractor

Major Incident Reports must be forwarded to the Superintendent within 48 hours of the incident occurring or becoming apparent.

Contractors shall use this Form for reporting of Traffic incidents on works under Contract and this form supplements the OSH Incident Reporting Form.

A Details of Incident	Reported to: ☐ Supervisor ☐ TMR ☐ Other						
OSH Incident Report No				**Atmospheric Conditions**		**Light Conditions**	
Fatality ☐				Clear	☐	Day Light	☐
Injury ☐	**Road Surface**			Overcast	☐	Night Time	☐
Property Damage ☐	Unsealed	☐		Raining	☐	Dawn/Dusk	☐
Police Attended **Yes/No**	Sealed	☐		Fog/Smoke/Dust	☐	**Street Lighting**	
Time and Date of incident	**AM / PM**			**Road Condition**		On	☐
	Day	Month	Year	Wet	☐	Off	☐
				Dry	☐	Not Provided	☐
Other relevant details, (Last maintenance grade, watering and dust conditions):							

B Details of Traffic Management in place:							
TGS No:				Name of individual that prepared the TGS			
Time last inspected:				Accreditation No:			
TGS Approved:	Day	Month	Year	TMP Approved:	Day	Month	Year

C Descriptions of Vehicles:			
Detail (make, model/ped/cyclist/VRU)	Registration No	Direction of Travel	Age of Driver
Vehicle 1			
Vehicle 2			
Vehicle 3			
Comments:			

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D Description of Incident:

Draw the incident including the direction of travel, traffic control signs, fixed structures and north point.



E Attachments:	The following copies MUST be submitted with this Incident Report.	

Approved TMP ☐ Approved TCP ☐ Approvals for temporary speed restrictions ☐ Daily Diary ☐ ☐

F Police Report:

Accident reported to Police: ☐ YES ☐ NO Report made by ☐ Phone ☐ Fax ☐ Mail or E-mail

Date Report Made Day Month Year Police WA Reference Number

G Details of Person Completing this Incident Form:

Name: Contractor Name:

Position:

Date: Signature:

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14 Appendix D - Traffic Analysis and Volume Counts



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LM00462- King William St/Coode St/Whatley Cres Intersection WEEKDAY

Day	Hour	EB Thru Loop 9	SB to EB and through Loop 14	NB off to EB Loop 11	EB combined Loops 9,11,14	WB off to NB Loop 13
Wednesday	0:00	9	9	14	32	3
Wednesday	1:00	5	5	8	18	3
Wednesday	2:00	1	1	6	8	1
Wednesday	3:00	5	14	8	27	5
Wednesday	4:00	6	30	13	49	2
Wednesday	5:00	24	98	37	159	18
Wednesday	6:00	58	271	64	393	28
Wednesday	7:00	92	472	101	665	70
Wednesday	8:00	97	619	148	864	57
Wednesday	9:00	103	297	131	531	63
Wednesday	10:00	82	312	138	532	64
Wednesday	11:00	85	194	132	411	65
Wednesday	12:00	93	260	131	484	54
Wednesday	13:00	95	254	99	448	60
Wednesday	14:00	91	357	124	572	63
Wednesday	15:00	128	409	165	702	50
Wednesday	16:00	139	366	166	671	51
Wednesday	17:00	184	341	186	711	48
Wednesday	18:00	108	253	138	499	51
Wednesday	19:00	77	193	93	363	35
Wednesday	20:00	46	97	59	202	28
Wednesday	21:00	43	94	54	191	15
Wednesday	22:00	40	27	24	91	13
Wednesday	23:00	22	25	14	61	11

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LM00462- King William St/Coode St/Whatley Cres Intersection- SATURDAY						
Day	Hour	EB Thru Loop 9	SB to EB and through Loop 14	NB off to EB Loop 11	EB combined Loops 9,11,14	WB off to NB Loop 13
Saturday	0:00	17	18	16	51	5
Saturday	1:00	6	8	13	27	5
Saturday	2:00	8	7	9	24	7
Saturday	3:00	6	10	7	23	3
Saturday	4:00	9	12	7	28	3
Saturday	5:00	20	32	12	64	9
Saturday	6:00	23	71	47	141	14
Saturday	7:00	50	178	70	298	42
Saturday	8:00	75	218	120	413	69
Saturday	9:00	119	286	155	560	66
Saturday	10:00	113	260	162	535	72
Saturday	11:00	169	456	181	806	85
Saturday	12:00	150	417	193	760	63
Saturday	13:00	100	356	135	591	64
Saturday	14:00	105	337	123	565	61
Saturday	15:00	111	296	131	538	66
Saturday	16:00	88	316	121	525	61
Saturday	17:00	87	266	153	506	56
Saturday	18:00	72	183	109	364	48
Saturday	19:00	59	164	84	307	43
Saturday	20:00	46	152	53	251	23
Saturday	21:00	39	173	53	265	16
Saturday	22:00	51	44	43	138	24
Saturday	23:00	31	34	32	97	11

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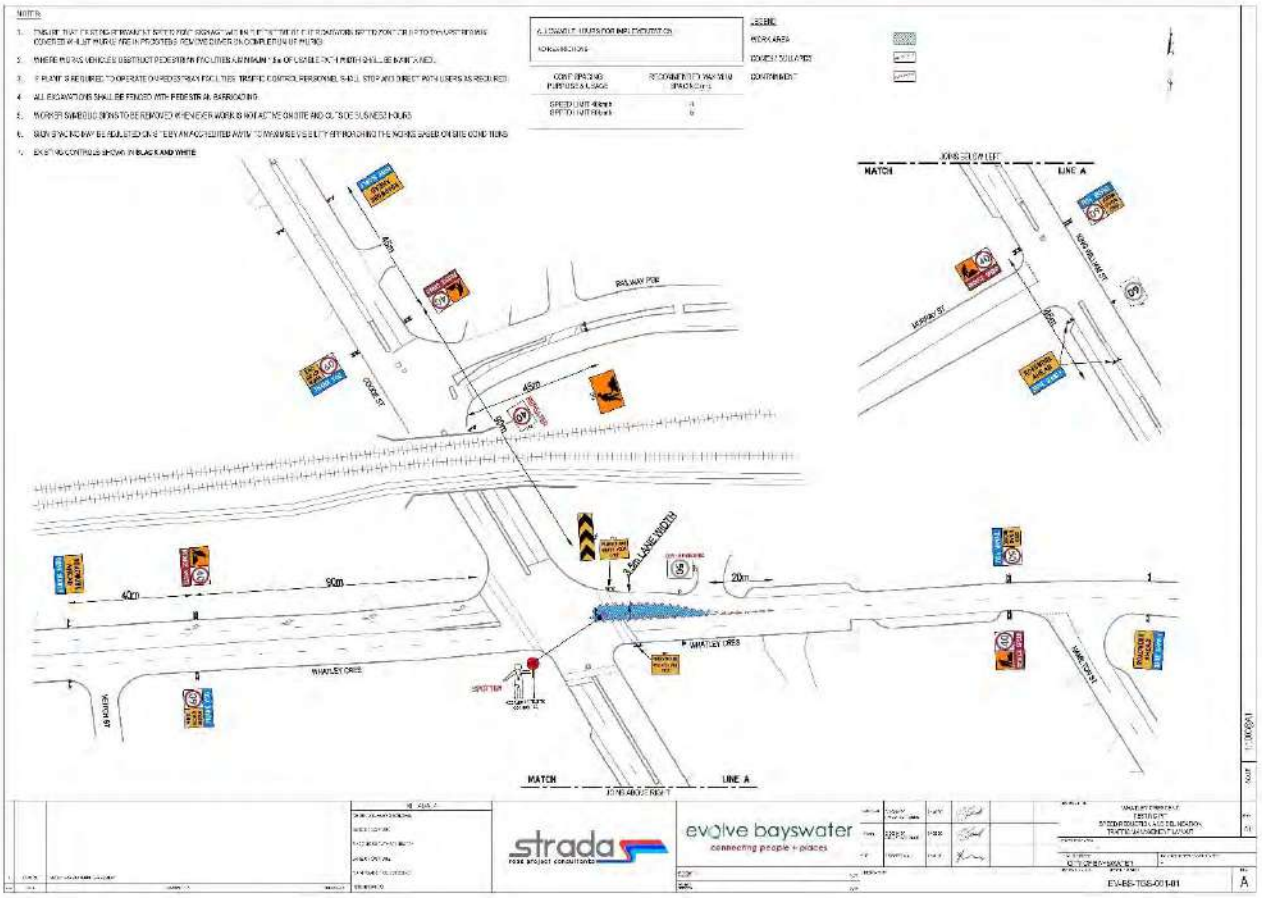
LM00462- King William St/Coode St/Whatley Cres Intersection SUNDAY						
Day	Hour	EB Thru Loop 9	SB to EB and through Loop 14	NB off to EB Loop 11	EB combined Loops 9,11,14	WB off to NB Loop 13
Sunday	0:00	23	100	24	147	10
Sunday	1:00	7	14	15	36	6
Sunday	2:00	9	5	12	26	5
Sunday	3:00	2	7	8	17	4
Sunday	4:00	7	10	3	20	4
Sunday	5:00	9	23	4	36	7
Sunday	6:00	15	50	25	90	11
Sunday	7:00	49	116	50	215	27
Sunday	8:00	60	165	87	312	45
Sunday	9:00	89	248	129	466	54
Sunday	10:00	103	247	141	491	67
Sunday	11:00	105	215	148	468	64
Sunday	12:00	119	296	120	535	60
Sunday	13:00	100	224	124	448	57
Sunday	14:00	87	285	110	482	48
Sunday	15:00	88	230	108	426	44
Sunday	16:00	84	230	112	426	52
Sunday	17:00	93	201	103	397	48
Sunday	18:00	65	183	101	349	30
Sunday	19:00	46	112	75	233	36
Sunday	20:00	51	120	45	216	26
Sunday	21:00	32	55	46	133	14
Sunday	22:00	25	21	27	73	6
Sunday	23:00	13	16	14	43	9

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15 Appendix E – Roadway Access Authorisation Permit

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16 Appendix F – Traffic Guidance Schemes


NOTES
LEGEND
WORK AREA
RAILWAY PDE
COOKE ST
WHATLEY CRES
MARCONI ST
LEIGHTON PL
MATCH
LINE A
3.5m LANE WIDTH
90m
40m
20m
45m
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strada

element.

the art and science of place

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