Master Specification
Part RW-OHW-D1

Overhead Wiring

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RW-OHW-D1 Overhead Wiring

1 General

a) This Master Specification Part sets out the requirements for the design of the railway overhead wiring system (OHWS) for train and tram networks including:

i) the documentation requirements, as set out in section 2;

ii) the Requirements Definition Design Documentation requirements, as set out in section 3;

iii) the Preliminary Design Documentation requirements, as set out in section 4;

iv) the Detailed Design Documentation requirements, as set out in section 5;

v) the Final Design Documentation requirements, as set out in section 6;

vi) the requirements for the construction specification, as set out in section 7; and

vii) the inspection, testing and commissioning requirements to be incorporated into the construction specification, as set out in section 8.

b) The design of the OHWS for train and tram networks must comply with the Reference Documents, including:

i) AM4-DOC-000466 - Type approval for railway products;

ii) AR-EL-STD-0102 - Rail Commissioner - Guidelines for the protective provisions related to electrical safety and earthing for the Adelaide metro electrified rail network;

iii) BS EN 50121-1 Railway applications - Electromagnetic compatibility general;

iv) BS EN 50122-1 Railway applications - Fixed installation. Electrical safety, earthing and the return circuit. Protective provisions against electric shock;

v) BS EN 50317 Railway applications - Current collection systems. Requirements for and validation of measurements of the dynamic interaction between pantograph and overhead contact line;

vi) BS EN 50367 Railway applications - Fixed installations and rolling stock. Criteria to achieve technical compatibility between pantograph and overhead contact line;

vii) PR-RC-MC-009 - Management of change;

viii) PTS-AR-10-PM-GUD-00000098 - Guidelines for inspections testing and commissioning of assets for rail projects;

ix) PTS-MU-1O-EG-PRC-00000016 - Public transport services - Design decision records procedure;

x) TP1-DOC-000389 - Electrical and mechanical clearances for the 25kV electrified train network;

xi) TP1-DOC-000390 - Overhead wiring system requirements for the 25kV electrified train network;

xii) TP2-DOC-002020 - Guidelines for Low Voltage Electrical Earthing and Bonding for the Adelaide Metro tram Network; and

xiii) TP2-DOC-003519 - Tram System - Overhead Wiring System Requirements for the 600v DC Tram network.

c) The Contractor must manage the design of the OHWS for train and tram networks in accordance with:

i) PC-EDM1 “Design Management”;

ii) PC-RW30 “Design”; and

iii) PR-RC-MC-009 Management of change.

2 Documentation

2.1 Design Documentation

In addition to the requirements of PC-EDM1 “Design Management” and PC-RW30 "Design", the Design Documentation must:

a) adopt the Principal’s design drawing template; and

b) include:

i) the Requirements Definition Design Documentation inclusions as required by section 3;

ii) the Preliminary Design Documentation inclusions as required by section 4;

iii) the Detailed Design Documentation inclusions as required by section 5;

iv) the Final Design Documentation inclusions as required by section 6; and

v) the construction specification including:

A. the construction and installation Hold Point requirements as outlined in section 7; and

B. the inspection, testing and commissioning Hold Point requirements as outlined in section 8.

3 Requirements Definition Design Documentation

In addition to the requirements of PC-RW30 “Design”, the Requirements Definition Design Documentation for the design of the OHWS for train and tram networks must include:

a) concept layout Design Drawings for the OHWS;

b) tension length Design Drawings;

c) proposed system Design Drawings;

d) major sectioning Design Drawings; and

e) a Design Report, in accordance with the requirements of PC-EDM1 “Design Management”, including:

i) evidence of interface to existing OHWS infrastructure and compliance with Reference Documents;

ii) proposed Design Departures and engineering waivers;

iii) type approval and details of manufacturer of any proposed materials, as per AM4-DOC-000466 - Type approval for railway products; and

iv) confirmation of existing sectioning diagram and any proposed modifications.

4 Preliminary Design Documentation

In addition to the requirements of PC-EDM1 “Design Management”, the Preliminary Design Documentation for the design of the OHWS for train and tram networks must include:

a) progressive update of information required by section 3, substituting ‘Requirements Definition’ with ‘Preliminary Design’;

b) Design Drawings for the route of the OHWS incorporating existing structures and foundations;

c) typical cross-section Design Drawings for each different type of structure and arrangement;

d) minor sectioning Design Drawings; and

e) a Design Report, in accordance with the requirements of PC-EDM1 “Design Management”, including:

   i) bill of materials;

   ii) any:

      A. engineering waivers being sought in accordance with PC-RW30 “Design”; or

      B. Design Departures being sought; and

   iii) desktop signal sighting assessment to ensure that OHWS structures do not obstruct the signal sighting and pedestrian crossings.

5 Detailed Design Documentation

In addition to the requirements of PC-EDM1 “Design Management”, the Detailed Design Documentation for the design of the OHWS for train and tram networks must include:

a) progressive update of information required by section 4, substituting ‘Preliminary Design’ with ‘Detailed Design’;

b) Design Drawings for the route of the OHWS including span lengths and wire heights;

c) details of how testing for section proving will be undertaken;

d) Design Report, in accordance with the requirements of PC-EDM1 “Design Management”, including:

   i) calculations including:

      A. radial loads;

      B. structural loading;

      C. span lengths;

      D. contact wire displacement;

      E. wind assessment of the project site;

      F. tension loss calculation; and

      G. along track movement of wires; and

   ii) list of recommended spare parts, with any spare part that is measured by length to be provided in metres;

e) dropper tables;

f) balance weight anchor sheets;

g) bonding Design Drawings for the OHWS including for:

   i) stations, traction, level crossings and bridges; and

   ii) screening and bridge screening;

h) special cross-section Design Drawings including overbridges;

i) foundation schedule;

j) height and stagger sheets;

k) cantilever tube length schedules;

l) index sheets;

m) final isolation procedures and instructions;

n) specifications for electrification signage;

o) electrification signage schedule;

p) scheduler designated earthing points Design Drawings;

q) information relevant to the operation and maintenance of the OHWS;

r) information regarding the OHWS which will need to form part of the Training Manual; and

s) combined services Design Drawings (with an aerial photograph background) overlaid with:

i) OHWS mast locations, booster transformers and traction power cable containment;

ii) trackside signalling equipment, including asset numbers and descriptions;

iii) major monuments, including railway stations, side roads and over bridges;

iv) existing railway services;

v) existing Utility Services and indicative conflicts;

vi) track and civil plan, including drainage;

vii) existing railway corridor access points;

viii) master signalling plan; and

ix) interface review for potential interface issues with other Utility Services.

6 Final Design Documentation

In addition to the requirements of PC-EDM1 “Design Management”, the Final Design Documentation for the design of the OHWS for train and tram networks must update information required by section 5, substituting ‘Detailed Design’ with ‘Final Design’.

7 Requirements for construction specification

In addition to the construction specification requirements in PC-RW30 “Design”, the Hold Points listed in Table RW-OHW-D1 7-1 must be included in the construction specification for the OHWS for train and tram networks.

Table RW-OHW-D1 7-1 Additional Hold Point requirements to be incorporated into the construction specification

Hold Point	Documentation or Construction quality	Occurrence point
Confirm footings, soil and concrete	Construction quality	Before concrete pouring
Confirm footing strength	Construction quality	Before loading footings
Confirm earthing and bonding	Construction quality	Before energisation
Confirm final high level OHWS	Construction quality	Before energisation
Confirm live section proving of OHWS	Construction quality	Before running an electric train or tram

8 Inspection, testing and commissioning requirements to be incorporated into the construction specification

In addition to the Hold Points listed in PC-RW50 “Inspection, Testing and Commissioning”, the Hold Points listed in Table RW-OHW-D1 8-1 must be included in the construction specification required by PC-RW30 “Design” for the inspection, testing and commissioning of the OHWS for train and tram networks.

Table RW-OHW-D1 8-1 Additional Hold Point requirements to be incorporated into the construction specification

Hold Point	Documentation or Construction quality	Occurrence point
Mega testing	Construction quality	Before section proving
Section proving	Construction quality	Before short circuit test
Short circuit test	Construction quality	Before pantograph run-through
Pantograph run-through	Construction quality	Before inspection of as-built height and stagger
As-built height and stagger	Construction quality	Before review of red line mark up
Red line mark up	Documentation	Before running of instrumented pantograph
Instrumented pantograph run	Construction quality	Before review of video pantograph run
Video pantograph run	Construction quality	Before commissioning of OHWS