Railway

Master Specification

RW-OHW-D1 Overhead Wiring

Document Information	
K Net Number:	14042189
Document Version:	1
Document Date:	23/04/2020

DEPARTMENT FOR INFRASTRUCTURE AND TRANSPORT

Government of South Australia
Department for Infrastructure and Transport

Document Amendment Record

Version	Change Description	Date
1	Initial issue (formerly D83)	23/04/20

Document Management

Contents

RW-OHW-D1 Overhead Wiring

1 General

1.1 This Part specifies the Requirements for the design of the Railway Overhead Wiring System (OHWS) for the train network.

1.2 The Contractor must comply with following DIT Standards:

a)	TP1-DOC-000389	Electrical and Mechanical Clearances for the 25kV Electrified Train Network.
b)	TP1-DOC-000390	Overhead Wiring System Requirements for the 25kV Electrified Train Network.
c)	AR-EL-STD-0102	Guidelines for the Protective Provisions Related to Electrical Earthing and Bonding for the Adelaide Metro Electrified Rail Network.
d)	AM4-DOC-000364	Drafting Standard for AutoCAD Drawings.
e)	AM4-DOC-000466	Type Approval for Railway Products.
f)	PTS-AR-10-PM-GUD-00000098	Guidelines for Inspections, Testing and Commissioning of Assets for Rail Projects.
g)	PTS-MS-05-AM-PRS-00000091	Asset Management Technical Data Requirements for Project.
h)	PTS-MU-1O-EG-PRC-00000016	Design Decision Records Procedure.
i)	FR-AM-GE-806	Identification and Numbering of Technical Documents and Drawings.
j)	PR-AM-GE-1013	Rail Drawings Acceptance Procedure.
k)	PR-AM-GE-762	Punchlist Management Procedure for Public Transport Projects.
l)	AM4-DOC-000936	Naming and Numbering Conventions for DIT Rail Assets & Infrastructure.
m)	AM4-DOC-000940	Asset Management Handover Requirements Standard.
n)	PR-RC-MC-009	Management of Change.
o)	TP1-DOC-003046	Overhead Wiring Drawing Standard.

1.3 The Contractor must comply with:

a)	EN50121	Railway Applications - Electromagnetic Compatibility.
b)	EN50122-1	Railway Applications - Fixed Installation. Electrical Safety, Earthing and the Return Circuit. Protective provisions against electric shock.
c)	EN50317	Railway Applications - Current Collection Systems. Requirements for and Validation of measurements of the dynamic interaction between pantograph and overhead contact line.
d)	EN50367	Railway Applications - Current Collection Systems. Technical criteria for the interaction between pantograph and overhead line (to achieve free access).

1.4 The Contractor must use the Overhead Wiring System Design drawing template, available from Rail Commissioner, to build any OHW design.

1.5 The Contractor must comply with Rail Commissioner Management of Change Procedure PR-RC-MC-009 for the types of changes specified in it.

1.6 An advice must be sought from the Principal's or Rail Overhead Engineering's representative for any clarification or conflict regarding the standards listed in the above clause.

2 Design Reports

2.1 At a minimum, the Design Reports listed in this Part for the Overhead Wiring System must be provided at the following stages (15% design complete, 30% design complete, 70% design complete, 100% design complete) unless otherwise specified by the Principal.

3 Requirements Definition (Notionally 15% Design Complete) Stage

3.1 The following shall constitute **Hold Points** for this stage:

a) concept layout plans for OHWS;

b) tension length drawings;

c) confirmation of existing OHWS System Design drawings and standards;

d) departures and / or proposed System Design drawings;

e) type approval and manufacturer, of any proposed materials;

f) confirmation of existing Sectioning Diagram and any proposed modifications;

g) Design Basis Report; and

h) Major Sectioning diagram.

4 Preliminary Design (Notionally 30% Design Complete) Stage

4.1 The following shall constitute **Hold Points** for this stage:

a) layout plans for route to OHWS, incorporating existing structures and foundations;

b) tension length drawings;

c) typical cross-sections for each different type of structure and arrangement;

d) Bill of Materials;

e) Design Development Report (including any Engineering Waivers);

f) confirmation that no pedestrian or signalling sighting issues are created due to OHWs structure allocation along with associated sighting drawings;

g) updated System Design drawings; including approval and manufacturer, of any proposed materials;

h) Major Sectioning diagram; and

i) Minor Sectioning diagram.

5 Detailed Design (Notionally 70% Design Complete) Stage

5.1 The following shall constitute **Hold Points** for this stage:

a) detailed System Design drawings; including approval and manufacturer, of any proposed materials;

b) final approved Sectioning Diagram;

c) detailed Design Report;

d) detailed layout plans for route to OHWS, including span lengths and wire heights;

e) detailed tension length drawings;

f) detailed cross-sections for each structure and arrangement;

g) detailed switching arrangement drawings;

h) calculations: including but not limited to radial loads, structural loading, span lengths and contact wire displacement;

i) dropper tables;

j) balance weight anchor sheets;

k) detailed Bonding plans for OHWS;

l) detailed Bonding plans for Stations, Traction, Level crossings and Bridges;

m) detailed Bonding plans for Screening: not limited to bridge screening;

n) special cross-sections (e.g. Overbridges);

o) detailed Bill of Materials;

p) detailed Bill of Quantities;

q) foundation schedule;

r) height and stagger sheets;

s) cantilever tube length schedules;

t) index sheets;

u) final Isolation procedures and instructions;

v) confirmation that no pedestrian or signalling sighting issues are created due to OHWs structure allocation along with associated sighting drawings;

w) specifications for Electrification Signage;

x) detailed Electrification Signage schedule;

y) detailed Scheduler designated earthing points drawings;

z) list of spare parts; Note: any spare part with length must be provided in meters;

aa) Operator and Maintenance manuals;

bb) training manuals;

cc) combined Services Plan (aerial photograph) overlaid with:

i) OHW mast locations & booster transformers; traction power cable containment;

ii) trackside signalling equipment including asset numbers and descriptions;

iii) major monuments: Railway Stations, Side Roads, over bridges, etc.;

iv) existing railway services;

v) existing Utility Services and indicative clashes;

vi) track and civil plan (including. drainage);

vii) existing railway corridor access points;

viii) Master Signalling Plan; and

ix) interface review for potential interfaces issues with other services.

dd) Major Sectioning diagram; and

ee) Minor Sectioning diagram.

6 Final Design (Notionally 100% Design Complete) Stage

6.1 The following shall constitute **Hold Points** for this stage:

a) final System Design drawings; including approval and manufacturer, of any proposed materials;

b) final approved Sectioning Diagram;

c) final Design Report;

d) final layout plans, including span lengths and wire heights;
e) final tension length drawings;
f) final cross-sections for each structure and arrangement;
g) final switching arrangement drawings;
h) calculations: including radial loads, structural loading, span lengths and contact wire displacement;
i) dropper tables;
j) balance weight anchor sheets;
k) final Bonding plans for OHWS;
l) final Bonding plans for Stations, Traction, Level crossings and Bridges;
m) final Bonding plans for Screening: not limited to bridge screening;
n) special cross-sections (e.g. Overbridges);
o) detailed Bill of Materials;
p) detailed Bill of Quantities;
q) foundation schedule;
r) height and stagger sheets;
s) cantilever tube length schedules;
t) index sheets;
u) final Isolation procedures and instructions;
v) confirmation that no pedestrian or signalling sighting issues are created due to OHWs structure allocation along with associated sighting drawings;
w) specifications for Electrification Signage;
x) final Electrification Signage schedule;
y) final Scheduler designated earthing points drawings;
z) final spare list; Note: any spare part with length must be provided in meters;
aa) final Operator and Maintenance Manuals;
bb) final Training manuals;
cc) combined Services Plan (aerial photograph) overlaid with:
    i) OHW mast locations & booster transformers; traction power cable containment;
    ii) trackside signalling equipment including asset numbers and descriptions;
    iii) major monuments: Railway Stations, Side Roads, over bridges, etc.;
    iv) existing railway services;
    v) existing Utility Services and indicative clashes;
    vi) track and civil plan (including. drainage);
    vii) existing railway corridor access points;
    viii) Master Signalling Plan; and
    ix) interface review for potential interfaces issues with other services.
dd) Major Sectioning diagram; and
ee) Minor Sectioning diagram.

7 Construction and Installation

7.1 The following are **Hold Point**s for construction and installation of Overhead Wiring system:

Hold point	Frequency	Acceptance criteria
Confirm – footings, soil, concrete	Before concrete pouring	Inspection and accepted by the Department's OHWS's representative
Confirm – footings	Before loading footings	Reviewed QA report and accepted by the Department's OHWS's representative
Confirm – Earthing and Bonding	Before Energisation	Inspection and accepted by the Department's OHWS's representative
Confirm – OHWS	Before Energisation	Inspection and accepted by the Department's OHWS's representative
Confirm – OHWS	Before running an electric train	Inspection and accepted by the Department's OHWS's representative

8 Inspection, Testing and Commissioning

8.1 The Contractor must comply with PC-RW50 "Inspection, Testing and Commissioning".

8.2 The following are additional **Hold Point**s, on top of Hold Points listed in PC-RW50 "Inspection, Testing and Commissioning", for inspection, testing and commissioning of Overhead Wiring system (OHWS):

Hold point	Frequency	Acceptance criteria
Mega testing	Before Section proving	Witnessed and accepted by the Department's OHWS's representative
Section proving	Before short circuit test	Witnessed and accepted by the Department's OHWS's representative
Short circuit test	Before pantograph run-through	Witnessed and accepted by the Department's OHWS's representative
Pantograph run-through	Before inspection of as-built height and stagger	Witnessed and accepted by the Department's OHWS's representative
As-built height and stagger	Before review of red line mark up	Inspection and accepted by the Department's OHWS's representative
Red line mark up	Before running of instrumented pantograph	Reviewed and approved by the Department's OHWS's representative
Instrumented pantograph run	Before review of video pantograph run	Witnessed and accepted by the Department's OHWS's representative
Video pantograph run	Before commissioning of OHWS	Reviewed and approved by the Department's OHWS's representative

9 Hold Points

9.1 The following is a summary of Hold Points referenced in this Part:

Document Ref.	Hold Point	Response Time
3.1	Provision of Requirements Definition Documents and Drawings	10 Working days prior 15% design complete stage
4.1	Provision of Preliminary Design Documents and Drawings	10 Working days prior 30% design complete stage
5.1	Provision of Detailed Design Documents and Drawings	10 Working days prior 70% design complete stage
6.1	Provision of Final Design Documents and Drawings	10 Working days prior 100% design complete stage
7.1	Construction and installation of Overhead Wiring system	
8.2	Inspection, testing and commissioning of Overhead Wiring system	

10 Asset Handover

10.1 The Contractor must comply with AM4-DOC-000940 Asset Management Handover Requirements Standard and PTS-MS-05-AM-PRS-00000091 Asset Management Technical Data Requirements for Project.