




Approval

	Name	Position	Signature
Document Author	Louisa Waymouth	Manager Standards	
Document Endorser	Lambros Lambropoulos	Manager Engineering Systems	
Approving Manager	Phil Ellingworth	Chief Engineer	 3/1/19

Amendment Record

Approval Date	Version	Description
23/04/2013	1	Initial Issue under MTM.
19/08/2013	2	Updated to include newly released MTM Standards and removal of supersede standards. Added section detailing precedence of standards. Updated Appendices to include General section and section for other MTM documents.
10/02/2014	3	Updated to include newly released Standards, Engineering Directives/Advice Notes and Design Practice Notes.
09/04/2015	4	Updated to include newly released Standards, Engineering Directives/Advice Notes and Design Practice Notes.
20/09/2016	5	Updated to include newly released Standards, Engineering Directives/Advice Notes and Design Practice Notes.
29/11/2016	6	Updated to include newly released Standards, Engineering Directives/Advice Notes and Design Practice Notes. List is complete as at 29/11/2016
07/06/2018	7	Updated to include newly released Standards, Engineering Directives/Advice Notes and Technical Notes.
16/01/2019	8	Updated to include newly released Standards, Engineering Directives/Advice Notes and Technical Notes from 29 June 2018 to 31 Dec 2018.

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1. Purpose

The purpose of this document is to provide the first point of reference for approved MTM Engineering Standards, Specifications, Technical Notes (formerly known as Design Practice Notes), Engineering Directives, Technical Guidelines, Manuals, key Procedures and adopted external standards that provide the engineering operational governance that must be followed as a minimum for all new and upgrade works on the Metropolitan Rail Network.

The listing is provided in a table format, categorised based on engineering disciplines, followed by the document types.

This document also specifies standards precedence.

2. Scope

This document provides a list of approved MTM Engineering Standards, Specifications, Technical Notes (formerly known as Design Practice Notes), Engineering Directives, Technical Guidelines, Manuals, key Procedures and adopted external standards. These documents are collectively referred as “Engineering Standards” for the purpose of this document.

This is not an exhaustive list of all MTM Technical Documents. This list contains only Engineering Standards and excludes documents such as policy, strategies, maintenance documents, operational standards and non-technical documents.

This document is not a live document. It is only current for the day this document is approved and published and it may not be up to date. Refer to Metro Intranet and Engineering Portal for latest released documents

This document shall be followed by all Divisions within MTM as well as all contractors working within the MTM lease.

3. Abbreviation

AS	Australian Standard
MTM	Metro Trains Melbourne
PTV	Public Transport Victoria
RISSB	Rail Industry Safety and Standards Board
VRIOGS	Victorian Rail Industry Operators Group Standards

4. Definitions

Infrastructure Manager Where the VRIOGS refers to the Infrastructure Manager this should be taken as meaning the MTM Chief Engineer.

5. References & Legislations

For Legislative and Standards/Codes, refer to: L1-SQE-PRO-003 Legislative and Standards/Codes Compliance.

6. Responsibilities

Chief Engineer	The Chief Engineer is responsible for setting the Engineering Standards to be followed for Infrastructure and Rolling Stock works. The Chief Engineer is also responsible for granting any dispensation against the Engineering Standards.
MTM Employees	All MTM staff are responsible to ensure that the Legislation and the Engineering Standards referenced in this document are adhered to. MTM employees are also to ensure that they are using the latest version of this document and any of the documents referenced within it.
Contractors	All contractors are responsible to ensure that the legislation and standards referenced in this document are adhered to. Contractors are also required to liaise with MTM to ensure that they are using the latest version of this document and any of the documents referenced within it.

7. Standards

Appendix 1 to 6 detail the list of Engineering Standards and other documents to be used for Infrastructure works within the Melbourne Metropolitan Rail Network.

Note 1: Unless stated otherwise the version of a Legislation or Standard to be followed is the latest approved version of that document.

Note 2: The list provided in Appendix 1-6 is not meant to be an exhaustive list of Legislation and Standards to be adhered to. Where appropriate other Legislation and Standards should also be adhered with in accordance with the MTM requirements laid out in the project scope of works.

Note 3: It is the responsibility of the person undertaking the works to obtain verification from MTM that they are utilising the latest documents that may have been released after the release of this document.

Note 4: In reference to Appendix 6 – The Guidelines and Technical Notes listed within this Appendix are held with the long term strategy of developing them into MTM Engineering Standards or other documents.

8. Standards Precedence

When there is one or more standards covering the same subject the following precedence of standards is to be adhered to:

1. State and Federal Legislation and Code (Refer to L1-SQE-PRO-003)
2. MTM Standards (including VRIOGS/PTV where adopted, which are listed in this document)
3. Australian Standards
4. International Standards

9. Standard Conformance

Where a particular clause in a standard cannot be adhered to an Engineering Waiver shall be raised in accordance with L1-CHE-PRO-001 Standard Waiver Procedure.

Where a VRIOGS Standard states words to the effect of “Unless the Infrastructure Manager agrees”, this shall be taken as meaning unless approved by the MTM Chief Engineer via the Engineering Waiver Procedure.

10. Standards Availability

It is the responsibility of the individual to ensure that they are using the latest versions of the Engineering Standards.

MTM Engineering Standards

Copies of MTM Engineering Standards can be obtained from the MTM Policies & Procedures page on the Depot. Other MTM Technical Documents can also be obtained from the same page.

Majority of Engineering Standards are also available to external stakeholders through the Engineering Document Portal via <https://documentportal.metrotrains.com.au/>. MTM Engineering Document which is not listed at the Engineering Document Portal can be requested via email to CMExtranet.Portal@metrotrains.com.au.

Note: From 30th June 2018, selected VRIOGS have been rebadge with a MTM document number, with the technical contents of the VRIOGS remaining unchanged.

PTV Standards

Copies of the PTV Standards are available from the PTV Drawing Management System (DMS) website (<https://dms.ptv.vic.gov.au>). Log-in is required.

Australian, International and other Standards

Australian, International and other Standards can be accessed via the SAI Global website. For instructions of accessing these documents see L1-SQE-PRO-003 Legislative and Standards/Codes Compliance. RISSB Standards can be sought via <https://www.rissb.com.au/>

11. Related Documents

- L1-SQE-PRO-003 Legislative and Standards/Codes
- L1-CHE-PRO-001 Standard Waiver Procedure

12. Appendices

- Appendix 1 – General Standards and Specifications
- Appendix 2 – Track and Civil Standards, Specifications, Directives and Technical Notes
- Appendix 3 – Electrical Networks Standards, Specifications, Manuals, Directives and Technical Notes
- Appendix 4 – Signalling Standards, Specifications, Directives and Technical Notes
- Appendix 5 – OCS Standards, Specifications, Directives and Technical Notes
- Appendix 6 – Other MTM Documents

Appendix 1 - General Standards and Specifications

Infrastructure Configuration

Document Number	Title
N/A	PTV Infrastructure Drafting Standards
N/A	PTV Infrastructure Drafting Standards Appendix
N/A	PTV Infrastructure Drafting Standards Amendments Sheet

Asset Management

Document Number	Title
N/A	PTV PASS Assets Data Requirements
L1-CHE-STD-006	Requirements Spares for New Assets

Rolling Stock and Track Vehicles

Document Number	Title
L1-CHE-STD-003, MFST 830100-01	Rolling Stock Minimum In-Service Standard
L1-CHE-STD-007, MTST 060800-01	Track Vehicles Standard
L2-CHE-PRO-005	Track Vehicle Operation

Passenger Detrainment Aids

Document Number	Title
L1-CHE-SPE-198	Passenger Detrainment Aids

Appendix 2 - Track and Civil Standards, Specifications, Directives and Technical Notes

Transit Clearances

Document Number	Title
L1-CHE-STD-025	Transit Space Clearances

Track Geometry

Document Number	Title
L1-CHE-STD-039, MTST 000002-01	Track Design & Construction
L1-CHE-SPE-003, MTSP 000003-03	Heavy Rail Construction Tolerances
L2-TRK-PRO-054, MTSP 030100-01	Track Geometry Maintenance Tolerances

Note: Sections of the following standards are still used for reference where the MTM Track Design and Construction Standard do not specifically replace the content of them:

- MetRail Track Design Manual - 1986,
- PTC 0006012 Heavy Rail Track Design Standard Part B – 1997 (Ver. 1.3),
- PTC Heavy Rail Track Construction Standard Part C – 1997 (Ver. 1.3), and
- VRIOGS 004.1 Heavy Rail Track Design Manual – 2010 (Draft A1).

Track System

Document Number	Title
L1-CHE-STD-022, MTST 033100-08	Rail Grindings
L1-CHE-STD-033, MTST 000002-09	Rail Lubrication
L1-CHE-SPE-063	Flash Butt Welding
L1-CHE-SPE-064	Ballast Supply Specification
L1-CHE-SPE-068, MTSP 030600-01	Manufacture and Supply of Insulated Rail Joints
L1-CHE-SPE-230	Turnouts and Special Track Work
L1-NAM-SPE-001, MTSP 030700-01	Manufacture and Supply of Aluminotheric Rail Welding Materials and Equipment
L2-TRK-SPE-003, MTSP 000003-01	Low Profile Concrete Sleepers
L2-TRK-SPE-004, MTSP 000003-02	Supply of Resilient Rail Fastening Assemblies
L1-NAM-INS-003	Installation of Bladeless Turnouts/Crossings
L1-CHE-INS-060	Use of Guard Rails
L1-CHE-INS-030	Station Pit Ballast Retention Structure

Other (Track – related)

Document Number	Title
L1-CHE-STD-032, MTST 000002-08	End of Track Protection Standard
L1-CHE-INS-079	Road-Rail Vehicle Access Pad

Civil

Level Crossings

Document Number	Title	Note
AS 1742.7	Manual of Uniform Traffic Control Devices: Railway Crossings	
L1-CHE-STD-034	Criteria for Infrastructure at Railway Level Crossings - Pedestrian Crossings	Rebadge of VRIOGS 003.2 Criteria for Infrastructure at Railway Level Crossings - Pedestrian Crossings
L1-CHE-INS-017	Mobility Scooter Simulations At Pedestrian Crossings	

Car Parks

Document Number	Title
AS 2890.1	Parking Facilities - Off Street Parking
AS 2890.6	Parking Facilities - Off Street Parking For People With Disabilities
L1-CHE-STD-059	Car Parking Standard
L1-CHE-SPE-057	System Requirement Specification: Carpark Occupancy Detection System

Earthworks, Drainage and Services

Document Number	Title
L1-CHE-STD-029, MTST 000002-05	Earthworks and Formation Standard
L1-CHE-SPE-178, MTSP 000002-04	Earthworks and Formation Specification
L1-CHE-STD-030, MTST 000002-06	Track Drainage Design Standard
ROA CODE 1977	For installation of other parties services and pipelines within Railway boundaries
AS 4799	Installation of Underground Utility Services and Pipelines within Railway boundaries.

Fencing

Document Number	Title
L1-CHE-STD-005	Requirements Line Side Fencing

Combined Services Route

Document Number	Title	Note
L1-CHE-STD-043	Combined Services Route	Rebadge of VRIOGS 012.2.1 Rev B Standard for Construction of Cable Route and Signalling Civil Works
L1-CHE-SPE-313	Recycled Glass Sand Specification	-

Structures

Bridges

Document Number	Title
L1-CHE-STD-010, MEST 000002-03	Railway Bridges Electrical Protection And Bonding
L1-CHE-STD-040	Bridge Standard
L1-CHE-INS-093	AS 5100 Deflection Wall Design Loads

Track & Structures

Document Number	Title
L1-CHE-STD-058	Overhead Wiring And Signalling Structures Standard

VicRoads Specification for Roadworks and Bridgeworks - 600 Series – Bridgeworks

Document Number & Title
602 Excavations
603 Cofferdams
604 Cylinders
605 Driven Piles
606 Bored Cast-In-Place Piles (without Permanent Casing)
607 Continuous Flight Auger Piles
608 Cast-In-Place Socketed Piles (with Permanent Casing)
610 Structural Concrete
611 Steel Reinforcement
612 Post-Tensioning of Concrete Units
613 Falsework
614 Formwork
619 Manufacture, Testing and Delivery of Precast Reinforced Concrete Box Culverts
620 Precast Concrete Units
622 Pre-Tensioning of Concrete Units
626 Installation of Precast Concrete Crown Unit Culverts
630 Fabrication of Steelwork
631 Protective Treatment of Steelwork
640 Sheet Piles
652 Supply of Elastomeric Bearings
653 Pot Type Confined Elastomeric Bearings
656 Installation of Elastomeric Bearings and Pads
660 Bridge Expansion Joints
680 Bonded Anchors
681 Cathodic Protection of Reinforced Concrete Structures
682 Reinforced Soil Structures
683 Soil Nail Walls
684 Sprayed Concrete
685 Anti-Graffiti Protection and Graffiti Removal
686 Coating of Concrete
687 Repair of Concrete Cracks
688 Fibre Reinforced Polymer Composite Strengthening of Concrete Structures
689 Cementitious Patch Repair of Concrete
691 Waterproofing of Concrete Bridge Decks

VicRoads Specification for Formation

Document Number & Title
204 Earthworks

VicRoads Specification for Incidental Construction

Document Number & Title
702 Subsurface Drainage
705 Drainage Pits
733 Conduits and Pits for Underground Wiring and Cabling
765 Noise Attenuation Walls

VicRoads Bridge Technical Notes

Document Number & Title
BTN003 - Bridge support protection
BTN005 - FRP for strengthening of bridge structures
BTN006 - Bonded anchors
BTN007 - Noise attenuation walls
BTN008 - Mechanical anchors
BTN009 - RC panels for reinforced soil structures
BTN010 - Integral and semi integral bridges
BTN011 - Approach slabs
BTN016 - Design of large box culverts
BTN018 - Step Joints

Buildings

Document Number	Title
L1-CHE-STD-001	Requirements Metropolitan Train Stabling
L1-CHE-STD-002	Requirements Metropolitan Train Maintenance Depot
L1-CHE-STD-013, MCST 020100-01	Metropolitan Railway Stations Standard
L1-CHE-SPE-158, MCSP 020100-01	Station Building Specification
L1-CHE-SPE-159, MCSP 020100-02	Station Building Fixtures, Fittings and Equipment Specification
L1-CHE-INS-015	Provision For Unassisted Access At Existing Metropolitan Railway Stations
L1-CHE-INS-025	Architectural Cladding
L1-CHE-INS-084	Solar System Requirements For Railway Stations
L1-NAM-INS-019	Design Practice Note Platform Renewal Design

Facilities

Lifts & Escalators

Document Number	Title
L1-CHE-STD-020, MCST 031302-01	Escalators
L1-CHE-SPE-130	Vertical Transport Lift

Fire Protection System

Document Number	Title
L1-SDD-STD-005, MCST 030200-01	Fire Protection Systems and Equipment Maintenance in the MURL Standard

Lighting General

Document Number	Title
N/A	Franchise Agreement Train – Section 3. Lighting
L1-CHE-STD-035, MCST 000002-01	Lighting and Power Design and Construction Standard
L1-CHE-SPE-155	LED Luminaire Requirements

Chief Engineer's Directives/Advice Notes

Document Number	Title
L1-CHE-GDL-003	Mind the Gap Curved Platforms
L1-CHE-GDL-004	54 Hour Service Suspension-Contaminated Rail Cleaning
L1-CHE-GDL-021	Safe Normal Speeds Through Turnouts
L1-CHE-GDL-047	Elimination of Bolt Holes
L1-CHE-GDL-058	Use of Ballast on Ballast Deck Bridges
L1-CHE-GDL-064	Manual Greasing of Sharp Curves
L1-CHE-GDL-067	Operation and Maintenance Of Certain Pakenham Line Level Crossings
L1-CHE-GDL-072	MURL Structural Concrete Inspection Criteria
L1-CHE-GDL-073	Raised Boarding Pad Clearances
L1-CHE-GDL-075	Mermec Track Geometry & Rail Profile Measurement System
L1-CHE-GDL-080	Piling Activities Adjacent to Track

Appendix 3 - Electrical Networks Standards, Specifications and Manual

Electrical Safety

Document Number	Title
N/A	Victorian Traction Industry Safety Rules 2014
L2-ELN-MAN-004	Electrical Safety Manual
L2-ELN-PRO-013	Purpose, Scope and Interpretation
L2-ELN-PRO-022	Definitions and Terminology
L2-ELN-PRO-023	General Safety Requirements
L2-ELN-PRO-024	Working within Electric and Magnetic Fields
L2-ELN-PRO-025	Training and Authorisation
L2-ELN-PRO-027	Approach to Electrical Apparatus by Persons
L2-ELN-PRO-028	Approach to Electrical Apparatus by Plant and Vehicles
L2-ELN-PRO-029	Operation of HV and Traction Electrical Apparatus
L2-ELN-PRO-030	Earthing and Short Circuiting HV and Traction Electrical Apparatus
L2-ELN-PRO-031	Access for Work On or Near HV and Traction Electrical Apparatus
L2-ELN-PRO-020	Electrical Access Permits
L2-ELN-PRO-014	Testing of HV and Traction Electrical Apparatus
L2-ELN-PRO-015	Permits to Work Near Electrical Assets
L2-ELN-PRO-016	Statements of Condition of Apparatus/Plant
L2-ELN-PRO-017	Placing HV & Traction Electrical Apparatus Out of Commission
L2-ELN-PRO-018	Live Work on HV and Traction Electrical Apparatus
L2-ELN-PRO-019	Working Near Traction Electrical Apparatus within Rolling Stock Depots
L2-ELN-PRO-021	Placing HV & Traction Electrical Apparatus Into Service or Into Commission
L2-ELN-PRO-026	Working in the Vicinity of Electrical Assets by Persons Not Under the Control of MTM
L2-ELN-PRO-032	Working On or Near Insulated Cables
L2-ELN-PRO-033	Permits to Work in the Vicinity of Electrical Apparatus
L2-ELN-PRO-034	Working On or Near Low Voltage Electrical Assets

General Electrical

Document Number	Title
L1-CHE-MAN-005	Electrical Networks Engineering Manual
L1-CHE-STD-010, MEST 000002-03	Railway Bridges Electrical Protection And Bonding
L1-CHE-STD-015, MEST 000002-06	Electrical Networks Principles And Performance
L1-CHE-STD-016, MEST 000002-05	Track Bonding For Signalling And Traction Return Current
L1-CHE-STD-035, MCST 000002-01	Lighting and Power Design and Construction
L1-CHE-STD-061, MEST 000002-08	Internal 22kV Distribution
L1-SDD-STD-006, MEST 070000-01	Train Maintenance Buildings Electrical Systems Earthing and Bonding
L1-CHE-SPE-065	System Requirements-UPS for Central Area Signalling Supply
L1-CHE-SPE-070	High Voltage Cable Routes

L1-CHE-GDL-005

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Document Number	Title
L1-CHE-SPE-200	Substation Signage and Labelling

Document Number	Title	Note
L1-CHE-STD-074	Traction Bonding, Track Circuit Connections and Traction Interfaces	Rebadge of VRIOGS 010.7 Traction Bonding, Track Circuit Connections and Traction Interfaces

Overhead

Document Number	Title
L1-CHE-STD-011, MEST 000002-02	1500VDC Overhead Wiring System
L1-CHE-STD-021, MEST 000002-07	Earthing Requirements For HV Transmission Structures
L1-CHE-STD-061, MEST 000002-08	MEST000002-08 – Internal 22kV Distribution
L1-CHE-SPE-001, MESP 130500-01	Contact Wire Hard-Drawn Copper 161mm ²
L1-CHE-SPE-017, MESP 050100-02	Transmission Wire Hard-Drawn Copper 19/2.14 70mm ²
L1-CHE-SPE-018, MESP 050100-03	Transmission Wire Hard-Drawn Copper 7/2.5 35mm ²
L1-CHE-SPE-019, MESP 130400-01	Catenary Hard-drawn Copper 37-2.5 181mm ²
L1-CHE-SPE-041, MESP 130400-07	MURL Jumper Wire Hard-Drawn Copper 19/1.75 46mm ²
L1-CHE-SPE-054, MESP 130400-02	Flexible Dropper Wire Tin-Bearing Copper 770.5 9.6mm ²
L1-CHE-SPE-055, MESP 130400-03	Catenary Wire Hard-Drawn Copper 37-3.00 261mm ²
L1-CHE-SPE-058, MESP 130400-04	Bare Flexible Annealed Copper Jumper Wire 37/7/0.7 100mm ²
L1-CHE-SPE-059, MESP 130400-05	Hard-Drawn Copper Solid Dropper Wire 21.15mm ²
L1-CHE-SPE-060, MESP 050100-04	Transmission Wire Hard-Drawn Copper 7/2.0 22mm ²
L1-CHE-SPE-132, MESP 110100-01	Electrolysis Wire Aluminium ACC1350 19/3.75 210mm ²
L1-CHE-SPE-133, MESP 130400-06	Catenary Wire Hard-Drawn Copper 7/3.5 70mm ²
L1-CHE-SPE-208, MESP 130400-08	Replacement And Re-Use Of Overhead Catenary Wire
L1-CHE-SPE-209, MESP 130400-09	Catenary Wire Hard-Drawn Copper 37/13 161mm ²
L1-CHE-SPE-210, MESP 130400-10	Catenary Wire Hard-Drawn Copper 37/11 242mm ²

Substations

Document Number	Title
L1-CHE-STD-009, MEST 000002-01	Traction Substations and Tie Stations
L1-CHE-SPE-010, MESP 010900-03	22 kV Metal Enclosed Switchgear
L1-CHE-SPE-013, MESP 040100-01	Signal Transformer for Use In A Railway Substation
L1-CHE-SPE-014, MESP 050100-01	Auxiliary or Essential Services and Auxiliary Transformer For Use in a Railway Substation
L1-CHE-SPE-024, MESP 040800-01	Uninterruptable Power Supplies for the Metropolitan Railway Essential Services Distribution System
L1-CHE-SPE-033	Electrical Earthing and Bonding in the MURL
L1-CHE-SPE-034, MESP 060100-01	Light and Power Isolation Transformers
L1-CHE-SPE-067, MESP 090000-02	Electrical Networks Building Security
L1-CHE-SPE-069, MESP 020100-02	4 MW Rectifier Transformer For The 1500v DC Traction System
L1-CHE-SPE-128	Remotely Operated 1500v DC Disconnecter & Short-Circuit Switch Assembly
L1-CHE-SPE-131, MESP 010500-01	Outdoor 22 kV Ac Circuit Breaker
L1-CHE-SPE-146	Electric Cable – 500mm ² Aluminium Conductor 3.8kV XLPE Insulated With Metallic Screen
L1-CHE-SPE-147	Electric Cable – 500mm ² Aluminium Conductor 3.8kV XLPE Insulated Without Metallic Screen
L1-CHE-SPE-148	Electric Cable – 35 mm ² CU Conductor 3.8 / 6.6 kV XLPE Insulated with Metallic Screen
L1-CHE-SPE-149, MESP 040700-02	3.3kV/400V Transformer For Use In The Essential Services Distribution System
L1-CHE-SPE-150, MESP 041000-01	3.3 KV Automatic Control and Indicated Fixed Mounted Trackside Switchgear for Signal Purposed
L1-CHE-SPE-152	Voltage Limiting Device
L1-CHE-SPE-153, MESP 020200-02	4 MW Rectifier Assembly For The 1500v DC Traction System
L1-CHE-SPE-154	3.3kV Essential Services Distribution System
L1-CHE-SPE-156, MESP 040900-01	Essential Services Supply Step Up Transformer
L1-CHE-SPE-157, MESP 040100-03	Signal Power Supply Transformers 3300/110V AC 50Hz
L1-CHE-SPE-169, MESP 060000-01	Stationary Control Battery And Charger Set For Use In A Substation
L1-CHE-SPE-170	Electric Cable – 400mm ² Aluminium or Copper Conductor 3.8/6.6kV XLPE Insulated With Metallic Screen PVC Sheathed
L1-CHE-SPE-171	Electric Cable – 400mm ² Aluminium or Copper Conductor 3.8/6.6kV XLPE Insulated Without Metallic Screen PVC Sheathed
L1-CHE-SPE-177, MESP 040300-01	Substation Automatic, Controlled And Indicated, Fixed Mounted Switchgear For Essential Services Or Signal Power Purposes
L1-CHE-SPE-199, MESP 000003-06	Substation Device Naming, Numbering and Labelling
L1-CHE-SPE-214	230V/110V and 400V/110V Transformer

Document Number	Title
L1-CHE-SPE-215	Electric Cable, TPWS Use, 2 CoreE 2.5 mm ² , 50/0.25mm Stranding, 0.6/1kV, XLPE X-90 Insulated 5V-90 PVC Sheathed
L1-CHE-SPE-225	Burnley Group 22 kV Protection Scheme Staging
L1-CHE-SPE-226	1500V DC Switchgear Assembly
L1-CHE-SPE-228	Electric Cable Single Core 35mm ² Copper Conductor 3.8kV -6.6 kV XLPE Insulated
L1-CHE-SPE-231	Electric Cable 22 kv 3 Core 185 mm ² Copper
L1-CHE-SPE-234, MESP 050100-05	22kV Distribution Wire Hard-drawn Copper 19/2.75 112.9mm ²
L2-ELN-SPE-006, MESP 020500-01	Rectifier Unit Control & Protection System for Use in the 1500 V Dc Traction System
L2-ELN-SPE-010, MESP 060000-01	Stationary Control Battery and Charger Set For Use In A Substation
L2-ELN-SPE-012, MESP 081000-01	SCADA Cabling in Substations
L2-ELN-SPE-013, MESP 030000-02	Electric Cable – 400mm ² Aluminium Conductor 1.9kv XLPE Insulated Without Metallic Screen
L2-ELN-SPE-024, MESP 000003-10	Modular Substation User Requirements
L2-ELN-SPE-025, MESP 012000-01	Electric Cable - 22 kV, 3 core, 185mm sq. Aluminium
L2-ELN-SPE-026, MESP 012000-02	Electric Cable - 22 kV, 3 core, 95mm sq. Copper
L2-ELN-SPE-028, MESP 000003-05	Modular Substation Housings
L2-ELN-SPE-029, MESP 030000-03	Electric Cable – 400mm ² Aluminium Conductor 1.9kv XLPE Insulated With Metallic Screen
L2-ELN-SPE-030, MESP 040100-02	Signal Power Supply Transformers 1000-110Vac Single Phase 50Hz
L2-ELN-SPE-032, MESP 030000-04	Electric Cable – 70mm ² Flexible Tinned Copper Conductor 3.3kv EPR Insulated Without Metallic Screen

Chief Engineer's Directives/Advice Notes

Document Number	Title
L1-CHE-GDL-024	Timing of Issue Of Electrical Switching Documents
L1-CHE-GDL-026	Testing For Integrity of 1500 Volt Overhead Wiring Sectionalising
L1-CHE-GDL-029	Conduit Usage in Sunlight
L1-CHE-GDL-045	Correlation of Sectionalising Drawings and Management of Dead Line Work
L1-CHE-GDL-046	Crossover Jumper Entanglement
L1-CHE-GDL-050	Contact Wire Heights
L1-CHE-GDL-060	Electrical Switching Programs
L1-CHE-GDL-070	Accountability for Electrical Safety Policy
L1-CHE-GDL-071	Electronic Access and Distribution of MTM Engineering Controlled Diagrams



CHIEF ENGINEER'S GUIDELINE ENGINEERING STANDARDS LISTING

L1-CHE-GDL-005

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Technical Notes/Design Practice Notes

Document Number	Title
L1-CHE-INS-001	Signal Power Supply Transformers
L1-CHE-INS-009	Electrical Systems Requirements
L1-CHE-INS-016	Earthing of TCA Surge Arrestors
L1-CHE-INS-029	1500v Auxiliary Side Feeder Location
L1-CHE-INS-038	Insulating Covers Over OHW Masts
L1-CHE-INS-039	Maximum Span Length of New Mixed Tension Airgaps
L1-CHE-INS-043	Minimum Flexible Dropper Length For Fixed and Regulated Overhead Wiring
L1-CHE-INS-054	Placement of Switches – Underground Cable Installations
L1-CHE-INS-055	1500V DC Section Cable Calculation Methodology
L1-CHE-INS-065	Trackside Signal Power Distribution Earthing
L1-CHE-INS-072	Contact Wire Height At Platforms
L1-CHE-INS-073	Minimum Traction System Voltage
L1-NAM-INS-002	Negative Busbar Shunts
L1-NAM-INS-005	22kV Support Structures
L1-NAM-INS-006	Use of Helical Terminations Splices in the Overhead Wiring System
L1-NAM-INS-008	Earth System Arrangement
L1-NAM-INS-010	Connection Method to Earth Grids
L1-NAM-INS-011	Negative to Earth Clearance Requirements
L1-NAM-INS-013	Water Ingress into Substation Pits
L1-NAM-INS-015	Relationship between Overhead Air Gaps and Signals
L1-NAM-INS-023	End of Line Relays
L1-NAM-INS-025	Requirements for Traction Bonding Plan
L1-CHE-INS-085	Substation And Tie Station Design
L1-CHE-INS-086	Over Voltage Protection Devices
L1-CHE-INS-092	Essential Services And Signal Power Distribution System Requirements
L1-CHE-INS-095	Traction Substation Electrical Capacity

Appendix 4 - Signalling Standards and Specifications

Signalling Principles

Document Number	Title	Note
L1-CHE-STD-064	Victorian Signalling Principles	Rebadge of VRIOGS 012.0 Victorian Signalling Principles
L1-CHE-STD-065	Signalling Principles – Overlaps	Rebadge of VRIOGS 012.0.1 Signalling Principles – Overlaps
L1-CHE-STD-066	Signalling Principles - Signals Enforcement	Rebadge of VRIOGS 012.0.2 Signalling Principles - Signals Enforcement
L1-CHE-STD-067	Signalling Principles - Axle Counter Application	Rebadge of VRIOGS 012.0.3 Signalling Principles - Axle Counter Application
L1-CHE-STD-068	Standard Rail Signalling Naming & Symbol Conventions	Rebadge of VRIOGS 012.0.4 Standard Rail Signalling Naming & Symbol Conventions
L4-CHE-FOR-098	Train Dynamics - Acceleration and Braking Performance Calculator	Rebadge of VRIOGS 009.3 Train Dynamics - Acceleration and Braking Performance Calculator

Document Number	Title
L1-SDD-STD-001, MSST 030209-01	MTM Train Protection and Warning System Overlaid on Existing Mechanical Train Stop System Standard
L1-SIG-STD-001, MSST 060000-01	MTM Communication Links for Signalling Standard
L1-CHE-STD-036	Signalling Principles and Configuration Requirements

Signal Sighting

Document Number	Title
L1-CHE-STD-004	Signal Sighting Standard

Signalling Interfaces

Document Number	Title
L1-CHE-SPE-040	Interfacing Red Light Cameras with Level Crossing New Equipment
L1-CHE-SPE-181	Permanent Connections to Rail for Signalling Equipment New

Signalling Design and Construction

Document Number	Title	Note
L1-CHE-STD-069	Standard for Signalling Design and Documentation	Rebadge of VRIOGS 012.1 Standard for Signalling Design and Documentation
L1-CHE-STD-070	Specification for Signalling Supply, Construction and Installation	Rebadge of VRIOGS 012.2 Specification for Signalling Supply, Construction and Installation
L1-CHE-STD-043	Combined Services Routes	Rebadge of VRIOGS 012.2.1 Standard for construction of Cable Routes and Signalling Civil Works
L1-CHE-PRO-040	Signalling Contractor "Like For Like" Work Process	-
L1-CHE-PRO-043	Signalling Arrangement Plan Approvals	-

Computer Based Interlocking

Document Number	Title	Note
L1-CHE-STD-071	Computer Based Interlocking	Rebadge of VRIOGS 012.3 Computer Based Interlocking



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Signal Box Work Stations

Document Number	Title	Note
L1-CHE-STD-072	Signal Box Workstation Specification	Rebadge of VRIOGS 012.4 Signal Box Workstation Specification

Testing and Commissioning

Document Number	Title	Note
L1-CHE-STD-073	Testing and Commissioning of Safety Related Railway Signalling Systems	Rebadge of VRIOGS 012.5 Testing and Commissioning of Safety Related Railway Signalling Systems

Bonding

Document Number	Title	Note
L1-CHE-STD-016, MEST 000002-05	Track Bonding For Signalling and Traction Return Current	-
L1-CHE-STD-074	Traction Bonding, Track Circuit Connections and Traction Interfaces	Rebadge of VRIOGS 010.7 Traction Bonding, Track Circuit Connections and Traction Interfaces

Standard Cable Specifications

Document Number	Title	Note
L1-CHE-SPE-235	7/19/0.22mm 1 Core Galvanised Steel Cable (Black)	Rebadge of VRIOGS 012.6.01
L1-CHE-SPE-236	7/19/0.22mm 1 Core Galvanised Steel Cable (Red)	Rebadge of VRIOGS 012.6.02
L1-CHE-SPE-237	24/0.20mm 1 Core Tinned Copper Cable	Rebadge of VRIOGS 012.6.03
L1-CHE-SPE-238	1 Core Traction Return Copper Cable	Rebadge of VRIOGS 012.6.04
L1-CHE-SPE-239	7/0.85mm 2 Core Copper Cable	Rebadge of VRIOGS 012.6.05
L1-CHE-SPE-240	7/0.50mm 4 Core Copper Cable	Rebadge of VRIOGS 012.6.06
L1-CHE-SPE-241	7/0.50mm 10 Core Copper Cable	Rebadge of VRIOGS 012.6.07
L1-CHE-SPE-242	7/0.50mm 10 Core Copper Cable + 7/0.85mm 2 Core Copper Cable	Rebadge of VRIOGS 012.6.08
L1-CHE-SPE-243	7/0.50mm 20 Core Copper Cable	Rebadge of VRIOGS 012.6.09
L1-CHE-SPE-244	7/0.50mm 50 Core Copper Cable	Rebadge of VRIOGS 012.6.10
L1-CHE-SPE-245	7/1.70mm ² Core 2.2Kv Underground Type Power Cable	Rebadge of VRIOGS 012.6.11
L1-CHE-SPE-246	19/2.14mm 1 Core Copper Bonding Cable	Rebadge of VRIOGS 012.6.12
L1-CHE-SPE-247	95mm ² 1 Core Copper Cable (CSEE Underground Track)	Rebadge of VRIOGS 012.6.13
L1-CHE-SPE-248	7/1.70mm 2 Core Copper Cable	Rebadge of VRIOGS 012.6.14
L1-CHE-SPE-249	7/1.35mm 4 Core Copper Cable + 7/0.67mm 1 Core Copper Cable	Rebadge of VRIOGS 012.6.15
L1-CHE-SPE-250	7/0.50mm 2 Core Flat Copper Cable	Rebadge of VRIOGS 012.6.16
L1-CHE-SPE-251	0.64mm & 0.90mm Multi-Pair Communications Cable	Rebadge of VRIOGS 012.6.17
L1-CHE-SPE-252	0.90mm 2 Pair Quad Communications Cable	Rebadge of VRIOGS 012.6.18
L1-CHE-SPE-253	0.64mm & 0.90mm Multi-Pair Communications Cable Jelly Filled	Rebadge of VRIOGS 012.6.19
L1-CHE-SPE-254	7/0.50mm 2 Core Shielded Copper Cable	Rebadge of VRIOGS 012.6.20
L1-CHE-SPE-255	16mm ² 2 Core 6.6Kv Underground Type Power Cable	Rebadge of VRIOGS 012.6.21

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Document Number	Title	Note
L1-CHE-SPE-256	25mm ² 3 Core 1000V Underground Type Power Cable	Rebadge of VRIOGS 012.6.22
L1-CHE-SPE-257	7/0.20mm ² 4 Pair Signalling Data Cable	Rebadge of VRIOGS 012.6.23
L1-CHE-SPE-258	1/1.27mm 1 Pair Signalling Data Cable	Rebadge of VRIOGS 012.6.24
L1-CHE-SPE-259	7/1.70mm 2 Core Helically Laid Copper Cable	Rebadge of VRIOGS 012.6.25
L1-CHE-SPE-260	24/0.20mm 50 Core Copper Cable (Flexible)	Rebadge of VRIOGS 012.6.26
L1-CHE-SPE-261	185mm ² 1 Core Flexible Copper Bonding Cable	Rebadge of VRIOGS 012.6.27
L1-CHE-SPE-262	120mm ² 1 Core Copper Flexible Bonding Cable	Rebadge of VRIOGS 012.6.28
L1-CHE-SPE-263	19/1.35mm 2 Core Power Cable	Rebadge of VRIOGS 012.6.29
L1-CHE-SPE-264	19/1.78mm 2 Core Power Cable	Rebadge of VRIOGS 012.6.30
L1-CHE-SPE-265	Hypalon Black Track Lead Cable, 1 Core Copper Cable, 6mm ² , 84/0.30mm	Rebadge of VRIOGS 012.6.31
L1-CHE-SPE-266	Hypalon Red Track Lead Cable, 1 Core Copper Cable, 6mm ² , 84/0.30mm	Rebadge of VRIOGS 012.6.32
L1-CHE-SPE-267	AF (CSEE or JTC) Track Cable, 1 Core Flexible Aluminium Cable, 95mm ² 493/0.5mm	Rebadge of VRIOGS 012.6.33
L1-CHE-SPE-268	Traction Return Bonding Cable, 1 Core Flexible Aluminium Cable, 300mm ² 1525/0.5mm	Rebadge of VRIOGS 012.6.34
L1-CHE-SPE-269	Traction Return Bonding Cable, 1 Core Flexible Copper Cable, 185mm ² 962/0.5mm or 5881/0.2mm	Rebadge of VRIOGS 012.6.35
L1-CHE-SPE-270	Spark Gap Cable, 1 Core Aluminium Cable 95mm ² , 19/2.45mm	Rebadge of VRIOGS 012.6.36
L1-CHE-SPE-271	Twisted 2 Pair Copper Signalling Cable 7/0.50mm	Rebadge of VRIOGS 012.6.37
L1-CHE-SPE-272	Twisted 6 Pair Copper Signalling Cable 7/0.50 mm Signal Cable Application Guidelines	Rebadge of VRIOGS 012.6.38
L1-CHE-SPE-273	Signalling and Communications Cable Application Guidelines	Rebadge of VRIOGS 012.6.39

Signal Equipment Specifications

Document Number	Title	Note
L1-CHE-SPE-274	Vital Relays - Miniature Plug-in	Rebadge of VRIOGS 012.7.1
L1-CHE-SPE-275	Vital Relays - Large Plug-in	Rebadge of VRIOGS 012.7.2
L1-CHE-SPE-276	Non Vital Relays for Signalling Applications	Rebadge of VRIOGS 012.7.3
L1-CHE-SPE-277	Track Circuit Types Characteristics and Applications	Rebadge of VRIOGS 012.7.4
L1-CHE-SPE-278	Audio Frequency Jointless Track Circuits (Vital)	Rebadge of VRIOGS 012.7.5
L1-CHE-SPE-279	High Voltage Impulse Track Circuits	Rebadge of VRIOGS 012.7.6
L1-CHE-SPE-280	Level Crossing Predictors	Rebadge of VRIOGS 012.7.7
L1-CHE-SPE-281	Standard Requirements for Signalling Electronic Systems	Rebadge of VRIOGS 012.7.8

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Document Number	Title	Note
L1-CHE-SPE-282	Lightning and Surge Protection - General Requirements	Rebadge of VRIOGS 012.7.9
L1-CHE-SPE-283	Lightning and Surge Protection – Varistors and Arrestors	Rebadge of VRIOGS 012.7.10
L1-CHE-SPE-284	Power Supply Units for Signalling Equipment - General Requirements	Rebadge of VRIOGS 012.7.11
L1-CHE-SPE-285	Power Supply Units for Signalling Equipment - DC (Regulated and Filtered) Units	Rebadge of VRIOGS 012.7.12
L1-CHE-SPE-286	Point Mechanisms	Rebadge of VRIOGS 012.7.13
L1-CHE-SPE-287	Train Stops	Rebadge of VRIOGS 012.7.14
L1-CHE-SPE-288	Train Protection Warning Systems	Rebadge of VRIOGS 012.7.15
L1-CHE-SPE-289	Axle Counter Systems	Rebadge of VRIOGS 012.7.16
L1-CHE-SPE-290	Pedestrian Gate Mechanisms	Rebadge of VRIOGS 012.7.18
L1-CHE-SPE-291	Boom Barrier Mechanisms	Rebadge of VRIOGS 012.7.19
L1-CHE-SPE-292	Flashing Light Units	Rebadge of VRIOGS 012.7.20
L1-CHE-SPE-293	Impedance Bonds	Rebadge of VRIOGS 012.7.21
L1-CHE-SPE-294	Connectors for Signalling Interface	Rebadge of VRIOGS 012.7.22
L1-CHE-SPE-295	Solder less Terminals and Cable Lugs for Signalling Applications	Rebadge of VRIOGS 012.7.23
L1-CHE-SPE-296	Solder less Terminals Screw and Spring Clamp Terminal Blocks	Rebadge of VRIOGS 012.7.24
L1-CHE-SPE-297	Environmental Conditions	Rebadge of VRIOGS 012.7.25
L1-CHE-SPE-298	Power Supply Units for Signalling Equipment - Battery Chargers	Rebadge of VRIOGS 012.7.26
L1-CHE-SPE-299	Techniques & Materials for the Jointing & Repair of Railway Signalling Multi Core and Power Supply Cable	Rebadge of VRIOGS 012.7.27
L1-CHE-SPE-300	Batteries for Railway Signalling Applications	Rebadge of VRIOGS 012.7.28
L1-CHE-SPE-301	Light Signals	Rebadge of VRIOGS 012.7.29
L1-CHE-SPE-302	General Requirements for Labelling of Signalling Equipment	Rebadge of VRIOGS 012.7.30
L1-CHE-SPE-303	Electrical and Electronic Components (Ratings and Construction Requirements)	Rebadge of VRIOGS 012.7.31
L1-CHE-SPE-304	AC Shelf Relays	Rebadge of VRIOGS 012.7.32
L1-CHE-SPE-305	Signal Identification and General Information	Rebadge of VRIOGS 012.7.33
L1-CHE-SPE-306	Signal Power Supply Transformer 2200v/110v Single Phase 10Kva 50Hz	Rebadge of VRIOGS 012.7.34
L1-CHE-SPE-307	Jointless Track Circuit Application Manual	Rebadge of VRIOGS 012.7.35

Chief Engineer's Directives/Advice Notes

Document Number	Title
L1-CHE-GDL-008	Securing of Redundant Wires in Signalling Installations
L1-CHE-GDL-013	Novel Signalling Design Risk Assessment
L1-CHE-GDL-014	Signalling T and C Plan Short and Long Form Applicability Matrix
L1-CHE-GDL-025	Track Vehicle TV2 Operation of Track Circuits – Insulation of Wheels
L1-CHE-GDL-027	Rail Condition Requirements for Axle Counters Systems
L1-CHE-GDL-033	Names and Dates for AIS Signalling Drawings for DMS Book-In
L1-CHE-GDL-061	CBI Safeguard Requirements

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Document Number	Title
L1-CHE-GDL-063	Signals Interim Maintenance Copy Process
L1-CHE-GDL-074	Type and Application of Signal Mast

Technical Notes/Design Practice Notes

Document Number	Title
L1-CHE-INS-001	Signal Power Supply Transformers
L1-CHE-INS-003	MTM AIS Submission Requirements for Signalling Drawings
L1-CHE-INS-012	CBI To CIS (Pride) Telemetry Interface
L1-CHE-INS-024	"Axle Counter Reset"
L1-CHE-INS-028	Signalling and High Voltage Equipment Enclosure Nomenclature Requirements
L1-CHE-INS-035	Relocatable Equipment Building (REB)
L1-CHE-INS-036	110V AC Surge Protection in Signal Equipment Rooms and Trackside Location Boxes
L1-CHE-INS-071	Like for Like Works
L1-CHE-INS-075	Frauscher Axle Counter Configuration
L1-CHE-INS-077	Signal Sighting – Signal placed on RHS
L1-CHE-INS-089	Requirement for Latched Gates at Pedestrian Crossings
L1-CHE-INS-092	Essential Services And Signal Power Distribution System Requirements
L1-CHE-INS-094	Requirements for Signal Passed at Danger (SPAD) Alarms
L1-CHE-INS-097	Elimination of Permissive Signals
L1-NAM-INS-015	Relationship between Overhead Air Gaps and Signals
L1-NAM-INS-016	Long Train Route Release
L1-NAM-INS-017	Train Stop Proving In The Signal In Rear
L1-NAM-INS-020	Correlation of Signalling Records
L1-NAM-INS-021	Point In Machine Hand Motor Control Proving for Points in the Overlap
L1-NAM-INS-025	Requirements for Traction Bonding Plan
L1-NAM-INS-027	Signalling CBI Data Software Submission Requirements
L1-NAM-INS-028	Approach Locking Release In Event of a Failed Trainstop or TSS
L1-NAM-INS-030	Foul Tracks

Appendix 5 - OCMS Standards and Specifications

Policy Framework

Document Number	Title
L1-CHE-POL-023	Operational Control Systems Security Policy Framework

OCMS Standards

Document Number	Title	Notes
L1-OCM-STD-001	Communications Equipment Room Standard	-
L1-OCM-STD-002	Generic ICT Communications Pathways Specifications	Rebadge of VRIOGS 013.3 Generic ICT Communications Pathways Specifications
L1-OCM-STD-003	ICT Nomenclature Specification	Rebadge of VRIOGS 013.4 ICT Nomenclature Specification
L1-OCM-STD-004	CCTV Development Standards for Fixed Installations	Rebadge of VRIOGS 013.2-2012 CCTV Development Standards for Fixed Installations

Chief Engineer's Directives/Advice Notes

Document Number	Title
L1-CHE-GDL-015	PicView Monitoring and Indication System
L1-CHE-GDL-054	Interim Implementation Guide Protec2 Keying System
L1-CHE-GDL-057	Supply and installation of IRJ's on the MTM network
L1-CHE-GDL-077	Radio Communications

Technical Notes/Design Practice Notes

Document Number	Title
L1-CHE-INS-031	OCS UPS Cable Installation
L1-CHE-INS-033	Public Address System - Core Zone Loudspeaker Coverage
L1-CHE-INS-050	OCS Security and Access Control and CCTV Requirements For SERS and PERS
L1-CHE-INS-063	Customer Help Point – Station Accessible Boarding Points
L1-CHE-INS-081	General OCS Specification Update
L1-NAM-INS-012	Rail Assets Security and Access Control

For a full list of OCS requirement please contact MTM Engineering Authority, OCMS.

Appendix 6 - Other MTM Documents

Chief Engineer's Directives/Advice Notes

Document Number	Title
L1-CHE-GDL-031	Engineering Change (Electronic) Form User Guide
L1-CHE-GDL-032	Operation of Heritage and Infrequently Used Rolling Stock on Metro Network
L1-CHE-GDL-052	Assignment of Engineering Authority
L1-CHE-GDL-076	Management System Requirements Clarity
L4-CHE-GDL-031	Engineering (Type Approval – Engineering Change – Waiver) Process Map

Manuals, Policies, Procedures and Other Documents

Document Number	Title
L0-HMR-MAN-001	Business Rules Manual for the Contracting Rail Safety Worker
L1-CHE-MAN-001	Engineering Management System (EMS) Methodology
L1-CHE-POL-001	Engineering Drawings Management Policy (IFC/As Builts)
L1-CHE-PRO-001	Standard Waiver Procedure
L1-CHE-PRO-004	Type Approval Procedure
L1-CHE-PRO-006	Chief Engineers Process - Network Access For New/Changed Rolling Stock
L1-CHE-PRO-007	Management of Overlapping Design Agreement
L1-CHE-PRO-031	Engineering Change Procedure
L1-NAM-PRO-002	MTM Design and Technical Review Procedure
L1-NPD-PRO-002	Works Readiness Procedure
L1-PRJ-PRO-009	MTM LXRP Design and Technical Review Procedure
L4-CHE-FOR-031	Request For Information (RFI) Form