

Sydney Trains



Engineering System Integrity
Engineering Procedure
Signalling and Control Systems

PR S 47111

Inspection and Testing of Signalling: Roles, Responsibilities and Authorities

Version 1.1

Date in Force: 15 July 2021

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Engineering System Integrity

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Document control

| Version | Date | Author/Prin. Eng. | Summary of change |
|---------|--------------|-----------------------|--|
| 1.0 | 8 March 2019 | E Pace | New document based on old RailCorp document SPG 0711.1 |
| 1.1 | 15 July 2021 | Ian Maydew/C Darnenia | Inclusion of axle counter requirements |

Summary of changes from previous version

| Summary of change | Section |
|---|---------|
| Update to Set to Work, Test and Certification of Rail Vehicle Detection Authorisation | 6.11.4 |
| Inclusion of axle counters within the 'Minimum Licensing or Authorisation requirements for suitably experienced personnel implementing New and Altered Signals Works' table | 6.13.5 |

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1 General

1.1 Purpose

The purpose of this procedure is to prescribe the roles, responsibilities and authorities associated with inspection, testing and certifying of new and altered signalling infrastructure works.

1.2 References

This procedure shall be read in conjunction with *PR S 47110 Inspection and Testing of Signalling: Introduction*.

1.3 Tasks and Responsibilities to be Retained

The position titles and grades used in this document are current at the time of publishing. Where changes to establishments or structures alter the position titles or grades stated in this document, then the specific tasks and responsibilities prescribed herein shall be mapped and assigned to appropriate positions within the changed establishment so not to lose the intended principles.

1.4 Test and Commissioning Team

The Test and Commission team shall act as a representative of the Professional Head Signalling and Control Systems and not as a representative of the installation contractor. This does not negate the standard requirement that individuals shall not test and certify their own installation work.

Also reference Section 5.2 of this document for the independence requirements of personnel involved in test and commissioning.

1.5 Authorisation & Permission to Work on Sydney Trains Signalling Infrastructure

All work performed on Sydney Trains signalling infrastructure including installation work, inspection and testing, certification, and maintenance work shall be done by persons competent, authorised, and where necessary licensed to do so.

All personnel shall comply with the training and competency requirements described in MN S 41412 which outlines the process for assessment, the issue of certificates of competency, and lists the activities and limitations for each authorisation and licence level.

Additionally, persons shall adhere to the requirements for licensing and authorisation as described in the Signalling Safeworking Procedures *PR S 40001 Introduction to Signalling Safeworking Procedures* and *PR S 40010 Risks and Controls Associated with Testing and Certifying Equipment*. These chapters along with the other relevant parts of the Signalling Safeworking Procedures and the specifications for Inspection and Testing of Signalling Works (including this procedure) provide certain delegation of Engineering Authority for specific accountabilities relating to design, installation, testing and certification, maintenance including specific safety critical determinations associated with signalling infrastructure.

Notwithstanding the above requirements, all persons who perform work on the signalling infrastructure shall obtain a Permit to Work authority in accordance with *PR S 41419 Authority to Work on Sydney Trains Signalling Infrastructure - Permit to Work* prior to commencing such work.

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1.6 Engineering Authority

Engineering Authority for the Signalling Discipline is principally held by the Sydney Trains Professional Head Signalling and Control Systems.

Engineering Authority exists for the following elements:

- production or amendment of any signalling standard and procedure, including configuration specifications, technical maintenance plans and engineering instructions
- approval to issue any new signal design or modification to an issued signal design
- type approval of new or altered signalling equipment or system that include supporting systems and products which form part of signalling infrastructure (these include electrical, electronic, mechanical and pneumatic components)
- approval of signalling training and competency processes, including licensing and authorisation processes, which permit personnel to work on Sydney Trains signalling infrastructure.

1.6.1 Delegated Authority

Delegation of Engineering Authority of certain tasks is detailed and authorised in various documents including this procedure.

Engineering Authority for production of signal design and control systems design, including reviewing and verification shall be approved by the Sydney Trains Professional Head, Signalling and Control Systems in accordance with *EPA 241 Engineering Authority for Design*. New or altered signal designs and control systems designs shall only be implemented utilising approved documented means or within the terms and conditions of an approved trial issued by the Professional Head Signalling and Control Systems.

Maintenance Signal Engineers and Control Systems Engineers have delegated authority to work in accordance with the Signalling Safeworking Procedures to provide integrity and reliability of the signalling system within their respective area of control.

Commissioning and Test Engineers have delegated authority to work in accordance with the specifications for Inspection and Testing of Signalling Works to provide integrity and reliability of the signalling system for the new or altered work.

Additionally, Commissioning Engineers have delegated authority to approve minor specific design variations such as the location and type of cable routes and air lines, signal installation methods and similar signalling infrastructure generally defined in a detail site survey plan. In these cases, the Commissioning Engineer shall administer controls to mitigate risks resultant of the variation from the signalling standards.

Examples include:

- where a cable route, due to limited clearances, is required to be installed closer to the track than prescribed in the signalling standards, then the risk of persons being struck by a train whilst accessing or working in or around the pit can be mitigated by use of demarcation fencing
- where a particular signal installation method differs from the standard design, then the installation method can be in accordance with an appropriate structural engineering design. The altered signal sighting (if any) shall be further approved by a signal sighting committee
- relocation of Control Systems equipment on a Rack to reduce risk to personal injury or to improve maintainability and reliability.

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Delegation of specific engineering design authority for site determinations is granted by the Professional Head Signalling and Control Systems to relevant signalling personnel holding the applicable competency, licence or authority as provided in this and other standards.

Examples include:

- agreement/acceptance of signal sighting
- approval of detailed site survey plans containing specific information about cable and air-line routes including under-line crossings, under-road crossings, pits and chambers, joints, manifolds and route markers
- approval of type, capacity and location of equipment housings
- minor allocation of cable cores, fuses and terminals
- replacement of control systems peripheral workstation equipment
- positioning of control systems equipment
- approval of minor mechanical drawings, for instance, apparatus labelling, tooling, etc.

The above determinations shall be made with due consideration to signalling construction standards and type approval.

1.7 Providing Safety Assurance

This procedure informs signalling personnel of the roles, responsibilities and authorities associated with the quality of installation, inspection and testing and commissioning work necessary for the safety assurance of new and altered signalling on Sydney Trains infrastructure.

Inspection and testing shall be read as including verification and validation tasks.

The Commissioning Engineer shall be responsible to ensure that all of the inspection and testing tasks defined within the signalling specifications are carried out and recorded as prescribed.

The Commissioning Engineer is the person responsible for the implementation of an effective, proven, auditable process for verification and validation of the safety integrity of the signalling system and for compliance of signalling standards for the new or altered signalling when commissioned.

Inspection and tests shall be recorded in an Inspection and Testing Plan and in Installation and Commissioning Work Packages.

The verification and validation process shall include:

- clear definition and communication of responsibilities
- detailed and comprehensive planning, risk assessment and programming
- application of proven inspection and testing practices by licensed, fit and competent personnel
- use of appropriate, calibrated test equipment
- monitoring and control of progress
- detailed recording of results.

The total verification and validation process shall be fully documented and strictly followed.

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The application of inspection, testing and certification of the completed work as set out in this procedure will not in itself provide sufficient assurance, as much of the installation will be “hidden” from many commissioning certification inspections and tests. It is therefore imperative that installation work is carried out by suitably competent and where necessary licensed, personnel and that the installation practices and workmanship be appropriately supervised, inspected, tested and recorded during the installation. These inspection and tests shall be planned and implemented in an Inspection and Testing Plan and Installation Work Package.

2 Interfaces and Relationships

2.1 Interfaces with Telecommunications Systems

The Commissioning Engineer shall ensure that:

- a. prior to commissioning new and altered signalling works that interfaces to a telecommunications system that all functional interfaces are duly certified as inspected, tested, fit for purpose and all tests have followed due process
- b. the telecommunications system group shall provide certification documentation as detailed within *PR S 47117 Inspection and Testing of Signalling: Standard Forms* certifying that the system has been inspected, tested, fit for purpose and reliability.

Where Communications Systems are brought into use at a later date using a previously commissioned signalling interface – the Communications Group shall be responsible to independently certify and bring the telecommunications system into use. In these instances, the telecommunications group shall appoint an experienced Signal Engineer in the role of Commissioning Engineer.

2.2 Interface Coordination

This procedure sets out the requirements applicable for new and altered signalling works implemented by an internal group separate from the asset owner. This relationship creates a functional interface between the parties that is addressed throughout the inspection and testing specifications. Should the asset owner require to internally implement works and thereby eliminate this functional interface, then the Infrastructure division shall ensure that an effective Interface Coordination Plan be used for internal interface coordination.

3 Achieving Signalling Safety

Inspection and testing and certification thereof, to current standards by licensed and competent designers, constructors and maintainers is the method of achieving safety assurance of the signalling system.

Inspection and testing is complicated by the spatial spread of signalling interlocking and control functions, the time spread of construction of a signalling project, staging of the works into existing systems and interaction with functional, operational and technical areas of Sydney Trains and third parties. It is therefore imperative that all stages of the inspection and testing process are planned and systematically implemented and documented by responsible signalling personnel who place the highest priority on the achievement of system safety.

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4 Safeworking, Network Rules and Procedures

It is essential that the Network Rules and Procedures be observed. Testing arrangements shall not interfere with or endanger the correct operation of signalling equipment in service.

In particular, testing shall not result in false clearance of a signal indication in the face of a train nor allow any set of points to be released after a train has accepted a proceed authority that indicates the points are closed and locked.

Qualified workers shall be provided as protection officers/hand signallers for signals, points and level crossings booked out of use as stipulated in the Network Rules and Procedures.

Network Forms shall be duly completed for notification of signalling apparatus taken out of use or restored to use and for certification of new or altered works brought into use.

Details of all removals and new and altered works that results in a change to any physical or operational interface with signallers or train drivers shall be published in the Weekly Notice with at least one week's notice prior to the implementation of the changes.

It is desirable that all field activities associated with the de-commissioning, changing-over and testing work and commissioning, be carried out in an environment where rail traffic is excluded. If rail traffic cannot be excluded or will operate in the close proximity, the Commissioning Engineer shall confer with the worksite protection officer to ensure that safety assessments are conducted for the planned work to include any operational risks or hazards associated with the conduct of the signalling work and testing. Planning shall include suitable arrangements for excluding rail traffic when risks cannot be eliminated. For example, any period where points are required to be unlocked for testing purposes and during the removal of signal "X" boards.

There shall be clear understanding and agreement documented between all involved parties of the safeworking systems to be employed during the period from the shutdown of the old system to the commissioning of the new system.

Signalling equipment installed but not yet commissioned or decommissioned but not yet removed is to be secured against interference.

5 General Responsibilities of Inspection and Testing New and Altered Works

It is the duty of each person performing safety-related work to carry out the work and documentation carefully and competently to the required Standards and in accordance with applicable Specifications and/or approved drawings, other approved documentation specific to installation and testing of new works and to check their work for completion and quality.

Persons conducting certification inspection and testing are to report each time they detect safety related errors or omissions in the work, equipment or documentation to the Commissioning Engineer.

The Commissioning Engineer is to investigate, advise and appropriately instruct the responsible person/supplier regarding any errors and defects detected and agree on the remedy to be applied. For supplied equipment advice is to be given and remedies agreed with the persons with engineering authority in the matter.

Only type-approved equipment and configurations shall be commissioned.

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Basic principles include:

- each new or altered piece of signals and control systems apparatus shall be inspected, tested and certified
- appropriately experienced and licensed personnel shall conduct independent inspection and testing of the work
- construction of new and altered signals and control systems equipment shall be conducted in accordance with the relevant Standards, Procedures and Instructions by suitably experienced Signal Engineers, Control Systems Engineers, Site Managers, Team Leaders, Work Group Leaders, Signal Electrical/Mechanical personnel.

5.1 Interface Planning

The Commissioning Engineer and the Regional Signalling Representative are responsible to ensure that all authorised new and altered signalling works proceed pursuant to a Project Work Interface Agreement and Interface Coordination Plan.

Procedure *PR S 47116 Inspection and Testing of Signalling: Interface Requirements and Procedures for Alterations* sets out the required procedures for:

- alterations and new interfaces
- authority for alterations to existing installation
- approval to commence alterations
- Interface Coordination Plan:
 - a. Detailed Site Assessment (Site Integrity Agreement)
 - b. Precautions to be agreed.

5.2 Independence of Certification, Inspection and Testing

The principle of independent inspection and testing of new and altered work is that no safety critical outcome should rely solely on one person doing and also certifying their own work. The independent person conducting the inspection, testing and certification work is responsible for the safety of the work.

In essence, any person who has installed Signalling equipment or circuits for new and altered work shall not carry out the certification inspection and tests of the particular items or circuit elements that they have installed.

At a project engineering level there are integrity advantages in having more rather than less familiarity with the physical and functional characteristics of the project. For example the Project Engineer in the role of Commissioning Engineer has the direct knowledge of the project, its interfaces and history necessary to ensure comprehensive inspection and testing planning, coordination and implementation.

In deciding the appropriate degree of independence a balanced judgement by experienced signal engineers is necessary depending on the nature and complexity of the project however the major determinant would be the licensing to the required level, competence and experience of the person performing the certification inspection and testing. The lack of availability of suitable personnel shall not justify any lowering or absence of the required independence.

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6 Personnel Responsibilities and Authorities

6.1 Professional Head Signalling and Control Systems

The Professional Head Signalling and Control Systems is the person who holds engineering signalling design authority for authorising and approving configuration and design changes to the existing or new signalling system in accordance with the Sydney Trains Engineering Principles, Standards, Specifications, Manuals, Instructions and Guidelines. The Professional Head Signalling and Control Systems may delegate various engineering design authorities and responsibilities provided that they are documented and clearly communicated.

The Professional Head Signalling and Control Systems shall nominate for new equipment and systems:

- the type approval and design
- the principals for integration, interfaces and standards
- the inspection and testing tasks and/or pass/fail criteria required
- the maintenance requirements, plans and manuals
- the training criteria.

The Professional Head Signalling and Control Systems is also responsible for ensuring signalling design drawings are maintained updated and that updated copies are issued promptly to relevant maintenance personnel.

The Professional Head Signalling and Control Systems shall provide safety assurance through the following activities to ensure the timely issue of checked and approved designs with no significant errors or omissions and also to validate the installed design:

- system design to functional requirements and to signalling design standards by appropriately qualified and experienced Signal Design Engineers
- verification of design by independent appropriately qualified and experienced Signal Design Engineers
- design integrity tests of installed systems to standard interlocking and control principles by appropriately qualified and experienced Signal Design Engineers.

Where new or altered works are to interface with existing signalling the Professional Head Signalling and Control Systems (or delegate) and the Commissioning Engineer, shall together satisfy themselves of the accuracy of the existing design drawings, in consultation with the Regional signalling representative.

6.2 Principal Engineer Signal Design

The Principal Engineer Signal Design shall exercise the delegated responsibilities and engineering signalling design authority for authorising and approving configuration and design changes, to the existing or new signalling system in accordance with the Sydney Trains Engineering Principles, Standards, Specifications, Manuals, Instructions and Guidelines.

6.3 Control Systems Design Manager

The Control Systems Design Manager shall, exercise the delegated responsibilities and engineering control systems design authority for authorising and approving configuration and design changes to the existing, or new Control Systems system in accordance with Sydney Trains Engineering Standards, Specifications, Manuals, Instructions and Guidelines.

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6.4 Project Manager

The Project Manager responsibilities are fully described in the Sydney Trains Project Management Methodology documents. In respect of the inspection, testing and commissioning process, the Project Manager is responsible for ensuring:

- provision of management support for the inspection, testing and commissioning process
- project management documentation (e.g. Project Management Plan, Project Safety Management Plan to comply with Sydney Trains requirements) is produced to allow the Commissioning Engineer and team to focus on Signalling documentation.
- provision of a Signal Project Engineer
- provision of a Control Systems Project Engineer
- provision of a Commissioning Engineer
- provision of Signals Tester In Charge
- provision of a Control Systems Commissioning Engineer
- provision of sufficient numbers of licensed, competent personnel to carry out all inspection and testing activities
- audit of the inspection, testing and commissioning activities to ensure compliance to Sydney Trains requirements
- arrange appropriate maintenance personnel involvement in the new and altered works to provide adequate familiarity with the scope of works, equipment/systems being constructed, the location/s affected by the work and any identification/markings in use to distinguish them
- arrange for test locomotives as required by the Commissioning engineer.
- archival of inspection and testing documents and packages.

6.5 Signalling Project Engineer

The Signalling Project Engineer shall have an appropriate working knowledge of Sydney Trains Signalling Installation Standards and practice. They are responsible for ensuring the quality of the new and altered works; and that they are planned and resourced with suitably competent staff, installed and inspected to the design and current Sydney Trains Standards, and are to schedule.

The Signal Project Engineer is responsible for tasks as detailed in table in Section 6.10.

6.6 Control Systems Project Engineer

The Control Systems Project Engineer shall have an appropriate working knowledge of Sydney Trains Control Systems Installation Standards and practice. They are responsible for ensuring the quality of the new and altered Control systems works; and that they are planned, resourced with suitably competent staff, installed and inspected to the design, current Sydney Trains Standards, and to schedule.

The Control Systems Project Engineer is responsible for tasks as detailed in table in Section 6.10.

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6.7 Signalling Tester In Charge

The Signalling Tester in Charge is authorised as per MN S 41412 and is responsible for planning and directing defined inspection and testing activities on new or altered signalling works. The role is defined after consultation with the Commissioning Engineer. General responsibilities include:

- determining the extent of testing and the tests required for all systems, included in the issued Signals and Control Systems designs and Release documentation (in consultation with the Control Systems Commissioning Engineer)
- the production of the Inspection and Testing Plans and packages
- ensuring that the Inspection and Testing of the entire signalling system has been completed and documented in accordance with Sydney Trains Standards.

This is in order that the Commissioning Engineer has sufficient evidence to sign off the safety assurance of completed signalling and control system works and certify that the signalling and control systems and equipment, have been properly installed using effective quality system processes and have undergone and passed all tests and inspections necessary to ensure safe and reliable operation.

This Authorisation does not allow the holder to book signalling in and out of use unless appropriately licensed.

The Signalling Tester In Charge is responsible for tasks as defined in table in Section 6.10.

6.8 Control Systems Commissioning Engineer

The responsibility for the certification of the safety of Control systems works to be commissioned ultimately lies with the Control Systems Engineer who signs the works as “brought into use.” Regardless of the nature of the control systems works, the Control Systems Engineer ultimately responsible for the inspection, testing and certification of the project from concept till completion and bringing the control system works into use is to be designated as “Control Systems Commissioning Engineer.”

When working on major work or works that require Signals and Control Systems disciplines to interact then the Control Systems Commissioning Engineer shall report to the Signals Commissioning Engineer (refer Section 6.9). In this scenario the Signal Commissioning Engineer takes responsibility for the correct and safe installation and testing of the Signalling system including all Control Systems works. The Control Systems Commissioning Engineer shall work with the Signals Commissioning Engineer and report the status of control system works as documented on any installations and test documentation as required and requested by the Signals Commissioning Engineer.

By bringing the Control System works into use the Control Systems Commissioning Engineer is certifying that they have the assurance that the new or altered Control System has been installed, inspected and tested in accordance with the approved design, Sydney Trains Standards, Specifications, Manuals, Procedures, Guidelines, Engineering Instructions, and any other relevant documents.

If appointment to the project occurs after the commencement of the project then the Control Systems Commissioning Engineer shall review the installation, inspection and testing documentation produced and if necessary, have the authority to order retesting, examination or uncovering of any portions of the installation where there is doubt, insufficient documentation or lack of evidence of inspection and testing activities carried out to that point. All preceding installation, inspection and testing records shall be endorsed by the Control Systems Engineer to whom the certification personnel reported. That person shall be considered as having the same responsibility as the Control Systems Commissioning Engineer up to that point in time.

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The Control Systems Commissioning Engineer is responsible for determining that commissioning of work can proceed. If the work will not be commissioned as planned, the Control Systems Commissioning Engineer shall ensure that any Control Systems risks associated with the commissioning not proceeding are mitigated.

The Control Systems Commissioning Engineer shall not allow the certification testing to be jeopardised by compression into too small a time-scale that over-extends testing personnel.

This authorisation does not allow the holder to book signalling in and out of use unless appropriately licensed.

The Control Systems Commissioning Engineer is responsible for tasks as defined in table in Section 6.10.

6.9 Commissioning Engineer

The responsibility for the certification of the safety of signalling works to be commissioned ultimately lies with the Signal Engineer who signs the works as “brought into use”. Regardless of the nature of the signalling works, the signal engineer ultimately responsible for the inspection, testing and certification of the project from concept till completion and bringing the signalling works into use is to be designated as “Commissioning Engineer.” (The Control Systems Commissioning Engineer shall work with the Signals Commissioning Engineer and report the status of control system works, as documented on any installations and test documentation as required and requested by the Signals Commissioning Engineer). By bringing the signalling works into use the Commissioning Engineer is certifying that they have the assurance that the new or altered signalling system has been installed, inspected and tested in accordance with the approved design, Sydney Trains Standards, Specifications, Manuals, Procedures, Guidelines, Signal Engineering Instructions, and any other relevant documents.

If appointment to the project occurs after the commencement of the project then the Commissioning Engineer shall review the installation, inspection and testing documentation produced and if necessary, have the authority to order retesting, examination or uncovering of any portions of the installation where there is doubt, insufficient documentation or lack of evidence of inspection and testing activities carried out to that point. All preceding installation, inspection and testing records shall be endorsed by the signal engineer to whom the certification personnel reported. That person shall be considered as having the same responsibility as the Commissioning Engineer up to that point in time.

The Commissioning Engineer is responsible for determining that commissioning of work can proceed. If the work will not be commissioned as planned, the Commissioning Engineer shall ensure that any signalling risks associated with the commissioning not proceeding are mitigated. (For example non-commissioned signalling equipment is secure, etc.).

The Commissioning Engineer shall not allow the certification testing to be jeopardised by compression into too small a time-scale that over-extends testing personnel.

The Commissioning Engineer may conduct, or delegate Design Integrity testing for Minor signalling works to a suitably qualified tester using a design integrity test plan provided and approved by signal design.

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6.9.1 Division of Roles and Responsibilities for Project and Commissioning Engineers

Depending on the size of the project and the nominated individual's workload, any or all of these roles can be combined, subject to appropriate authorisations and licenses.

Where a project is planned to have Signalling Project Engineer, Control Systems Project Engineers, Signalling Tester In Charge, Control Systems Commissioning Engineer and Signals Commissioning Engineers the typical responsibilities shall be in accordance with table in Section 6.10. The final agreement on responsibilities between Commissioning Engineer, Signal Project Engineer and Signal Tester in Charge for the project shall be documented and signed off using table in Section 6.10 as a pro-forma.

The roles of Signalling Project Engineer, Control Systems Project Engineers, Signalling Tester In Charge, Control Systems and Signals Commissioning Engineers shall continue until all signalling works are complete and the Final Certificate is issued.

6.10 Typical Division of Responsibilities for Control Systems Project Engineer, Signal Project Engineer, Control Systems Commissioning Engineer, Signal Tester in Charge and Commissioning Engineer

* - The Commissioning Engineer may be supported by the Control Systems Commissioning Engineer when changes to the Sydney Trains network require Control Systems involvement.

Note:

Where activities are transferred between the CE/STIC/CSCE/SPE or CSPE, this table it to be printed, updated, initialled and placed in the Inspection and Test Plan.

| ACTIVITY | CSPE | SPE | CSCE | STIC | CE * |
|---|------|-----|------|------|------|
| Signalling Installation: Manage or delegate all aspects. | CSPE | SPE | | | |
| Project Specific Practice: Ascertain and brief work groups. | CSPE | SPE | | | |
| Signal Design, Working Drawings: Registration and control of design documents, including modifications and amendments. Ensure latest approved versions are used for installation activities. | | SPE | | | |
| Control Systems Design, Working Drawings / Release Documentation: Registration of the Release documentation and control of design documents, including modifications and amendments. Ensure latest approved versions are used for installation activities. | CSPE | | | | |

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| ACTIVITY | CSPE | SPE | CSCE | STIC | CE * |
|---|------|-----|------|------|------|
| Installation Work Package: Preparation and Implementation of work instructions for installation activities. | CSPE | SPE | | | |
| Project Works Notification: Produce and obtain agreement of the District representatives. | CSPE | SPE | | | |
| Statutory Approvals: Prepare as required. | CSPE | SPE | | | |
| Operational Notices: Ensure preparation of Weekly Notice, Safe Notices, Special Train Notices as required | | SPE | | | |
| Site Access and Possession requirements: Agree with the District Signal Maintenance representative. | CSPE | SPE | | | |
| Project Planning Meetings Conduct and record. | CSPE | SPE | | | |
| Interface Coordination Plan: Produce in conjunction with the Commissioning Engineer and the District signal representative. | | | CSCE | STIC | |
| Inspection and Testing: Determine and prepare the Inspection and Testing Plan (Strategy, Outline and Detailed Plans) | | | CSCE | STIC | |
| Track Possessions: Determine and arrange provision for Inspection, Testing and Commissioning activities. May include rail traffic management and coordination and provision of test locomotives. | | | CSCE | STIC | |
| Inspection and Testing Resources: Provide and ensure inspection and testing resources are appropriately licensed or authorised. | | | CSCE | STIC | |
| Commissioning Program: Prepare, monitor and update. | | | CSCE | | CE |
| Interface Management: Liaise with the Signal Maintenance representative and Signal/Control Systems Design for installation matters. | CSPE | SPE | | | |

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| ACTIVITY | CSPE | SPE | CSCE | STIC | CE * |
|---|------|-----|------|------|------|
| Set Out and Construction Ensure signalling installation is in accordance with design, standards and type approvals and provide evidence as per agreed Installation Work Package | CSPE | SPE | | | |
| Installation QA Records and Equipment/Material Test Certificates: Ensure completion and appropriate storage | CSPE | SPE | | | |
| Test Copies and Commissioning Copies of the Signalling Design: Confirm as updated and issue to the Tester In Charge. | CSPE | SPE | | | |
| Safe Access Arrangements to Existing Equipment: Control project activities to ensure that activities do not interfere with the integrity of the existing infrastructure. | CSPE | SPE | | | |
| Installation Work Package: Review and authorise Installation Work Package, | | | CSCE | | CE |
| Permits To Work: Issue for the project as per PR S 41419 | | | | | CE |
| Signalling and Control Systems Inspection & Testing Program: Prepare, monitor and update. | | | CSCE | STIC | |
| Site Installation QA documentation: Ensure complete and retained. | | | CSCE | STIC | |
| Control of Design: Ensure that the latest version of all design and working drawings and modifications are used during Inspection and Testing activities. | | | CSCE | STIC | |
| Manage Test Equipment: Ensure equipment is calibrated and maintain calibration records. | | | CSCE | STIC | |
| Inspection & Testing and Commissioning Planning Meetings: Conduct and minute regular meetings with Inspection and Testing, Commissioning and site personnel. | | | CSCE | STIC | |

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| ACTIVITY | CSPE | SPE | CSCE | STIC | CE * |
|---|------|-----|------|------|------|
| Commissioning Work Package: Prepare and manage CWP. | | | CSCE | STIC | |
| Design Integrity Test Plans: Ensure DIT plans are produced, coordinated and authorised by appropriate personnel. | | | CSCE | STIC | |
| Inspection and Testing Plans: Review and authorise Inspection & Testing Plans. | | | CSCE | | CE |
| Inspection and Testing Activities: Monitor and audit inspection and testing activities. | | | CSCE | | CE |
| Inspection and Test, Commissioning Records: Ensure records are managed, completed and appropriately stored. Includes test certificates and equipment test certificates. | | | CSCE | | CE |
| Commissioning Work Package: Review and Authorise CWP. | | | CSCE | | CE |
| Commissioning Works: Responsible for the overall control and implementation. | | | CSCE | | CE |
| Signalling Personnel: Ensure personnel are correctly authorised/licensed with relevant competencies for allocated commissioning activities | | | CSCE | | CE |
| Design Certification: Responsible for certifying site drawings and working drawings produced for installation e.g. Rack layouts, cable plans.(Refer 1.6.1) | | | CSCE | | CE |
| Planning of Any Permitted “Other Party” Works: Control and coordinate other party works during the commissioning period. | | | CSCE | | CE |
| Other Infrastructure That Directly Interfaces With The Signalling System: Agree what certification is required. (e.g. Train Control & Telecommunication systems, Electrical power or traction, Trackworks) | | | CSCE | | CE |

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| ACTIVITY | CSPE | SPE | CSCE | STIC | CE * |
|--|------|-----|------|------|------|
| Other Discipline Works: Responsible for ensuring other discipline works are certified prior to booking the signalling infrastructure into use. | | | CSCE | | CE |
| Control of Temporary Circuit Bridging Straps: Responsible for ensuring bridging straps are controlled, applied and removed in accordance with Sydney Trains Safeworking procedures; and that they are numbered and made in accordance with Sydney Trains standards. | | | | | CE |
| Design Modifications: Control and certify modifications issued during the commissioning period. | | | CSCE | | CE |
| Pre-commissioning Meeting: Arrange with Regional representative and the team leaders of the commissioning work teams. | | | CSCE | | CE |
| Network Rules and Procedures: Commission the new and altered works into use in accordance with NRPs. | | | CSCE | | CE |
| Commissioning Certificate: Completion of commissioning certificate; this authorises the booking into use. | | | CSCE | | CE |
| Infrastructure Integrity Certification: Complete in accordance with Infrastructure Division requirements | | | CSCE | | CE |
| Infrastructure Certification by “Others:” Obtain and ensure complete for systems that directly interface with Signalling and Control Systems. May include: Train Control & Telecommunication systems, Electrical power or traction, Trackworks, Civil or others. | | | CSCE | | CE |

OFFICIAL

| ACTIVITY | CSPE | SPE | CSCE | STIC | CE * |
|---|------|-----|------|------|------|
| Interim Maintenance Copies: Provision to Regional Signal Representative of circuit books, plans and drawings, track history cards, updated asset change data and any other relevant documentation and provide information about equipment status for all equipment booked out of order or partially commissioned including points booked out of order with normal detection commissioned or not commissioned. | | | CSCE | | CE |
| Incomplete Commissioning Activities: Determine what may be transferred to post commissioning Work instructions. | | | CSCE | | CE |
| Completion of the Signalling Works: Responsible for ensuring that both on and off site inspection, testing and commissioning activities have been completed and certified. | | | CSCE | | CE |
| Certified Office Copies (COC's) Mark up the issued design and working drawings and documents for sign off by the Commissioning Engineer. | | | CSCE | STIC | |
| Certified Office Copies (COC's) Ensure field alterations marked up on circuit books, site drawings and working drawings produced for installation (e.g. Rack layouts, cable plans.) Sign-off and return issued drawings and documents to the design authority. | | | CSCE | | CE |
| Minor Works Package (Where applicable): Prepare and manage MWP to enable implementation commissioning and handover of minor signalling works. | | | | | CE |
| Support Package (Where used for project works): Prepare package. | CSPE | SPE | | | |
| Support Package (Where used for project works): Authorise prior to being approved by Signal Support Service Provider | | | | | CE |

OFFICIAL

| ACTIVITY | CSPE | SPE | CSCE | STIC | CE * |
|---|------|-----|------|------|------|
| Handover Package Compile and issue. | | | CSCE | STIC | |
| Post Commissioning Activities: Delegate to relevant parties. | | | CSCE | | CE |
| Post Commissioning Reviews: Conduct lessons learnt at project completion and feed back to the Project Manager. | CSPE | SPE | | | |
| Defects Rectification: Ensure completion. | CSPE | SPE | | | |
| Practical and Final completion: Complete process. | CSPE | SPE | | | |
| Project Inspection and Test and Commissioning documentation: Archive. | | | CSCE | | CE |
| Post-Commissioning Inspection: Conduct front of train inspection of the newly commissioned installation for signal sighting. | | | | | CE |

6.11 Testers

Testers shall be authorised in accordance MN S 41412 and are responsible for carrying out independent inspection, testing and certification as required by the Sydney Trains Infrastructure Engineering Specifications and Signalling Safeworking Procedures under the control and direction of the Commissioning Engineer or Signal Tester In Charge or Control Systems Commissioning Engineer (Control Systems works only).

Testers shall:

- verify that the installation and equipment conforms to the approved design and site drawings
- comply with the procedures and practices detailed in this series of documents
- following consultation and agreement with the Commissioning Engineer, exercise the authority to require re-testing of portions of the work where doubt arises as to the performance of testing assistants, integrity/security/interference or issues.
- verify that the installation complies with the applicable equipment and construction specifications regarding the installation quality, personnel access, safety and reliability
- challenge and bring to the attention of the Commissioning Engineer any unclear, unusual or unsatisfactory feature of the vital design or installation and any potential risk to the reliability and integrity of the signalling
- form independent test team/s consisting of suitably authorised or licensed personnel
- ensure Test Assistant’s knowledge of the communication protocols to be used and ensure the appropriate familiarity with the particular apparatus and testing procedures.

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The Authorisations that have been created to allow non-licensed staff to carry out testing activities on the Sydney Trains network are fully defined in MN S 41412 and are summarised below.

6.11.1 Assistant Testers

Assistant Testers shall assist the lead Tester in carrying out defined inspection and testing activities on new or altered signalling works. Persons assisting in certification testing shall diligently carry out the instructions of the Lead Tester and assist in ensuring the tests are correct and comprehensive.

6.11.2 Circuit Tester

This authorisation entitles the holder to carry out inspection and testing of new or altered signalling works to confirm that the installed equipment and wiring conform to the approved design and applicable standards. The work is carried out following standard procedures and in accordance with an Inspection and Test Plan provided by others. It includes leading a small team, inspection of equipment type and configuration, tests to prove wiring complies with approved design, insulation tests to prove integrity of the wiring, and checks to prove the absence of additional, undocumented wiring.

This unit does not include verification that the system interlocking functions in compliance with design, or validation of the design to specifications and signalling principles.

6.11.3 Circuit Function Tester

This authorisation entitles the holder to carry out inspection and testing of new or altered signalling works to confirm that the installed signalling control functions work in accordance with the approved design and applicable standards.

The work is carried out following standard procedures, in accordance with an Inspection and Test Plan provided by others and after tests to confirm that the work has been installed and wired in accordance with the approved design. The work includes leading a small team, performing tests to confirm that contacts, sub systems and complete circuits function in accordance with the approved design and applicable standards, and recording of observations and test readings.

This unit does not include verification that the system interlocking functions in compliance with design, or validation of the design to specifications and signalling principles.

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6.11.4 Set to Work, Test and Certification of Rail Vehicle Detection System Authorisation

Holders of track circuit and axle counter authorisation are deemed competent to set to work, test and certify signalling equipment in accordance with Sydney Trains Standards.

6.12 Regional Signals Representative

The Infrastructure Division is primarily responsible for infrastructure integrity; this includes permission for access and provision of track possessions, Project Work Interface Agreements, Interface Coordination Plans and review or overview of the delivery of new and altered works delivered by other divisions and 3rd parties.

For each project job the Region shall nominate a Regional Signal Representative responsible for the following:

Network Maintenance Division

- approve development process and maintenance of interface coordination planning throughout the project lifecycle
- (In order to authorise commissioning of the works, the Regional Signal Representative shall) remain satisfied that the works are principally to the agreed requirements, by regular liaison with the Project Manager throughout the project and by approval-in-principle of the Installation and Commissioning Work Packages.

Signalling Works - Installation Phase

- collaborate with the Commissioning Engineer to develop and authorise the Project Work Interface Agreement for the new and altered work. Maintain the Interface Coordination Plan for the duration of the works (PR S 47116 Clause 1.6)
- approve in principle the Installation (or Minor) Work Package
- hold regular meetings with the signalling maintenance personnel to inform, advise progress and resolve issues.

Commissioning – Preparation Phase

- arrange for test locomotives as required by the Commissioning Engineer
- approve in principle the Commissioning Work Package.

Commissioning – Implementation Phase

- arrange appropriate maintenance personnel involvement in the new and altered works to provide adequate familiarity with the equipment/systems being “brought into use”, the location/s for storage of interim design and spare equipment
- arrange attendance for follow up activities, e.g. points adjustments due to track settlement, track circuit adjustments and stand-by.

Commissioning – Evaluation Phase

- attend the Post Commissioning Meeting.

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Asset Management Division

- collaborate for the provision of the necessary track possessions and access in accordance with the Project Work Interface Agreement, Interface Coordination Plan and the Works Program
- arrange for the provision and issue of the approved design and manage the control of documentation throughout the project life cycle
- manage configuration control process to provide and maintain accurate status of the approved configuration of equipment on the region
- manage configuration management (update documentation and databases) to ensure records accurately reflect existing assets.

Signalling Works - Installation Phase

- collaborate with the project team to provide possession access in accordance with the Works Program. Manage detail possession planning to ensure that optimal use by the project
- change manage (when required) the possession arrangements in consultation with the Project team to take advantage of new opportunities or mitigate negative effects
- initiate and manage the configuration management process for the works including Technical Maintenance Plans
- manage the Asset and Configuration control processes.

Commissioning – Preparation Phase

- coordinate possession detail planning to ensure that other works are excluded when not compatible with the commissioning process
- arrange for the publishing of SAFE Notices and Circulars.

Commissioning – Implementation Phase

- change manage (when required) the possession management in consultation with the Commissioning Engineer to mitigate risks to the commissioning process.

Commissioning – Evaluation Phase

- manage the distribution of Interim design prior to the first peak
- close out any applicable Configuration Control processes.

6.13 Construction Personnel

6.13.1 Team Manager

Team Manager shall be responsible for the management of personnel and equipment including, resource planning, depots, vehicles, OH&S, briefing, rostering, training, PPE, briefing Team Leaders and provision of access to and/or copies of Sydney Trains Infrastructure Engineering Standards, Specifications, Procedures, Instructions and Divisional Instructions.

The Team Manager shall oversee the personnel “Experience and Assessment Log Books” to verify the correct use and identify experience requirements.

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The Team Manager shall allocate personnel resources primarily to fulfil the job requirement for licensing, experience and knowledge of the equipment and systems involved. Further, shall allocate personnel to facilitate the maintenance of experience on all types of equipment and systems. Where a “Statement of Competency” nominates that “work under supervision” is required, in collaboration with site management arrange to allocate to the areas where the required experience may be gained.

The Team Manager is responsible to ensure the provision of adequate personnel requirements, whilst ensuring independence of verification personnel.

The Team Manager may carry out Signalling duties in accordance with their Sydney Trains licence.

6.13.2 Site Manager

Appointed on specific projects is responsible to safely resource, procure and implement the construction of the new and altered project infrastructure whilst ensuring the integrity of the existing infrastructure to design and specification. The Site Manager shall be responsible to manage the completion of the installation and commissioning Inspection and Testing Plan/s and work instructions for the preparation, implementation and evaluation of the works as directed by the Project/Commissioning Engineer.

Responsibilities include:

- direct and manage a multi-disciplinary work team (or teams/contractors) engaged in the construction of the project to ensure safety, time, resource and budgetary constraints under the direction of the Commissioning Engineer including: develop in consultation with the Commissioning Engineer, review, agree and assign and monitor delegated responsibilities in line with the Responsibility Assignment Matrix (R.A.M.)
- supervise, direct and conduct installation inspection and testing activities within the limitations of their licence
- ensure works are constructed in accordance with the relevant Sydney Trains practices and procedures, Signal Construction Standards, Instructions and Guidelines
- ensure works are constructed in accordance with the approved design
- ensuring the works are implemented in accordance with the requirements of the Signalling Safeworking Procedures
- ensure works are implemented in accordance with the Network Rules and Procedures
- ensure works are implemented in accordance with the Project Work Interface Agreement and Interface Coordination Plan
- ensure works are constructed, documented and inspected and tested in accordance with the approved Installation Work Package
- ensure works are conducted by personnel who have the relevant experience and licensing whilst ensuring independence of verification personnel
- ensure works are conducted and documented to comply with approved quality processes including rectification work, timely procurement, storage and preservation of materials, works program and costs
- arrange for sufficient personnel, whilst ensuring independence of verification personnel
- performance, signing and returning of work instruction/s.

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Signalling Works - Installation Phase

Responsible to support the Commissioning Engineer and perform the delegated tasks as directed:

- safely manage the works to Sydney Trains standards, manuals, instructions, cost and time requirements, including plant, personnel, equipment and material resources
- arrange for, set up and test construction site communications systems and prepare registers for recording details of issue.

Commissioning – Preparation Implementation and Evaluation Phases

Responsible to support the Commissioning Engineer and perform the delegated tasks as directed:

- safely manage the implementation, commissioning and evaluation of the works to Sydney Trains Standards, Manuals, Instructions, cost and time, including plant, personnel, equipment and material resources
- manage the construction activities, plant, personnel and material resources.
- implement and or conduct as Team leader - Work instructions as nominated by the Commissioning Engineer
- arrange for, set up, pre-test and manage commissioning communications systems, prepare registers for recording details of issue
- manage the provision and suitable registration of commissioning spares, and equipment e.g. Spare signalling apparatus, torches and batteries, emergency wet weather gear and tarpaulins
- manage the completion of site clean-up including: removal of any equipment housings, redundant wiring, cable routes and air lines; removal and disposal of remaining redundant equipment/foundations, stockpiles.

Minor Signalling Works

- roles and responsibilities shall generally be as for major signalling works, as well as document and report in the “Minor Signalling Works - Installation, Inspection, Testing and Commissioning Log” (Minor Works Log) all defects, defective materials, incidents and items requiring further action related to the performance of the installation, inspection, testing and commissioning of the works. Regularly (weekly) present the log to the Commissioning Engineer for review and sign off.

6.13.3 Team Leader

The Team Leader is responsible to implement the installation and commissioning Inspection and Testing Plan/s, work instructions for the preparation, implementation and evaluation of the works as directed by the Project/Commissioning Engineer.

Where a project structure does not include a Site Manager, the Team Manager shall nominate a Team Leader whose responsibilities shall include those nominated herein for a Site Manager.

The Team Leader is responsible to ensure the implementation of the following activities or delegate and effectively communicate to the various Team Leaders and work groups:

- review, agree and assign delegated responsibilities in line with the Responsibility Assignment Matrix (R.A.M.)

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- apply policies and procedures to ensure the highest standards of OH&S, Safeworking, environmental and quality principles are practiced and maintained in the workplace
- implement the construction of the works to specification by leading multi-discipline work team/s or contractors, supervise, and conduct installation inspection and testing activities within the limitations of their licence
- organise and direct personnel and materials in the construction of the works
- organise and direct plant for the construction of the works
- supervise quality and specification compliance during the construction of the works
- perform, sign and return work instruction/s
- the day to day resolution of general matters.

6.13.4 Work Group Leader

Work Group Leaders are responsible to implement Sydney Trains policies, standards, specifications, instructions, practices, and procedures including installation and commissioning Inspection and Testing Plan/s, work packages and work instructions for the preparation, implementation and evaluation of the works as directed by the Commissioning Engineer, Site Manager and or the Team Leader. Work Group Leaders shall construct the works to specification, lead work team/s and/or contractors, and supervise and conduct installation inspection and testing activities within the limitations of their licence as stipulated herein.

6.13.5 Minimum Licensing or Authorisation requirements for suitably experienced personnel implementing New and Altered Signals Works

| Certification Inspection And Test Activity | Assist In Test Or Set To Work | Inspect, Test And Certify |
|--|---|--------------------------------------|
| Documentation Check | Signal Electrician Circuit Tester | Signal Engineer Circuit Tester |
| Correlation Checking ** | Signal Electrician Signal Electrical Installer | Signal Electrician Circuit Tester |
| Apparatus Inspection | Signal Electrician Signal Electrical Installer Assistant Tester | Signal Engineer Circuit Tester |
| Wire Count | Signal Electrician Signal Electrical Installer Assistant Tester | Signal Engineer Circuit Tester |
| Null Count | Signal Electrician Signal Electrical Installer Assistant Tester | Signal Engineer Circuit Tester |
| Insulation Test | Signal Electrician Signal Electrical Installer Assistant Tester | Signal Electrician Circuit Tester |
| Bell Continuity Test | Signal Electrician Signal Electrical Installer Assistant Tester | Signal Engineer Circuit Tester |

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| Certification Inspection And Test Activity | Assist In Test Or Set To Work | Inspect, Test And Certify |
|--|---|--|
| Hand Trace | Signal Electrician Signal Electrical Installer | Signal Electrician Circuit Tester |
| Apparatus Function Test | Signal Electrician Assistant Tester | Signal Engineer Circuit Tester with appropriate authority for type of equipment |
| Contact Proving Test | Signal Electrician Assistant Tester | Signal Engineer Circuit Function Tester |
| Circuit Function Test | Signal Electrician Assistant Tester | Signal Engineer Circuit Function Tester |
| Circuit Strap and Function Test | Signal Electrician Assistant Tester | Signal Engineer Circuit Function Tester |
| Function Test to Control Tables* | Signal Electrician Assistant Tester | Signal Engineer Person with appropriate engineering authority |
| Through Circuit Test | Signal Electrician Assistant Tester | Signal Engineer Circuit Function Tester |
| Through System Test | Signal Electrician Assistant Tester | Signal Engineer Circuit Function Tester |
| Track Circuit Shunt/Drop/Polarity Tests | Signal Electrician Assistant Tester | Signal Engineer with appropriate authority for type of equipment Authorised person with appropriate authority for type of equipment |
| Axle counter setup, adjustment and certification tests | Signal Electrician Assistant Tester | Signal Engineer with appropriate authority for type of equipment Authorised person with appropriate authority for type of equipment |
| Power Supply Polarity Test | Signal Electrician Signal Electrical Installer | Signal Engineer Circuit Function Tester |
| Power Supply Isolation Test | Signal Electrician Signal Electrical Installer | Signal Engineer Circuit Function Tester |
| Aspect Sequence Test ** | Signal Electrician Assistant Tester | Signal Engineer Person with appropriate engineering authority |
| Mechanical Interlocking Test | Signal Electrician Interlocking Fitter | Signal Engineer for up to and including 8 levers, or Two Signal Engineers with Interlocking Certificate for greater than 8 levers |

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| Certification Inspection And Test Activity | Assist In Test Or Set To Work | Inspect, Test And Certify |
|---|---|--|
| Points Correspondence Test | Signal Electrician Assistant Tester | Signal Engineer Circuit Function Tester |
| Points Out of Correspondence Test | Signal Electrician Assistant Tester | Signal Engineer Circuit Function Tester |
| Facing Point Lock Test | Signal Electrician Assistant Signal Sectioner Signal Mechanical Installer | Signal Engineer |
| Closed Switch Detection Test | Signal Electrician Assistant Signal Sectioner Signalling Mechanical Installer | Signal Engineer |
| Open Switch Detection and Switch Opening Test | Signal Electrician Assistant Signal Sectioner Signalling Mechanical Installer | Signal Engineer |
| Track Insulation Plan (Bonding) | | Signal Engineer Authorised person with appropriate authority for type |
| Signalling Plan (Track Plan/Working Sketch) | | Signal Engineer |
| * where no design integrity test is required | | |
| ** In high risk scenarios a Licensed person shall be used in preference to an Authorised person | | |

Table 1: Minimum Licensing or Authorisation requirements for suitably experienced personnel implementing New and Altered Signals Works

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6.13.6 Minimum Licensing or Authorisation requirements for suitably experienced personnel implementing New and Altered Control Systems Works

| Certification Inspection And Test Activity | Assist In Test Or Set To Work | Inspect, Test And Certify |
|---|--|--|
| Documentation Check | Authorised Control Systems Personnel Control Systems Technician Control Systems Engineer | Control Systems Engineer |
| Correlation Checking * | Authorised Control Systems Personnel Control Systems Technician Control Systems Engineer | Control Systems Engineer |
| Apparatus Inspection | Authorised Control Systems Personnel Control Systems Technician Control Systems Engineer | Control Systems Engineer |
| Wire Count | Authorised Control Systems Personnel Control Systems Technician Control Systems Engineer | Control Systems Engineer |
| Null Count | Authorised Control Systems Personnel Control Systems Technician Control Systems Engineer | Control Systems Engineer |
| Hand Trace | Authorised Control Systems Personnel Control Systems Technician Control Systems Engineer | Control Systems Engineer |
| Apparatus Function Test | Authorised Control Systems Personnel Control Systems Technician Control Systems Engineer | Control Systems Engineer |
| Control Systems Circuit Function Test | Authorised Control Systems Personnel Control Systems Technician Control Systems Engineer | Control Systems Engineer |
| Control Systems Through Circuit Test | Authorised Control Systems Personnel Control Systems Technician Control Systems Engineer | Control Systems Engineer |
| Control Systems Through System Test | Authorised Control Systems Personnel Control Systems Technician Control Systems Engineer | Control Systems Engineer |
| Control Systems Power Supply Polarity Test | Authorised Control Systems Personnel Control Systems Technician Control Systems Engineer | Control Systems Engineer |
| Control Systems Power Supply Isolation Test | Authorised Control Systems Personnel Control Systems Technician Control Systems Engineer | Control Systems Engineer |
| Database Integrity Verification | Control Systems Technician Control Systems FAT/FQT | Control Systems Engineer Control Systems Configuration Designer |

OFFICIAL

| Certification Inspection And Test Activity | Assist In Test Or Set To Work | Inspect, Test And Certify |
|---|---|---|
| Installation and Rollback | Control Systems Technician Control Systems FAT/FQT | Control Systems Engineer Control Systems Configuration Designer |
| System Startup, Shut Down, Logging | Control Systems Technician Control Systems Software designer Control Systems Infrastructure Designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Infrastructure Designer Control Systems FAT/FQT Tester |
| Map Layout | Control Systems Technician Control Systems Infrastructure Designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Software Designer |
| Security Commands | Control Systems Technician Control Systems Infrastructure Designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Software Designer |
| Control Workstation Certification | Control Systems Technician Control Systems Software Designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Infrastructure Designer |
| View Only Workstation Certification | Control Systems Technician Control Systems Software Designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Infrastructure Designer |
| Overview Workstation Certification | Control Systems Technician Control Systems Software designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Infrastructure Designer |
| Arbitration | Control Systems Technician Control Systems Infrastructure Designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Software designer |

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| Certification Inspection And Test Activity | Assist In Test Or Set To Work | Inspect, Test And Certify |
|---|--|---|
| Signalling Commands | Control Systems Technician Control Systems Infrastructure Designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Software Designer |
| Trip Commands | Control Systems Technician Control Systems Infrastructure Designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Software Designer |
| Restriction Commands | Control Systems Technician Control Systems Infrastructure Designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Software Designer |
| Timetables | Control Systems Technician Control Systems Infrastructure Designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Software Designer |
| Train Stepping | Control Systems Technician Control Systems Infrastructure Designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Software Designer |
| ARS | Control Systems Technician Control Systems Infrastructure Designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Software Designer |
| Alarms | Control Systems Technician Control Systems Infrastructure Designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Software Designer |

OFFICIAL

| Certification Inspection And Test Activity | Assist In Test Or Set To Work | Inspect, Test And Certify |
|---|---|--|
| Reports | Control Systems Technician Control Systems Infrastructure Designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Software designer |
| RCS Monitor | Control Systems Technician Control Systems Infrastructure Designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Software Designer |
| OSS/ESS | Control Systems Technician Control Systems Infrastructure Designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Software Designer |
| Simulator | Control Systems Technician Control Systems Infrastructure Designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Software Designer |
| IO Correspondence - Controls & Indications | Control Systems Technician Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Configuration Designer Control Systems FAT/FQT All in conjunction with a Signal Engineer |
| TDTES | Control Systems Technician Control Systems Infrastructure Designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Software designer |
| Network | Control Systems Engineer Control Systems Technician Control Systems Software Designer Control Systems Infrastructure Designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Infrastructure Designer |

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| Certification Inspection And Test Activity | Assist In Test Or Set To Work | Inspect, Test And Certify |
|--|---|---|
| Backup Restore | Control Systems Technician Control Systems Infrastructure Designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Software Designer |
| Housekeeping | Control Systems Technician Control Systems Software Designer Control Systems Infrastructure Designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer |
| Telemetry | Control Systems Technician Control Systems FAT/FQT | Control Systems Engineer Control Systems Infrastructure Designer Control Systems Configuration Designer |
| TDLink | Control Systems Technician Control Systems Software designer Control Systems Configuration Designer Control Systems FAT/FQT | Control Systems Engineer Control Systems Software Designer |
| * In high risk scenarios an Engineer shall be used in preference to a Technician | | |

Table 2: Minimum Licensing or Authorisation requirements for suitably experienced personnel implementing New and Altered Control systems Works

6.14 Typical Project Responsibility Assignment Matrix (R.A.M.)

The following R.A.M's are typical for a project. Each project shall review and assign responsibilities in line with the particular project scope, organisational structure, skills and licensing of the allocated project personnel. The project matrix shall be updated to reflect any changes occurring within the project lifecycle. All permanent or temporary stakeholders shall be notified of their responsibilities and updated to any changes. Roles and responsibilities associated with construction site safety shall be detailed in a "Site Safety Management Plan" for the works.

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| Responsibility Assignment Matrix: RailCorp Infrastructure Division | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|------------------------------|---------------------------------------|----|-----|----|----|-------------------------------|-----|-----|-----------------------------------|----|-----------------------------|----|----|---|------|------------------------------|-----------|---|---|----------------|------------|-------|--|--|--|---------------|--|--|--|--|
| Renewals / Major Projects | | | | | | | | | | File No: | | | | | Document No: | | | | | | | | | | | | | | | | |
| Description: <i>Construction of New & Altered Signalling</i> | | | | | | | | | | Date: | | | | | Revision No: Version 1, 14/08/2006 | | | | | | | | | | | | | | | | |
| Project: | | | | | | | | | | Project phase: <i>Preparation</i> | | | | | | | | | | | | | | | | | | | | | |
| WBS | Activity - Task | Project Management/Construction Group | | | | | | | | | | Infrastructure Division | | | Regulatory Authorities | | | Community | | | RailCorp Other | | | | | | | | | | |
| | | Key position: | PM | TTM | CE | TE | SM | SMS | SDM | WGL | CS | TM | AE | ME | RR | WCov | EPA | | | | Track | Elec | Civil | | | | | | | | |
| 1 | Scope Documentation & Budget | A | C | R | C | S | C | C | C | | C | I | I | SO | | | | | | C | C | C | | | | | | | | | |
| 2 | Signalling Works Program | A | I | R | C | S | C | C | S | S | C | I | I | C | I | I | | | C | C | C | C | | | | | | | | | |
| 3 | Configuration Change Request | S | | S | | S | | S | S | | | R | I | A | | | | | | C | C | C | | | | | | | | | |
| 4 | Site Safety Management Plan | SO | | A | I | R | I | I | S | S | C | I | I | C | | | | | | I | I | I | | | | | | | | | |
| 5 | Project Works Authority | A | I | S | I | S | | S | I | I | C | SO | SO | R | | | | | | C | C | C | | | | | | | | | |
| 6 | Interface Plan | A | I | C | C | C | | C | C | I | C | C | C | R | | | | | | C | C | C | | | | | | | | | |
| 7 | Design Coordination | I | | C | C | C | | S | C | | | R | | A | | | | | | C | C | C | | | | | | | | | |
| 8 | Signal Sighting / D.S.S's | A | I | R | S | S | | S | S | S | | I | C | SO | | | | | | C | C | C | | | | | | | | | |
| 9 | Possession Utilisation | C | I | A | C | R | S | C | S | S | C | C | C | C | | | | | | C | C | C | | | | | | | | | |
| 10 | Inspection & Testing Plan | A | I | R | C | S | | C | S | S | C | C | C | SO | | | | | | | | | | | | | | | | | |
| 11 | Installation Work Package | A | I | R | C | S | | C | S | S | C | C | C | SO | | | | | | | | | | | | | | | | | |
| 12 | Construction Program | C | | A | C | R | S | C | S | S | C | I | I | SO | | | | | | C | C | C | | | | | | | | | |
| 13 | Scope - Variation Mgmt | R | | C | C | C | I | C | I | I | | C | C | A | | | | | | | | | | | | | | | | | |
| 14 | Communications Planning | A | I | R | I | I | I | I | I | I | I | I | I | I | I | I | | | I | I | I | I | | | | | | | | | |
| 15 | Procurement | I | | A | C | R | | C | C | I | S | | | | | | | | | | | | | | | | | | | | |
| 16 | Compliance & Audit | R | C | S | S | S | | S | S | S | S | I | I | A | | | | | | | | | | | | | | | | | |
| Personnel legend | | PM - Program/Project Manager | | | | | TTM - Snr Tech Team Mgr | | | | | CE - Commissioning Engineer | | | | | TE - Testing Engineer | | | | | | | | | | | | | | |
| | | SM - Site Manager / Team Leader | | | | | SMS - Service Manager Signals | | | | | SDM - Signal Design Mgr | | | | | WGL - Work Group Leader/s | | | | | | | | | | | | | | |
| | | CS - Construction Staff | | | | | AE - Asset Engineer | | | | | ME - Maintenance Engineer | | | | | RR - Regional Representative | | | | | | | | | | | | | | |
| | | W Cov - Work Cover | | | | | EPA - Enviro Protection Auth | | | | | TM - Team Manager | | | | | | | | | | | | | | | | | | | |
| Responsibilities Legend | | R - Responsible | | | | | A - Accountabl | | | | | C - Consult | | | | | S - Support | | | | | I - Inform | | | | | SO - Sign off | | | | |
| NOTE Team Leaders responsibilities shall be those of the Site Manager where no Site Manager is attached to the project | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| Responsibility Assignment Matrix: RailCorp Infrastructure Division | | | | | | | | | | | | | | | | | | | | | | | |
|---|----------------------------------|---------------------------------------|-----|----|-----------------|----|-------------------------------|-------------|-----|----------------------------------|-------------|---------------------------|----|------------|---|-----|------------------------------|-----------|--|-------|----------------|-------|--|
| Renewals / Major Projects | | | | | | | | | | File No: | | | | | Document No: | | | | | | | | |
| Description: <i>Construction of New & Altered Signalling</i> | | | | | | | | | | Date: | | | | | Revision No: Version 1, 14/08/06 | | | | | | | | |
| Project: | | | | | | | | | | Project phase: <i>Evaluation</i> | | | | | | | | | | | | | |
| WBS | Activity - Task | Project Management/Construction Group | | | | | | | | | | Infrastructure Division | | | Regulatory Authorities | | | Community | | | RailCorp Other | | |
| | | PM | TTM | PE | TE | SM | SMS | SDM | WGL | CS | TM | AE | ME | RR | WCov | EPA | | | | Track | Elec | Civil | |
| 1 | Scope - Variation Mgmt | I | | A | C | R | | C | I | I | I | I | I | SO | | | | | | | | | |
| 2 | MIMS Asset Update Information | I | | C | S | S | | C | | | | A | R | C | | | | | | | | | |
| 3 | Teams II, MMS Service Schedule | I | | C | S | S | | C | | | | A | R | C | | | | | | | | | |
| 4 | Delivery of C.O.C's | I | I | R | S | C | | C | | | | I | I | A | | | | | | | | | |
| 5 | Delivery of As-Built D.S.S's | I | I | R | S | S | | | S | C | | I | I | A | | | | | | | | | |
| 6 | Handover Package | I | I | R | S | S | | | S | | | I | I | A | | | | | | | | | |
| 7 | Practical Completion Certificate | I | I | R | S | S | | | C | | | I | I | A | | | | | | | | | |
| 8 | Final Certificate | I | I | R | S | S | | | C | | | I | I | A | | | | | | | | | |
| 9 | Compliance & Audit | I | C | A | S | R | | S | S | S | S | I | I | I | | | | | | | | | |
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| Personnel legend | | PM - Program /Project Manager | | | | | TTM - Srr Tech Team Mgr | | | | | PE - Project Engineer | | | | | TE - Testing Engineer | | | | | | |
| | | SM - Site Manager / Team Leader | | | | | SMS - Service Manager Signals | | | | | SDM - Signal Design Mgr | | | | | WGL - Work Group Leader/s | | | | | | |
| | | CS - Construction Staff | | | | | AE - Asset Engineer | | | | | ME - Maintenance Engineer | | | | | RR - Regional Representative | | | | | | |
| | | WCov - Work Cover | | | | | EPA - Enviro Protection Auth | | | | | TM - Team Manager | | | | | | | | | | | |
| Responsibilities legend | | R - Responsible | | | A - Accountable | | | C - Consult | | | S - Support | | | I - Inform | | | SO - Sign off | | | | | | |
| NOTE Team Leaders responsibilities shall be those of the Site Manager where no Site Manager is attached to the project. | | | | | | | | | | | | | | | | | | | | | | | |

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