



AUSTRALIAN RAIL TRACK CORPORATION LTD

Discipline: Engineering (Track & Civil - Construction)

Category: Technical Specification

Turnout Replacement

ETC-03-01

Applicability

ARTC Network Wide	✓
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Primary Source

Document Status

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1.5	06 Jan 14	All	Updated from North South to Network wide applicability. Reviewed as part of major review of points and crossings documents. Obsolete information deleted including references to withdrawn standards.

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1 General

1.1 Extent of work

This Technical Specification provides for the replacement of existing turnouts with turnouts with 60kg/m material and concrete bearers.

This Specification should be read in conjunction with other Contract Documents.

Trackwork Design and Signalling Design is not included in this Specification.

1.2 Definitions

Unless defined otherwise in the contract documents, terms used in this Specification shall have the following meanings assigned:

Term	Definition
'Principal'	shall mean Australian Rail Track Corporation (ARTC).
'Superintendent'	shall mean the person/s appointed by the Principal to act as the nominated Clients Representative.
'Contractor'	shall mean the Contractor engaged for the work to be carried out under this Specification.
'Project Quality Plan'	shall mean the Contractor's Project Quality Plan for the Project.
'Approved'	shall mean approved in writing by the Superintendent.

1.3 Scope of works

Works under this contract comprise of the supply of all labour, materials and plant for replacement of existing turnouts with turnouts with 60kg/m material and concrete bearers. It includes, but is not limited by the following items that shall be carried out in accordance with the Contract:

- Project management and supervision
- Carrying out the service identification for all services and equipment within the nominated work scope area
- Relocation of services
- Relocation of turnouts as shown on the drawings
- Preparation of bottom ballast bed including the removal and replacement of any fouled ballast
- Laying of concrete bearers
- Laying of top ballast
- Provision and installation of new 60kg/m turnouts and fastenings and insulated rail joints
- Installation, testing and commissioning of all signalling works
- Turnout resurfacing
- Turnout welding and providing CWR to adjoining plain track to maintain stress adjustment
- Initial grinding of rails in accordance with relevant ARTC standards
- Removal from site redundant bearers and turnout components, fastenings, rail, fouled ballast and all other surplus materials
- Notification to the general public and authorities prior to commencement and during site works
- Protection of rail traffic and ARTC infrastructure during site works

- Environmental, Safety and Traffic management of all maintenance and construction activities.

1.4 Responsibilities

The Contractor shall be responsible for carrying out all track and signalling works associated with the works in accordance with the design drawings, this Specification, the Contractor's Project Quality Plan and all associated contract documents.

1.5 Certification

All materials and manufactured components supplied to the work shall be accompanied by a certificate from the supplier stating compliance with the Specification and any relevant ARTC and/or Australian Standards, together with such details and parameters required to be supplied by those documents and/or the Project Quality Plan.

1.6 Service identification

Services shall include all signalling and track-side monitoring equipment.

All work areas to be subject to a complete services search. The search to include all services associated the infrastructure including (coaxial cable, fibre optic, CTC, signalling, communications and external services (including but not limited to) power, gas, communications, water and sewer and track-side monitoring equipment).

All services are to be identified on a plan provided by the contractor indicating service depth and location with respect to the track. All services to be clearly marked on site and appropriate protection measures taken in accordance with section 9.

1.7 Co-Ordination with Service Authorities

The Contractor will be required to liaise with Service Authorities to manage the priorities of service identification and marking on plans where required. The Contractor will be required to liaise with service authorities to ensure project milestones are deliverable with respect to adequately identifying, marking and relocating services.

1.8 Service relocations

The Contractor shall be responsible for carrying out the relocation and/or re-installation of all services affected by the works in accordance with the design drawings, relevant standards, the Contractor's Project Quality Plan and all associated contract documents.

1.9 Drawings

The drawings that form part of this contract are listed in Appendix D.

1.10 Interpretation of railway construction and maintenance terms

In addition to the definitions listed in the preliminaries the following words appearing in the Specification will have the following meanings:

'Formation Level'	The design level of the formation complete with capping layer.
'Rail Level'	The design level of both rails of tangent track or the low rail of any super-elevated track.
'Plain Track'	Track comprising of rails, sleepers, fastenings and ballast.
'Points and Crossings'	Turnouts, diamonds, catch points, single and double slips.
'Track'	All track including points and crossings and plain track.

'Rails'	All rails including points, crossings, check rails, stock rails, junction rails, plain rails, etc.
'Ballast'	Ballast is a free draining coarse aggregate or metallurgical slag used to support railway tracks.
'Bottom Ballast'	Ballast placed in a continuous windrow on formation.
'Top Ballast'	Ballast placed between bottom ballast and the finished ballast level.
Contaminated ballast	Ballast containing degraded ballast fines, fines from failed formation and/or deposited material. Free drainage has been blocked
'Resurfacing'	Adjusting rails by mechanically compacting ballast under sleepers to support sleepers to ensure a smooth rail running surface for traffic.
'Bearer'	Concrete beams to which turnout rails and components are attached to via a fastening system to take bearing forces of operating traffic.
'Turnout Components'	The constituents or parts of a Turnout.

1.11 Definition of the site

For the purpose of this Specification, 'Site' means that area of land detailed by the Principal as the Rail Corridor where the works is designated to be carried out.

1.12 Works excluded from contract

Works excluded from this Contract have been included as Appendix B.

1.13 Supply and delivery of materials

The Contractor shall supply to site all necessary materials and equipment to complete the works, including concrete bearers, 60kg/m rail and turnout components and fastenings, ballast, track laying plant, resurfacing machinery, ballast profiling machinery, rail grinding machinery, consumables, small tools, insulated joints and signalling equipment.

Drawings shall be complete with notes and dimension tolerances covering at least the following items:

- Design, manufacture and testing of bearers and cast-in fastenings shall be in accordance with AS 1085.14
- The bearer is designed for the calculated Rail Seat Load
- Concrete compressive strength shall comply with Clause 3.4
- Tendons shall be as nominated with the relevant Standards referenced
- Minimum ultimate tensile stress of tendons shall be nominated as well as jacking force at stressing
- Test loads shall be tabulated as required by Clause 13 Table 1
- Minimum concrete cover to tendons and steel reinforcement including that in the vicinity of cast-in fastenings shall be nominated
- Estimated minimum and maximum masses of bearers in each set.

The Contractor shall in its Quality Plan describe what procedures and tests will be adopted to ensure that all track materials comply with the requirements of the standards specified in this Specification.

During the performance of this Contract, the Contractor shall implement its quality procedures, verify that the materials comply with the specified standards, and have quality documentation to verify this has been achieved.

Materials that do not comply with specified standards are liable to rejection for use in the Works.

The Superintendent may carry out independent examination and testing of the materials. The Contractor shall provide any necessary facilities and facilitate the Superintendent in such independent examinations and testings.

1.14 Handling, transport and storage of Materials

The Contractor in its Quality Plan shall describe what procedures will be adopted in transporting materials from the source supplier and delivery to Site, the handling and temporary storage (if any) of materials on Site, and the handling to the workface to ensure that all track materials will retain their integrity and compliance with the standards specified in this Specification.

1.15 Materials supplied by the Principal

The Contractor shall arrange for the recovery and delivery to Site of the supplied materials from the supply location nominated.

All planning and coordination of deliveries shall be the responsibility of the Contractor. Items to be supplied by the Principal are detailed in Appendix A.

1.16 Spare parts

Spare parts to be provided by the Contractor are shown in Appendix C.

1.17 Hot weather

Limitations on working in hot weather shall be complied with and the Contractor shall manage the Works Program in accordance with the provisions included in the accepted Tender Offer.

1.18 Construction under Traffic – Rail

The Contractor shall at all times during the period of construction take all necessary precautions in accordance with ARTC regulations to avoid any delay, obstruction or stoppage to rail traffic.

2 Quality Assurance

2.1 Quality System

The Contractor shall maintain a documented Quality System in accordance with this document and Australian Standard for Quality System AS/NZ ISO 9002.

The quality system shall cover the whole of the work under this contract.

2.2 Project Quality Plan

The Project Quality Plan shall detail how the Contractor will manage and control the quality of the work under the Contract. It shall be based on, and consistent with, the draft tender Quality Plan. It shall be specific to the work under this contract and for a specific package of work.

The plan is to be submitted to the Superintendent within 10 working days of award of contract. Works are not to proceed until the Quality Plan is approved by the Superintendent. The Superintendent will review the submitted Quality Plan and respond to the contractor with acceptance and/or comments within 10 working days of submission.

The Quality Plan shall include:

- Management responsibilities specific to the Contract including the responsibility and authority for quality
- Organisation proposed for the Contract

- Qualifications and competencies including currency of all staff, including sub-contractors, proposed to be used on the works
- Contractor's method of control of sub-contract work
- All work processes and equipment including service identification, signalling tasks and Work as Executed drawing production.

Work method statements for all activities which shall include all requirements nominated in this specification. The Contractor shall include details on the following:

- Equipment and methods proposed to be used
- Removal from site redundant bearers, turnout components and fastenings
- Relocating turnouts as shown in contract drawings
- Bottom ballast bed grading and removal of fouled ballast
- Laying of concrete bearers
- Laying of top ballast
- Provision, assembly and installation of new 60kg/m turnouts and associated fastening system and insulated rail joints
- Provision and installation of signalling equipment
- Testing and Commissioning of signalling equipment
- Track resurfacing
- Turnout welding and where appropriate adjustment of adjacent track to CWR
- Initial grinding of new rails in accordance with ARTC requirements
- Identification and relocation of services
- Site management and supervision
- All witness and hold points
- Inspection and test plans.

2.3 Inspection and tests

During the course of the work the Contractor shall arrange for all relevant testing required by the Project Quality Plan to be carried out by suitably qualified personnel approved by the Superintendent.

Inspection and Test Plans shall be submitted to the Superintendent for approval prior to any work commencing. Inspection and test plans shall:

- identify tests/inspections against Contract requirements including referenced ARTC and/or Australian standards
- identify hold points and witness points
- identify records to be maintained or particular tests and/or inspections
- detail test equipment to be used for specified tests and/or inspections.

2.4 Records

The Contractor shall establish and maintain a system of records that provides objective evidence that the requirements of the contract have been satisfied.

The Contractor shall make all records pertaining to the Contract available to the Superintendent at all reasonable times and, where requested by the Superintendent, provide the Superintendent with a copy of the records.

At the completion of a package of works the Contractor shall supply a scanned copy of all the records in Tiff or other approved format on a CD Rom or DVD.

2.5 Quality Audit and non-conformances

The Contractor shall give the Superintendent access to its or its sub-contractor's premises / working area and to documentation.

The Contractor shall make or arrange to be available all facilities, documentation, records and personnel, including those of sub-contractors, that are reasonably required for any audits or surveillance to be undertaken by the Superintendent..

2.6 Occupational Health and Safety

The Contractor shall incorporate into the Quality Plan a system covering the management of occupational health and safety in accordance with the relevant Statutory Occupational Health and Safety Acts. The system element shall provide prompt notification to the Superintendent of any accident or injury occurring at site.

When requested by the Superintendent, the Contractor shall convene a meeting for the purpose of reviewing occupational health and safety matters relating to the contract.

The Contractor shall provide and maintain an environment that is safe and without risks to health and safety for employees and others, in the course of their work and entry onto site.

2.7 Rail Safety Act

The Contractor shall comply with the requirements of the relevant Rail Safety Act.

3 Hold Points and Witness Points

3.1 Hold Points

A Hold Point is defined as a point in the production and inspection cycle beyond which work may not proceed without review by the Superintendent

The Contractor shall not proceed beyond a Hold Point until the Superintendent or his representative has released the Hold Point.

The Contractor shall make suitable arrangements to notify the relevant person/s when a Hold Point will be reached so that they can review and/or witness any work process, record or test being undertaken by the Contractor and thus expedite the release of that Hold Point. Unless agreed otherwise by the Superintendent, the Contractor shall notify the nominated parties a minimum of 48 hours prior to the date of witness of any Hold Point.

As a minimum Hold Points shall be provided for the following or related activities:

- Services identification and marking;
- Setting out of works;
- Stockpiling of materials.

The Contractor shall define the method of release of Hold Points by the relevant parties in his Quality Plan.

3.2 Witness Points

Witness Points shall be specified by the Contractor in the Quality Plan.

Unless agreed otherwise by the Superintendent the Contractor shall provide the nominated person/s a minimum 48 hours' notice of all witness points so that inspection may be made of the items specified in the Quality Plan.

4 Protection of the environment

4.1 General

Herbicides and other toxic chemicals shall not be used on the site without the prior written approval of the Superintendent.

All work shall be performed in accordance with hours of works defined in consent conditions. The Contractor shall notify the superintendent of its intention to obtain approval to extend working hours. Any approval received shall be supplied to the Superintendent a minimum 7 days prior to commencing work outside hours specified in the consent conditions. The Contractor shall not use, during such period, any plant, machinery or equipment that, in the opinion of the Superintendent, is causing or is likely to cause a nuisance to the public.

4.2 Disposal of material

All surplus materials removed during the course of the works shall be disposed of as directed by the Superintendent. Serviceable material shall be stockpiled as directed by the Superintendent.

4.3 Dust suppression

The Contractor shall take all measures necessary to comply with EPA Regulations and keep airborne dust on site to a minimum. No separate payment will be made for the suppression of dust. The Contractor shall effect adequate dust control measures and ensure the safety and convenience of the public is not adversely affected.

4.4 Fire risk

The Contractor shall comply with all statutory obligations with respect to the management of bushfire hazards.

The Contractor must comply with any Total Fire Bans imposed by Government Authorities. No burning off, hot work or naked flame of any type is allowed during this period except as exempted in the relevant Acts.

To effectively manage fire risk on site, the Contractor shall prepare work method statements as part of their Quality Plan.

5 Standards and references

5.1 General

All design, materials, equipment, workmanship and installations shall comply with the latest revision of the ARTC Engineering Standards, and Australian Standards relating to the relevant element or component of Works unless otherwise noted in this Specification or advised at the time of Tender.

For items of overseas manufacture that are not in accordance with Australian Standards, relevant overseas standards shall be subject to consent from the ARTC prior to proceeding with design or manufacture of equipment.

Latest ARTC Engineering Standards available from www.artc.com.au.

5.2 Changes to ARTC standards

A number of ARTC Standards have been changed to meet operational and financial objectives.

6 Access

6.1 Access to the site

If the Contractor requires access to a part of the Site where no access has been provided the Contractor shall supply to the Superintendent any plans for obtaining such access and shall not commence work on the access until approval has been given. No additional payment will be made to the Contractor for provision of access roads.

The completed formation shall be used as an access road only where approved by the Superintendent. Where approved it shall be used in such a manner to afford minimum damage to the capping, formation, ditches, shoulders and slopes. All tyre ruts shall be removed. All repairs required to restore the capping material or the formation to its original condition shall be at the Contractor's expense.

6.2 Access roads through private properties

If the Contractor proposes to use adjacent properties for access purposes it is the Contractor's responsibility to make those arrangements and obtain agreement with each such property owner. However, the Contractor shall notify the Superintendent of the proposed arrangements before contacting property owners and all communications with property owners shall be vetted by the Superintendent prior to contact. The Contractor shall provide written details of each agreement, with supporting Drawings, as part of its Quality Plan documentation. Evidence of any such agreement shall be submitted to the Superintendent prior to the commencement of any work.

On completion of use, the Contractor shall restore each property in accordance with all such agreements.

The Contractor shall inform the Superintendent of any change to any agreements with the private property owner and also inform the Superintendent of any matter, which may adversely affect the relationship between ARTC and any private property owner.

No additional payment will be made to the Contractor for provision of access roads through any private property.

7 Survey

7.1 Setting out of the works

Setting out of the works shall be conducted in accordance with the provisions of the relevant Government Regulations and the design drawings.

The Contractor shall be responsible for maintaining existing survey monuments, control lines and recovery pegs. All new pegs and stakes shall remain in place until all track work is completed to the satisfaction of the Superintendent.

The Contractor's proposals for the setting out of the works shall be included in the Contractor's Project Quality Plan.

7.2 Marking out

The Contractor shall mark out on site all equipment and services that may be affected by the works. Signalling equipment shall be marked with bright orange paint. All other equipment shall be suitably marked so as to avoid unintended damage.

7.3 Location of Signalling Equipment

The Contractor shall set out the location of signals and signalling equipment to meet the nominated signal design and in compliance with ARTC signalling standards and specifications.

- As part of the setting out of works, signal sighting shall be performed in accordance with the nominated signalling design and with relevant ARTC standards and specifications.
- The location of signalling equipment shall be planned following site inspections and shall consider requirements for maintenance access. This shall be in accordance with relevant ARTC standards and specifications.
- The cable route shall be planned to coordinate with the location of the signalling equipment as above and travel & civil requirements and in accordance with relevant ARTC standards and specifications.

The Contractor shall submit a plan for the location of signalling equipment including supporting information, together with confirmation that the plan is consistent with nominated signalling design, this specification and all relevant ARTC standards and specifications.

8 Replacement of existing turnouts with turnouts with 60kg/m material

8.1 General

Turnouts shall be replaced in accordance with the contract drawings in Appendix C, this Specification and the specified ARTC standards.

8.2 Earthworks, formation and capping materials

The construction of earthworks (the "formation") beneath the track structure shall be in accordance with ARTC Track & Civil Code of Practice (T&C CoP) Section 8 Earthworks.

8.3 Drainage

Drainage construction (cess drains, pipe and box culverts, concrete drainage structures, sub-soil drainage and associated items) shall be constructed in accordance with the requirements of ARTC T&C CoP Section 10 Flooding.

8.4 Ballasting

Contaminated ballast, as defined in section 1.10, shall be removed prior to the placing of the bearers. The construction of ballast shall be in accordance with ARTC T&C CoP Section 4 Ballast.

Contractor shall ensure sleeper bed is graded to ensure the standard ballast depth. Where the specified depth cannot be achieved without cutting into the formation the works shall proceed as directed by the Superintendent.

Ballast shall be laid out in accordance with the Contractor's Quality Plan.

8.5 Concrete bearers

Unless specified otherwise by the Superintendent or shown on the contract drawings, all bearers shall be concrete. Manufacture of concrete bearers shall be in accordance with contract drawings specified in Appendix C.

Installation of the concrete bearers shall be undertaken as specified in the Contractor's Quality Plan.

8.6 Turnout

Turnouts shall be manufactured in accordance with ARTC Standard ETA-03-03 Technical Specification for Manufacture of Components for Points and Crossings and the contract drawings.

The Contractor shall not cut, bore or change the shape of any prefabricated turnout components to make them fit or 'joint up' unless authorised by the Superintendent. Except only when aluminothermic welding, the prefabricated turnout components or other materials shall not be heated, cut or welded without written authority of the Superintendent.

The Contractor shall determine the most suitable and safest method for removing and transporting released turnouts for re-use or stockpiling and gain approval from the Superintendent prior to undertaking the works.

Switch blades shall bear evenly on all slide chairs and fit properly against the stockrail when closed. Spreader bars shall be so fitted that switches open to the full operational extent. The bearing surfaces of all slide chairs shall be cleaned and lubricated with approved long lasting dry lubricant before switches are brought into use.

Crossing gauge and flangeways shall be to the dimensions and tolerances in accordance with ARTC T&C CoP Section 3 "Points and Crossings".

New turnouts installed are to be ground initially in accordance with ARTC Standard ETM-03-02.

All new crossings shall be marked in accordance with ARTC Standard ETA-03-03.

The Contractor shall assemble the turnouts and associated components in accordance with his Quality Plan.

8.7 Relocation of existing turnouts

Where required existing turnouts shall be relocated in accordance with the Contractor's Quality Plan. The turnouts shall be reassembled and installed in accordance with the dimensions and tolerances specified in ARTC T&C CoP section 3.

Life expired components such as bearers and resilient fasteners shall be replaced during the relocation process as directed by the Superintendent.

Relocation of existing turnouts shall be in accordance with the Contractor's Quality Plan.

8.8 Aluminothermic welding

All joints in the turnouts shall be aluminothermically welded (except as specified in clause 8.9) in accordance with ARTC Technical Standard ETM-01-01.

8.9 Field flash butt welding

Mobile flashbutt welding machines may be utilised for field welding subject to the approval of the Superintendent.

8.10 Welded rail adjustment

The rails in turnouts and adjacent to the turnouts shall be adjusted so that the stress free temperature is 38 degrees C. The adjustment shall be undertaken in accordance with the Contractor's Quality Plan.

8.11 Junction Rails

When joining rails of different profiles the Contractor shall install junction rails in accordance with ARTC T&C CoP and relevant Standards in Section 1 Rail.

8.12 Glued insulated joints

Glued insulated joints shall be provided in accordance with ARTC T&C CoP Section 1 Rail.

8.13 Catch points

Catch points are to be provided and installed in accordance with the ARTC design drawings, this Specification and ARTC T&C CoP Section 3 Points and Crossings.

8.14 Resurfacing

The completed turnout shall be lifted as necessary and accurately packed to correct line and level. Geometric tolerances for new and serviceable rail specified in ARTC T&C CoP and relevant Standards in Section 5 shall be achieved.

The ballast shall be tamped by means of mechanical tampers of a type approved by the Superintendent. The ballast shall be tamped for the full length of the bearer with a maximum lift of 50mm each pass.

The cribs and shoulders of the ballast shall be vibration-compacted where specified by the Superintendent.

Following resurfacing, all ballast is to be profiled in accordance with ARTC T&C CoP Section 4 Ballast and broomed off bearers to ensure all fastenings, rail seat, rail foot, turnout components and signalling equipment are visible for future inspection and certification.

The Contractor shall undertake all resurfacing works in accordance with his Quality Plan.

9 Signals

9.1 Signalling Construction and Alterations

The Contractor shall construct and/or amend the signalling in accordance with the nominated signalling design for the works. The Contractor shall undertake the following tasks in conjunction with the works under this contract:

- a) Setting out of the equipment
- b) Supply of all signalling equipment and return to ARTC of all recovered signalling equipment unless otherwise specified
- c) Installation of cable routes and equipment housings
- d) Installation of signals, points equipment, track circuit equipment and all trackside equipment
- e) Testing of all signalling equipment and recording results
- f) Commissioning of all new or altered signalling equipment
- g) Updating of all signal drawings to as-built status in CAD or hard copy.

The actual tasks to be undertaken will be dependent on the scope and nature of the works and possession arrangements.

9.2 Signalling Staff

The Contractor shall provide qualified Signalling support staff to undertake the tasks in conjunction with the works under this contract.

The work shall only be undertaken by staff that are duly accredited as signal electricians and associated construction trades. The works are to be managed by a Signals Construction Engineer who is duly accredited and experienced in signalling infrastructure construction and the signalling standards and practices for use in the relevant Jurisdiction. Details of the proposed signalling staff including accreditation, and resume are to be submitted to the Signal Manager for the region at least 2 weeks prior to the works activity.

9.3 Applicable ARTC Signalling Standards

The Signalling Standards applicable to this Specification are available on the ARTC website at www.artc.com.au.

9.4 Signalling Equipment

The Contractor shall provide signalling equipment that is in accordance with the ARTC signalling equipment standards that are detailed in Appendix F of this specification. These are available on the ARTC website at www.artc.com.au.

The Contractor shall only supply equipment that has been in use for signalling in New South Wales or has been approved by ARTC for use in New South Wales. New Equipment or Systems not previously approved need to be approved in accordance with ARTC standard:

EGP-21-01	New Equipment and Systems Approval
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10 Acceptance criteria

10.1 Certification of completed work

On completion of the works the Contractor shall clear the area in the vicinity of the track work, all redundant and scrap material to the satisfaction of the Superintendent.

Completion of the work for the purposes will not occur until ARTC has confirmed that the works including the signalling works have been completed in accordance with the construction standards with track geometry in accordance with relevant ARTC Standards.

10.2 Defects Liability period

The Contractor shall maintain free from defects the renewed turnout for the period of 12 months from practical completion date. Items to include, but not limited to:

- Faults in any materials supplied and installed by the Contractor (excludes any Free Issue Material)
- Any failure of the materials installed due to poor workmanship by the Contractor as determined by the Principal
- As defined in the Conditions of Contract.

10.3 Handover documentation

The Contractor shall provide a handover package containing, but not limited to, the following data:

- Requests for information, Test certificates and other forms as nominated in the Contractor's Project Quality Plan
- Record of lifting and tamping including details of pre and post alignment
- Record of turnout measurements in accordance with ARTC Points and Crossings Procedure ETE-03-01
- The records specified in section 2.4
- Inspection and Test Plans (signed off by the Principal or its' Representative)
- All records of welding in accordance with ARTC T&C CoP Section 1 Rail and ARTC Standard ETE-01-03
- All records of track adjustment to achieve the neutral rail temperature
- Works as Executed drawings.

10.4 Works as Executed drawings (WAE)

As a condition precedent to the achievement of Practical Completion, the Contractor shall revise all drawings and documentation to show the Works as finally installed.

The Contractor shall submit preliminary copies of the drawings in CAD format for review by the Superintendent who will indicate their acceptability or alternatively indicate the required modifications.

The Contractor is required to prepare and submit to the Superintendent one (1) full set of construction drawings marked up with works as executed.

11 Planning and Restrictions

11.1 General planning

Unless specified otherwise, the works shall be undertaken concurrently with mainline operations.

The order and progress of the works shall be planned to eliminate disruption to normal mainline operations. If constructed under traffic the length of the work face shall be minimised with the work procedures and program approved by the Superintendent.

Track possessions will be provided as specified in contract documents.

A copy of a typical train graph will be provided for the information of the Contractor if requested.

11.2 Speed restrictions

Temporary speed restrictions are to be avoided and should only be applied where essential or in an emergency. Where essential speed restrictions may be applied subject to a maximum of 2 number, or over a maximum workface of 1 km, where agreed by the Superintendent. Prior to the Superintendent's agreement the Contractor shall prepare a submission outlining the reasons for the restriction, its severity and expected duration.

11.3 Contract program

The Contractor shall submit to the Superintendent for endorsement a works program within 28 days of award of tender.

The accepted Tender Construction Program will be the base Contract Construction Program. When endorsed this program shall become the contract program for the measurement of work performance and work control.

Contractor to provide a monthly report of progress against program, including applicable production rates per possession hour.

11.4 Safe-working

All safeworking is to be undertaken in accordance with ARTC regulations. Staff are to hold appropriate current competencies to undertake specific tasks for activities and certification work performed under the Contract.

Qualified and experienced safeworkers are to be provided on site. Track supervisor holding current track certification, appropriate competencies and relevant experience to be on site during the works to ensure track is safe when returned to traffic after possession.

Contractor is responsible for all safeworking including the operation / travel of any rail bound equipment and communication with Train Control.

11.5 Staff rail safety training

All staff performing work on site under the contract shall have Track Safety Awareness certification for the respective jurisdiction.

Appendix A - Schedule of Principal supplied items

Appendix B - Works excluded from the contract

Appendix C - Spare parts to be supplied by the contractor

Appendix D - Schedule of tender drawings