

Superseded

**Technical Specification**

**Transport and Main Roads Specifications  
MRTS50 Specific Quality System Requirements**

**November 2022**

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## 1 Introduction

This Technical Specification describes the requirements for the application of a Quality System for the management of all aspects of the Contractor's obligations for construction of road infrastructure projects. For details on how As Constructed drawings should be prepared, refer to EP172 *Electronic Signature Policy for Engineering Drawings* and the *Drafting and Design Presentation Standards Manual* (DDPSM).

This Technical Specification shall be read in conjunction with MRTS01 *Introduction to Technical Specifications* and other Technical Specifications as appropriate.

This Technical Specification forms part of the Transport and Main Roads Specifications Manual.

## 2 Definition of terms

The terms used in this Technical Specification shall be as specified in Clause 2 of MRTS01 *Introduction to Technical Specifications*.

## 3 Referenced documents

Table 3 lists documents referenced in this Technical Specification.

**Table 3 – Referenced documents**

| Reference                        | Title  |
|----------------------------------|--|
|                                  | Construction Materials Testing (CMT) Supplier Registration System  |
|                                  | <i>Drafting and Design Presentation Standards Manual</i>   |
|                                  | <i>TMR Surveying Standards</i>   |
| AS 1141.3.1                      | <i>Methods for sampling and testing aggregates, Method 3.1: Sampling – Aggregates</i>  |
| AS 1289.1.4.2                    | <i>Methods of testing soils for engineering purposes, Method 1.4.2: Sampling and preparation of soils – Selection of sampling or test sites – Stratified random number method</i>  |
| AS/NZS ISO 9001                  | <i>Quality Management Systems – Requirements</i>   |
| MRTS01                           | <i>Introduction to Technical Specifications</i>  |
| MRTS56                           | <i>Construction Surveying</i>  |
| Quarry Registration System (QRS) | Transport and Main Roads Quarry Registration System (QRS) which includes the following:<br>QRS1: <i>Quarry Registration System Outline</i><br>QRS2: <i>Preparing a Quarry Assessment Report for a Hard Rock Quarry</i><br>QRS3: <i>Preparing a Quarry Assessment Report for a Natural Sand and/or Natural Gravel Quarry</i><br>QRS4: <i>Assigning Quarry-Specific Testing Frequencies for Source Rock Tests</i><br>QRS5: <i>Preparing a Recycled Material Assessment Report (RMAR) for Recycled Material Sites</i> |
| TIPDS Volume 1                   | <i>Transport Infrastructure Project Delivery System, Volume 1: Selection of Delivery Options</i>   |

#### **4 Quality system requirements**

The Contractor shall establish, implement and maintain a Quality System that complies with the Contract.

Construction activities shall be carried out in accordance with the provisions of the Contractor's Quality System which shall comply with the requirements of AS/NZS ISO 9001.

The quality planning for the project shall be documented in a project specific quality plan.

#### **5 Quality plan**

The Quality Plan shall define at least the following:

- a) A commitment to achieve the quality objectives contained in the Contract and a statement of the quality objectives the Contractor intends to deliver.
- b) The specific allocation of responsibilities and authorities and the management procedures to apply for the delivery of the Contract, including those for selection, engagement and control of Subcontractors and Suppliers.
- c) The name, qualifications and experience of the following Contractor's supervisory personnel:
  - i. Project Manager
  - ii. Project Engineer(s)
  - iii. Contractor's Quality Representative
  - iv. Safety Officer
  - v. Environmental Representative
  - vi. Landscape Representative
  - vii. Surveyor(s), and
  - viii. Works Supervisor(s).
- d) The communication processes to be implemented in management of the activities of the Contract.
- e) The controls to be applied for management of amendments to the Contract Plan documents as Work under the Contract proceeds.
- f) The quality records to be maintained by the Contractor and its subcontractors and those to be submitted to the Administrator, and
- g) Schedules of construction procedures and Inspection and Test Plans giving the dates by which these are to be prepared.

The following information shall be added to the Quality Plan in accordance with the requirements of the Contract:

- A. at least those construction procedures nominated in the Contract
- B. lot numbering and lot identification systems
- C. inspection and Test Plans including a copy of the NATA scope of accreditation for the Contractor's compliance testing laboratories

- D. other specific requirements as set out in the Contract, and
- E. the interconnections between the documents included in the Contract Plan.

## **6 Construction procedures**

The Contractor shall prepare written procedures for all construction processes, including statement of equipment to be utilised for work processes as warranted and all controls to be exercised to ensure satisfactory achievement of Contract requirements, where the absence of such procedures could adversely affect quality of the work. Where appropriate, such procedures may be included in the Inspection and Test Plans or other documentation.

The Contractor shall submit to the Administrator all construction procedures nominated in the Contract and any construction procedures requested by the Administrator during the execution of the Contract.

Construction procedures shall be submitted to the Administrator at least 14 days before construction of the relevant work commences unless alternative times are specified elsewhere in the Contract.

Construction procedures shall contain the purpose and scope of the activity, what is to be done and by whom, when, where and how it is to be done, what materials, equipment and documents are to be used, and how the activity is to be controlled and recorded.

## **7 Identification and traceability**

### **7.1 Lots**

The Contractor shall divide the Works into lots for the purpose of:

- a) positive identification and traceability of all work activities, measurements and tests
- b) monitoring the quality of product
- c) submission of work to the Administrator under cover of a conformance report
- d) rejection of work
- e) application of concession provisions for below standard work, and
- f) application of bonus provisions for above standard work.

Lots shall be chosen by the Contractor taking into account any restrictions included in the Contract.

### **7.2 Lot registration**

The Contractor shall define a system of lot registration which is practical for the Works and which shall include:

- a) a lot number
- b) a description of the lot
- c) the location, including where necessary three-dimensional surveyed position of the lot
- d) a method which ensures traceability of all sampling and test results relevant to the lot
- e) the means for recording and/or cross-referencing records of compliance or Nonconformance related to the lot, and
- f) a suitable method of identification for lots which replace nonconforming lots.

The Contractor's system of lot numbering shall be logical, shall suit the specific application and shall be consistent with any specified computerised system. Bridgeworks and similar activities may be identified by plain English titles as used on the drawings (Pier 1, Span 2, and so on).

Each lot shall be recorded in the lot registration system.

Reworked or subdivided lots shall be renumbered and shall be cross referenced to the original lot number.

### **7.3 Lot identification**

The physical bounds of each lot and its lot number shall be clearly identified by a system of lot identification. All work and/or activities shall be able to be readily identified with the relevant lot.

Work on a lot shall not commence until the lot identification has been established and is understood by all relevant staff.

### **7.4 Lot notification and status**

The Contractor shall submit to the Administrator early each working day a list of all lots on which work commenced on the preceding working day, including sufficient information of the relevant lot numbers and lot identification system to ensure timely assessment of completed Works for compliance with the requirements of the Contract.

The Contractor shall also notify the Administrator of all lots which were physically completed on the preceding working day.

### **7.5 Traceability**

The lot identification system, Site records and sample numbering system shall allow test results to be positively identified with the lot they represent.

### **7.6 Recording the Registered Quarry Reference Number on Test Reports**

Where a material is sourced from a quarry registered under the department's Quarry Registration System (QRS), the Registered Quarry Reference Number ("RQ No.") as shown on the *Quarry Registration Certificate* shall be recorded on all test reports specified for the material. This requirement applies to:

- a) all tests including, but not limited to, Source tests, Source Rock tests and Product tests in accordance with the relevant Technical Specification, and
- b) all materials from the quarry source, including those used as a constituent in another specified material.

If a specified material is sourced from multiple registered quarries, the Registered Quarry Reference Number for each of the quarries shall be recorded on the test report.

## **8 Inspection and testing**

### **8.1 General**

Compliance assessment shall apply only within a lot which remains homogeneous.

Where a lot is not homogeneous, it may be divided into separate sublots. Inspection and testing of each subplot shall be undertaken in accordance with the requirements for a separate lot.

The Administrator and/or Principal may have completed lots reviewed for homogeneity.



No material shall be supplied to or used in the Works until written approval is given by the Administrator.

#### **8.1.1 Material produced and/or sourced from a Quarry Registration System registered quarry**

This clause shall be read in conjunction with Clause 8.1 and applies to material sourced and/or produced from a quarry registered under the QRS.

- a) The *Quarry Registration Certificate's* Testing Frequency Schedule details quarry-specific source material properties and the associated testing frequencies for which the quarry is registered. For conformance testing of a source material property, the Test Method and property limit or limits are specified, and the following applies:
  - i. unless otherwise specified, the frequency of testing shall not be less than that assigned in the *Quarry Registration Certificate's* Testing Frequency Schedule for that source material property.
- b) A source material property may not change between the point of manufacture and the point of use including after storage, transport, compaction and finishing.
- c) Where more than the following quantity of material is supplied to a single departmental project from a quarry source:
  - i. 5 000 tonnes of unbound pavement material
  - ii. 1 000 tonnes of cover aggregate, and/or
  - iii. 20 000 tonnes of asphalt, lean mix concrete subbase, concrete base and/or structural concrete.

Prior to removal from the quarry of any material to be used in the Works and in addition to testing required as part of the QRS, a sample for each test shall be taken from the product jointly by the Administrator and the Contractor.

The sample shall be split into three sub-samples. The Contractor and Administrator shall each test one sample, and the untested third sample shall be held by the Administrator as a reference sample.

- d) For a QRS registered quarry source that does not have a testing frequency schedule nominated on the *Quarry Registration Certificate*, the Default Level testing frequencies stated in the QRS shall apply.

#### **8.2 List of items to be included in Inspection and Test Plan**

Inspection and test procedures shall be included in an Inspection and Test Plan and shall include:

- a) the work process and associated inspection and test points
- b) the allocation of responsibilities for carrying out the inspections and testing
- c) the required frequency of the inspections and testing
- d) the methods to be used for measurements and tests
- e) the criteria for acceptance
- f) measurements or tests which involve use of calibrated equipment, and
- g) all Witness and Hold Points.

The Administrator and/or Principal may review the Contractor's Inspection and Test Plans to determine if all compliance sampling and testing methods, acceptance criteria and testing frequencies conform to the Contract between the Principal and the Contractor, and comply with the relevant Technical Specifications. Due to the differing requirements for Test Plans for structures a separate Inspection and Test Plan will generally be required for structures.

### **8.3 Hold Points, Witness Points and Milestones**

#### **8.3.1 General**

Where a Hold Point, Witness Point or Milestone applies in a Technical Specification, the text is highlighted at the appropriate point and a summary of all such points is included in the Quality Clause of the relevant Technical Specification.

A Hold Point is indicated in the text as **Hold Point** A Witness Point is identified in the text as **Witness Point** A Milestone is identified in the text as **Milestone**

#### **8.3.2 Hold Point**

Hold Point means an identified point in a process beyond which the Contractor shall not proceed without written authorisation from the Administrator authorising release of the Hold Point.

Hold Points shall apply as follows:

- a) as specified in the Contract or as otherwise nominated by the Administrator
- b) on issue of a Nonconformance Report, or
- c) on issue of a corrective action request by the Administrator.

To obtain the Administrator's authorisation to proceed past a specified Hold Point, the Contractor shall provide evidence to the Administrator that all applicable work has been completed and tested and inspected by the Contractor in accordance with the Contract. Following provision of all specified information, the Contractor shall allow at least one working day for a response from the Administrator.

To obtain the Administrator's authorisation to proceed past a Hold Point associated with a Nonconformance or corrective action request, the Contractor shall demonstrate amendments to its Quality System to prevent recurrence of the Nonconformance and propose disposition of the nonconforming product, where applicable.

Hold Points specified in the Contract are those required by the Principal. The Contractor may designate additional Hold Points in the Contractor's Quality Plan and nominate a person responsible for authorisation of continuation past those points.

#### **8.3.3 Witness Point**

Witness Point means an identified point in a process where the Contractor is required to give the Administrator prior notice with the option to observe an activity.

Unless specified otherwise, the Contractor shall give the Administrator notice of at least one working day of an approaching Witness Point but may proceed with the activity when the period of notice has expired whether or not the Administrator elects to witness the activity.

#### **8.3.4 Milestone**

Milestone means a point in time within a project which marks the start or completion of an activity.

Milestones nominated in the Technical Specifications shall be shown on the Contractor's construction program prepared in accordance with the Supplementary Conditions of Contract.

#### **8.4 Compliance inspection and testing**

Compliance inspections and tests shall be carried out by the Contractor to ensure compliance with the Contract requirements and shall include at least all inspections and tests which are specified in the Contract. At the time of tendering for a project the contractor will nominate principal testing subcontractor/s registered as a CMTSRS level 2 facility.

Unless otherwise specified all compliance sampling and testing shall be carried out by laboratories accredited by NATA and certified for the appropriate tests and registered as Construction Materials Testing (CMT) Suppliers at level 2 in the CMTSRS, unless exempted by the CMTSRS or allowed to be subcontracted by the CMTSRS. To be clear, this means that compliance sampling and testing must only be conducted by staff directly employed or contracted to and managed by a NATA-accredited laboratory.

All compliance assessment, inspections, sampling and testing shall be based on lots. Compliance testing shall be performed on a lot at the time when the lot has been processed in accordance with the Contractor's construction procedure to comply with the requirements of the Contract.

Assessment of compliance shall be completed by a responsible person at least one remove from the person performing the work.

The Contractor shall advise the Administrator of the location of each compliance test as well as the lot number, prior to the commencement of testing of the lot.

Once compliance testing of the lot has commenced, the compliance test procedures shall be completed, and a result reported even if a failure occurs. Testing must be supervised by NATA Level 2 or higher staff with the delegated authority to sign reports on behalf of the registered Supplier.

Results from compliance tests are to be provided to the Contractor and the Administrator at the same time. Corresponding NATA-endorsed sampling and testing reports shall be submitted with the conformance report. If the results indicate Nonconformance, no further testing shall be permitted until a Nonconformance report has been submitted and corrective action has been approved by the Administrator.

The Contractor shall provide the Administrator with two business days' notice to enable the Administrator to attend sampling and testing activities for compliance tests.

#### **8.5 Frequency of testing**

The frequency of testing for compliance shall not be less than the minimum requirements nominated in the Contract. Minimum testing frequencies and minimum number of tests are stated in the relevant Technical Specifications. Where a minimum testing frequency or minimum number of tests is not given, it shall be nominated by the Contractor and submitted to the Administrator at least 14 days prior to the commencement of testing.

Specified testing frequencies represent a minimum testing requirement. The Contractor remains responsible for performing sufficient tests and inspections to ensure that a lot complies with all requirements of the Contract, including testing during the performance of the work to ensure that processes remain in control.

### **8.6 Level of compliance testing**

Testing for compliance shall be carried out at the Normal Testing Level stated in the relevant Technical Specification subject to the requirements of this clause.

The Contractor may adopt any Reduced Testing Level stated in the relevant Technical Specification after no Nonconformances have occurred in four consecutive lots and it has been demonstrated that the Contractor's processes are under control and consistent.

Where a Contractor is operating at the Reduced Testing Level and a Nonconformance occurs for any requirement for a lot, the Contractor shall immediately revert to the Normal Testing Level for all standards and requirements.

For an offsite continuing process (for example, pavement material production), approval may be given by the Administrator to move to a Reduced Testing Level based on testing undertaken outside the Contract in accordance with the Supplier's Quality System.

#### **8.6.1 Material produced / sourced under the Quarry Registration System**

This clause shall be read in conjunction with Clause 8.6 and applies to each source material property detailed on the *Quarry Registration Certificate* for a material sourced and/or produced from a quarry registered under the Quarry Registration System.

For each test undertaken as part of the compliance testing requirements:

- a) The Normal Testing Level shall be at least the frequency for that test listed in the *Quarry Registration Certificate* Testing Frequency Schedule.
- b) When a nonconforming test result occurs, two additional tests on other samples obtained from the same lot shall be taken, and:
  - i. if both additional tests are conforming, the Normal Testing Level may be maintained, and
  - ii. the Contractor shall provide written notification to the TM (QRS) in accordance with Guideline QRS1: *Quarry Registration System Outline* of the three test results within three working days of completion of each test.

### **8.7 Sampling**

All sampling shall be carried out by laboratories accredited by NATA for sampling specified in the Contract and registered as CMT Suppliers at level 2 in the CMTSRS, unless exempted by the CMTSRS or allowed to be subcontracted by the CMTSRS.

Selection of sampling and test Sites shall comply with Test Method AS 1289.1.4.2 *Sampling and preparation of soils – Selection of sampling or test sites – Stratified random number method* unless an alternative test method is specified.

Obtaining representative samples from stockpiles shall comply with AS 1141.3.1 *Methods for sampling and testing aggregates – Sampling – Aggregates* unless an alternative method is specified.

When obtaining representative samples from stockpiles using AS 1141.3.1, the purpose of the sampling shall be as follows:

- a) where a single sample is required from a lot / stockpile, sample for testing of average properties, or
- b) where multiple samples are required from a lot / stockpile, sample for testing of average properties and variation using the number of samples specified in the relevant Technical Specification.

Obtaining representative samples from other than stockpiles, shall comply with AS 1141.3.1 unless an alternative method is specified.

### **8.8 Reinstatement**

The Contractor shall be responsible for and reinstate all core holes, test holes, excavations and any other disturbance resulting from control and/or compliance testing. The reinstatement shall be to a standard which is at least equal to the specified requirements for the particular work.

## **9 Auditing**

### **9.1 General**

The Administrator and/or Principal may conduct system and performance audits at any stage.

The Contractor shall supply any information, documentation, access and assistance requested for the completion of audits.

### **9.2 Audit testing**

Audit testing of completed lots may take one or both of the following forms:

- a) inspection and/or sampling and/or testing carried out by the Administrator and paid for by the Principal, or
- b) inspection and/or sampling and/or testing ordered by the Administrator and carried out by the Contractor. Where the result of testing indicates compliance, the testing will be paid for by the Principal; otherwise the cost shall be borne by the Contractor.

Where required, the Administrator may request the Contractor to obtain sufficient material when sampling to provide a split reference sample(s) for retention or testing by the Principal.

Excavations caused by audit testing carried out in accordance with this clause shall be repaired at the Principal's cost if the test result indicates compliance. Otherwise, the Contractor shall repair such excavations at its own expense.

### **9.3 Surveillance**

The Administrator and/or Principal may inspect any process or procedure at any time to gain assurance that the Contractor's system, including Subcontractor systems, is in compliance with the Contract. Visual inspections or surveillance may reduce the need for audit testing.

Surveillance activities for laboratories may include but are not limited to:

- a) observation of laboratory operations, including storage and handling of samples as well as sampling and testing techniques
- b) assessment of test results through analysis of trends and use of other statistical techniques, and
- c) observation of product manufacturing processes particularly those removed for the project construction site. This includes, but not limited to, precast (including prestressed) manufacture processes, metal fabrication of components, bearing manufacture or testing.

The various Supplier Registration Systems provide further detail regarding surveillance activities.

## **10 Conformance and Nonconformance**

### **10.1 Conformance**

#### **10.1.1 Conformance reports**

A Conformance Report shall be prepared for each lot and shall include the following:

- a) completed inspection and test records
- b) analysis of the results to demonstrate compliance with the relevant Technical Specification
- c) where there has been an engineering variation to the design, as determined by the Administrator, during the construction or manufacturing process, the variation shall be captured in a design revision drawing certified by the Registered Professional Engineer Queensland (RPEQ), and
- d) As Constructed surveys in accordance with MRTS56 *Construction Surveying*.

The Contractor shall provide the Administrator with a Conformance Report on completion of the relevant lot and prior to substantial progress on subsequent lots.

This clause shall be read in conjunction with Clause 12.3 detailing requirements for the verification and certification of As Constructed drawings and Clause 13 detailing requirements for As Constructed surveys. Transport and Main Roads' *Drafting and Design Presentation Standards* manual includes guidance for the preparation of As Constructed drawings.

#### **10.1.2 Indicative conformance**

Where a lot is subject to any of the following requirements:

- a) surface evenness (Road Roughness)
- b) moisture content (Degree of Saturation)
- c) moisture content (General Earthworks)
- d) testing of concrete on the basis of slump or spread and/or strength
- e) testing stabilised pavement materials on the basis of strength, and
- f) insitu air voids in asphalt.

The Administrator may approve the use of Indicative Conformance procedures for testing and/or analysis. An Indicative Conformance report for the construction lot may be submitted before the listed testing and/or analysis is carried out.

The purpose of Indicative Conformance is to allow work to progress prior to the minimum timeframes required for testing and/or analysis to demonstrate conformance.

Where the Contractor is seeking Indicative Conformance, a separate Indicative Conformance report shall be prepared for each lot. Each report shall contain:

- a) a statement acknowledging that test results are not yet available for confirmation of conformance, and
- b) a statement accepting risk of rework upon conformance reporting.

The Conformance Report shall be processed as soon as possible after the test results become available.

Notwithstanding Indicative Conformance being achieved, the lot shall still be subject to rework should it subsequently fail to comply with the specified requirements.

## **10.2 Nonconformance**

For every Nonconformance which occurs, the Contractor shall promptly initiate the Nonconformance and corrective action procedures defined in the Contractor's Quality Plan.

The Contractor shall notify the Administrator of each Nonconformance within one working day of its detection where:

- a) there is potential for progress of the work to be seriously affected
- b) the proposed action to correct the Nonconformance will result in work not complying with the requirements of the Contract
- c) the Contractor has failed to comply with the time requirements of the Contract
- d) the Nonconformance may cause a health and safety hazard
- e) the Nonconformance has resulted from a deficiency in the drawings or Technical Specification
- f) client supplied product is involved
- g) the Administrator has directed that specific types of Nonconformances be notified
- h) material or serious environmental harm has occurred
- i) items of cultural heritage significance are discovered, or
- j) contaminated land or contaminated materials delivered to the Site are identified.

Each such notification by the Contractor shall include details of the action proposed for correction of the Nonconformance or the arrangements made for its disposition and the amendments to its Quality System to mitigate recurrence of the Nonconformance.

The Contractor shall not proceed to cover up or otherwise incorporate the Nonconforming work or materials before the Administrator has approved of the proposed action in writing.

If the Administrator observes a Nonconformance and the Contractor, when informed of such, does not take appropriate action, the Administrator will issue a corrective action request. Within one working day of receipt of the corrective action request, the Contractor shall issue a Nonconformance Report.

Where the proposed action to correct the Nonconformance will result in work not complying with the requirements of the Contract, the identification of a Nonconformance and the subsequent issue of a Nonconformance Report and/or corrective action request shall constitute a Hold Point in accordance with Clause 8.3.2.

Throughout the Technical Specifications, requirements in the event of a Nonconformance which may occur are identified in the text as **Nonconformance**. Areas where the Administrator may have cause to raise a corrective action request are identified as **Corrective Action Request**.

## **11 Quality records**

### **11.1 General**

The Contractor or their major subcontractors or suppliers shall, from the commencement of the Contract until the Date of Practical Completion, establish, file and maintain at its Site office, or other location approved by the Administrator, for inspection by the Administrator and the Principal up-to-date records which demonstrate implementation of the Contractor's Quality System including the Contract Plan documents.

Notwithstanding any other nominated timeframe, prior to the issue of the Final Certificate, the Contractor shall have handed over to the Administrator the following records, or certified copies thereof:

- a) the lot register that clearly allows forensic location of a lot as described in this Technical Specification
- b) test results, analyses, reports, measurements and observations as defined in the Contract or as nominated by the Administrator. These shall be provided in an electronic format able to be directly uploaded into a departmental data system where that capability exists.
- c) all conformance and Nonconformance reports, and
- d) As Constructed drawings and surveys for Work under the Contract.

Quality Records retained by the Contractor pursuant to the requirements of the Contractor's Quality System and the Contract shall be available for evaluation by the Administrator up to and including the time of issue of the Final Certificate.

The Administrator and/or Principal may have sampling and testing records reviewed to determine if all sampling and testing was undertaken by registered CMT suppliers in keeping with the Contractor's Inspection and Test Plans.

This clause shall be read in conjunction with Clause 12.1 and Clause 12.2 detailing requirements for the preparation of As Constructed drawings.

### **11.2 Retention of records**

The Contractor shall retain all records from the Contract in accordance with the Contractor's statutory requirements and company policy.

If not otherwise required, records shall be kept for at least one year after the date of the Final Certificate.



## 12 As Constructed drawings

### 12.1 Preparation and submission of As Constructed drawings

As Constructed drawings are to be prepared that represent the design as it has been constructed, including any drafting and design modifications made since the Issued for Construction (IFC) issue of the drawings.

As Constructed drawings shall be provided to the Administrator as a condition precedent to the issue of the Certificate of Practical Completion.

Responsibility to produce As Constructed drawings is dependent on Contract type, see Table 12.3. Where the Principal is responsible for the production of As Constructed drawings, the Contractor's Representative is responsible to provide final revision drawings to enable As Constructed drawing creation.

### 12.2 Format of As Constructed drawings

The As Constructed drawings shall be free of clouds and all revision indicators and the text shall be modified to black.

### 12.3 Verification and certification requirements of As Constructed drawings

Where works are constructed out of tolerance or other engineering design change that would affect the engineering intent or functionality, the work is deemed 'Design Revision' and shall be certified by the relevant RPEQ design engineer(s) as revisions prior to the As Constructed revision. Where the Principal has supplied the IFC drawings this will be the Principal's RPEQ design engineer. In all other cases it will be the Contractor's RPEQ design engineer.

Where the IFC drawings require amendment but the changes do not affect the engineering intent or functionality (for example, a service is located in a different position to that shown on the IFC drawings), these drawings do not require RPEQ certification and only require verification by the designer or drafter responsible for preparing the drawing. Similarly, the As Constructed revision only requires verification as an acknowledgement of previous drafting and design revisions.

Where the IFC drawings are not required to be amended, or where the latest revision drawings only require the removal of clouds, to be reissued as As Constructed drawings, there is no requirement for RPEQ certification.

The Contractor's Representative shall sign a statement stating that 'the works shown on the drawings are a factual representation of works constructed'. These are submitted to the Administrator for review and acceptance prior to being submitted to the designer / drafter to update the drawing in AutoCAD and reissue the drawings as As Constructed drawings.

Transport and Main Roads' *Drafting and Design Presentation Standards Manual* includes guidance for the preparation of As Constructed drawings.

#### **As Constructed Drawings**

**Purpose:** The purpose of As Constructed drawings is to provide an accurate record and validation that the works were constructed according to the design dimensions, specifications, all other construction details and variations shown on the design drawings.

**Definition:** As Constructed drawings reflect all on site changes such as dimensions and geometric location of all elements on the design drawings during the construction process. They have been certified by the Contractor's Representative as being a Factual Representation of what was built. Dimensions are usually not validated by on site survey measurements. Hence, they may not reflect a survey accurate representation of the constructed works.

**When does the Principal supply the IFC drawings?** This is determined by the type of Contract that has been used to engage the Contractor. The Principal will supply the IFC drawings to the Contractor in contracts where the design has been finalised and the Contractor has only been engaged to deliver the Works. This is the case for the Transport Infrastructure Contract (TIC) – Construct Only, TIC – Sole Invitation, Minor Infrastructure Contract (MIC) and some Maintenance Contracts. These Contract types are the most common ways that Contractors are engaged to deliver works for the Department of Transport and Main Roads.

Other Contract types such as TIC – Design and Construct, and Collaborative Project Agreement, will require the Contractor to undertake at least some additional design work and subsequently issue its own IFC drawings. These Contracts are more frequently used for large construction projects where the Contractor will have a design team as part of the works delivery. It is therefore appropriate for the Contractor in these situations to retain responsibility for amendments to the design. The table following provides an overview of works delivery methods, Contract types, and whether the Principal will supply IFC drawings (further detail on Contract types can be found in the department's TIPDS Volume 1).

**Table 12.3 – Responsibility for supply of drawings**

| Delivery model                         | Contract types   | Issued for Construction drawings supplied by | As Constructed drawings supplied by |
|--|--|--|-------------------------------------|
| Design and then Construct              | TIC and MIC – Construct Only<br>TIC and MIC – Sole Invitation  | Principal                                    | Contractor                          |
| Design and then Document and Construct | Document and Construct – Design Novation   | Contractor                                   | Contractor                          |
| Design and Construct                   | TIC – Design and Construct (Design and Construct)<br>Collaborative Project Agreement<br>Collaborative Project Delivery Agreement | Contractor                                   | Contractor                          |
| Design, Construct and Maintain         | Design, Construct and Maintain<br>Public Private Partnerships  | Contractor                                   | Contractor                          |

## 12.4 As Constructed documents for structures

Since structures generally have a design life of 100 years, there is a significant long-term Asset Management requirement attached to each structure. As a consequence, the quantum of 'As Constructed' documents required for a structure is significantly larger than that usually associated with road works. The department's Bridge Information System (BIS) is capable of storing a number of files associated with the construction of structures. When submitting digital files as part of the Handover Document care should be exercised to ensure that the documents are provided in a simple format which can be accessible well into the future.

For each structure in the Contract a 'Structure As Constructed Handover Pack' shall be prepared, for submission to the Deputy Chief Engineer Structures.

Structure construction handover documentation shall include at least:

- 'As Constructed' drawings complying with Clause 12.3 of this document
- RPEQ certification of all design changes
- records as detailed in the relevant Transport and Main Roads Technical Specifications, and
- construction records, including all associated Nonconformance Reports (NCR) or Requests For Information (RFI) whether completed, closed out or otherwise.

Further details of the precise requirements for As Constructed documents can be found in the relevant Transport and Main Roads' Technical Specification.

There is currently a process of transitioning the reporting requirements for As Constructed data from each individual Technical Specification to MRTS50. An overlap will occur until such time as all the Technical Specifications have been amended to reflect this new philosophy.

### 12.4.1 BIS Inspection

When as part of the Contract the Contractor is required to undertake a BIS Level 2 (or 3) inspection then the results of this inspection shall be presented in a format capable of being uploaded into the Bridge Information System.

### 12.4.2 Timing

Documents required by this Technical Specification may be delivered progressively as major elements of the works are completed or on completion of the project. All documents, other than As Constructed drawings, shall be delivered not later than four weeks after Practical Completion.

Some documents or data which is required to permit works to be accessed for acceptance or for the release of hold points may be required during construction, such data may include but not limited to piling test data (Vibration records, PM or HSDA) concrete strength tests data or other monitoring data. Where requested by the Administrator such data shall be made available to the Administrator in real time. Provision of such data during construction shall in no way effect the delivery of a complete set of data in the hand over report.

### 13 As Constructed survey

As Constructed surveys are to be undertaken where specified in the Contract documentation. These may include works as specified in MRTS56 *Construction Surveying*, or other relevant Technical Specifications that form part of the Contract.

Deliverables including the Survey Control Register, Conformance and all As Constructed survey data, shall be provided as specified in MRTS56 *Construction Surveying*.

#### **As Constructed Survey**

**Purpose:** The purpose of As Constructed Survey works is to provide an accurate spatial record of completed works for record purposes that can be used to validate completion and conformance of works for contractual purposes. They can be used as a basis for future design works and for accurate future location such as in the case of constructed underground assets.

**Definition:** As Constructed Survey refers to detail site survey measurements that accurately record details of completed works. They can reflect real world constructed objects depicting surface shapes in three dimensions (3D) in geospatially referenced location. They also provide descriptive attribute information.

Superseded

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