ITS specification
Handover and commissioning process
(ITS-10-01)

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Document management plan

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   The purpose of this document is to specify the requirements for the handover commissioning and maintenance acceptance process requirements for technology systems and equipment.

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</tr>
</tbody>
</table>
# Contents

Document management plan .................................................. i

Record of amendments ......................................................... ii

## 1.0 Purpose of the document ............................................. 1

1.1 Scope ........................................................................ 1

1.2 Staging ....................................................................... 1

1.3 Background ................................................................. 1

## 2.0 ITS equipment design considerations .............................. 3

2.1 Whole of life considerations ........................................... 3

2.2 Operational requirement considerations ........................... 3

2.3 Assumptions ................................................................. 3

## 3.0 Process overview ......................................................... 4

## 4.0 Stage 1 – Factory acceptance testing ............................... 5

4.1 Factory acceptance testing requirements .......................... 5

4.2 Key activities, deliverables and responsibilities ................ 5

4.2.1 Equipment approval .................................................. 5

4.2.2 Factory acceptance test ............................................. 6

4.2.3 FAT documentation .................................................. 6

4.2.4 Milestone completion ................................................ 6

## 5.0 Stage 2 – Site acceptance testing ..................................... 7

5.1 Installation and site acceptance testing ............................. 7

5.2 Key activities, deliverables and responsibilities .................. 7

5.2.1 Network change request ........................................... 7

5.2.2 Develop site acceptance procedure ............................. 8

5.2.3 Site acceptance test .................................................. 8

5.2.4 SAT documentation .................................................. 8

5.2.5 Milestone completion ................................................ 9

## 6.0 Stage 3 – Network testing and commissioning ................ 10

6.1 Network testing ......................................................... 10

6.2 Site/system commissioning ............................................ 11

6.3 Key activities, deliverables and responsibilities .................. 11
6.3.1 Detail commissioning plan 11
6.3.2 Operator training 11
6.3.3 User acceptance testing 12
6.3.4 User acceptance testing documentation 12
6.3.5 Milestone completion 12

6.4 Practical completion and handover requirements 13
6.4.1 General 13
6.4.2 Contractual information 13
6.4.3 Operations and maintenance information 13
6.4.4 As-built documentation 13
6.4.5 Certification and test results 13
6.4.6 Training documentation 13
6.4.7 Spares documentation 14
6.4.8 Software/firmware 14
6.4.9 Site data 14

6.5 Operational handover 14
6.5.1 Practical completion plan 14
6.5.2 Practical completion inspections 14
6.5.3 Practical completion documentation 15
6.5.4 Milestone completion 15

6.6 Road asset maintenance management 15

7.0 Stage 4 – Defects liability 16
7.1 Maintenance requirements for new assets 16
7.2 28-day test 16

8.0 Stage 5 – Maintenance handover 17

9.0 Appendices 18
9.1 Appendix A – Handover flow chart 19
9.2 Appendix B – Auckland motorways guidelines 20
1.0 Purpose of the document

1.1 Scope

The purpose of this document is to define the process that is to be followed in the delivery and handover of ITS Systems and Components into Operation and Maintenance (O&M).

This document describes the elements that should be considered prior to commencement of installation works through to those activities involved in handing a Technology Scheme over for operation and maintenance.

The key elements of commissioning are identified along with the order in which these shall be addressed. Familiarisation with this document shall enable the user to understand the correct sequence of events needed to ensure that the commissioning of a Technology Scheme is implemented successfully.

1.2 Staging

The key stages of the Technology Scheme handover and commissioning process as defined below are:

a. Stage 1 Factory Acceptance Testing
b. Stage 2 Site Acceptance Testing
c. Stage 3 Network Testing and Commissioning
d. Stage 4 Defects Liability Maintenance
e. Stage 5 Maintenance Handover.

Key stakeholders involved within each stage of the Commissioning Process are identified within this document but the typical roles stated are subject to contract specific conditions and as such should be determined at the start of each stage.

Collaboration is a crucial element to the Commissioning and Handover Process and this is repeatedly emphasised throughout this document.

Each stage of the Commissioning Process includes a list of Deliverables that shall be in place before the next stage of the process is commenced. This list is not exhaustive and is intended to give examples of the requirements on a typical scheme. Contract specific conditions shall always be applied to the generic requirements laid out within this document and the extensive list of associated specifications.

Specific areas of risk are also identified at the end of this overview chapter to allow the user to be aware of some of the issues that may prevent the Commissioning Process from progressing from one stage to another.

1.3 Background

Effective maintenance and operation of Technology Systems is essential for the safety of all road users and for achieving the NZ Transport Agency’s (NZTA) objectives as Network Operator.

The NZTA’s role includes through life support for its Technology Systems. The operation and maintenance element of this is provided by contractors appointed on a term basis. Their objectives are to optimise operational availability and minimise whole life costs, whilst protecting capital investment. Such objectives can only be achieved where there are economies of scale from standardised equipment, and effective operational and maintenance practice.
At the Maintenance Handover stage of a scheme (stage 5), the systems provided must be handed over to the appropriate maintenance authority for ongoing O&M support. As part of this process, the NZTA needs to be satisfied that the systems can be maintained in accordance with national standards and practice. This ensures that through whole-life support objectives are achieved, and that safety is not compromised. It is therefore a contractual requirement for all schemes that provide Technology Systems to comply with the O&M requirements defined in this specification. Failure to comply will mean that adequate through life and maintenance support cannot be guaranteed.
2.0 ITS equipment design considerations

2.1 Whole of life considerations

When designing a deployment of ITS field equipment the whole of life of the equipment must be considered, the deployment of unsupported equipment types and systems can significantly impact ongoing costs and reliability as do maintenance access issues.

It is important that there is consistency of hardware and communications protocols being integrated in the field and that the equipment is the current model and is supported by the manufacture and available through more than one supplier.

If a new type of equipment is proposed it must go through type approval testing by the NZTA and their network operations and maintenance organisations to ensure compatibility with existing systems and functional requirements for operations.

It is acknowledged that the ITS field is driven by constant technical advances and thus the network operations and maintenance organisations can provide guidance for any issues that the contractor may perceive.

It is very important to provide safe maintenance access for ITS installations as the sites are often critical to the safe operation of the road corridor and rapid access to assist without the need for traffic management.

2.2 Operational requirement considerations

During the design phase it is critical that the Control Room Operators, Traffic Management Units, Network Operators and Regional Maintenance Organisations are consulted on the proposed locations of new equipment to ensure that the equipment locations are both serviceable and provide the Control Room Operators and the Traffic Management Unit with an asset that fits their requirements.

2.3 Assumptions

A control and development process controlled by the Contract Engineer runs in parallel to this specification and its functionality is mentioned but not described.

It is assumed that all change control requests and network configuration documentation has been compiled and approved by the relevant organisations for these process to proceed.
3.0 Process overview

Figure 1 summarises the Commissioning Process for Technology Schemes. The flow chart may be applied to the commissioning of any Technology Scheme and each stage is summarised within this document.

Figure 1: Handover process flow chart
Please note: A copy of this flow chart is attached in appendix A

There is a ‘HOLD POINT’ between each stage in the process where all deliverables identified for that stage of a scheme must be in place before progressing to the next stage.

The Activities that make up each stage of the process are identified in process charts within appendix A of this document. These are expanded upon within part B with descriptions, specific key deliverables, responsibilities and timescales for all the activities.
4.0 Stage 1 – Factory acceptance testing

4.1 Factory acceptance testing requirements

All items of equipment supplied shall be comprehensively tested in the manufacturer’s production facility in accordance with documented and certified testing procedures.

Production test reports for each item of equipment shall be collated, bound and delivered as part of the As Built documentation requirements.

It shall be the Contractor’s responsibility to demonstrate that all tests have been carried out and that the test reports demonstrate the equipment is fit for the designed purpose. Schedule of Works shall include dates for all tests. Contractor shall provide adequate notice of dates when testing will actually take place.

All equipment and systems supplied are required to undergo comprehensive pre-delivery factory acceptance testing to be witnessed by the Engineer, or their representative.

Three weeks before the scheduled date for factory acceptance testing the Contractor shall submit a detailed list of the proposed factory acceptance test procedures for the Engineer’s review and acceptance. The Engineer shall review the test procedure and the Contractor shall incorporate any requested modifications in the procedure and resubmit prior to the scheduled tests.

All measuring instruments required to measure parameters shall be calibrated by an approved testing authority. The equipment will be inspected for standards of construction and electrical and mechanical safety. Testing shall be carried out at the place of manufacture or assembly.

The Contractor shall inform the Engineer in writing two weeks in advance of the Contractor’s intent to undertake the tests. The Engineer, or the Engineer’s representative, will attend and witness the tests.

Prior to testing, all equipment under test shall be livened and left to “soak” for at least 24hrs.

4.2 Key activities, deliverables and responsibilities

4.2.1 Equipment approval

The key deliverable is that all items of technology identified in the design have met the criteria outlined in the Asset Technical Specification.

The roles and responsibilities are:

a. NZTA’s Project Manager: Overall Control of the Project and order approval;

b. Engineer’s Representative: Act on behalf of the client and providing liaison between contractor and the client;

c. Contractor: Responsible for the delivery of technology into operations and maintenance;

d. NZTA’s Network Communications Team: Confirm acceptability of proposed equipment in the network;

e. Maintenance Contractor: Advise acceptability of proposed equipment maintenance requirements.

The expected outcomes and benefits are early identification of proposed equipment for the Network Communication Team and Maintenance Contractor shall ensure no delays with integration further down the line, enables the maintenance contractor to better plan maintenance regimes with the early notification of new assets.
4.2.2 Factory acceptance test

The key deliverable is to witness that the operation of the technology meets the minimum requirements identified prior to purchase in the assets functional requirements and technical specifications.

The roles and responsibilities are:

a. NZTA’s Project Manager: Overall Control of the Project;
b. Engineer’s Representative: Act on behalf of the client and providing liaison between contractor and the client;
c. Contractor: Responsible for the delivery of technology into operations and maintenance;
d. Manufacturer: Perform the Factory Acceptance Test;
e. Maintenance Contractor: An optional attendee.

The expected outcomes and benefits are that the asset’s core functionality is confirmed and its ability to exist within the operational environment is highlighted and that manufacture issues are identified prior to delivery, ensuring speedier resolution. Early involvement of the maintenance organisation to satisfy themselves of the validity of the test will streamline their subsequent acceptance of the equipment handover.

4.2.3 FAT documentation

The key deliverable is compilation of test certificates detailing the asset’s worthiness and operational abilities.

The roles and responsibilities are:

a. NZTA’s Project Manager: Overall Control of the Project;
b. Engineer’s Representative: Act on behalf of the client and providing liaison between contractor and the client and certification of the documentation to form part of the handover process;
c. Contractor: Prepares documentation for the Engineer;
d. Maintenance Contractor: Review test results and advise the Engineer of the acceptability of test results.

Certification and sign-off from the NZTA and their maintenance contractor provides the start of the evidence chain of the asset’s ability to operate. Documentation will form part of the handover process that will be delivered to the NZTA and their maintenance contractors in order for the ITS System and components to be handed over.

4.2.4 Milestone completion

The key deliverable is the sign off of each asset’s operational suitability order to move to the Site Acceptance stage.

The roles and responsibilities are:

a. NZTA’s Project Manager: Overall Control of the Project;
b. Engineer’s Representative: Act on behalf of the client and providing liaison between contractor and the client;
c. Contractor: Install pre-approved technology;
d. NZTA’s Network Communications Team: Confirm acceptability of proposed equipment in the network;
e. Maintenance Contractor: Confirm their agreement with the technologies operational worthiness.

The expected outcomes and benefits of ensuring that all parties have signed off prior to the completion of stage 1 is to provide an audit trail that will assist in the successful handover of ITS components and the entire system into operational maintenance.
5.0 Stage 2 – Site acceptance testing

5.1 Installation and site acceptance testing

Upon completion and the sign off of stage 1 the technology is ready for installation. The purpose of the site acceptance test is to satisfy all parties that the asset and associated components are operating correctly in the local environment prior to any network configuration.

A pre-SAT will be undertaken by the contractor prior to the actual SAT to ensure operational capability.

The Contractor shall supply structured site testing and commissioning procedures in line with the NZTA guidelines for Site Acceptance Testing for all equipment in the scope of their supply. The procedures shall cover site tests to be performed on individual components, subsystems, and the complete system, as necessary to confirm that the system functions satisfactorily and fulfils the requirements of this specification.

These procedures shall be made available to the Contract Engineer prior to the commencement of any test. These procedures will be made available by the Engineer to both the NZTA’s Project Sponsor and the Regional Maintenance Contractor for external review; only upon approval from both organisations shall the Engineer permit the tests to commence.

All tests shall only be carried out between the hours of 10:00 – 15:00 Monday to Friday to ensure the tests do not impact on the normal day to day operation of the network or cause any undue concern with motorist. However dispensation may be granted by the Engineer if these tests are undertaken in environments that are not accessible to the general public. Tests that are required to be undertaken outside normal working hours shall need to be organised a minimum of 3 weeks in advance of the test to ensure all parties are available.

The following organisations shall be involved in all Site Acceptance Testing, their roles and reasonability’s shall be fully defined within the testing procedures supplied by the contractor but will typically include:

- NZTA’s Project Sponsor: Responsible for the overall project;
- Contract Engineer: Witness for the Project;
- Contractor: Responsible for undertaking the test;
- Maintenance Organisation: Witness for O&M.

5.2 Key activities, deliverables and responsibilities

5.2.1 Network change request

The key deliverable is to ensure all technology that will be eventually connected to the NZTA’s network is configured in accordance with the NZTA’s Network operations protocols and relevant subsystem configuration, e.g. DVTel CCTV Configuration.

The roles and responsibilities are:

a. NZTA’s Project Manager: Overall Control of the Project;

b. Engineer’s Representative: Review network change requests and provide liaison between contractor and the client;

c. Contractor: Produce the relevant documentation that will enable each asset to connect to the NZTA network and associated sub systems;

d. NZTA’s Network Communications Team: Approval of network change requests.
The expected outcome and benefit of ensuring that all control and addressing documentation is complete is a speedier integration into the NZTA’s network resulting in a right first time response and that when all parties are fully aware of what is due to be connected there will be no gaps in commissioning.

5.2.2 Develop site acceptance procedure

The key deliverable is the detailed document outlining each test that will be undertaken including a program of delivery that will outline the timings of each event and expected outcome.

The roles and responsibilities are:

a. NZTA’s Project Manager: Overall Control of the Project;

b. Engineer’s Representative: Approves testing procedure on behalf of the client. Liaison between contractor and required attendees of the test;

c. Contractor: Responsible for the development of testing plan;

d. NZTA’s Network Communications Team: Advised of proposed testing, equipment is not to be connected to the network so minimal impact.

The expected outcomes and benefits are that the asset’s core functionality is confirmed and its ability to exist within the operational environment is highlighted and that manufacture issues are identified prior to delivery, ensuring speedier resolution. Early involvement of the maintenance organisation to satisfy themselves of the validity of the test will streamline their subsequent acceptance of the equipment handover.

5.2.3 Site acceptance test

The key deliverable is to witness that the operation of the technology meets the minimum requirements identified prior to purchase in the assets functional requirements and technical specifications and the equipment operates within the environment.

The roles and responsibilities are:

a. NZTA’s Project Manager: Overall Control of the Project;

b. Engineer’s Representative: Act on behalf of the client and providing liaison as witnessing the test;

c. Contractor: Responsible for the Site Acceptance Testing;

d. Maintenance Contractor: An optional attendee.

The expected outcomes and benefits are that the asset’s core functionality and its ability to work in the operational environment is confirmed and local issues are identified and resolved prior to network integration, ensuring speedier resolution. Early involvement of the maintenance organisation to satisfy themselves of the validity of the test will streamline their subsequent acceptance of the equipment handover.

5.2.4 SAT documentation

The key deliverable is compilation of test certificates detailing the asset’s worthiness and operational abilities in its operational environment.

The roles and responsibilities are:

a. NZTA’s Project Manager: Overall Control of the Project;

b. Engineer’s Representative: Act on behalf of the client and providing liaison between contractor and the client and certification of the documentation to form part of the handover process;

c. Contractor: Prepares documentation for the Engineer;

d. Maintenance Contractor: Review test results and advise the Engineer of the acceptability of test results.
Certification and sign-off from the NZTA and their maintenance contractor continues the evidence chain of the asset’s ability to operate. Documentation will form part of the handover process that will be delivered to the NZTA and their maintenance contractors in order for the ITS system and components to be handed over.

5.2.5 Milestone completion

The key deliverable is the sign off of that ITS site and associated assets is operational in order to move to stage Network Testing and Commissioning stage.

The roles and responsibilities are:

a. NZTA’s Project Manager: Overall Control of the Project;
b. Engineer’s Representative: Act on behalf of the client and providing liaison between contractor and the client;
c. Contractor: Install factory tested technology;
d. NZTA’s Network Communications Team: Confirm acceptability of proposed equipment in the network;
e. Maintenance Contractor: Confirm their agreement with the technologies operational worthiness.

The expected outcomes and benefits of ensuring that all parties have signed off prior to the completion of stage 2 is to provide an audit trail that will assist in the successful handover of ITS components and the entire system into operational maintenance.
6.0 Stage 3 – Network testing and commissioning

6.1 Network testing

Upon completion of stage 2 and with the agreement of the Contract Engineer and Regional Maintenance Contractor each site and associated assets shall be in a position for network integration.

Strict NZTA’s procedures shall be followed to ensure the integrity of the existing network and associated assets are not comprised by the introduction of additional and new technologies. This stage of the Handover and Commissioning Process shall be a collaborative effort between the following parties:

a. NZTA’s Project Sponsor;
b. Contract Engineer;
c. Installation Contractor;
d. Regional Maintenance Contractor;
e. NZTA’s Network Management and Configuration Team.

A detailed testing and commissioning plan shall be developed between the Contract Engineer and the Installation Contractor outlining in clear detail the delivery timescales and the roles and reasonability’s that each member of the Testing and Commissioning Team shall undertake.

This plan shall include:

a. Dates and Times the Integration shall take place;
b. The order of connection;
c. Provide detail of all assets that are being connected including:
   - equipment type
   - manufacture
   - serial number
   - communication path
   - IP address
   - MAC address
   - relevant configuration detail
   - SAT results
   - relevant technology tests
   - roles and reasonability’s
   - all involved contact details, including fall back contact.

Upon completion of the testing and commissioning plan it shall be circulated to the relevant parties involved for their approval, upon agreement the network integration can commence.
6.2 Site/system commissioning

The Commissioning Process identifies the activities that shall be undertaken to ensure that the new systems installed under a scheme are fully operational and suitable to be taken into operational maintenance.

Each asset shall have completed a Site Acceptance Test (SAT) which tests every operation of that system. The majority of the commissioning is carried out from the Traffic operations Centre.

Collaboration shall form an integral part of the site commissioning and a detailed plan shall need to be developed in line with the Traffic Operations Centre and Traffic Management Units, the following parties shall be involved in the process:

a. NZTA’s Project Sponsor;
b. Contract Engineer;
c. Installation Contractor;
d. Regional Maintenance Contractor;
e. NZTA’s Network Management and Configuration Team;
f. Traffic Operations Centre and Management;
g. Traffic Management Unit.

By the end of the commissioning stage the systems installed under a scheme shall be fully operational and in use by the operators. At this point the scheme shall be handed into Support Maintenance until such a time that the activities described under the handover process have been completed.

This should be a short period of time if the requirements of this document have been followed and all milestones completed.

The following table outlines the elements of the testing and commissioning process.

6.3 Key activities, deliverables and responsibilities

6.3.1 Detail commissioning plan

The key deliverable is an entire system commissioning plan resulting in an operational system.

The roles and responsibilities are:

a. NZTA’s Project Manager: Overall Control of the Project and order approval;
b. Engineer’s Representative: In collaboration with the Traffic operations and Contractor produce the commissioning plan that will enable the system to be handed into operational maintenance;
c. Contractor: Develop commissioning Plan and Undertake Site Tests during commissioning;
d. NZTA’s Traffic Operations Centre: Assist in developing commissioning plan with the Engineer and Installation Contractor.

The expected outcomes and benefits are an agreed commissioning plan and timescales, all parties identified and within which order activities should be undertaken to ensure no delays with integration further down the line.

6.3.2 Operator training

The key deliverable is that each Traffic Operations Centre Operator is familiar with the technology assets and the system in its entirety.

The roles and responsibilities are:

a. NZTA’s Project Manager: Overall Control of the Project;
b. Engineer’s Representative: Provide testing procedure approval on behalf of the client and liaison between contractor and required trainees;

c. Contractor: Responsible for the arrangement of training courses;

d. NZTA’s Traffic Operations Centre: Make Operators available for training.

The expected outcomes and benefits are that when all operators are fully versed in the operation of the assets and understand their relationship to the overall system the system operation will be optimized.

6.3.3 User acceptance testing

The key deliverable is live operational testing of components within the system and the system itself.

The roles and responsibilities are:

a. NZTA’s Project Manager: Overall Control of the Project;

b. Engineer’s Representative: Act on behalf of the client and providing liaison as witness for the client;

c. Contractor: Responsible for the test and production of operator reference manuals;

d. NZTA’s Traffic Operations Centre: Operator availability for user acceptance testing;

e. Maintenance Contractor: O&M witness of user testing.

The expected outcomes and benefits are that the asset’s core functionality is confirmed and its ability to exist within the operational environment is highlighted and that manufacture issues are identified prior to delivery, ensuring speedier resolution. Early involvement of the maintenance organisation to satisfy themselves of the validity of the test will streamline their subsequent acceptance of the equipment handover.

6.3.4 User acceptance testing documentation

The key deliverable is certification detailing the Traffic Operation Centre sign off of the operational ability of the asset.

The roles and responsibilities are:

a. NZTA’s Project Manager: Overall Control of the Project;

b. Engineer’s Representative: Act on behalf of the client and providing liaison between contractor and the client and compiling the UAT documentation to form part of the handover process;

c. Contractor: Prepares documentation for the Engineer;

d. NZTA’s Traffic Operations Centre: User Acceptance Test sign off;

e. Maintenance Contractor: Review and sign off on fault management system.

Sign-off from the Traffic Operations Centre confirms the systems acceptance into operation. Documentation will form part of the handover process that will be delivered to the NZTA and their maintenance contractors in order for the ITS System and components to be handed over.

6.3.5 Milestone completion

The key deliverable is the sign off of each asset’s operational suitability order to move to the Site Acceptance stage.

The roles and responsibilities are:

a. NZTA’s Project Manager: Overall Control of the Project;

b. Engineer’s Representative: Act on behalf of the client and providing liaison between contractor and the client;

c. Contractor: Install pre-approved technology;

d. NZTA’s Network Communications Team: Confirm acceptability of proposed equipment in the network;

e. Maintenance Contractor: Confirm their agreement with the technologies operational worthiness.
The expected outcomes and benefits of ensuring that all parties have signed off prior to the completion of stage 1 is to provide an audit trail that will assist in the successful handover of ITS components and the entire system into operational maintenance.

### 6.4 Practical completion and handover requirements

#### 6.4.1 General

Running parallel to the system commissioning and handover to operations will be the practical completion process that will enable the completion of stage 3. It is at this point all documentation and associated software’s associated with the project will be complete in preparation for handover, all documentation, software and spares will need to be handed to the NZTA prior to the practical completion inspections, and the documentation will form part of this process.

The following list details the required documentation to be handed to the NZTA prior to Practical Completion, all documents shall be available in both paper and electronic format:

- All drawings shall be in an approved NZTA’s format agreed at time of contract and supplied in a fully editable version with all relevant reference layers, paper copies in A3 landscape format shall also be provided.

#### 6.4.2 Contractual information

- Signed contract excluding pricing information, supplied by the NZTA.
- Notice to Engineer detailing variations and engineer requests, supplied by the Engineer to the Contract.

#### 6.4.3 Operations and maintenance information

- Project overview, provided by the NZTA.
- System Operations Manual, prepared by the Contractor.
- Asset manuals including conformance certification, prepared by the Contractor.

#### 6.4.4 As-built documentation

- Site drawings, marked up by the Contractor and certified by the Engineer.
- Fibre optic information, provided by the Contractor.
- Power supply details, provided by the Contractor.
- Cabinet wiring diagrams, provided by the Contractor.
- Structural designs, provided by the Design Engineer.

#### 6.4.5 Certification and test results

- Civil construction results, provided by the Contractor.
- Safety audit report, provided by the Engineer.
- Producer statements, provided by the Contractor.
- Electrical certificates, provided by the Contractor.
- SAT/FAT/UAT documentation, provided and certified by the Engineer.

#### 6.4.6 Training documentation

- Operator and maintenance manuals, provided by the Contractor.
- Test/maintenance software, provided by the Contractor from the manufacturer.
6.4.7 Spares documentation
Critical spares, provided by the Contractor.
Long lead time spares, provided by the Contractor.
Quantity list of all assets, provided by the Contractor.

6.4.8 Software/firmware
Firmware version list, provided by the Contractor.
Copies of all current firmware, provided by the Contractor.
Special instructions of software use and requirements.

6.4.9 Site data
System configuration information, provided by the Contractor.
GPS reference, provided by the Contractor.
Full equipment list, provided by the Contractor.
Warranty details of all assets, provided by the Contractor.
Site data will form part of the RAMM requirements which are detailed in Section 6.6.

6.5 Operational handover

The key activities, deliverables and reasonability table for operational handover are as follows:

6.5.1 Practical completion plan
The key deliverable is a program delivery plan detailing the roles and reasonability's of all people in regard of the practical completion of the site.

The roles and responsibilities are:
a. NZTA's Project Manager: Overall Control of the Project;
b. Engineer’s Representative: In collaboration with the Traffic operations and Contractor produce the Practical Completion plan;
c. Contractor: Develop commissioning plan and Practical Completion Plan;
d. NZTA’s Network Communications Team: Confirm acceptability of proposed equipment in the network;
e. Maintenance Contractor: Develop commissioning plan with the Engineer and Installation Contractor.

The expected outcomes and benefits are an agreed Practical Completion Plan and timescales, all parties identified and within which ordered activities should be undertaken.

6.5.2 Practical completion inspections
The key deliverable is to Undertake Practical Completion inspections at all sites within the project delivered directly by the installation contractor.

The roles and responsibilities are:
a. NZTA’s Project Manager: Overall Control of the Project;
b. Engineer’s Representative: Attends and certifies each inspection;
c. Contractor: Carries out each inspection under the guidance of the contract engineer;
d. Maintenance Contractor: Attends to ensure each site is maintainable.
The expected outcomes and benefits are that all Practical Completion inspections are completed on time with minimal defects discovered and that the maintenance organisation is satisfied with quality of work and willing to acceptance into operational maintenance after completion of the 28-day test.

6.5.3 Practical completion documentation

The key deliverable is production of a detailed report detailing the condition of each site and any defects in existence at the time of inspection.

The roles and responsibilities are:

a. NZTA’s Project Manager: Overall Control of the Project;
b. Engineer’s Representative: Review report prior to issue;
c. Contractor: Prepares report documentation for the Engineer;
d. Maintenance Contractor: Review report prior to issue and advise the contract engineer of any issues.

Documentation of the full agreement between the Client, Contractor Engineer, Installation Contractor and the Maintenance Organisation of the status of each site and the required work needed to ensure handover.

6.5.4 Milestone completion

The key deliverable is the sign off of each asset’s operational suitability order to move to the Defects Liability stage.

The roles and responsibilities are:

a. NZTA’s Project Manager: Overall Control of the Project;
b. Engineer’s Representative: Act on behalf of the client and providing liaison between contractor and the client;
c. Contractor: Install pre-approved technology;
d. NZTA’s Network Communications Team: Confirm acceptability of proposed equipment in the network;
e. Maintenance Contractor: Confirm their agreement with the technologies operational worthiness.

The expected outcomes and benefits of ensuring that all parties have signed off prior to the completion of stage 3 is to provide an audit trail that will assist in the successful handover of ITS components and the entire system into operational maintenance.

6.6 Road asset maintenance management

In order for asset details to be recorded and maintained there is a required for the relevant information to be uploaded and stored in RAMM.

RAMM is the NZTA’s asset management tool that records details of the existing condition and status of all road assets and street furniture, the contractor will be supplied with the relevant RAMM entry form by the NZTA prior to the start of the contract, typically the information required would include:

a. Date of factory acceptance test;
b. Date of site acceptance test;
c. Manufacturer;
d. Equipment type;
e. Serial number;
f. Location;
g. Configuration details;
h. Associated warranty details.
7.0 Stage 4 – Defects liability

Upon completion of stage 3 and the practical completion inspections a defect liability period will be enforced for a period of time determined at the start of the contract. This will be the period of time that the contractor will be required to remedy all defects detected during the PC inspections and any subsequently picked up during the remaining DLP period.

The Defect Liability Period will include all warranties that have been provided for each asset/system.

7.1 Maintenance requirements for new assets

Upon installation and acceptance into operational maintenance the installation contractor shall be responsible for the maintenance of all assets until an agreed handover with the existing maintenance contractor. This is to include all preventative maintenance and fault rectification, at the start of the contract this maintenance regime will have been agreed with the required response and resolve times the maintenance contractor would have to satisfy.

By agreeing the maintenance requirements of the individual assets prior to any installation between the installation contractor and the existing maintenance organisation will ensure that the warranties associated with the individual assets are not compromised with the operation of differing regimes.

The maintenance period will be dependent on the number of assets and scale of installation, for small schemes the handover of operational maintenance shall occur at the end of the 28-day test, for larger projects the contractor may be asked to provide a maintenance facility for an agreed period of time.

7.2 28-day test

Prior to final handover to the maintenance organisation a defined fault free operation period of 28 days will need to occur. The requirements of the 28-day fault free period shall be dependent on the asset type and will be agreed at the start of the contract.

Upon completion of the 28-day fault free period the assets can be handed into operational maintenance. Fault events that occur or events that inhibited the assets from functioning correctly will be examined to determine the cause, any cause deemed to be the reasonability of the asset will be classed as a failure and upon resolve the 28-day test will start again.
8.0 Stage 5 – Maintenance handover

Dependant of the maintenance arrangements agreed at the start of the contract and the length of the DLP period delivered through stage 4 the system and associated assets shall be in a position to be formally handed over into operational maintenance.

All contractual documentation shall have been delivered through stage 3 and all that remains will be the operational reports identifying the level of performance.

Prior to final handover the following will need to be provided by the contract engineer to the NZTA:

- Resolution report of all defects;
- Maintenance records of all assets and systems;
- Fault/performance records of all assets (28-day test).

Once these reports have been completed they will be circulated to the NZTA’s Project Sponsor and the current Maintenance Contractor, upon approval the assets and associated systems can be formally handed into operational maintenance.
9.0 Appendices
9.1 Appendix A – Handover flow chart
9.2 Appendix B - Auckland motorways guidelines

Auckland Motorway Alliance Operations and Maintenance Guidelines for Planning, Design, Construction and Handover of Capital Projects in the Auckland South Area Motorway Network - October 2009 is available from the Auckland Motorway Alliance.