SPECIFICATION 702

ROADSIDE HELP PHONES

REVISION REGISTER			
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CONTENTS

Clause **Page No**

SPECIFICATION 702

ROADSIDE HELP PHONES

GENERAL

702.01 SCOPE

1. This Specification defines the requirements for the supply, installation, testing, commissioning, and handover of Roadside Help Phones (RHPs), and associated equipment required as part of the work under the Contract. ***General***

2. The scope of work covered by this Specification includes: ***Scope***

   (a) the supply of materials for the RHP;

   (b) the installation and workmanship of the RHP;

   (c) the interfacing of the RHP into Main Roads Customer Information Centre (CIC);

   (d) testing, commissioning, and asset handover; and

   (e) the supply of Installation, Operation and Maintenance Manuals (IOMs) and the Manufacture Data Reports (MDRs) as part of the Asset Data Requirements List (ADRL) as detailed in Annexure 702C.

702.02 REFERENCES

1. Australian Standards, Main Roads Western Australia Test Methods, Main Roads Western Australia Standards and Main Roads Western Australia Specifications are referred to in abbreviated form (e.g. AS 1234, MRS 67-08-43 or WA 123). For convenience, the full titles are given below:

Acts and Regulations

Electricity Act 1945 (WA)

Electricity (Licensing) Regulations 1991 (WA)

Western Australian Electrical Requirements

Western Australian Services and Installation Requirements

Australian Standards

AS 1428.2:1992	Design and Access for Mobility
AS 1744:2015	Standard Alphabets for Road Signs
AS 1768:2021	Lightning Protection
AS 2700:2011	Colour Standards for General Purposes
AS 4262.1:1995	Telecommunication Overvoltages Part 1: Protection of Persons
AS 4262.2:1999	Telecommunication Overvoltages Part 2: Protection of Equipment

AS 60529:2004	Degree of Protection Provided by Enclosures for Electrical Equipment (IP Code)

Australian and New Zealand Standards

AS/NZS 1020:2023	The Control of Undesirable Static Electricity
AS/NZS 1125:2001	Conductors in Insulated Electric Cables and Flexible Cords
AS/NZS 1170.2:2021	Structural Design Actions Part 2: Wind Actions
AS/NZS 1580.457.1:1996	Paint and Related Materials – Methods of Test Method 457.1: Resistance to Natural Weathering
AS/NZS 3000:2018	Electrical Installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3008.1.1:2017	Electrical installations - Selection of cables - Cables for alternating voltages up to and including 0.6/1 kV - Typical Australian installation conditions
AS/NZS 3100:2022	Approval and Test Specification – General Requirements for Electrical Equipment
AS/NZS 3111:2009	Approval and Test Specification – Miniature Over-current Circuit Breakers
AS/NZS 4534:2006	Zinc and Zinc/aluminium-alloy Coatings on Steel Wire
AS/NZS 4676:2000	Structural Design Requirements for Utility Poles
AS/NZS 4680:2006	Hot-dipped Galvanised (Zinc) Coatings on Fabricated Ferrous Articles
AS/NZS 4792:2006	Hot-dipped Galvanised (Zinc) Coatings on Ferrous Hollow Sections, Applied by a Continuous and Specialised Process
AS/NZS 5000.1:2005	Electric Cables – Polymeric Insulated – For Working Voltages up to and Including 0.6/1kV
AS/NZS 61000.6.1:2006	Electromagnetic Compatibility (EMC) Part 6.1: Generic Standards – Immunity for Residential, Commercial and Light-industrial Environments
AS/NZS 61000.6.3:2021	Electromagnetic Compatibility (EMC) Part 6.3: Generic Standards – Emission Standard for Equipment in Residential environments (IEC 61000-6.3:2020 (ED 3.0) MOD)
AS/NZS 61558.1:2018	Safety of Power Transformers, Power Supply, Reactors and Similar Products

	Part 1: General Requirements and Tests (IEC 61558-1 Ed 3, MOD)
AS/NZS ISO 9001:2015	Quality Management Systems – Requirements
AS/NZS 4676:2000	Structural Design Requirements for Utility Services Poles

Other Standards

AS/CA S008:2020	Requirements for Customer Cabling Products
AS/CA S009:2020	Installation Requirements for Customer Cabling (Wiring Rules)
IEC 61086.1:2004	Coating for Loaded Printed Wire Boards (Conformal Coatings) – Part 1: Definitions, Classification and General Requirements
IEC 61643-12:2020	Low-voltage Surge Protection Devices – Part 12: Surge Protection Devices Connected to Low-voltage Distribution Systems – Selection and Application Principles

MAIN ROADS Specifications

Specification 100	GENERAL REQUIREMENTS
Specification 201	QUALITY MANAGEMENT
Specification 202	TRAFFIC MANAGEMENT
Specification 301	VEGETATION CLEARING AND DEMOLITION
Specification 302	EARTHWORKS
Specification 801	TRENCHING AND BACKFILL FOR STRUCTURES
Specification 908	ANTI-GRAFFITI

702.03 DEFINITIONS

1. Unless otherwise detailed in the Contract, the meaning of terms and definitions in this Specification are as follows:

ADRL	Asset Data Requirements List
AS	Australian Standard
AS/NZS	Australian and New Zealand Standard
CIC	Customer Information Centre (Main Roads)
CDDL	Contract Drawing and Data List
ERP	Ear Reference Point
FAT	Factory Acceptance Testing

IEC	International Electrotechnical Commission
Installation	"…the installation" used non-specifically, refers to the entire RHP installation including all componentry, local communication infrastructure, firmware, mounting infrastructure and fixing hardware. The intention of "the installation" is to provide an operational RHP.
IOM	Installation, Operation and Maintenance Manuals
IP	Ingress Protection
ISO	International Organisation for Standardisation
ITP	Inspection and Test Plan
RHP	Roadside Help Phone – complete with all components and inherent sub-systems required to provide an operational system.
MDR	Manufacturer Data Report
SMS	Short Message Service
STC	Standard Test Conditions
WA	Western Australia

702.04 – 702.05 NOT USED

PRODUCTS AND MATERIALS

702.06 GENERAL

1. Products and materials must facilitate inspection, cleaning and repairs and must be selected to ensure satisfactory operation under variations of load as may be met on the system, including short circuit. ***Products and Materials***

2. All equipment covered by this Specification must comply with AS/NZS 61000.6.1:2006 and AS/NZS 61000.6.3:2021. ***EMC Immunity***

3. All equipment covered by this Specification must comply with AS/NZS 1020:2023. ***Static Electricity***

4. The RHP must have the following features:

   (a) hands free operation;

   (b) a speaker to clearly broadcast the ring tone and voice communications; and

   (c) a microphone to clearly allow the user to clearly communicate to the Main Roads CIC.

5. The RHP must be designed to be frangible if it is hit by an errant vehicle. ***Frangibility***

702.07 QUALITY OF MATERIALS

1. All materials used must be new and of the finest quality and class most suitable for working under the conditions specified. ***Material Quality***

2. Materials must withstand the variations of temperature and loading arising under working conditions without: ***Working Conditions***

   (a) distortion;

   (b) deteriorating at an unreasonable rate;

   (c) the setting up of undue stresses at any point; and

   (d) affecting its strength and suitability to its ability to perform work.

702.08 EQUIPMENT DESIGN LIFE

1. The design life of an RHP and all associated components, including footings and any structural supports, must be no less than the following: ***Design Life***

   (a) electrical design life – 15 years;

   (b) pillar and associated hardware – 30 years; and

   (c) pillar foundation support footing and associated infrastructure – 50 years.

   The Contractor must provide actual design operation life parameters in the datasheet at Annexure 702A.

702.09 SPARE PARTS

1. The Contractor must submit a complete spare parts list with pricing and submit under code V02 in accordance with the ADRL at Annexure 702C. At a minimum, the list must contain recommended spare parts to ensure ten years of operation. ***Spare Parts List***

2. The Contractor must also submit a commissioning spare parts list as per code V03 in accordance with the ADRL at Annexure 702C. The Contractor must have commissioning spares available for site commissioning works. ***Commissioning Spares***

702.10 MAINTAINABILITY

1. Carrying out maintenance on any part of the RHP system must not require proprietary or specialist tools. ***Maintenance Tools***

2. All internal equipment and cabling must be easily accessible during routine maintenance. There must be no need to remove or adjust other equipment to access any internal component of the RHP. ***Maintenance Accessibility***

3. The regular periodic maintenance requirement for any system component must not be less than 12 months. ***Periodic Maintenance***

702.11 PILLAR AND USER INTERFACE

702.11.01 GENERAL

1. The RHP must be comprised of a self-contained pillar structure which houses the control, communications and electronics attached to the face plate. ***Self-contained***

2. The pillar's specifications must permit attachment to the footing as detailed on Main Roads Standard Drawing 200731-0003. ***Pillar Attachment***

3. The pillar's specifications must permit the attachment of a pole to provide attachment of a solar panel. ***Pole Connection***

4. The pillar must be able to support the solar panel and permit internal routing of cable from solar panel to charge controller. ***Internal Cable Route***

5. The pillar must be pest, insects and vermin proof, including termites, ants, bees, rats and mice. ***Vermin***

6. Access to fixing bolts attaching the RHP must only be accessible from inside the pillar. ***Access***

7. The pillar must be vandal and impact resistant to prevent unauthorised access to the internal equipment. Vandal and impact resistant can be defined as being able to remain functional while withstanding moderate to severe blows by hand-held objects without suffering more than cosmetic damage in most circumstances. ***Vandal and Impact Resistant***

8. The pillar face plate must be fixed to the pillar structure using a panel to tongue latch type, secured with a Main Roads 247E key for a keyed cam lock at the top of the face plate, and a locating flange at the bottom of the face plate. ***247E Keyed***

9. The pillar face plate must have the text 'HELP PHONE' machined 25 mm ± 2 mm below the lock at the top of the face plate, with the following specifications: ***HELP PHONE Text***

   (a) height: 12 mm ± 1 mm;

   (b) thickness: 2.5 mm ± 0.5 mm; and

   (c) colour: B11 in accordance with AS 2700:2011.

10. The pillar face plate must have a machined centric circle around the centre of the call button with the following specifications: ***Annulus***

    (a) radius: 30 mm ± 2 mm;

    (b) thickness: 5 mm ± 1 mm; and

    (c) colour: R13 in accordance with AS 2700:2011.

11. The pillar face plate must have the text 'CALL BUTTON' machined 20 mm ± 2mm below the centric circle around the call button, with the following specifications: ***CALL BUTTON text***

(a) height: 12 mm ± 1 mm;

(b) thickness: 2.5 mm ± 0.5 mm; and

(c) colour: R13 in accordance with AS 2700:2011.

12. Text fonts as per clauses 702.11.01 (9) and 702.11.01 (11) must be in accordance with AS 1744:2015. ***Fonts***

13. The paint for the text and centric circle, as specified in clauses 702.11.01 (9), (10), and (11), must be primed and finished with an epoxy-based application that exceeds the minimum design life specified in clause 702.08. ***Paint***

14. The speaker unit must be located behind a perforated section of the face plate. The perforations must follow the shape of the speaker cone to allow sound to clearly transmit to the user. ***Speaker Unit***

15. The speaker cone must be constructed of a weather resistant material such as Mylar or similar. ***Speaker Material***

702.11.02 CALL BUTTON

1. The user interface must have a singular button that initiates a call. ***Single Call Button***
2. The call button must have the following specifications: ***Call Button***

(a) diameter: 15 mm;

(b) minimum travel: 1 mm;

(c) IP rating: 65;

(d) minimum operating force: 0.5 kgf; and

(e) withstand force rating without damage: 10 kgf.

3. The height of the call button must be between 850 mm and 1000 mm, in accordance with the requirements of AS 1428.2:1992. ***Call Button Height***

702.11.03 CALL ESTABLISHMENT

1. During the period of call establishment, the user must be provided with all the standard call progress tones (i.e. dial tone, ring tone and busy tone). ***Call Progress Tone***

2. A green indicator Light Emitting Diode must be illuminated upon initialisation and remain illuminated for the duration of the call and extinguished at the end of the call. ***Indicator Light***

3. The ability to vary the maximum duration of any call from one minute to unlimited must be provided, with the default set to unlimited. ***Call Duration***

702.11.04 PERFORMANCE

1. The RHP must be able to clearly distinguish the caller’s speech from the background noise (roadside) up to 95 dB. ***Ease of Hearing***

2. A maximum voice output of at least 120 dB SPL peak is required, as measured at the Ear Reference Point (ERP) with the ERP located hard against the RHP speaker grille, with the option to adjust volume levels via SMS commands. ***Voice Output***

702.11.05 MASS

1. The total mass of all components installed onto the pillar structure and including the pillar must not exceed 30 kg. ***Maximum Mass***

702.11.06 MATERIALS

1. The pillar and solar pole must be constructed with marine grade aluminium 5251 H32 or 5052 H32 with a thickness of between 2.5 mm and 5.0 mm. ***Material Grade***

2. The RHP face plate must be constructed with stainless steel grade 316 with a minimum thickness of 2.0 mm. ***Face Plate Material***

3. All materials, fixing methods and surface treatments must be inherently corrosion resistant or be treated to prevent electrolytic and galvanic corrosion. ***Corrosion Resistant***

702.11.07 DIMENSIONS

1. The general dimensions of the RHP are as follows: ***General Dimensions***

   (a) the pillar dimensions are to be within 5% of 1400H x 200W x 150D mm;

   (b) the mounting base of the installation is to be 300 mm x 300 mm to a minimum thickness of 5 mm; and

   (c) the pole for the solar panel should be 100 mm in diameter, with a total combined installation height between 3500 mm and 4000 mm.

2. The pillar face plate dimensions are to be within 2% of 450H x 140W mm. ***Face Plate Dimensions***

3. The pillar and face plate must not permit pooling of water on any surface. ***Water Pooling***

4. The transition between the pillar and the pole must be evenly tapered if the pole is integrated into the top face of the pillar. ***Tapered Transition***

702.11.08 EXTERIOR AND INTERIOR FINISH

1. The exterior and interior must be free from any protrusions and burrs. ***External Finish***

2. All exterior corners must have a bend radius within the range of 2 – 4 mm. ***Bend Radii***

3. Primer and undercoat must be a polyester powder coating and applied the pillars surface in accordance with manufacturer's recommendations. ***Coating***

4. The exterior finish must be primed and finished ripple-free to colour B11 in accordance with AS 2700:2011. The exterior finish must be matte. ***Colour and Matte Finish***

5. The exterior finish must be resistant to natural weathering, in accordance with AS/NZS 1580.457.1.1996. ***Weathering Resistance***

6. All public faces must be finished with a clear anti-graffiti coating in accordance with Specification 908 ANTI-GRAFFITI. ***Anti-graffiti***

702.12 INSTALLATION ENVIRONMENTAL REQUIREMENTS

1. The RHP must be designed to operate under any combination of the following climatic and environmental conditions in order to exceed the minimum design life of the equipment: ***Operating Conditions***

   (a) ambient air temperatures ranging from -10 ºC to 65 ºC;

   (b) relative humidity up to a maximum of 95%;

   (c) start-up temperature as low as -5 ºC; and

   (d) high levels of continuous exposure to motor vehicle exhaust gases or salt-laden environments.

2. The RHP components must be designed to be stored under any combination of the following conditions: ***Storage Conditions***

   (a) storage air temperatures from -10 ºC to 70 ºC; and

   (b) relative humidity up to a maximum of 95%.

3. The face plate and call button must have a minimum ingress protection rating of IP65 in accordance with AS 60529:2004. Compliance with AS 60529:2004 must be evidenced at or prior to Factory Acceptance Testing (FAT), as detailed in the Inspection and Test Plans (ITPs). ***Ingress Protection***

4. The electronics must have a minimum ingress protection rating of IP66 in accordance with AS 60529:2004. Compliance with AS 60529:2004 must be evidenced at or prior to Factory Acceptance Testing (FAT), as detailed in ITPs. ***Ingress Protection***

5. The RHP must remain operatable and withstand windspeeds for its defined wind region in accordance with AS/NZS 1170.2:2021. ***Wind***

702.13 ELECTRICAL REQUIREMENTS

702.13.01 GENERAL

1. The RHP internal wiring must comply with AS/NZS 3000:2018. ***Wiring Rules***

2. The RHP wiring nominal voltage must be 12 V. ***Nominal Voltage***

3. The RHP must have charge capacity, through the use of batteries, such that the RHP will provide a minimum of 7 days normal operation under a primary power source failure condition. Normal operation is based on one call per day at 10 minutes per call for 7 days, the remaining time being “Idle Time”. ***Charge Capacity***

4. All printed circuit boards must have at least two coats of conformal coating, where each coat applied is greater than 50 µm in thickness, in accordance with IEC 61086.1:2004. ***Conformal Coating***

702.13.02 PHOTOVOLTAIC ARRAY

1. All details within clause 702.13.02 are assumed to be taken under Standard Test Conditions (STC) as: ***Standard Test Conditions***

   (a) average irradiance of 1000 Wm^2;

   (b) cell junction temperature of 25 ºC, and;

   (c) air mass coefficient of 1.5.

2. Only a single photovoltaic panel must be used for each sign installation. ***Single Panel***

3. The Contractor must provide the dimensions of the photovoltaic panel within the datasheet at Annexure 702A. ***Dimensions***

4. Photovoltaic cell types used in the photovoltaic panel must be monocrystalline (preferred) or polycrystalline. ***Photovoltaic Cell Type***

5. Photovoltaic panel must employ a tempered glass protective cover. ***Cover***

6. The frame of the photovoltaic panel must be marine grade aluminium 5251 H32 or 5052 H32. ***Panel Grade***

7. The photovoltaic panel must have avian deterrent strikes of the same material and grade as the frame. ***Deterrent Strikes***

8. The photovoltaic panel must operate in temperatures ranging from -10 ºC to 85 ºC. ***Operating Temperature***

9. The minimum acceptable efficiency of the photovoltaic module is 17%. ***Efficiency***

10. The temperature coefficient at open circuit voltage must be no greater than -0.3 %/ ºC. ***Temperature Coefficient***

11. The photovoltaic panel bulkhead connector must have a minimum ingress protection rating of IP65. ***Ingress Protection***

12. The Contractor must provide the nominal maximum power of the photovoltaic panel within the datasheet at Annexure 702A, within a tolerance of 5%. ***Power Rating***

13. The Contractor must provide the open circuit voltage of the photovoltaic panel within the datasheet at Annexure 702A. ***Open Circuit Voltage***

702.13.03 CHARGE CONTROLLER

1. The RHP system must contain a charge controller that uses active circuitry for the safe charge and discharge of the batteries used in the RHP. ***Charge Controller***

2. The charge controller must provide safety features of overcharge, over-discharge, over-current, short-circuit and reverse-polarity. ***Controller Features***

3. The charge controller must contain active circuitry to provide a regulated 12 V supply to the batteries, within the maximum expected voltage range ***Regulated Voltage***

of the photovoltaic array. The charge controller must use a maximum power point tracker control to provide the regulated voltage.

4. The charge controller must contain lightning protection in accordance with clause 702.14.05. ***Lightning Protection***

5. The efficiency of the charge controller must be a minimum of 95%. ***Efficiency***

6. The Contractor must provide the maximum photovoltaic voltage input range of the charge controller within the datasheet at Annexure 702A. ***Input Voltage***

7. The charge controller must adhere to the ingress protection of a rating 43, and terminals of the charge controller must adhere to the ingress protection of a rating 22. ***Ingress Protection***

702.13.04 BATTERIES

1. The RHP must use batteries to provide sufficient power for at least the period specified in clause 702.13.01(3), at maximum operational load, whilst the photovoltaic array cannot provide power. ***Capacity***

2. The batteries must be fully charged within a maximum charge period of 5 hours under STC, as defined in clause 702.13.02(1). ***Maximum Charge Period***

3. The battery packs used must have a nominal operation voltage of 12 V and the Contractor must provide the maximum charge voltage of the battery pack within the datasheet at Annexure 702A. ***Nominal and Maximum Voltage***

4. The battery packs used must be mounted to the back of the faceplate and integrated with the RHP system. ***Mounting***

5. The required chemistry of the battery packs is LiFePO4. ***Chemistry***

6. The battery packs employed must: ***Battery Features***

   (a) support deep discharging of the battery cells;

   (b) contain an integrated battery management system to protect the battery from overcharge, over-discharge, over-current, short-circuit, reverse-polarity and thermal overload; and

   (c) operate in any orientation.

702.13.05 POWER SURGE AND LIGHTNING PROTECTION

1. All protection equipment must comply with AS 4262.1:1995, AS 4262.2:1999, AS 1768:2021 and IEC 61643-12:2020. ***Lightning Protection***

2. All protection devices must have a visual indicator to determine their operating state. ***Visual Indication***

702.13.06 TERMINALS

1. Terminals must be sized and rated for the connection of field equipment power cables. ***Size and Rating***

2. Terminals must be DIN rail mountable. ***Mounting***

702.14 COMMUNICATIONS

702.14.01 GENERAL

1. The RHP must be compliant with 4G LTE and 5G protocols and capable of connecting to respective infrastructure. ***4G LTE***

2. The RHP must be compatible with all network service providers. ***Compatibility***

3. Antenna can be either internal to the RHP or mounted on the solar panel. ***Antenna Location***

702.14.02 CONFIGURATION INTERFACE

1. The RHP must be configurable by SMS commands and, at a minimum, permit the following parameters to be programmed: ***Configurable by SMS***

   (a) establish communication with specific mobile numbers through a four digit pin code;

   (b) adjust pin code;

   (c) program up to five mobile numbers to receive automated messages in accordance with 702.14.03 (2) and be able to delete and change numbers;

   (d) adjust speaker volume level;

   (e) adjust microphone volume level;

   (f) set maximum call time;

   (g) adjust SMS lock time if incorrect pin number is sent;

   (h) change status of the RHP to automatically answer a call;

   (i) demand RHP to do a soft reset maintaining all programmed parameters; and

   (j) demand RHP to do a hard reset, back to default parameters.

   All configuration parameters and specific instructions must be made clear in the IOMs.

702.14.03 DIAGNOSTICS

1. The RHP must be capable of receiving an SMS with the message "STATUS" and send a diagnostics report in reply that includes the following parameters: ***Diagnostics***

   (a) battery status;

   (b) battery voltage;

   (c) RSSI level;

(d) photovoltaic panel voltage;

(e) photovoltaic panel current;

(f) speaker status and volume level;

(g) microphone status and volume level;

(h) stuck button notification (is button stuck on or not); and

(i) call number status.

2. The RHP must send an SMS to an allocated mobile number when the RHP can only make one phone call no greater than 30 minutes in length, and when the button is in a stuck state. SMS must also be complete with all parameters listed in 702.14.03 (1). ***Automated SMS***

702.15 – 702.25 NOT USED

CONSTRUCTION – CIVIL REQUIREMENTS

702.26 CONFLICT WITH OTHER SERVICES

1. Prior to the commencement of any installation or any work under the Contract associated with the RHP, the Contractor must verify the exact location of existing services and structures likely to be utilised, modified or in any way affected by the proposed installation. ***Location of Services***

2. Excavation near other utilities and services must be undertaken in a manner that minimises the risk of damage to other utilities and services in accordance with the requirements of Specification 100 GENERAL REQUIREMENTS. ***Excavation Near Services***

702.27 TRENCHING AND BACKFILL

1. Any required trenching and backfill must be undertaken in accordance with Specification 801 EXCAVATION AND BACKFILL FOR STRUCTURES. ***Trenching and Backfill***

2. Earthworks must be carried out in accordance with Specification 302 EARTHWORKS. ***Earthworks***

3. When an excavation is necessary, the trench must be backfilled with full surface reparation. ***Excavation***

4. Any backfill must be compacted to match the surrounding soil density and graded to match the surrounding surface level. ***Compaction***

5. The Contractor must undertake the work under the Contract relating to RHP such that the length of any trenching or excavation is kept to a minimum. Open trenches or exaction sites must not be left unattended or be accessible to the public. ***Trenching***

702.28 REINSTATEMENT AND CLEAN-UP

1. Disturbed pavement surfaces for non-motorised traffic, such as concrete or brick-paved areas and pathways, must be reinstated to original condition and to the satisfaction of the Superintendent. ***Re-instatement***

2. Any surplus or waste materials, off-cuts and packaging must be removed from site by the Contractor. The Contractor is responsible for all cartage and disposal charges. ***Waste Materials***

702.29 – 702.35 NOT USED

CONSTRUCTION – INSTALLATION REQUIREMENTS

702.36 CONCRETE PAD AND ANCHORING

1. All RHPs must be installed and anchored in accordance with Standard Drawing 200731-0003, the design drawings, and the manufacturer's specifications. ***Manufacturer's Specifications***

2. The RHP footing must comply with the manufacturer's recommendations and standards. ***Footing***

3. The anchor bolt assembly must include four nuts and four washers per assembly. ***Nuts and Washers***

4. Sufficient thread must be provided on each bolt to allow for the levelling of the pillar when installed. This must be not less than twice the sum of the nut, washer and pillar base thickness. ***Bolt Thread***

5. All bolts must be the same length with respect to the vertical axis of the assembly. The anchor bolt assembly must be such that the pillar may be mounted parallel to the road centre line. ***Bolt Length and Alignment***

6. Each pillar must be installed on the anchor bolt assembly and adjusted to be vertical. The pillar must comply with the requirements of AS/NZS 4676:2000 for stability. ***Adjustment***

7. The RHP must be installed such that the button, speaker and microphones allow the user to face oncoming traffic in the closest lanes. The user must never be positioned with their back to adjacent active traffic lanes while the RHP is in use. ***Orientation***

8. All concrete and reinforcement for the bases and anchor bolt assemblies must be the Class specified on Standard Drawing 200731-0003 in accordance with Specification 901 CONCRETE – GENERAL WORKS. ***Concrete Class***

9. All steelwork for the anchor bolt assemblies must be hot dipped galvanised in accordance with AS/NZS 4534:2006, AS/NZS 4680:2006 and AS/NZS 4792:2006. ***Hot-dipped Galvanised Steelwork***

10. After the installation of the RHP, the Contractor must impact mortar grout under the pillar base. ***Grouting***

11. All external surfaces must free from sharp edges or protrusions and free of any chips or defects. ***External Surfaces***

702.37 PUBLIC SAFETY

1. Control of traffic including pedestrians and cyclists must be undertaken by the Contractor in accordance with Specification 202 TRAFFIC MANAGEMENT. ***Traffic Control***

702.38 VEGETATION CLEARING

1. Any vegetation clearing must be undertaken in accordance with Specification 301 VEGETATION CLEARING AND DEMOLITION. ***Vegetation***

702.39 PHOTOVOLTAIC PANEL

1. The photovoltaic panel must be securely connected to an adjustable theft resistant mount at the top of the post. ***Mounting***

2. The mounting arrangement must be securely locked in position and tightened sufficiently to prevent the photovoltaic panel from becoming misaligned during heavy winds. ***Secure Alignment***

3. The photovoltaic panel must be positioned and fixed at the correct tilt and azimuth angles for the specific latitude, to receive optimal insolation over the winter months. Azimuth angle must be 0° and tilt angle must be the absolute value of the latitude at the specific location. ***Optimal Angle***

702.40 GENERAL ELECTRICAL

1. All electrical equipment and cabling must comply with AS/NZS 3100:2022, AS/NZS 3000:2018, AS/NZS 3111:2009, AS/NZS 5000.1:2005 and Western Australian Electrical Requirements. ***Compliance***

2. All cabling must be secure and shielded from inadvertent access. ***Shielding***

3. All power cable insulation must have a temperature rating greater or equal to V90 grade PVC or XLPE/PVC. ***Insulation***

4. Transformers and power supply units (if utilised) must be in accordance with AS/NZS 61558.1:2018. ***Transformers***

5. Equipment must be hardwired using industry standard connections and terminal panels. ***Connections and Terminals***

6. There must be no exposed cabling at the completion of installation. ***No Cable Exposure***

702.40.01 WIRING AND TERMINATION

1. Standard industry wire ferruling, e.g. Grafoplast or similar, must be used on all wire terminations in accordance with manufacturer drawings. ***Ferruling***

2. Ferrule numbers must be placed near the termination on either end of the wire. The wire number must be legible and placed in a location where it can be read without disturbing the other wires. Ferrule numbers must not be applied directly to wires but encased in a removable identification tag. ***Numbering***

3. An allowance must be made to the length of wire at each terminal to permit cutting and remaking of the wire termination at least once without interference with the main run of wire. ***Additional Length***

4. All wire insulation must be non-hygroscopic, incapable of supporting combustion and suitable for the site-specific climatic conditions. ***Insulation***

5. Electrical internal wiring must be of minimum size 2.5 mm^2. ***Minimum Wire Gauge***

6. Electrical wiring must be suitably de-rated, in accordance with AS/NZS 3008.1.1.2017. ***De-rating***

7. All communication cabling must be in accordance with the requirements of AS/CA S008:2020 and AS/CA S009:2020. ***Communication Cabling***

8. It must be possible to check the tightness of all bolted and screwed connections, by removing covers if necessary, post assembly and installation. ***Cover Removal***

9. Conductors must be in accordance with the requirements of AS/NZS 1125:2001. ***Conductors***

702.40.02 LABELS

1. All equipment and devices must be identified with engraved traffolyte or Rowmark nameplates. Titles must be as specified on equipment design drawings, including any manufacturer drawings. ***Labelling***

2. General labels must be black letters on white background engraved traffolyte or adhesive type rated for temperatures above 150 ºC. ***Fixing***

3. Labels must be located so that they are not obscured by wiring or equipment and are visible from the normal access point. Labels must not be fixed to removable equipment such as switchgear. ***Location***

702.41 EXTERNAL LABELS

1. Asset numbers must be clearly shown on the side of the control box facing the roadside, or if behind a barrier, facing the entrance to the emergency stopping bay in conjunction with a phone symbol, as specified on Standard Drawing 200731-0022. ***Asset Number***

2. Signs and labels must be installed as per design drawings and in accordance with Standard Drawings 9220-0160, 200731-0004 and 200731-0005. ***Label Installation***

702.42 EXTERNAL MARKINGS

1. The manufacturer's nameplates or other markings must not be visible externally. ***External Markings***

702.43 ASSET DATA REQUIREMENTS

1. The Contractor must submit all drawings and data in accordance with all coded items as per the ADRL at Annexure 702C. ***ADRL***

702.43.01 CONTRACT DRAWING AND DATA LIST

1. **At least six weeks prior to FAT, the Contractor must submit the CDDL to the Superintendent under code V01 for review and acceptance, as specified in the ADRL at Annexure 702C.** ***HOLD POINTS***

702.43.02 DATASHEETS

1. As part of the submission of the IOMs, the Contractor must complete this Specification's datasheet at Annexure 702A. ***Specification Datasheets***

2. The Contractor must submit all equipment datasheets to the Superintendent under ADRL code E07, as specified in Annexure 702C. ***Equipment Datasheets***

702.43.03 INSTALLATION, OPERATION AND MAINTENANCE MANUALS, AND MANUFACTURER'S DATA REPORTS

1. **At least five weeks prior to FAT, the Contractor must prepare IOMs and submit to the Superintendent under ADRL code V05, as specified in Annexure 702C. The Contractor must verify to the Superintendent that the IOMs are in accordance with the ADRL, CDDL, and the Electrical and ITS Asset Drawing and Data Requirements Procedure on the Main Roads website.** ***HOLD POINT***

2. **At least five weeks prior to FAT, the Contractor must prepare the MDR and submit to the Superintendent under ADRL V04, as specified in Annexure 702C. The Contractor must verify to the Superintendent that the MDR is in accordance with the ADRL, CDDL, and the Electrical and ITS Asset Drawing and Data Requirements Procedure on the Main Roads website.** ***HOLD POINT***

702.44 – 702.60 NOT USED

INSPECTION AND TESTING

702.61 GENERAL

1. The Contractor must supply all labour, materials and equipment required to fully test and commission the installation. ***Labour, Materials, and Equipment***

2. The installation and/or equipment will be accepted only after satisfactory completion of commissioning tests, in accordance with approved ITPs. If a test is unsuccessful, the Contractor must remediate as appropriate and subject to retest until successful. ***Testing***

3. The cost of any retesting must be borne by the Contractor. ***Retesting Cost***

4. The Contractor must provide the ITPs for FAT and commissioning plan. ***ITPs***

5. The Contractor must provide the ITPs in electronic format, printable in A3 landscape of minimum font size 11 in a tabular format with the following columns: ***ITP Format***

   (a) unique line identifier;

   (b) description of item to be tested and witnessed;

(c) relevant specification or AS clause;

(d) testing and witnessing procedure;

(e) expected compliance witnessed event;

(f) description of what was witnessed;

(g) pass/fail, and;

(h) comments.

702.62 TESTING AND COMMISSIONING

702.62.01 FACTORY ACCEPTANCE TESTING

1. **The Contractor must facilitate FAT of all RHP equipment and systems procured under Contract. FAT of the RHP must occur at the relevant factory or premises whereby any non-conformances identified can be easily rectified. Witnessing of FAT must be conducted in person, as such the Contractor must provide suitable conditions for the Superintendent and up to two representatives.** ***HOLD POINT***

2. At least four weeks prior to the agreed FAT date, the Contractor must submit the FAT ITP to the Superintendent under ADRL code P01, for review and acceptance. ***Submission of FAT ITP***

3. The FAT ITP must cover all physical and integration items as detailed in the Specification including the following: ***FAT ITP Content***

   (a) ingress protection ratings;

   (b) electrical tests;

   (c) labelling;

   (d) dimensions verification;

   (e) surface finishings;

   (f) structural/mechanical verification;

   (g) visual inspection of components for quality, craftsmanship and conformance;

   (h) system stability; and

   (i) overall system operation including all functionality testing.

4. **Prior to releasing the RHP from the FAT facility, the Contractor must certify to the Superintendent that the RHP meets the requirements of the respective FAT ITP criteria in accordance with the requirements of Specification 201 QUALITY MANAGEMENT.** ***HOLD POINT***

702.62.02 COMMISSIONING

1. At least four weeks prior to the agreed commissioning date, the Contractor must submit a commissioning plan to the Superintendent under ADRL code P02, for review and acceptance. ***Commissioning***

2. The commissioning plan must cover all physical, functional, and operational items applicable in the Specification and any requirements because of the installation. This includes the connection to the Main Roads CIC, the RHP setup and initialisation, as well as verification of all operational and diagnostic requirements. The criteria must be based on the FAT criteria as well as any additional requirements borne from installation, in accordance with the design. ***Commissioning Plan***

3. The Contractor must follow the process to connect to the Main Roads CIC in accordance with Annexure 702B. ***Connection***

4. **Following commissioning, the Contractor must certify to the Superintendent that the RHP meets the requirements of the respective commissioning plan, in accordance with the requirements of Specification 201 QUALITY MANAGEMENT.** ***HOLD POINT***

702.63 – 702.80 NOT USED

AS BUILT AND HANDOVER REQUIREMENTS

702.81 AS BUILT CONSTRUCTION DRAWINGS

1. The Contractor must produce all necessary ‘as-built’ construction drawings, schedules and lists in legible marked-up form to reflect all construction design changes and actual installation, in accordance with Specification 201 QUALITY MANAGEMENT. The marked-up drawings and documents must be issued to the Superintendent for approval and will be reviewed as part of the quality and inspection process. ***As-builts***

702.82 COMPLIANCE

1. The Contractor must cooperate and participate in respect of the Principal’s quality and compliance inspection processes. These processes are detailed in: ***Handover***

   (a) Handover of Electrical and ITS Assets Policy; and

   (b) Handover of Electrical and ITS Assets Procedure.

   The above documents are available on the Main Roads website.

702.83 – 702.90 NOT USED

CONTRACT SPECIFIC REQUIREMENTS

702.91 – 702.99 NOT USED

ANNEXURE 702A

ROADSIDE HELP PHONE DATASHEET

Submit under ADRL Code E08

ITEM	DESCRIPTION	UNITS	DATA BY PRINCIPAL	DATA BY CONTRACTOR
1.0	**Manufacturer's Details**			
1.1	Manufacturer’s name		Contractor	
1.2	Place of manufacture		Contractor	
1.3	Minimum electrical design life	years	15	
1.4	Minimum pillar and associated hardware design life	years	30	
1.5	Minimum pillar foundation support footing and associated infrastructure design life	year	50	
1.6	Maximum total mass	kg	30	
2.0	**Help Phone General Specifications**			
2.1	Pillar material		Marine grade aluminium 5251 H32 or 5052 H32	
2.2	Pillar material thickness range	mm	2.5 – 5.0	
2.3	Pillar IP rating		65	
2.4	Minimum ambient temperature range	ºC	-10 to 65	
2.5	Minimum storage temperature range	ºC	-10 to 70	
2.6	Minimum start-up temperature	ºC	-5	
2.7	Relative humidity range	%	Up to 95	
2.8	Fixing hardware such as hinges, locking mechanisms, face plate		Stainless steel grade 316	
2.9	Keys		Main Roads 247E	
2.10	Lock Type		Panel to tongue	
2.11	Pillar external colour and finish		B11 Rich Blue (AS 2700)	
2.12	Pillar external treatment		Polyester power coating	
2.13	Anti-graffiti coating		Yes	
2.14	Rounded exterior edges	mm	2 – 4	

ITEM	DESCRIPTION	UNITS	DATA BY PRINCIPAL	DATA BY CONTRACTOR
2.15	Total unit height	mm	3500-4000 (solar panel mounting can be on separate pole, or integrated as part pillar structure)	
2.16	Pillar dimensions (W x H x D)	mm	1400H x 200W x 150D (+/- 5%)	
2.17	Pole diameter	mm	100	
2.18	Base	mm	300 x 300	
2.19	Network compatibility		4G LTE and 5G	
2.20	Network service providers compatibility		All providers	
2.21	Call button diameter	mm	15	
2.22	Call button minimum Ingress Protection rating		IP65	
2.23	Call button height	mm	850-1000	
2.24	Call button operating force range	kgf	0.5-10	
2.25	Call button minimum travel	mm	1	
2.26	Face plate dimensions	mm	2% of 450H x 140W	
2.27	Face plate material		Stainless steel grade 316	
2.28	Face plate minimum thickness	mm	2.0	
2.29	Electronics enclosure minimum IP rating		66	
2.30	“HELP PHONE” text specifications	mm	Minimum height: 12 ± 1 Thickness: 2.5 ± 0.5 Colour: B11 Rich Blue (AS 2700)	
2.31	“CALL BUTTON” text specifications	mm	Minimum height: 12 ± 1 Thickness: 2.5 ± 0.5 Colour: R13 Signal Red (AS 2700)	
2.32	Call button centric circle specifications	mm	Radius: 30 ± 2 Thickness: 5 ± 1 Colour: R13 Signal Red (AS 2700)	
2.33	Text/centric circle paint		Epoxy based	
5.34	PCBs 2 x conformal coating		Yes	
3.0	**PV System**			
3.1	Photovoltaic panel manufacturer name		Contractor	
3.2	Photovoltaic panel place of manufacturer		Contractor	

ITEM	DESCRIPTION	UNITS	DATA BY PRINCIPAL	DATA BY CONTRACTOR
3.3	STC: -Irradiance -Cell junction temperature -Air mass coefficient	Wm^{-2} ºC	1000 25 1.5	
3.4	Number of solar panels		1	
3.5	Photovoltaic panel dimensions		Contractor	
3.6	Cell type		Mono or polycrystalline	
3.7	Protective cover		Tempered glass	
3.8	Frame, avian strike deterrent material		Marine grade aluminium 5251 H32 or 5052 H32	
3.9	Cable (PV to Charge Controller)		double insulated UV resistant	
3.10	Connector type		MC4	
3.11	Operating temperature range	ºC	-10 to 85	
3.12	Module efficiency minimum	%	17	
3.13	Rated power tolerance maximum deviation from zero	%	5	
3.14	Nominal maximum power (STC)	W	Contractor	
3.15	Nominal system voltage	V	12	
3.16	Open circuit voltage (STC)	V	Contractor	
3.17	Temperature coefficient at open circuit voltage maximum deviation from zero	%/ºC	-0.3	
3.18	Photovoltaic panel bulkhead connector minimum Ingress Protection rating		IP65	
4.0	**Charge Controller**			
4.1	Manufacturer		Contractor	
4.2	Place of manufacture		Contractor	
4.3	MPPT		Yes	
4.4	Ingress protection rating minimum		43	
4.5	Terminals ingress protection rating minimum		22	
4.6	Reverse polarity protection		Yes	
4.7	Lightning protection		Yes	
4.8	Short circuit / over current protection		Yes	

ITEM	DESCRIPTION	UNITS	DATA BY PRINCIPAL	DATA BY CONTRACTOR
4.9	Operating temperature range	ºC	-10 to 70	
4.10	Efficiency minimum	%	95	
4.11	Maximum photovoltaic voltage input range	V	Contractor	
5.0	**Batteries**			
5.1	Battery manufacturer's name		Contractor	
5.2	Place of manufacturer		Contractor	
5.3	Make and model		Contractor	
5.4	Nominal voltage	V	12	
5.5	Maximum charge voltage	V	Contractor	
5.6	Chemistry		$LiFePO_4$	
5.7	Maximum charge period (at STC)	h	5	
5.8	Deep discharge type		Yes	
5.9	Integrated battery management system		Yes	
6.0	**Configurable SMS Commands**			
6.1	Establish and amend pin code		Yes	
6.2	Program up to five mobile devices and amend capability		Yes	
6.3	Adjust speaker volume		Yes	
6.4	Adjust microphone volume		Yes	
6.5	Adjust maximum call time		Yes	
6.6	Adjust SMS lock time		Yes	
6.7	Change status to auto answer		Yes	
6.8	Soft reset		Yes	
6.9	Hard reset		Yes	
7.0	**Diagnostics through SMS**			
7.1	Battery status		Yes	
7.2	Battery voltage		Yes	
7.3	RSSI level		Yes	
7.4	PV panel voltage		Yes	
7.5	PM panel current		Yes	
7.6	Speaker status and volume level		Yes	
7.7	Microphone status and volume level		Yes	

ITEM	DESCRIPTION	UNITS	DATA BY PRINCIPAL	DATA BY CONTRACTOR
7.8	Stuck button notification		Yes	
7.9	Unique identification status		Yes	
7.10	Call number status		Yes	
7.11	Automated SMS when RHP can only make one phone call to a max of 10 mins		Yes	

ANNEXURE 702B

ROADSIDE HELP PHONE CONNECTIVITY PROCESS

The following process is to be adhered to when commissioning new or relocated RHPs on the Main Roads network. When a RHP is commissioned correctly, it will provide a facility for road users to make a telephone call to the Main Roads Customer Information Centre (CIC) for assistance during a vehicle breakdown. From the call, Main Roads CIC will also be able to identify the location of the caller on the road network.

New Roadside Help Phones

The following steps must be followed by the Contractor:

1. Provide the Superintendent a list of the RHP to be commissioned under the Contract with their respective Asset Numbers and location as specified in the Design, in an excel spreadsheet. The Contractor is to allow four (4) weeks to receive a Main Roads SIM card(s) with associated mobile number and SIM card number from the Superintendent.

2. The Superintendent will free-issue the SIM card(s) to the Contractor, and the Contractor is to deploy the SIM card in the installed RHP and make a test call to Main Roads CIC in accordance with the approved commissioning plan as per clause 702.62.02 (2).

   Test calls to Main Roads CIC must not be made during peak times being between the hours of 0700 to 0900, 1200 to 1300 and 1600 to 1800.

3. Main Roads CIC will notify the Contractor over the phone if the phone is working correctly.

   (a) If it is working correctly, the Contractor must proceed with the commissioning of the RHP, as well as notify the Superintendent in writing that the RHP is connected to Main Roads CIC, in accordance with the approved commissioning plan as per clause 702.62.02 (2).

   (b) If it is not working correctly, the Contractor must mark the RHP with an out of service tag and consult the Superintendent with regards to rectification. The out of service tag must as a minimum cover the speaker and microphone as well as the button area of fascia.

Relocation or New Connection to Existing Roadside Help Phones

The following steps must be followed by the Contractor:

1. Provide the Superintendent a list of the RHP to be temporarily de-commissioned under the Contract with their respective Asset Numbers and location as specified in the Design, in an excel spreadsheet.

2. Where new SIM card(s) is required, The Superintendent will free-issue the SIM card(s) to the Contractor, and the Contractor is to deploy the SIM card in the installed RHP and make a test call to Main Roads CIC in accordance with the approved commissioning plan as per clause 702.62.02 (2).

   Test calls to Main Roads CIC must not be made during peak times being between the hours of 0700 to 0900, 1200 to 1300 and 1600 to 1800.

3. Main Roads CIC will notify the Contractor over the phone if the phone is working correctly.

   (a) If it is working correctly, the Contractor must proceed with the commissioning of the RHP, as well as notify the Superintendent in writing that the RHP is connected to Main Roads CIC, in accordance with the approved commissioning plan as per clause 702.62.02 (2).

(b) If it is not working correctly, the Contractor must mark the RHP with an out of service tag and consult the Superintendent with regards to rectification. The out of service tag must as a minimum cover the speaker and microphone as well as the button area of fascia.

ANNEXURE 702C

ASSET DATA REQUIREMENTS LIST

ASSET DATA REQUIREMENTS LIST - ADRL Electrical and Intelligent Transport Systems				
	EQUIPMENT DESCRIPTION:	**Roadside Help Phone**	**Rev:**	**0**
	ADRL No:		**Date:**	**17/06/2024**
ADRL Code	**DESCRIPTION**		**INCLUDE IN:**	
V	**Management / Execution Documents**			
V01	Contract Drawing & Data List (CDDL)		IOM	
V02	Spare Parts with Pricing		IOM	
V03	Commissioning Spare Parts List		IOM	
V04	Manufacturer's Data Report (MDR)			
V05	Installation, Operation and Maintenance Manual (IOM)			
M	**Mechanical**			
M01	Not applicable		-	
M02	Outline / General Arrangements		IOM	
M03	Shop Fabrication Drawings		MDR	
M04	Detail Drawings with Parts List		IOM	
M05	Handling/Storage Procedure and any Special Lifting Requirements		MDR	
M06	Paint & Surface Preparation Procedure		MDR	
E	**Electrical and ITS**			
E01	Not applicable		-	
E02	Power Consumption List		IOM	
E03	Wiring Diagrams		IOM	
E04	Schematics e.g. for PCBs		IOM	
E05	Not applicable		-	
E06	Not applicable		-	
E07	Specific Equipment Data Sheets		IOM	
E08	Specification 702 Datasheets		IOM	
E09	Typical Faults and Remedies		IOM	
E10	Not applicable		-	
E11	Not applicable		-	
E12	Not applicable		-	
E13	Not applicable		-	
P	**Inspection / Test / Procedures**			
P01	Factory Acceptance Testing Procedure		MDR	
P02	Commissioning Procedure		MDR	
T	**Inspection Reports / Records**			
T01	Fabrication and Delivery Test Records		MDR	
T02	Factory Acceptance Testing Records		MDR	
T03	Not applicable		-	
C	**Material / Supplier Certificates**			
C01	Certificates of Compliance		MDR	
C02	Warranty Certificates		MDR	

REVISION HISTORY

Rev	Description	Prepared by	Date	Approved by	Date
0	Roadside Help Phones	Tim Sezer	01/12/2023	Tom Peacock	17/06/2024

GUIDANCE NOTES

FOR REFERENCE ONLY – DELETE GUIDANCE NOTES FROM FINAL DOCUMENT

1. All edits to this Specification are to be made using track changes, to clearly show added/ deleted text.

2. If **all** information relating to a clause is deleted, the clause number should be retained and the words **"NOT USED"** should be inserted.

3. The proposed document with tracked changes must be submitted to the Project Manager for review, prior to finalising the document.

4. Once the Project Manager's review is complete, accept all changes in the document, turn off track changes and refresh the Table of Contents.

5. The Custodian of this specification is Principal Electrical Standards Engineer.

6. The Main Roads Project Manager is to be familiar with, and follow, the procedure for commissioning and de-commissioning help phones available from the intranet, which details the requirements to be followed to procure SIM cards from Electrical Asset Management.

CONTRACT SPECIFIC REQUIREMENTS

The following clauses are to be placed under the CONTRACT SPECIFIC REQUIREMENTS, as required. After inserting the clause, change the clause number and heading to style “H2 SP” so it appears in the Table of Contents.

XXX.XX SUB HEADING (H2 SP)

1. Insert text (Main Table SP) ***Keyword SP***

Insert text (Main Table SP)

XXX.XX SUB HEADING (H2 SP)

1. Insert text (Main Table SP)

Insert text (Main Table SP)

AMENDMENT CHECKLIST

Specification No. **702** Title: **ROADSIDE HELP PHONES** Revision No: _____

Project Manager: _____ Signature: _____ Date: _____

Checked by: _____ Signature: _____ Date: _____

Contract No: _____ Contract Name: _____

ITEM	DESCRIPTION	SIGN OFF
Note: All changes/amendments must be shown in tracked changes until approved.		
1.	Project Manager has reviewed the Specification and identified additions and amendments.	
2.	Standard clauses amended? **MUST SEEK** approval from Manager Contracts and Commercial Management.	
3.	Any unlisted materials/products proposed and approved by the Project Manager? If "Yes" provide details at 16.	
4.	Deleted clauses shown as **"NOT USED"**.	
5.	Ensure appropriate **INSPECTION AND TESTING** parameters are included in Specification 201 (test methods, minimum testing frequencies verified).	
6.	**AS-BUILT AND HANDOVER** requirements addressed.	
7.	**CONTRACT SPECIFIC REQUIREMENTS** addressed? Contract specific materials, products, clauses added? (refer Specification Guidance Notes).	
8.	**ANNEXURES** completed (refer Specification Guidance Notes).	
9.	Estimates Manager has approved changes to **SMM**.	
10.	Project Manager certifies completed Specification reflects intent of the design.	
11.	Independent verification of completed Specification arranged by Project Manager.	
12.	Project Manager's review completed.	
13.	**SPECIFICATION GUIDANCE NOTES** deleted.	
14.	**TABLE OF CONTENTS** updated.	
15.	**FOOTER** updated with Document No., Contract No. and Contract Name.	
16.	Supporting information prepared and submitted to Project Manager.	
Additional information or further action:		

Signed: _____ *(Project Manager)* Date: _____