

**SUPPLY & INSTALLATION  
of the  
FIRE PROTECTION SERVICES  
for the  
LTA KARAVI WEIGHBRIDGE STATION  
at  
KARAVI, BA, FIJI ISLANDS  
for  
PACIFIC ENERGY SWP LTD**

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**DATED: MAY 2019  
PROJECT NO: 7835**

**FIRE PROTECTION INSTALLATION  
LTA KARAVI WEIGHBRIDGE STATION,  
KARAVI, BA, FIJI ISLANDS**

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**SECTION 1 GENERAL CONDITIONS OF CONTRACT**

General Conditions of Contract shall be the Conditions of Contract LTA Karavi Weighbridge Station, Karavi, Ba, Fiji Islands and any other Amendments and Revisions up to date of issue, provided by the Principal Consultant – Irwin Alsop Pacific Ltd.

**SECTION 2 SPECIAL CONDITIONS OF CONTRACT**

Special Conditions of Contract shall be the Conditions of Contract LTA Karavi Weighbridge Station, Karavi, Ba, Fiji Islands and any other Amendments and Revisions up to date of issue, provided by the Principal Consultant – Irwin Alsop Pacific Ltd.

**SECTION 3 PRELIMINARY AND GENERAL**

Conditions of Contract shall be the Conditions of Contract LTA Karavi Weighbridge Station, Karavi, Ba, Fiji Islands and any other Amendments and Revisions up to date of issue, provided by the Principal Consultant – Irwin Alsop Pacific Ltd.

## SECTION 4 GENERAL

### 4.1 SCOPE OF WORK

The scope of works comprises the supply, installation, testing, commissioning, maintenance and defects liability service of the complete Fire Protection Services installation for the LTA Karavi Weighbridge Station at Karavi, Ba, Fiji Islands.

This shall include all necessary work required to implement the intent and meaning of this specification and associated drawings.

Whether or not the words "supply and install" appear in this Specification or on the drawings, unless clearly excluded, all items of equipment for the complete installation are required shall be supplied and installed.

#### Extent of Work

The work shall include but will not be limited to the following main items:

- a) Supply and installation of the complete Automatic Conventional Fire Alarm System.
- b) Supply and installation of the Fire Indicating Unit. (FIU)
- c) Supply and installation of the Automatic Smoke and Heat Detectors.
- d) Supply and installation of the Fire Alarm Sounders. (including IP65 rated types)
- e) Supply and installation of the Visual Alert Devices. (Strobe types)
- f) Supply and installation of the Manual Call Points.
- g) Supply and installation of the 36m Stainless Steel Fire Hose Reels in Cabinet.
- h) Supply and installation of the Fire Speaker Cabling.
- i) Supply and installation of the Conduits, catenary wire, fastener and associated accessories.
- j) Supply and installation of the following Portable Fire Extinguishers with their associated accessories. (hook and blazon mounted at appropriate heights):
  - i. Dry Powder 2.0kg
  - ii. Dry Powder 2.5kg
  - iii. Dry Powder 4.5kg
  - iv. Carbon-Dioxide 3.5kg
- k) Supply and installation of the Fire Alarm System.
- l) Supply and installation of the associated accessories.
- m) The Preparation and Supply of Shop drawings. (Only the background Architectural drawings in .DWG format shall be issued for the creation of shop drawings. No Services .DWG's shall be supplied.)
- n) Testing and commissioning, including independent inspection.
- o) 12 months monthly maintenance.
- p) Supply of spares.
- q) As installed drawings and maintenance manuals.

### 4.2 DRAWINGS

The following drawings shall form part of the Contract:

| DRAWING NUMBER: | TITLE  | SCALE        |
|-----------------|--|--------------|
| F01             | SCHEDULE OF DRAWINGS, LOCALITY PLAN, LEGENDS & ABBREVIATIONS | NTS          |
| F02             | SPECIFICATION & SCOPE OF WORKS                               | NTS          |
| F03             | PROPOSED SITE PLAN<br>FIRE PROTECTION LAYOUTS                | 1 : 250 @ A3 |
| F04             | PROPOSED FLOOR PLANS<br>FIRE PROTECTION LAYOUTS              | 1 : 100 @ A3 |
| F05             | PROPOSED FIRE PROTECTION DETAILS                             | NTS          |

### 4.3 COMPLIANCE WITH REGULATIONS

The work carried out by the Fire Protection Sub-Contractor shall comply in all respects with this Specification and:

- a) The Building Regulations applying to the project
- b) The Current issue of relevant New Zealand and Australian Standards
- c) National Fire Authority regulations
- d) The National Building Code of Fiji
- e) The Health and Safety at Work Act

The completed installation shall be passed by the National Fire Authority prior to Practical Completion.

### 4.4 AUTHORITIES AND FEES

Make application to the local Authorities for permits to carry out the work and pay all fees and charges in respect of the work involved. Certificates shall be obtained from the appropriate Authorities indicating satisfactory completion of services and handed over to the Engineer before application for final payment.

Variations to the installation found necessary to obtain approval shall be brought to the notice of the Engineer immediately.

### 4.5 SHOP DRAWINGS

Supply shop drawings in SI Metric to completely detail the works as follows:

| ITEM      | INFORMATION REQUIRED              | SETS |
|-----------|-----------------------------------|------|
| Equipment | Equipment Layouts and Details     | 3    |
| Hose Reel | Locations and Dimensional Details | 3    |

Shop Drawings and Equipment Layouts (in triplicate) shall include the following details as a minimum:

1. Fire Alarm Zoning Plan with Detector Loop Wiring Layouts.
2. All locations of proposed equipment.
3. Conduit and cabling routes.
4. Equipment installation & fixing details.
5. Dimensional details of all fire alarm and fire-fighting equipment to be installed.

Submission to the Lead Consultant in the first instance shall be made not less than one week prior to approval in principle is required.

Examination by the Engineer shall not diminish the Contractor's responsibility for co-coordinating and checking shop drawings nor the Contractor's responsibility for correctness of his work.

## **SECTION 5 AUTOMATIC CONVENTIONAL FIRE ALARM SYSTEM**

### **5.1 SCOPE OF WORK**

The Fire Protection Sub-Contractor shall supply, install, test and commission the Automatic Conventional Fire Alarm System for the LTA Karavi Weighbridge Station.

These works include the supply, installation, testing and commissioning of the manual call points, alerting devices and associated equipment required to provide a complete automatic fire detection system as detailed on the drawings.

The Fire Protection sub-Contractor shall be responsible for inspecting the site and the documents during the Tender period. Failure to inspect the site shall not relieve the Contractor of his responsibility to provide a system in accordance with the Rules, Regulations and Standards listed here-in.

A full set of Architectural documents can be viewed at the offices of the Engineer.

### **5.2 SYSTEM DESCRIPTION**

The Automatic Conventional Fire Alarm system shall comprise of the Fire Indicating Unit, detectors, alerting devices, manual call points, and associated cabling.

Upon receipt of a fire alarm signal from a manual call point, the Fire Indicating Unit shall sound the alerting devices

### **5.3 RULES, REGULATIONS AND STANDARDS**

Materials used, and the work carried out, shall be strictly in accordance with the most recent rules, regulations and standards of the following Authorities:

- a) National Fire Authority
- b) Energy Fiji Limited
- c) New Zealand Standard NZS4512 and relevant Standards
- d) Telecom Fiji Ltd

It is the responsibility of the Fire Protection Sub-Contractor to arrange for all necessary inspections and rectify any defects and deficiencies arising within the installation, to the full satisfaction of the above mentioned Authorities and the Engineer.

### **5.4 MATERIALS**

Supply materials and equipment of the best available, conforming with the appropriate current New Zealand Standards.

Install free of damage, corrosion, scale or any defect whatsoever and maintained in that condition until the Contract is completed.

Comply with manufacturer's instructions and recommendations for use and installation, unless directed otherwise.

### **5.5 SAMPLES AND APPROVALS**

Submit for approval samples, sketches, drawings, test certificates of all materials or equipment purposed to be used on this Contract. Allow two weeks for approval.

### **5.6 INSPECTION**

All work carried out under this Section of the Contract will be subject to inspection both during and after completion.

A satisfactory review after inspection and all required tests must be given by the Engineer before invoices for work done will be paid.

### **5.7 PAINTING**

The Fire Protection Sub-Contractor shall allow for the painting of all mounting brackets, supports, etc.,

whether wood or metal and where exposed to view or corrosion/rotting is possible due to environmental conditions. The paint process used shall be appropriate to the material being painted and the colour shall match the adjacent surfaces. The paint process and material shall be approved by the Engineer prior to any painting work being commenced.

## 5.8 TROPICALISATION

All items of equipment covered by this Section of the Specification shall be tropicalized to suit the conditions prevailing in Fiji.

## 5.9 SHOP DRAWINGS

Within four weeks of the commencement of the contract, the Fire Protection Sub-Contractor shall submit 3 sets of working drawings showing exact routes of cables, locations of equipment and layouts of the Fire Indicating Unit.

## 5.10 FIRE INDICATING UNIT

The Fire Protection Sub-Contractor shall supply and install an Automatic Conventional Fire Indicating Unit at the position shown on the drawing(s) and in compliance with New Zealand Standard *NZS4512*:

- a) The panel shall be equipped with a 24V 7AH sealed lead acid battery supply system complete with charging circuits suitable for a 240V AC supply.
- b) The panel shall monitor the fire detection heads and manual call stations and on the occurrence of fire shall indicate on a mimic diagram the appropriate fire zone.
- c) Fire indication and zone fault lamps shall be mounted on the front of the panel with an engraved mimic diagram to identify the zone locations.
- d) The panel shall be provided with suitable front access for servicing.
- e) A trial evacuation switch shall be located on the front of the panel.
- f) A full size drawing of the front of the panel layout including mimic details shall be submitted for approval prior to manufacture.
- g) All plug-in contacts, cards and relays to have non-corrodible metal surfaces and shall have retainers to prevent them shaking loose.
- h) A permanent diagram of connections of the panel, as agreed by the Engineer, shall be fastened inside the panel.
- i) A xerox, photo or similar type of chemical process print (pencil or ink not accepted) depicting the circuitry of the control panel. This print shall be at least 300mm x 200mm in size and mounted behind a plastic panel inside the control panel.
- j) Panel shall be complete with internal supply (24V sealed lead acid batteries and trickle charger unit).
- k) The rating of the batteries and trickle charging unit shall be sufficient to meet all the power requirements of the complete system plus 25% spare capacity.
- l) Batteries should be firmly attached to the body of the panel using clamps, etc.

The Fire Protection Sub-Contractor shall provide and install a Georgian glass door for the weatherproofing for the Fire Indicating Unit.

## 5.11 DETECTORS

### 5.11.1 General

Detectors shall be of the Conventional type as required by the relevant codes and local authorities. Actual locations shall be determined with reference to luminaires and air-conditioning diffusers.

All detectors at the plant rooms, services cupboards and toilets shall be protected by approved stainless steel wire guards.

Prior to commencement of wiring rough-in, provide the Engineer with Shop Drawings showing detector positions for approval.

### **5.11.2 Appearance**

Detectors to be installed in offices, public areas, and the like shall be of neat, compact appearance and shall provide the minimum possible area for the lodgment of dust.

### **5.11.3 Remote Indicator**

An indicator connected to a detector consisting of a light emitting diode (LED), mounted in a clearly visible position, which illuminates whenever the detector operation causes an alarm condition to register on the main indicating unit. A faulty indicator shall not render the detector inoperative under fire conditions

### **5.11.4 Remote Indicators**

Mounting positions:

- \* Detectors in concealed spaces: On a visible panel close to the concealed space housing the detector
- \* Detectors within lockable rooms: On wall above door

### **5.11.5 Mounting of Detectors**

In all cases, appropriate facilities for correctly mounted detectors shall be provided by the Fire Protection Sub-Contractor. Heights and type of ceilings shall be determined by the Contractor during the Tender period.

In all cases, the Fire Protection Sub-Contractor shall provide and install additional battens above ceiling materials for the proper fixing of detectors. Detectors shall not be fixed to ceiling materials alone without appropriate backing as indicated.

For all detectors, special care shall be taken and adequate provisions made to prevent contact between electrically active parts including terminals, and between active parts and any metal surface support or other object.

### **5.11.6 Installation**

Install detectors so that they can be easily inspected and tested in situ, and readily withdrawn from service for testing or replacement.

## **5.12 MANUAL CALL-POINTS**

Manual call points shall comply with Appendix E *NZS4512*. Call points shall be suitable for surface and flush mounting and be inscribed with the words "FIRE ALARM - BREAK GLASS". Mount at 1300 above floor level (to the centre of the call-point).

## **5.13 ALERTING DEVICES**

Audible alarm alerting devices shall be mounted at 2500mm above floor level (to the centre of the devices).

## **5.14 CABLING INSTALLATION**

### **5.14.1 General**

All fire alarm cabling shall be thermoplastic sheathed (TPS) with red coloured sheathing.

All wiring shall be carried out on the "loop-in" loop-out system and no joints shall be made except at outlets.

All wiring shall be concealed unless otherwise specified or shown on the drawings.

Generally where electrical wiring in an area is concealed the fire alarm wiring shall also be concealed.

Wiring may be surface mounted in areas without ceilings (such as service ducts and the like) and shall be surface mounted in conduit, in plant rooms: but otherwise no wiring shall be surface mounted without written approval.

Where cables must be surface mounted, they shall be installed in such a manner as to conform to any pattern formed panelling, beams, battens, columns and the like, and in all cases shall be as unobtrusive as possible. All surface mounted cables shall be enclosed in approved duct or conduit as specified.

## 5.14.2 Method of Wiring

### 5.14.2.1 General

Install all wiring in accordance with an approved colour code, so that all wires are readily distinguishable.

All fire alarm wiring shall be completely separated from 240volt wiring and where it crosses 240volt wiring a separating bridge of rigid non-conducting material shall be supplied and installed between the fire alarm and 240volt wiring. In general, fire alarm cables must be so spaced from all other wiring or otherwise protected, such that the magnitude of induced voltage in the detector circuit cannot cause a fire alarm.

The minimum size of conductors shall be as follows:

|                             |                                       |
|-----------------------------|---------------------------------------|
| 240volt wiring              | 2.5 sq. mm                            |
| D.C Wiring                  | 1.5 sq. mm (Stranded)                 |
| Wiring to remote indicators | 0.75 sq. mm (Flexible – Coloured RED) |
| Multicore Cables            | 0.50 sq. mm (Stranded)                |

However, size each circuit, with due regard to voltage drop, as well as the above minimum conductor size. If larger cables are required on any circuit these shall be marked on the drawings sent for review.

### 5.14.2.2 TPS Wiring

Where TPS wiring is to be installed, the wiring shall consist of PVC insulated, red PVC sheathed, 0.6/1kV grade cable (red TPS).

Cabling in false ceiling spaces shall be installed on catenary wires fixed to the building structure. Cabling shall be fixed to the catenary wires by means of proprietary cable ties at intervals not exceeding 450mm.

### 5.14.2.3 Wiring in Conduit

Other than red TPS enclosed in conduit in certain locations, all wiring in a conduit system shall consist of PVC insulated 0.6/1kV grade stranded copper cables. All conduits enclosed single insulated cable must be mechanically continuous back to the Fire Indicating Unit.

### 5.14.2.4 Terminations

Connections of cables to studs or under screw heads shall be by means of approved type of insulated crimp tool, to Manufacturer's recommendations.

## 5.15 TESTING AND COMMISSIONING

### 5.15.1 General

Testing shall be carried out to demonstrate and record, prior to completion, that all work meets the performances specified. The work shall be re-tested in the presence of the Engineer and a National Fire Authority officer, who requires at least seven full working days prior notice to enable them to attend. A testing programme is required to be submitted to the Engineer for approval which sets out the sequence, approximate timetable and method to be used.

Appendix J of *NZS4512* shall be completed by the Fire Protection Sub-Contractor and National Fire Authority and handed over to the Engineer.

### 5.15.2 Faults

Should any one of the tests reveal a fault, the fault shall be corrected and re-tested prior to acceptance of the work. It shall be the responsibility of the Fire Protection Sub-Contractor to supply all necessary testing equipment, measuring instruments and the appropriately skilled labour required for conducting the tests. The Fire Protection Sub-Contractor shall prepare a detailed and comprehensive check list for his use during testing. This check list shall be submitted to the Engineer for approval. All tests shall be conducted in accordance with the requirements of the Specification and New Zealand Standard *NZS4512*.

### 5.15.3 Procedures

Prior to starting the test, the Fire Protection Sub-Contractor is required to satisfy himself that:

- a) The installation is strictly in accordance with the Specification and the Drawings.
- b) All equipment is in proper working order.
- c) All instruments to be used for the testing are suitable for the purpose and have been calibrated by a recognised laboratory within the last 12 months.
- d) The draft installation, commissioning, operation and maintenance instructions are available.
- e) The test checklists are available for recording all testing information and results.
- f) Each detector shall be tested in situ to prove correct operation and automatic resetting.

#### **5.16 GUARANTEE**

The Fire Protection Sub-Contractor is to guarantee for a period of one (1) year after the commissioning of the system and its acceptance by the Fire Protection Engineer, the full and proper functioning of the fire alarm system. The Contractor has to promptly and without cost to the Proprietor correct all defects due to faulty components, materials or workmanship.

#### **5.17 MAINTENANCE**

The Fire Protection Sub-Contractor is to be responsible for the comprehensive maintenance of the fire alarm system for a period of 12 months to run concurrently with the Defects Liability period. Full details of the maintenance are to be included in the Tender documents. A notice shall be attached prominently near the Fire Indicating Unit showing names, address and telephone numbers of servicemen, and shall be kept up to date and legible throughout the Contract period.

#### **5.18 FINAL ACCEPTANCE TEST**

##### **5.18.1 General**

Prior to the completion of the Maintenance Period, an annual survey shall be carried out to the approval of the Engineer and in accordance with the instructions contained in Part 6 of *NZS4512*. Test all detectors in-situ to ensure correct operation and automatic resetting.

The Contract shall be deemed to be complete when the results of final tests, as prescribed by the Engineer and carried out by the Fire Protection Sub-Contractor, are to the satisfaction of the Engineer and the National Fire Authority. Provide the Engineer with written notice two weeks in advance of the final test which should be carried out in the final month of the Maintenance Period.

#### **5.19 SPARES**

Provide three spare detectors of each type used. The Fire Protection Sub-Contractor shall also provide a full list of spares, including costs that he considers necessary at 24 hours per day, 7 days per week.

## SECTION 6 FIRE HOSE REEL SYSTEMS

### 6.1 SCOPE OF WORKS

The work covered in this section of the specification includes the supply of materials, labour, plant & equipment to install, test, commission and maintain the fire hose reel system to comply with the requirements of appropriate Authorities.

This shall include all necessary minor and incidental work to comply with both the intent and meaning of this specification and as detailed on the drawings.

Whether or not the words "Supply & Install" appear in this specification or on the drawings, unless clearly and specifically excluded, all items of equipment for the complete installation are required and shall be supplied and installed.

### 6.2 EXTENT OF WORK

The work shall include, but not be limited to, the following major item:

- \* Fire Hose Reels

### 6.3 ADDITIONAL REQUIREMENTS

Provision of the following additional services:

- \* Operating & Maintenance Manuals & "As Installed" drawings
- \* Testing, Commissioning, Warranty & Preventative Maintenance both for a period of 12 months from the date of Practical Completion for the above systems

### 6.4 RULES, REGULATIONS & STANDARDS

Materials used, and the work carried out, shall be strictly in accordance with the most recent rules, regulations and standards of the following authorities:

- a) National Fire Authority
- b) Water Authority of Fiji
- c) Energy Fiji Limited
- d) New Zealand Standard NZS4504 and NZS4510 and all related standards

It is the responsibility of the Fire Protection Sub-Contractor to arrange for all necessary inspections and rectify all defects and deficiencies arising in the installation, to the full satisfaction of the above mentioned authorities and the Engineer.

### 6.5 FIRE HOSEREEL SYSTEM

#### 6.5.1 General

The Fire hose reel, set and pipe work shall be supplied and installed in accordance with the relevant New Zealand Standards and to the complete satisfaction of the National Fire Authority.

#### 6.5.2 Cabinet Fire Hose reels

Fire hose reels shall have swivel hose guides complete with all fittings and containing 36 metre length of 13mm internal diameter fabric-reinforced non-kinking rubber hose and housed in a cabinet. The hose reel shall conform to the type approved by the National Fire Authority. Anti-Kink springs shall be provided in cabinets for all Fire Hose Reels to prevent kinking between the water supply pipework and fire hose reel assembly.

The reels shall be painted and finished with the Colour No. R13 Signal Red. The mounting plate shall be secured in a rigid workmanlike manner without damage to the surrounding areas in an approved manner using galvanised steel or non-ferrous metal bolts or other approved margin of safety, the maximum static and dynamic loads likely to be applied to the fixing.

The hose reel shall be mounted at a spindle height of 1500mm above floor level. Cabinets shall be of a reversible type suitable for RH and LH operation.

Hose reels shall comply with *NZS4504* and be installed to comply with *NZS4503*.

## **6.6 PAINTING, FINISHING AND IDENTIFICATION**

### **6.6.1 General**

The work covered by this Section includes the painting, finishing and identification requirements for all items of plant, pipe work and equipment pertaining to the installation.

All painting and identification shall follow *NZS5807* unless indicated otherwise.

### **6.6.2 Painting and Finishing**

The work shall include the following:

- \* All plant and equipment which is not finish painted in the factory

Items of normally bright and polished metal finishes shall not be painted unless specifically indicated otherwise.

Upon completion of painting, the whole installation and the surrounding building surfaces shall be thoroughly cleaned of all paint marks, grease, oil and dirt. Normally bright metal parts of installation and all equipment identification plates shall be polished.

### **6.6.3 Identification**

All instruments, gauges, indicators, valves, etc., shall be clearly labelled using labels to match the existing installation or shall be of the engraved plastic type unless specifically indicated otherwise.

All items of equipment shall be labelled in accordance with the symbolism and equipment identification used throughout the Specification and Drawings unless otherwise indicated or directed.

All pipe work shall have identification colours painted on in the form of bands of colour and appropriate lettering with proprietary self-adhesive labels. Flow direction shall be indicated.

Pipework identification shall be applied at:

- \* 8 metre intervals along pipe runs
- \* All branches in the system

### **6.6.4 Schedule of Finishes**

The Schedule below shall be used for all exposed services except where otherwise directed by the Architect.

| <u>Description</u>      | <u>Colour &amp; Reference</u> |
|-------------------------|-------------------------------|
| Fire Hose Reel Pipework | Signal Red 537                |

## **6.7 TESTING AND COMMISSIONING**

### **6.7.1 Test Requirements**

All testing and commissioning shall be carried out as necessary to put the systems into commercial use and to the full approval of the local Authorities.

Notwithstanding the above, all systems shall be pressure tested and witnessed for a period of two (2) hours as follows:

- \* Fire Hose reel System : 1.5 x max. Operating Pressure

### **6.7.2 Test Records**

Final test sheets recording all settings, adjustments, test results and Authority approvals shall be incorporated into the Operating and Maintenance Manual.

## SECTION 7 PORTABLE FIRE EXTINGUISHERS

### 7.1 GENERAL

The work covered in this section of the Specification includes the supply, installation, testing, commissioning and maintenance of the portable extinguishers.

This shall include all necessary minor and incidental work to comply with both the intent and meaning of this Specification and as detailed on drawings inclusive.

Whether or not the words "Supply & Install" appear in this Specification or on the drawings, unless clearly and specifically excluded, all items of equipment for the complete installation are required and shall be supplied and installed.

### 7.2 ADDITIONAL REQUIREMENTS

Provisions of the following additional services:

- \* Installation Manuals & As Installed drawings
- \* Testing, Commissioning, Warranty & Preventative Maintenance for a period of 12 months from the date of Practical Completion.

### 7.3 RULES, REGULATIONS & STANDARDS

Materials used and the work carried out shall comply with:

- a) National Fire Authority Regulations
- b) New Zealand Standards NZ4503, NZS4506 and NZS4508 and all related standards

It is the responsibility of the Fire Protection Sub-Contractor to arrange for all necessary inspections and rectify all defects and deficiencies arising in the installation, to the full satisfaction of the above mentioned authorities and the Engineer.

### 7.4 PORTABLE FIRE EXTINGUISHERS

Portable fire extinguishers shall be supplied and installed in accordance with the NZS4503 and as indicated on the drawings. Include all proprietary mounting brackets and signage appropriate to each extinguisher.

## **SECTION 8 TESTING AND COMMISSIONING**

### **8.1 GENERAL**

The installation shall be tested to the satisfaction of the Engineer and the National Fire Authority prior to the acceptance of the installation and the commencement of the Defects Liability Period.

The tests shall comprise a thorough inspection of the installation and the operational and performance tests.

The necessary skilled and competent personnel together with all equipment, fuel and electrical power required to test and commission the works shall be provided.

All testing and commissioning shall be carefully preplanned and scheduled in order that it is fully coordinated with other relevant trades and shall be carried out in a safe and efficient manner with a minimum of inconvenience to all concerned.

The installation shall be tested progressively as the work is carried out then finally tested once it is completed to ensure compliance with the Specification, is mechanically and electrically safe and that it will operate correctly under normal, emergency and fault conditions.

Control, protection and operative devices shall be checked for correct adjustment and rating.

All equipment or materials found to be faulty during testing shall either be replaced or repaired free of charge. The completed installation or stages therefore shall be ready for connection at the programme target dates and where applicable copies of related correspondence with the National Fire Authority shall be submitted to the Engineer.

Should a trial or test be deemed unsatisfactory by the Engineer, it shall be repeated at no further charge after necessary rectification until such time as a satisfactory result is obtained.

### **8.2 COMMISSIONING**

Practical Completion is granted. Each item of equipment individually and the complete system as a whole Carry out all commissioning tests necessary to put the system into commercial use and to approval before shall be checked and adjusted to achieve satisfactory performance.

### **8.3 TESTS AND INSTALLATION INSTRUMENTS**

All instruments, appliances and test loads shall be provided for the duration of the test as necessary to complete the test procedures specified. Gauges and instruments provided as permanent parts of the installation may be used during performance testing providing evidence is submitted of their calibration accuracy.

### **8.4 TEST RESULTS**

All test procedures used and results obtained for both works and site tests shall be submitted in the form of a written Test Report.

Records shall be kept of test results and two (2) copies shall be submitted to the Engineer at the completion of the work. Approval of the format required for the test results shall be obtained prior to the submission.

### **8.5 NOTICES**

All tests required by the National Fire Authority shall be completed in accordance with directions given by them.

Copies of all approval notices including the Final Acceptance notice shall be submitted prior to the claim for final payment.

## SECTION 9 AS INSTALLED DRAWINGS AND INSTALLATION MANUALS

### 9.1 GENERAL

The Fire Protection sub-Contractor shall hand over at Practical Completion, As Installed Drawings and Installation Manuals for the building.

### 9.2 AS INSTALLED DRAWINGS

Installation drawings correctly brought up to date to present true and accurate representation of the actual installation and to a scale of not less than 1:00 shall be provided at Practical Completion.

The following shall be included in these drawings:

- a) Complete cabling routes.
- b) Physical layouts of the Fire Indicating Unit, manual call points, alerting devices and associated equipment.
- c) Physical layouts of the Fire Hose Reel system equipment.
- d) Physical layouts of the portable extinguishers
- e) Upon submission and approval the following issue of "As Installed" Drawings shall be made:
  - \* 3 complete sets of prints, bound as sets.
  - \* An accompanying typed list of all drawings shall be provided, with both full drawing number and title.

### 9.3 INSTALLATION MANUALS

Three copies of an Installation Manual shall be supplied at Practical Completion.

A full description of the various systems involved and instructions covering every action necessary for the efficient operation and maintenance of the installation shall be included.

The manual shall be bound neatly in a blue vinyl hardback folder with stamped gold lettering on the front cover, in a format to be confirmed by the Engineer.

In addition, the words, "Installation Manual", the services, and the job name, shall be stamped in gold lettering along the spine of the folder.

All aspects of the style and quality of the manual, including folders and contents shall be to approval.

The general format to be followed shall be:

#### **Section 1 Index**

All sub-divisions of each section including lists of drawings, equipment and similar shall be indexed for quick reference.

#### **Section 2 General Description of Fire Protection Services**

Each individual system shall be included as a sub-section as appropriate. Full details of any system which requires regular maintenance shall be included. The function of each system or sub-system shall be described.

#### **Section 3 As-Installed Drawings**

A complete set of As Installed Drawings shall be included in the Installation Manual.

#### **Section 4 Equipment**

All major items of equipment installed shall be listed complete with manufacturer's name, model, and/or type No., Serial No., size, design ratings in sub-divided sections as for Section 2 above (i.e. all relevant data necessary for re-ordering or replacing).

#### **Section 5 Installation Maintenance & Operating Instructions**

Manufacturer's installation, maintenance and operating instruction for each system shall be included and sub-divided as for Section 2. A comprehensive maintenance schedule to be followed throughout the warranty period shall be included along with copies of all data relating to commissioning testing.

**Section 6 Plant Operating Instructions**

A complete description and correct sequence of all actions necessary to operate each system shall be provided and sub-divided as for Section 2. Full operation on such items as normal and abnormal dial readings and protection equipment settings shall be included. Information on the immediate action to be taken in the event of hazardous conditions arising shall be provided concluding with the following sentence in large lettering.

FOR SERVICE - CALL TELEPHONE NO. ....

With appropriate telephone number provided.

**Section 7 Performance Test Results**

Space for inclusion of all performance test results shall be provided and sub-divided as for Section 2. All results of progressive tests during the installation works shall be included.

## **SECTION 10 MAINTENANCE AND SERVICING**

### **10.1 MAINTENANCE**

Routine maintenance and servicing shall be carried out for a period of twelve months from date of Practical Completion to the end of the Defects Liability Period.

Routine maintenance shall be carried out on a monthly basis and emergency service shall be carried out on a 24 hour call out basis.

Maintenance procedures shall be as appropriate to ensure the safe and proper operation of all systems and shall be in accordance with current standard requirements of the Building Act and Regulations having jurisdiction, relevant New Zealand Standards, Local Authority Regulations, National Fire Authority Regulations and the schedule provided in the Installation Manual as outlined in Section "Testing and Commissioning" of this Specification.

Routine maintenance shall be deemed to be the regular maintenance of equipment and shall include not less than:

- a) Maintaining a dated record of servicing performed on each system in a servicing record book to be retained under the Proprietor's control on site.

### **10.2 RECTIFICATION OF DEFECTS**

All defects shall be promptly rectified. Retention moneys or Bank Guarantee will not be released until all outstanding defects notified during the Maintenance and Defects Liability Period has been rectified and completion of such work subsequently advised in writing to the approving authority.

# APPENDICES

**FIRE PROTECTION SERVICES TENDER  
LTA KARAVI WEIGHBRIDGE STATION  
KARAVI, BA, FIJI ISLANDS**

We, the undersigned having examined the Drawings and Specification hereby offer to execute and complete the whole of the Works required to be done, as shown on the said Drawings and described by or referred to in the Specification and for the Fixed Lump Sum of:

.....

..... (F\$.....) which includes all Contingency, Provisional and PC Sums and is a Fixed Lump Sum V.A.T. inclusive without provision for fluctuations in the cost of labour and materials.

AS WITNESS OUR HANDS THIS ..... day of ..... 2019

SIGNATURE ..... OF ..... TENDERER

OFFICE ..... STAMP

ADDRESS .....

WITNESS [SIGNATURE AND BLOCK CAPITALS] .....

ADDRESS .....

OCCUPATION .....

DATE .....

We confirm that our time for completion is .....calendar weeks.

The Tender shall be open for acceptance for a period of sixty (60) days.

The Principal does not bind himself to accept the lowest or any Tender.

The documents must not be altered in any way. Any special observation should be made in a separate letter attached to this Tender. Please return documents with Tender.

Name of Tenderer \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

IRWIN ALSOP PACIFIC LTD  
BUILDING SERVICES CONSULTING ENGINEERS  
DOMAIN, SUVA

PROJECT NO: 7845  
DATE: MAY 2019



**APPENDIX III SCHEDULE OF TECHNICAL DATA - SCHEDULE**  
**PRINCIPAL :** IRWIN ALSOP PACIFIC LTD  
**PROJECT :** LTA KARAVI WEIGHBRIDGE STATION, KARAVI, BA, FIJI ISLANDS  
**SPECIFICATION :** FIRE PROTECTION SERVICES

**SCHEDULE 1**  
**SHEET 1 OF 3 SHEETS**  
**PROJECT NO: 7845**  
**DATE: MAY 2019**

**NAME OF TENDERER:** \_\_\_\_\_

Two loose copies of this Schedule are supplied with this Specification.

One copy shall be completed, signed by the Tenderer and returned with his tender.  
The other copy is for the Tenderer's retention.

A Tender shall be regarded as not complying with this Specification if the information required by this Schedule of Technical Data is not supplied with the Tender.

Tenders are to be based on equipment etc., as specified.

Alternatives may be submitted, but must be clearly described to receive consideration.  
For each alternative, an alternative tender price must be submitted.

**NAME OF PROPOSED SUB-CONTRACTOR / SUPPLIER SUB-CONTRACT EQUIPMENT**

- |         |       |
|---------|-------|
| 1. .... | ..... |
| 2. .... | ..... |
| 3. .... | ..... |
| 4. .... | ..... |
| 5. .... | ..... |
| 6. .... | ..... |

**COMPARABLE WORK CARRIED OUT BY THE TENDERER AND APPROXIMATE VALUE**

- |         |         |
|---------|---------|
| 1. .... | \$..... |
| 2. .... | \$..... |
| 3. .... | \$..... |
| 4. .... | \$..... |
| 5. .... | \$..... |
| 6. .... | \$..... |

**Name of Tenderer** \_\_\_\_\_

**Signature** \_\_\_\_\_ **Date** \_\_\_\_\_

IRWIN ALSOP PACIFIC LTD  
BUILDING SERVICES CONSULTING ENGINEERS  
DOMAIN, SUVA

**PROJECT NO: 7845**  
**DATE: MAY 2019**

1. Fire Indicating Unit:

Manufacturer \_\_\_\_\_

Model No \_\_\_\_\_

2. Alarm Signalling Equipment (ASE):

Manufacturer \_\_\_\_\_

Model No \_\_\_\_\_

3. Audible Alerting Device (Sounder):

Manufacturer \_\_\_\_\_

Model No \_\_\_\_\_

4. Manual Call Point:

Manufacturer \_\_\_\_\_

Model No \_\_\_\_\_

5. Visual Alerting Device (Strobe):

Manufacturer \_\_\_\_\_

Model No \_\_\_\_\_

6. Portable Fire Extinguishers:

a. 4.5kg Dry Powder

Manufacturer \_\_\_\_\_

Model No \_\_\_\_\_

b. 2.5kg Dry Powder

Manufacturer \_\_\_\_\_

Model No \_\_\_\_\_

**Name of Tenderer** \_\_\_\_\_

**Signature** \_\_\_\_\_

**Date** \_\_\_\_\_

**APPENDIX III**                    **SCHEDULE OF TECHNICAL DATA - SCHEDULE**  
**PRINCIPAL**     : IRWIN ALSOP PACIFIC LTD  
**PROJECT**        : LTA KARAVI WEIGHBRIDGE STATION, KARAVI, BA, FIJI  
                      : ISLANDS  
**SPECIFICATION** FIRE PROTECTION SERVICES

**SCHEDULE 1**  
**SHEET 3 OF 3 SHEETS**  
**PROJECT NO: 7845**  
**DATE: MAY 2019**

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c. 2.0kg Dry Powder

Manufacturer \_\_\_\_\_

Model No \_\_\_\_\_

d. 3.5kg Carbon-Dioxide

Manufacturer \_\_\_\_\_

Model No \_\_\_\_\_

7. Fire Blanket (1.2m x 1.2m)

Manufacturer \_\_\_\_\_

Model No \_\_\_\_\_

8. Fire Hose Reel (Recessed within Cabinet):

Manufacturer \_\_\_\_\_

Model No \_\_\_\_\_

9. Fire Alarm Cabling:

Manufacturer \_\_\_\_\_

Model No \_\_\_\_\_

10. Fire Alarm Cabling Conduits (with Draw Wires):

Manufacturer \_\_\_\_\_

Model No \_\_\_\_\_

**Name of Tenderer** \_\_\_\_\_

**Signature** \_\_\_\_\_

**Date** \_\_\_\_\_

IRWIN ALSOP PACIFIC LTD  
BUILDING SERVICES CONSULTING ENGINEERS  
DOMAIN, SUVA

**PROJECT NO: 7845**  
**DATE: MAY 2019**

**APPENDIX IV SCHEDULE OF RATES****SCHEDULE 1****(To be completed and submitted with Tender)**

**PRINCIPAL :** IRWIN ALSOP PACIFIC LTD  
**PROJECT :** LTA KARAVI WEIGHBRIDGE STATION, KARAVI, BA, FIJI ISLANDS  
**SPECIFICATION :** FIRE PROTECTION SERVICES

**SHEET 1 OF 1 SHEET**  
**PROJECT NO: 7845**  
**DATE: MAY 2019**

The following Schedule of Rates shall be used as a basis to value variations (either additions or deletions) and progress claims for this Contract.

Rates shall include all overheads (including on and off site supervisory staff, allowance etc.) profit and V.A.T.

Rates for equipment and materials are that delivered to site, without installation (unless otherwise stated)

| ITEM | DESCRIPTION   | UNIT PRICE |
|------|---|------------|
| 1.   | Licensed Technician (per Hour)                                | \$         |
| 2.   | Technician (per Hour)   | \$         |
| 3.   | Unskilled Labour (per Hour)                                   | \$         |
| 4.   | Fire Indicating Unit  | \$         |
| 5.   | Automatic Smoke Detectors                                     | \$         |
| 6.   | Automatic Smoke Detectors                                     | \$         |
| 7.   | Audible Alerting Device IP65 rated (Horn Alarm)               | \$         |
| 8.   | Audible Alerting Device (Alarm Sounder)                       | \$         |
| 9.   | Visual Alerting Device (Strobe Alarm)                         | \$         |
| 10.  | Manual Call Point   | \$         |
| 11.  | Fire Hose Reel (36m) – Stainless Steel(SS) type in SS cabinet | \$         |
| 12.  | Fire Blanket (1.2m x 1.2m)                                    | \$         |
| 13.  | Fire Extinguisher Cabinet – Stainless Steel cabinet           |            |
| 14.  | <u>Portable Fire Extinguishers:</u>                           |            |
| a.   | 4.0kg - Dry Powder  | \$         |
| b.   | 2.5kg - Dry Powder  | \$         |
| c.   | 2.0kg - Dry Powder  | \$         |
| d.   | 3.5kg - CO <sub>2</sub>                                       | \$         |
|      |   |            |
|      |   |            |
|      | <b><u>On Cost Percentage Mark-Up</u></b>                      |            |
| I.   | Labour  | %          |
| II.  | Material  | %          |
| III. | Plant   | %          |

Name of Tenderer \_\_\_\_\_

Signature \_\_\_\_\_

Date \_\_\_\_\_

IRWIN ALSOP PACIFIC LTD  
 BUILDING SERVICES CONSULTING ENGINEERS  
 DOMAIN, SUVA

PROJECT NO: 7845  
 DATE: MAY 2019