

**SUPPLY & INSTALLATION
of the
HYDRAULICS SERVICES
for the
LTA KARAVI WEIGHBRIDGE STATION
at
KARAVI, BA, FIJI ISLANDS**

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**HYDRAULICS SERVICES
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 for 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 PTE Ltd.

SECTION 2 SPECIAL CONDITIONS OF CONTRACT

Special Conditions of Contract shall be the Conditions of Contract for the 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 PTE Ltd.

SECTION 3 PRELIMINARY AND GENERAL

Conditions of Contract shall be the Conditions of Contract for the 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 PTE Ltd.

SECTION 4 SCOPE OF WORKS

4.1 GENERAL

The scope of works comprises the supply, installation, testing, commissioning, maintenance and defects liability services of materials, labour and equipment for the complete Hydraulics Services installation for the LTA Karavi Weighbridge Station, 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 and shall be supplied and installed.

Extent of Work

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

- a) The supply and installation of all plumbing fittings, fixtures and tap wares in the building as specified by the Architect and as indicated on the drawings and provision of cold water, wastes, floor wastes where specified and sanitary drainage to serve these fixtures including support system for the pipework. The work includes all the waste and soil pipework within the building and underground drainage pipework outside the building up to the connection to the inspection chambers. Provide external inspection chambers for grey and black water.
- b) The supply and installation of cold water pipework to all the fixtures within and around the building from the rainwater tanks and site reticulation pipework and support system for the pipework as indicated on the drawings.
- c) The supply and installation of rainwater harvesting tank assembly as specified and indicated on the drawings including all fittings and pipework connections – 2 x 10,200L Rainwater Harvesting Tanks.
- d) The supply and installation of fire hose reel supply pipework as specified and indicated on the drawings including all fittings and pipework connections.
- e) The supply and installation of pumps, filters and ultra violet treatment units as specified and indicated in the drawings.
- f) The supply and installation of wash down hose taps with vacuum breakers as indicated on the drawings including all fittings and pipework connections.
- g) Carry out final inspections of all insulation, joints and pipework connections prior to commissioning of the system.
- h) Flow and pressure testing and commissioning of all installation work.
- i) Provision of shop drawings.
- j) Provision of As Installed drawings and Installation Manuals.
- k) Maintenance work during the Defects Liability Period.

4.2 WORK BY OTHERS

The following work will be provided by others:

- a) The power supply to the rainwater water pump will be provided by the Electrical Sub-Contractor.
- b) Water tank plinth will be provided by Building Contractor

4.3 DRAWINGS

The scope of work is shown on the Hydraulics Services drawings (H01 – H12) which should be read in conjunction with this Specification. Refer to the Hydraulics drawings for the exact positions of fixtures, fittings, plant equipment, sundry appliances and structural elements. Confirm dimensions on site before commencing work.

The following drawings shall form part of the Contract:

H01	SCHEDULE OF DRAWINGS, LINETYPES, LEGENDS & ABBREVIATIONS
H02	SPECIFICATION / SCOPE OF WORKS, SCHEDULE OF INSPECTION CHAMBERS, DISCHARGE PIPE, MINIMUM BURIED COVER FOR PIPES & LOCALITY PLAN
H03	PROPOSED SITE PLAN RAINWATER HARVESTING SUPPLY LAYOUTS
H04	PROPOSED SITE PLAN SANITARY PLUMBING LAYOUTS
H05	PROPOSED FLOOR PLAN DOMESTIC COLD WATER, RAINWATER HARVESTING, HOT WATER & FIRE HOSE REEL SUPPLY LAYOUTS
H06	PROPOSED FLOOR PLAN SANITARY PLUMBING LAYOUTS
H07	PROPOSED ROOF PLAN SANITARY PLUMBING LAYOUTS
H08	PROPOSED RAINWATER HARVESTING & PUMP DETAILS
H09	PROPOSED SCHEMATICS
H10	HYDRAULICS SUPPLY DETAILS
H11	HYDRAULICS SANITARY PLUMBING DETAILS
H12	SEPTIC TANK DETAILS

4.4 RULES, REGULATIONS AND CODES

All work performed under this Section of the Contract shall be carried out by or under the full supervision of a fully licensed Plumber and shall comply in all respects with the Regulations and By-Laws of the appropriate Authorities including:

- a) The Building Regulations applying to the project
- b) The National Building Code of
- c) Electricity Fiji Ltd
- d) Water Authority of Fiji
- e) National Fire Authority of Fiji
- f) Local Authority Council
- g) Any other regulations that apply directly or indirectly to such regulations in the locations. Materials, manufactured articles and workmanship shall conform to the relevant Standards. Where Authorities so require, items shall be stamped with their approval.
- h) AS/NZS 3500

4.5 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 Principal Consultant.

4.6 SHOP DRAWINGS

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

ITEM	INFORMATION REQUIRED	SETS
General Pipe Routes	Construction and Layout Details	3

Submission to the Services Engineer in the first instance shall be made not less than one (1) week

prior to approval in principle is required.

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

SECTION 5 PLUMBING – SANITARY AND COLD WATER SERVICES

5.1 SCOPE OF WORK

The work of this Section includes but is not limited to, supplying and installation of a complete water tank and pump system and the reticulation of cold water supplying to the building including associated isolating valves, stop taps all necessary brackets, fixing bolts, screws and outlets to connect the following items, also supplied and installed under this Contract:

- a) Hose Basin
- b) Hose Cocks
- c) Shower Bases
- d) Kitchen Sink
- e) Stove
- f) Tundish (Condensate Waste)
- g) Drain Valve
- h) Over Flow
- i) Floor Waste Gully
- j) WC Pans and Cisterns
- k) Isolating Valves
- l) Non-Return Valves
- m) Gully Trap
- n) Inspection Chamber
- o) Terminal Vent

5.2 COLD WATER MAINS SUPPLY CONNECTION

There is no work needed for connection from the mains supply.

5.3 RELATED WORK

Co-ordinate and co-operate with the following trades:

Sewerage and drainage
Schedule of sanitary items
Fire services installation
Ceramic tiles
Finishing trades

5.4 QUALITY ASSURANCE

Submit evidence of the firm's quality assurance system only if required by the Builder.
Perform the work of this Section using Tradesmen whose experience and skills meet the requirements of the controlling Statutory Authorities.

5.5 REFERENCES

Comply with the latest revisions of the applicable portions of the following Australian and New Zealand Standards:

AS/NZS 3500 National Plumbing and Drainage Code
3500.0 Glossary of terms
3500.1 Water supply
3500.2 Sanitary plumbing and sanitary drainage
3500.3 Storm water drainage
3500.4 Hot water supply systems

AS/NZS 1596 The Storage and Handling of LP Gas
Comply with requirements of Statutory Authorities having jurisdiction.

5.6 SUBMISSIONS

Before ordering scheduled material, submit required product data to the Services Engineer, particularly where the specified material is not available and alternatives are offered.

5.7 MATERIALS- ACCEPTABLE MANUFACTURERS

Supply and install sanitary fixtures, fittings and tapware as specified by the Architect. Ensure that items to be installed are approved for installation by the Local Authorities before ordering.

5.8 MATERIALS

5.8.1 GENERAL

The Services Engineer reserves the right to call for test certificates of the materials. These certificates must use the tests listed in the appropriate Standard.

Unless otherwise specified materials shall be in accordance with the Australia and New Zealand Building Code, relevant standards, and local authority requirements.

Pipes embedded in concrete shall appropriately protected against damage due to construction, materials etc.

5.8.2 COPPER PIPING

Make freely available to the Services Engineer all invoices and documents relating to the origin of the piping used.

Half hard copper pipe shall comply with NZS 3501 Table 1 and bear the standard certification mark of the Standards Association of New Zealand or its equivalent.

NZS3501 -Table 3, light gauge copper tube shall not be used.

5.8.3 UN-PLASTICIZED POLYVINYL CHLORIDE PIPE - uPVC

Pressure pipe shall comply with AS/NZS 1477 Series 1 metric sizes.

Foul water discharge and ventilating pipe, fittings and accessories shall comply with AS/NZS 1260.

Underground sewer piping shall be PVC to AS/NZS 1260, SN rating as shown on the drawings, installed in compliance with NZS 7643 and/or NZS 4452.

5.8.4 POLYPROPYLENE PIPING - PE

Polypropylene waste and ventilating pipes and fittings shall have purpose made double taper compression joints, 'DUX' or similar approved.

All Polypropylene pipe and fittings shall be equal to Aquatherm Fusiontherm SDR 11, Class PN 12.9 to DIN 8078 and DIN 16962, and must:

Be approved by Local Authorities

Be socket fusion welded jointed in accordance with the manufacturer's instruction

Incorporate fittings of the same manufacture as the pipe used.

Comply with the relevant Australian Standards

5.8.5 SCHEDULE OF PIPEWORK MATERIALS

SERVICE	MATERIAL
Mains Cold Water(CW)	Fusion-welded polypropylene as specified: Note. Pipe sizes indicated on the drawings are internal diameters. Ensure pipework installed complies with pipe sizes specified.
Mains Cold Water (CW)	Polyethylene to: AS/NZS 4130
Internal Cold Water (CW)	PE-X (K2)
Hot Water (HW)	Fusion-welded polypropylene as specified
Hot Water (HW)	Copper to NZS 3501 Table 1 (table 3 shall not be used)
Hot Water (HW)	PE-X (K2)
Gravity Grease Waste	HDPE to AS/NZS 5065
Gravity Grease Waste	Copper to NZS 3501 Table 1
Sanitary Plumbing	uPVC to AS/NZS 1260
Gas supply (Below Ground)	Fusion- welded polyethylene to AS/NZS 4130.
Gas supply (Above Ground)	Copper to NZS 3501 table 1.

5.9 EQUIPMENT

Provide necessary equipment to affect a complete installation of each part of this Section, including seals, jointing materials, flanges, etc.

Plinths – The pumps to be mounted on plinths provided by the Main Contractor.

Anti-Vibration isolation – The pump bases are to be seated on 13mm thick rubber pads.

Pump inlet line – Provide flexible connector in the inlet line from tank for tank settlement allowances.

5.9.1 FIRE HOSE REEL WATER PUMP (NOT APPLICABLE)

Provide a single fire hose reel water pump as scheduled on the drawings or equal approved. This pump shall be supplied on a common base support and pre-piped with flow headers, isolating valves, spring loaded check valves, hydraulic vessel, flexible connection at inlet and outlet headers, controlling pressure sensors, pressure gauges and all control mountings for sequence control, lead/lag change over on 24 hour basis and variable speed control. Provide safety interlocks for high temperature and no water flow to stop the pumps in the event of water failure. The pump setup shall be tested in the supplier's workshop before delivery. The test shall be witnessed by the Services Engineer.

5.9.2 WATER STORAGE TANK

Provide two 10,200 litre water storage tanks, 1 10,200 litre rainwater harvesting tank and 3 1,000 litre overhead tanks. The tanks shall be fabricated of food grade polyethylene. The tanks shall be of single wall model. The tanks shall be provided with a 10 year warranty against internal and external corrosion and structural failure. Provide earthquake restraints for the tank.

The tank shall be installed on the vinyl so that the bottom plate does not come in contact with the concrete foundation pad. The joint between the tank bottom and vinyl shall be sealed with ultraviolet resistant sealant.

5.9.4 DOMESTIC WATER FILTER (NOT APPLICABLE)

Water filters shall be mounted before the water tank and after the pump. Filters to be constructed from clear polypropylene with 20 micron pleated polyester or equivalent approved.

5.9.5 FLOOR WASTE GULLY (NOT APPLICABLE)

Provide floor waste gullies where shown on the drawings. Install such that the top of the waste is below final level of any floor covering to ensure drainage. The floor waste gullies are to be trapped and unvented. Co-ordinate with the Builder to ensure that the floor is laid to fall to the floor waste gully.

5.9.6 CISTERN OVERFLOWS

Provide all water closet cisterns with internal overflows.

5.9.7 WASTE AND SOIL RISER STACKS

Provide waste stack risers to serve all plumbing fixtures.

5.9.8 SOIL WASTES AND VENTS

Provide soil, waste and vent systems for all soil and waste fixtures as per AS/NZS 3500. All soil, waste and vent pipes shall be to AS 1415 and AS 1260.

5.9.9 PLUMBING FIXTURES GENERALLY

All fixtures shall be provided and installed as specified by the Architect. All sinks and wash hand basins are to be complete with chromed brass waste outlet tail pipe and trap with cleaning eye, plug and chain. The waste shall be firmly clamped to the fixture with a locking collar to allow the trap to be removed. All waste outlets shall be positioned low enough to ensure complete drainage of the fixture.

5.9.10 FIRE HOSE REELS AND FIRE HYDRANTS

The fire hose reels and fire hydrant fixtures shall be supplied by the Fire Protection Sub-Contractor as shown on the Fire Protection drawings. The fire hose reels and fire hydrant supply and installation of pipework is to be carried by the Hydraulics Sub-Contractor.

SECTION 6 SEWERAGE AND DRAINAGE

6.1 SCOPE

The work of this Section includes but is not limited to supplying and laying a complete system of sewer pipes, pits, covers, septic tank etc., as specified below and as detailed on the Architectural and Hydraulics Services drawings.

6.2 RELATED WORK

Co-ordinate and co-operate with the following trades:

Excavation

Concrete (small works)

Roof plumbing

Sanitary plumbing

6.3 QUALITY ASSURANCE

Submit evidence of the firm's quality assurance system only if required by the Builder.

Perform the work of this Section using Tradesmen whose experience and skills meet the requirements of the controlling Statutory Authorities.

The Architect and Engineer will make random inspections during the execution of the work.

6.4 REFERENCES

Comply with the latest revisions of the applicable portions of the following Australian/ New Zealand Standards:

AS/NZS 3500 National Plumbing and Drainage Code
3500.0 Glossary of terms
3500.1 Water supply
3500.2 Sanitary plumbing and sanitary drainage
3500.3 Storm water drainage
3500.4 Hot water systems

Perform work also in accordance with the regulations and requirements of the Local Authority, and drawings provided by the Local Authority and Engineer for the purpose.

Comply with requirements of any Statutory Authority having jurisdiction.

6.5 MATERIALS

Sewer drainage shall be to AS 1260 and complying with the relevant standards and Authority requirements. Gravity drains shall comply with AS1260 parts 1 to 5 or equal approved standard. All soil waste and vent drains shall be UPVC complying with AS1415 parts 1 to 5 or equal approved standard.

Jointing of pipes and fittings shall be by using approved solvent cement. Before application of solvent cement, joints and fittings shall be cleaned with approved priming fluid, coloured for proof of usage. Installation shall be strictly in accordance with Manufacturer's instructions.

Vent pipes shall be free to move through roof opening with weatherproof apron fit bird cowl on all vents.

6.6 PIPELAYING

Lay drains to gradients complying with the relevant Authority's requirements, to the levels, if any, shown on the drawings, and in any case not less than the following:

PIPE DIA. (MM)	GRADIENT
40 - 65	1 in 40
80 - 100	1 in 60
125	1 in 80
150	1 in 100
225	1 in 150

Lay pipelines to uniform gradients falling to the outlets, straight between required changes of direction, properly supported, with watertight joints aligned flush at internal surfaces, and with spigot ends pointed in the direction of flow. Provide the necessary fittings and accessories, including junctions, branches, inspection and cleaning openings, expansion joints and the like.

Provide inspection openings as required by the regulatory Authority and in any case so that each straight length of sewer line can be inspected in at least one direction. Seal the openings with purpose-made covers fixed by a jointing method appropriate to the pipework. Raise the openings to surface level in various locations to ensure that all main runs of drain can be rodded. Inside buildings, finish off inspection openings to floor level with a screwed brass cap.

6.7 ACCESSIBILITY

Particular care shall be taken in placing of trap sewers and inspection openings to ensure that all are accessible, easily drained, and conveniently placed for insertion of cleaning rods and wires. All pipe traps, bends, junctions etc shall be inspection type regardless of their location, unless access is possible by other means e.g. pits.

6.8 PIT CONSTRUCTION

6.8.1 GENERAL

Construct pits, sumps, manholes, tanks, wells and the like as follows, unless otherwise specified

6.8.2 FLOORS AND WALLS

In situ concrete: 20MPa, reinforced with F72 mesh centrally located. All reinforcement to be fully lapped. Thickness not less than 150mm, unless otherwise shown or specified.

6.8.3 PREFABRICATED CONCRETE

Walls of spun precast sections not less than 60mm thick. Floor cast in situ or prefabricated. Provide cored holes as required.

6.8.4 FINISH TO EXPOSED SURFACES

Smooth, seamless, equal to steel trowelled render or concrete cast in steel forms. Cover or splay internal corners. Bench floors and fall to drain.

6.8.5 ACCESS

Provide ladders to pits deeper than one metre, cast or built into the pit walls clear of drain outlet openings or discharges.

Rungs: mild steel rod, galvanised, 450mm wide.

Rung spacing: 300mm maximum, 250mm minimum, with bottom rung not more than 450mm from the floor and top rung not more than 450mm below surface level.

6.8.6 COVERS

Rebate the top of the pit walls to suit the cover frame or provide a precast rebated surround, and grout

the frame into the rebate with infill concrete.

Top level of cover or grating, including frame:

In paved areas, flush with the paving surface

In landscaped areas, 25mm above finished surface

Gratings taking surface water runoff: as necessary to receive runoff without ponding

In trafficable areas, provide Gatic or equal covers or sump grates appropriate for the wheel loadings involved. Inside buildings provide covers incorporating brass edge strips to allow floor finishes to be incorporated.

6.8.7 CONSTRUCTION

Build inlet and outlet pipes into the pit walls during construction. In existing pits, make openings of the correct size and pack the joint around the pipe to the full thickness of the wall with 1:3 mortar, finished off neatly and flush with the internal face of the pit wall. When pipe channels are required in pit floors, form the channel to the full depth of the pipe.

SECTION 7 EXECUTION

7.1 EXAMINATION

Visit the site before delivery of materials, and compare conditions with those shown on the drawings. Start of work means total acceptance of conditions.

Registered Plumbers and Drain Layers shall be employed as required by the Regulations.

7.2 OBVIOUS WORK

Contract drawings are diagrammatic and as such show the intent of design. Where an item of work or equipment is obvious or can be inferred as normal practice in the class of work generalized herein, such shall be included, whether shown on the drawings and/or specified or not.

Allow for all bends, offsets and other measures necessary avoid interference with the structure and/or other building services.

7.3 LEVELS AND DIMENSIONS

Invert levels shown on the Contract drawings are recommended only. Check levels on site before excavation or installation of pipework to ensure correct cover, fall and compatibility between existing and proposed levels.

Be responsible for taking all dimensions on site. Dimensions must be checked before work is put in hand or prefabricated.

7.4 CO-ORDINATION OF SERVICES

Where a number of services occur in any one area, carry out co-ordination of the services installation. Co-operate with other Sub-Contractors to avoid clashes and make any alterations found necessary. Co-ordination shall include minor re-arrangement of the affected services in order to accommodate these services within the available space and to the approval of the Architect.

7.5 EXISTING SERVICES

Alter existing services as necessary.

Obtain approval before interrupting an existing service and perform the work so that the duration and number of interruptions are reduced to a minimum. Provide a programme before starting this work.

If an existing service or structure, which is to be retained, crosses the line of a required trench, provide permanent support for the existing service or structure.

7.6 SAMPLES, WORKMANSHIP AND MATERIALS

Provide skilled and expert labour necessary to carry out the work in the best possible manner. The quality of workmanship shall be of first grade and in accordance with the highest standards of the respective trades. Workmanship of poor quality or of an unacceptable standard will be rejected by the Principal Consultant and must be replaced at no extra cost with workmanship of the required standard.

All materials, fittings, accessories and apparatus are to be of first grade design and manufacture and are to comply with the relevant Standard. All materials, fittings, accessories and apparatus shall be new ex-works and shall be of current model and design unless specified otherwise.

Submit for the approval, prior to commencing installation, a sample of all accessories, fittings and apparatus which it is proposed to employ in the work, and only such items as have been approved may be installed. Failure to comply with this provision will result in the unconditional rejection of such

items when inspected on site. Provide a samples room where 'approved' samples shall be kept on site. Each item of equipment shall be a standard catalogue product of an established, reputable, approved manufacturer. All similar equipment shall be of the same manufacture, type, class and finish, unless otherwise specified.

Where no alternative materials are noted in the Specification or on the drawings and where the words equal, approved equal, as approved, etc. do not appear, the exact make specified must be furnished and installed.

Take every care to avoid damage to fittings, surface and equipment in the premises and any damage caused shall be made good at no extra cost to the Contract.

Complete contracted work in accordance with the Contract documents and written variation orders issued by the Engineer.

On completion, remove debris and clean visible work to the Engineer's satisfaction.

7.7 INSTALLATION

Install pipework in straight lines and uniform grades without sags. Provide bends and tees as required and sufficient unions, flanges and ball valves for satisfactory removal of piping and fittings for maintenance. Arrange and support pipework as necessary so that it remains free from vibration whilst permitting necessary movements such as thermal expansion and contraction. Provide the fittings and components connected up and ready for testing the service. Keep the number of joints to a minimum.

Do not install copper in contact with steel, zinc, or other materials likely to generate electrolytic, galvanic or corrosive action. Make junctions between dissimilar metals with special fittings manufactured in suitable compatible material.

Use bends where practicable in preference to elbows. Use elbows where pipes are led up or along walls and then through to fixtures.

Fit joints tightly, seal and make leak proof, with no internal projections, burrs or obstructions.

7.8 JOINTS

Joints for copper pipework, brass fittings etc., shall be mechanical joints or formed sockets sweated with silver solder of not less than 15% silver content.

7.9 WELDING AND BRAZING

Observe all precautions, bans and restrictions in force with respect to fire precautions.

Be responsible for providing adequate fire protection facilities to safeguard the premises from hazard caused by welding or any other hot work operations. Fire retardant sheeting shall be placed against adjacent walls, cupboards, tiles etc. to protect the surfaces from burn or scorch marks. Welding shall comply with the relevant Welding Codes.

Fabricate and join components to the Engineer's and the Authority's approval, to applicable Australian Standards and to the manufacturer's instructions.

7.10 CAPPING OFF

During construction, be responsible for leaving all unfinished work in a safe condition, for protecting the works against damage or loss through any cause whatsoever, and shall seal off open ends of pipes in such a manner as to prevent the entry of foreign material into the pipelines, until the works have been handed over.

7.11 COREHOLES, SLEEVES AND CHASES

Be responsible for setting out work and fitting or fixing core holes on floors, walls or beams prior to placing of concrete.

The exact location of all penetrations in the building structure shall be approved by the Principal Consultant before commencement. Submit detailed and dimensioned penetration drawings for this purpose.

Light gauge pipe sleeves shall be provided for all pipes that pass through walls or concrete floors of suitable internal bore to allow 7mm clearance all around the pipe so that they can be withdrawn when required.

Sleeves shall be flush with the finished surface and where other than in ducts, shall be made watertight with compressible cellular plastic strips similar and equal to Compriband, set down 10mm and sealed over with gunned silicone rubber joint sealer (self-extinguishing grade).

Ensure penetrations do not compromise fire ratings of building structure components and provide suitable treatment, e.g. fire stop collars for all UPVC penetrations, Morganite Kaowool fire master or equal approved as required.

Location of all chases shall be approved by the Principal Consultant. All chases shall be cut with a mechanical saw. Reinforced concrete work shall not be chased unless approval in writing is obtained from the Principal Consultant.

7.12 CONCEALMENT OF AND ACCESS TO PIPEWORK

Except where projecting from floor, wall or ceiling to connect to a fitting, piping of every kind and description throughout the building shall be concealed. Where practicable, all piping shall be run below floors, in walls, above ceilings and in ducts.

All pipes shall be fixed free of each other and easily accessible for their full length. Pipes shall not be fixed behind other pipes or to each other unless approved by the Principal Consultant.

Provide access panels, doors and ceiling traps for access to service control and isolating valves, inspection junctions and bends. Access panels shall be of Trafalgar manufacture or equal approved. Access panels in fire rated building elements shall have equivalent fireproof rating.

Where possible, the control valves shall be positioned adjacent to a sanitary fitting inspection opening thereby making use of a common access panel.

7.13 FIXING AND SUPPORTING OF ABOVE GROUND PIPEWORK

All service pipes shall be fixed in a direct vertical line or where horizontal, with minimum falls. All pipes shall be adequately supported and secured from walls, floor slabs and beams to the satisfaction of the Principal Consultant. All piping shall be free to move without causing stresses in the pipe or in the pipe joints.

The spacing and type of brackets shall conform to the relevant Standards and the appropriate Authority's regulations pertaining to the type of tube and pipe installed for the various services.

All steelwork used to support the pipe brackets shall be fixed to the concrete or brick working. The use of explosive type fixings is prohibited. Hangers exceeding 200mm in length and alternative type fixings or supports shall be submitted to the Principal Consultant for approval. Where the piping is specified to be painted or treated, the supports shall be given the same treatment as for the piping.

7.14 BELOW GROUND PIPEWORK

Below ground pipework shall be installed with cover as required by the relevant Authorities. Prepare

trenches or openings and lay pipes at approved depth on approved base material. Pipe laying shall be in accordance with the manufacturer's recommendations, Authority requirements and this specification.

After the pipes have been tested and approved, the trench shall be backfilled and covered with approved material and consolidated as required by the Statutory Authority and the Engineer. Maintain required separation distances between pipework, other services and structure.

Damage to kerb and channel, concrete paths, and other finished surfaces shall be repaired to match the existing.

All existing drainage, gas, water and other service pipes and appurtenant structures shall be supported and protected from damage during the work and repaired to the Principal Consultant's satisfaction should damage occur.

7.15 ISOLATION OF DISSIMILAR MATERIALS

- i) All materials including bolts, etc., which may set up a corrosive action when in contact, shall be isolated from each other in accordance with the Fiji Public Works Department and the Manufacturer's approved methods of jointing or insulation.

7.16 TESTING

Carry out all tests as specified or as required by the respective Authorities concerned. Supply all plugs, apparatus and other materials and equipment necessary for the tests. Submit the test results in writing.

Underground or enclosed work shall not be covered or concealed from view until it has been inspected, tested and approved by the Principal Consultant and the Authority concerned.

On completion, the works included under this section of the Specification shall be tested under normal working conditions and as directed. All defects shall be remedied immediately and the test reapplied to the satisfaction of the Principal Consultant.

7.17 FINAL INSPECTION

On completion, thoroughly check all services and flush clear all debris. Prove all pipework is free from obstruction and secure all union and inspection openings.

Check and tighten all screws, bolts, brackets and fixings and leave secure.

Wait on after all other trades and make good to all services and finishes as required.

Wait on and liaise with the Principal Consultant during final inspection. Hand over all Manufacturer's Warranties, operating and maintenance manuals, As-Installed drawings and Certificates of Practical Completion, all as previously specified.

7.18 WARRANTY

The plumbing installation shall be covered by warranties which shall guarantee against defects in workmanship, materials, equipment and performance for a period of not less than one year after the date of Practical Completion of the Building Contract and shall obligate the Hydraulics Sub-Contractor to make good immediately all such defects (including removal of defective materials and supply and installation of new materials, clearing of stoppages, and repairing of leaks), every time that they occur during the currency of the warranty.

SECTION 8 VALVES AND FITTINGS

8.1 VALVES

8.1.1 GENERAL

All valves shall be located in accessible positions for ease of operation and maintenance. If doubt should arise concerning the exact point of installation this Sub-Contractor shall refer to the Engineer for final locations.

Unless specified otherwise, all valves where possible shall be of the same make, of an approved manufacturer and shall conform to the relevant Australian, British or American Standard. The nominal bore of any valve (excluding automatic control valves) shall be the same bore of the pipe to which it is fitted unless specified otherwise.

On all valves 65 mm bore and over, connecting pipes shall be supported adjacent to each valve.

8.1.2 CONNECTIONS AND BONNETS

Connections between valves and equipment shall be made either by flanges or by unions. All valves shall be screwed to Australian Standard Pipe Thread AS 1722 Part 2 or shall be flanged to Australian Standard AS 2129 as follows:

SERVICES	SIZE (mm)	PRESSURE (kPa)	CONNECTIONS	BONNET
General	25 & less	1050 & over	Flanged	Screwed
32 & over	1050 & over	Flanged	Bolted	
40 & less	Up to 1050	Screwed	Screwed	
50 & over	Any	Flanged	Bolted	

8.1.3 GENERAL VALVE SCHEDULE

Generally, valves shall be of a type listed in the schedule contained at the end of this clause. Where a choice of valve types is available for a specific duty the type to be used will be indicated on the drawings. Special valves will be specified in the relevant Section of the specification covering that particular service.

8.1.4 MISCELLANEOUS VALVES

Valves with screwed ends shall have bronze bodies and flanged valves shall have cast Iron bodies. All valves shall have stainless steel spindles with stainless steel trim for two-way valves and brass trim for three-way valves. Valves shall be of the normally closed type with motors fitted with spring return. Linkages shall be fitted with easy to read valve position indicator.

8.1.5 ABBREVIATIONS

B	:	Bolted
F	:	Flanged
S	:	Screwed
Br	:	Bronze
CI	:	Cast Iron
CS	:	Cast Steel
FS	:	Forged Steel
SS	:	Stainless Steel
IS	:	Inside Screw
OS	:	Outside Screw
AIB	:	Arsenic Inhibited Brass
NKL	:	Nickel Based Copper/Tin Alloy

Int. : Integral
Ren : Renewable

8.1.6 WATER VALVES

8.1.6.1 ISOLATING-BALL

DUTY : ISOLATING
TYPE : BALL
Standard : AS 1628 & BS 5150
Size (mm) : 40 & LESS 50 & ABOVE
Body : Br CI
Connections : S F
Bonnet S : B (High neck to clear insulation)
Spindle : IS-AIB OS-Br (1 piece)
Seat : Int Br
Valve : Br Br
Temp (c) : 90 99
Press (kPa) : 400 1300

8.1.6.2 THROTTLING-BUTTERFLY

DUTY : THROTTLING
TYPE : BUTTERFLY
Standard : AS 5155, ISO 5752
Size (mm) : 50 & ABOVE
Body : CI
Connections : Wafer
Bonnet S : (High neck to clear insulation)
Spindle : SS
Seat : Resilient Liner
Valve : Br
Temp (c) :
Press (kPa) :
Operation : Sizes 125mm and below: Positive locking operation bar parallel to disk
125mm and above geared or motorized operators

8.1.6.3 CHECK-SWING

DUTY : CHECK
TYPE : SWING
Standard : AS 1628 & BS 5153
Size (mm) : 40 & LESS 50 & ABOVE
Body : Br CI
Connections : S F
Bonnet : S B
Spindle : Fitted with lever & weight as required
Seat : Int. Br
Valve : Br Br
Temp (c) : 90 99
Press (kPa) : 1300

8.2 AUTOMATIC AIR VENTS

Air vents provided at all high points in pipework where air may collect shall consist of an approved air bottle, a 15mm valve, a 15 mm "Spirax" No. 'OP' automatic air eliminator (without non-return valve) and a 20 mm copper drain.

All drain pipes from automatic air eliminators shall be run to discharge over suitable floor gullies.

SECTION 9 TRENCH EXCAVATIONS AND BACKFILLING

9.1 EXISTING SERVICES

The Hydraulics Sub-Contractor shall first identify the location of all existing services and take particular care to avoid damage to the services. All damage to existing services installations shall be reported to the Principal Consultant immediately and all necessary repair work and make good shall be carried out by the Hydraulics Sub-Contractor at his own expense.

9.2 TRENCH EXCAVATION

Excavation shall be by open cut method unless otherwise approved in accordance with the lines and grades shown on the drawings.

9.3 EXCAVATION IN ROCK

It is the Hydraulics Sub-Contractor's responsibility to check information from bore logs, site investigation reports etc., from which a reasonable assessment may be made of the nature of materials existing below the surface and it shall be deemed that the Contract Sum includes full provision of all excavation work required for construction and satisfactory completion of the Works.

9.4 OVER-EXCAVATION

Where over-excavation occurs in services trenches, excessive depth shall be filled with Class 2A crushed rock compacted in layers to 98% Standard Maximum Dry Density.

Where unsuitable material is encountered at the base of excavations, the Hydraulics Sub-Contractor shall obtain the Principal Consultant's approval before excavating and making good. Except where excavation is authorised, the Hydraulics Sub-Contractor shall bear the cost of over-excavation and making good.

9.5 TIMBERING OF EXCAVATIONS

Where necessary for the protection of workers, other construction including pavements, the excavations shall be protected by sheeting, walling, props, struts, bracing or other methods to ensure the stability of the excavation. Timbering shall be removed during backfilling.

9.6 DEWATERING OF EXCAVATIONS

All necessary precautions shall be taken to prevent water entering the trench or excavation. Should water enter a trench, it shall be removed by pumping. If the trench is damaged or rendered useless by water it shall be made good or the excavation extended to solid ground. No additional payment shall be made for extra excavation or backfilling material.

9.7 BACKFILLING

Bedding, side support and overlay shall comply with relevant Standards. Care shall be taken to avoid displacement and damage to pipes and fittings. The material shall not be dropped from a height of more than one metre unrestricted fall.

Backfill under existing or future buildings and pavements shall consist of Class 2A crushed rock (20mm size) placed in 200mm loose layers and compacted to 98% Standard Maximum Dry Density to the underside of the floor slab or pavement.

Backfill in other areas shall consist of selected material from the site excavations. The material shall be free of rubbish, topsoil, organic matter and lumps of clay or rock with a dimension in excess of 100mm. Backfill material shall be placed in 300mm (max.) loose layers and compacted to 90% Standard Maximum Dry Density. Remove any excess soil, rubbish etc., left over after the completion

of backfilling from the site.

9.8 SAFETY PRECAUTIONS

While excavations are left open, the Hydraulics Sub-Contractor shall take all necessary precautions to prevent accidents, and shall provide suitable temporary barriers, fences, bridges, ramps, warning signs, lighting, and other necessary protective devices at all locations of potential risk.

SECTION 10 TESTING AND COMMISSIONING

10.1 GENERAL

- j) The installation shall be tested and commissioned to the satisfaction of the Engineer and Fiji Public Works Department prior to the acceptance of the installation and the commencement of the Defects Liability Period.

All necessary testing and commissioning shall be carefully pre-planned 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.

All equipment or materials found to be faulty during testing shall either be replaced or repaired free of charge.

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.

10.2 TESTS AND INSTALLATION INSTRUMENTS

All instruments, appliances and test loads shall be provided by the Hydraulics Sub-Contractor for the duration of the tests as necessary to complete the test procedures specified.

10.3 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.

10.4 NOTICES

All tests required by the Statutory 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.

10.5 PIPING

Piping shall be tested to twice working pressure, or as set out below, whichever is higher.

Joints in pipes may be hammered to detect any crystallised or flux bound joints.

Any instrument not capable of withstanding the test pressures shall be removed before testing and tested later at normal pressure.

All test pressures are to be maintained until the Engineer has satisfied himself as to the soundness of the pipework or equipment. In no case shall the test period be less than 30 minutes or exceed eight (8) hours.

SECTION 11 NOISE AND VIBRATION

11.1 GENERAL

Rectify at no cost to the Principal all mechanical plant noise or vibration which can be heard or felt in the occupied spaces of the building and covered by this Specification.

Attention is drawn to the following principal precautions which must be taken in order to ensure that the minimum noise and vibration emanates from the plant installed under this Contract.

- a) All rotating machinery shall initially be designed and selected for minimum noise and shall be fully statically and dynamically balanced.
- b) All connections to rotating machinery shall be rendered flexible by an approved method.

Make all necessary changes in the pipe runs and/or pipe supports to de-tune the pipe should any resonance occur in the piping under any load conditions to the approving authority.

SECTION 12 COMMISSIONING AND PERFORMANCE TESTS

12.1 EXTENT OF WORK

This section of the specification covers the requirements for commissioning and acceptance tests for all the equipment and systems installed under this Contract.

Commission the plant to provide the specified performance.

Carry out all tests required by Statutory Authorities. Authority approvals shall be obtained in writing and included in the Maintenance Manual.

12.2 PRE-COMMISSIONING

Prior to commencement of the commissioning of the systems the following procedures shall be carried out:

- a) All piping systems must fill completely through every loop and branch circuit, with all valves in the fully open position and no circulating pumps operating. Initial flushing out shall be carried out using non-foaming detergent compatible with the final selected water treatment chemical and in accordance with the requirements of the selected water treatment specialist. A second flushing procedure shall be carried out using clean water only. All strainers shall be removed and cleaned out.
- b) Pressure and leak test pipework systems as outlined in the testing and commissioning, section of this Specification.

12.3 COMMISSIONING

- a) Carry out all commissioning tests necessary to put the systems into use and to approval before Practical Completion is granted. Record all test results and include in the Maintenance Manual.
- b) Commissioning shall be carried out by specialists in the respective fields.
- c) Commissioning personnel shall be provided with preliminary copies of Maintenance Manuals and As-Installed drawings to facilitate correct commissioning and for checking of Manuals and drawings for correctness.
- d) All water flow rates shall be adjusted to give design figures within -0+5%.

12.4 PERFORMANCE TESTS

Carry out Performance Tests on all systems installed under this Contract.

Performance tests shall be run over a nominated period of up to five consecutive days in summer, and during the Warranty Maintenance period.

The extent and nature of the test data to be recorded shall be as necessary to determine the operating capacity and efficiency of the various systems.

Submit for approval proposed test sheets.

Provide all test instruments. (Refer Testing and Commissioning Section).

Two copies of all calculations shall be submitted to the Engineer together with photocopies taken of all charts etc.

SECTION 13 AS INSTALLED DRAWINGS & INSTALLATION MANUALS

13.1 GENERAL

The Hydraulics Sub-Contractor shall supply at Practical Completion As Installed drawings and Installation Manuals for the project.

13.2 AS-INSTALLED DRAWINGS

As from the commencement of work, keep a record of all deviations and changes from the Contract drawings and mark on a set of prints an accurate record of all work as actually installed. Provide As-Installed drawings to show the actual installation and to a scale of not less than 1:100.

Three copies of the As-Installed drawings shall be provided to the Principal Consultant for approval at Practical Completion. The drawings shall show the installed positions of all services, depth of underground pipework, special equipment and valves, etc.

13.3 INSTALLATION MANUALS

Three copies of the Installation Manual shall be provided to the Principal Consultant 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

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 manufacturers 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 start up and 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 14 MAINTENANCE AND SERVICING

14.1 MAINTENANCE

Routine maintenance and servicing shall be carried out for a period of 12 months from the 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 standards requirements of the Building Act and Regulations having jurisdiction, relevant Australian Standards, Local Authority Regulations and the schedule provided in the Installation Manual as outlined in Section 12 Commissioning and Performance Tests 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 Principal's control on site.
- b) Checking of insulation and general condition of piping, valves and quarterly.

The last maintenance visit prior to the end of the Defects Liability Period shall be a major visit for complete service. The Engineer shall be advised of the proposed service program for the last major visit not less than one week prior to the date of the proposed last visit so that a representative may be present during the service.

14.2 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 have been rectified and completion of such work subsequently advised in writing to the approving Authority.

14.3 SERVICE LOG BOOK

Provide a log book bound in an approved hard cover folder and containing sufficient pages to record all operational maintenance during the defects liability period. Provide a fixed holder in an approved location for the log book.

Record in the log book all maintenance work performed. Each log sheet shall be signed by the Serviceman responsible and shall include the date and description of work carried out.

All log sheets must be countersigned by the Principal's representative.

The front cover of the log book shall be labelled with the name of the project and shall clearly note that each sheet must be countersigned.

Inform the Maintenance staff and supplier's Serviceman on the correct use of the log book.

14.4 DEFECTS LIABILITY

The Defects Liability Period shall be 52 weeks from the date of Practical Completion.

During the Defects Liability Period the Hydraulics Sub-Contractor to be responsible for the provision of all labour, materials and other costs associated with the removal of defective components, bad workmanship and the installation, adjusting and testing of replacements and to carry out such work within a reasonable time. Equipment replaced or repaired during the warranty period shall be provided with a warranty of 52 weeks commencing from the date of replacement or repair.

Warranty maintenance for the replaced or repaired equipment shall be limited to the 52 weeks from date of Practical Completion.

14.5 CERTIFICATION

At the end of the Defects Liability period, make a final service visit and upon satisfactory completion of the above procedures certify in writing that the installation is operating correctly.

APPENDICES

APPENDIX I TENDER FORM

HYDRAULICS 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 P C 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]

ADDRESS1

OCCUPATION

DATE

We confirm that our time for completion iscalendar 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 _____

APPENDIX II SUMMARY OF TENDER**PRINCIPAL** : LAND TRANSPORT AUTHORITY**SHEET 1 of 1 SHEET****PROJECT** : LTA KARAVI WEIGHBRIDGE STATION
KARAVI, BA, FIJI ISLANDS**PROJECT NO:** 7835**SPECIFICATION:** HYDRAULICS SERVICES**DATE:** MAY 2019

ITEM	DESCRIPTION	PRICE (VEP)
1	Preliminary and General	\$
2	The supply and installation of cold water pipework (Including pipework support system)	\$
3	The supply and installation of rain water pipework (Including pipework support system)	\$
4	The supply and installation of sanitary plumbing pipework (Including pipework support system)	\$
5	The supply and installation of fire hose reel pipework (Including pipework support system)	\$
6	The supply and installation of Rain Water Harvesting water storage tanks – 2 x 10,200L (including all fittings and pipework connections)	\$
7	The supply and installation water pump system as indicated on the drawings (including all fittings and pipework connections)	\$
8	The supply and installation water filter system as indicated on the drawings (including all fittings and pipework connections)	\$
9	The supply and installation water UV treatment system as indicated on the drawings (including all fittings and pipework connections)	\$
10	All other items not included above (Please specify _____)	\$
11	Supply of Shop Drawings	\$
12	Testing and Commissioning	\$
13	Supply of As Installed Drawings	\$
14	Supply of Installation Manuals	\$
15	Twelve (12) months Maintenance	\$
16	Contingency Sum	\$10,000.00
TOTAL TENDER PRICE		\$

Name of Tenderer _____

Signature _____ Date _____

IRWIN ALSOP PACIFIC PTE LTD
 BUILDING SERVICES CONSULTING ENGINEERS
 DOMAIN, SUVA

PROJECT NO: 7835
DATE: MAY 2019

APPENDIX III SCHEDULE OF TECHNICAL DATA (To be completed and submitted with Tender)

PRINCIPAL : LAND TRANSPORT AUTHORITY

SHEET 1 of 2 SHEET

PROJECT : LTA KARAVI WEIGHBRIDGE STATION
KARAVI, BA, FIJI ISLANDS

PROJECT NO: 7835

SPECIFICATION: HYDRAULICS SERVICES

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

APPROXIMATE VALUE

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

Name of Tenderer _____

Signature _____ Date _____

APPENDIX III SCHEDULE OF TECHNICAL DATA (To be completed and submitted with Tender)

PRINCIPAL : LAND TRANSPORT AUTHORITY

SHEET 2 of 2 SHEET

PROJECT : LTA KARAVI WEIGHBRIDGE STATION
KARAVI, BA, FIJI ISLANDS

PROJECT NO: 7835

SPECIFICATION: HYDRAULICS SERVICES

DATE: MAY 2019

A. WATER BOOSTER PUMP

Manufacturer

Model No

B. 10,200 LITRE WATER STORAGE TANK

Manufacturer

Model No

C. WATER FILTER SYSTEM

Manufacturer

Model No

D. WATER UV TREATMENT SYSTEM

Manufacturer

Model No

Name of Tenderer _____

Signature _____ Date _____

IRWIN ALSOP PACIFIC PTE LTD
BUILDING SERVICES CONSULTING ENGINEERS
DOMAIN, SUVA

PROJECT NO: 7835
DATE: MAY 2019

APPENDIX IV SCHEDULE OF RATES (To be completed and submitted with Tender)**PRINCIPAL** : LAND TRANSPORT AUTHORITY**SHEET 1 of 1 SHEET****PROJECT** : LTA KARAVI WEIGHBRIDGE STATION**PROJECT NO:** 7835

KARAVI, BA, FIJI ISLANDS

SPECIFICATION: HYDRAULICS SERVICES**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 VAT.

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

ITEM	DESCRIPTION	UNIT	PRICE
1	Licensed Plumber	Per hour	\$
2	Technician	Per hour	\$
3	Unskilled Labour	Per hour	\$
4	Ø25mm Cold Water Pipe	m	\$
5	Ø20mm Cold Water Pipe	m	\$
6	Ø15mm Cold Water Pipe	m	\$
7	Ø100mm UPVC Sanitary Pipe	m	\$
8	Ø80mm UPVC Sanitary Pipe	m	\$
9	Ø50mm UPVC Sanitary Pipe	m	\$
10	Ø40mm UPVC Sanitary Pipe	m	\$
11	Ø25mm FHR Pipe	m	\$
12	Rainwater Harvesting Pump	Per unit	\$
13	Rainwater Storage Tank	Per unit	\$
14	Water Filter	Per unit	\$
15	Water UV Treatment	Per unit	\$
16	Pressure gauge	Per unit	\$
	On Cost Percentage Mark-Ups		
17	Labour		%
18	Material		%
19	Plant		%

Name of Tenderer _____

Signature _____ Date _____

IRWIN ALSOP PACIFIC PTE LTD
BUILDING SERVICES CONSULTING ENGINEERS
DOMAIN, SUVA

PROJECT NO: 7835
DATE: MAY 2019