Infrastructure Cook Islands

RFP Terms of Reference (TOR) Consultant Services

**Avatiu Punanganui Market Bridge Replacement – Design Services**

October 2018
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1 Terms of Reference Overview

1.1 About this document
This document specifies the terms of reference (TOR) for the undertaking of the design services relating to the Avatiu Punanganui Market Bridge Replacement Project on behalf of the Cook Islands Government.

Interested suppliers are requested to submit a Proposal to undertake the scope of works outlined within this TOR and the RFQ document including Appendices.

A Summary of the key design services required are as noted below;

Design Services
- Review of existing information and reports including consultation with key project stakeholders.
- Concept design and cost estimate for replacement of the existing Avatiu Punanganui Market Bridge in Avarua, Rarotonga.
- Submission & approval of minimum design standards to be adopted.
- Detailed bridge design including provision of design statement and calculations.
- For construction drawings and construction specifications.
- Tender documentation including; RFT documents, Contract documents (to NZS3910:2013), Schedule of Quantities (SoQ) and an Engineers estimate for the contract works.

1.2 Goals and Outcomes
The Goal of the Avatiu Punanganui Market Bridge Replacement Project is to provide for a safe and reliable land transport network which will encourage and support socio economic development as well as strengthen the resilience of Rarotonga to the impacts of natural disasters and climate change.

The outcomes are:
- A structurally safe, reliable, durable bridge compliant with appropriate standards.
- Provision of a resilient transport network.
- Flood management and mitigation
- Facilitate social and economic development of Rarotonga and the Cook Islands.
- Secure critical infrastructure and transport routes during and post an event of disaster.
- Use and development of local resources and skills during the project.

1.3 Background
The volcanic island of Rarotonga is over 14,750 feet (4,500 meters) above the ocean floor. It is 32 km in circumference and has an area of 67.19 km$^2$. The island is surrounded by a lagoon, which often extends more than a hundred metres to the reef, then slopes steeply to deep water. The reef however generally fronts the shore to the north of the island. Rarotonga is encircled by a main road, Ara Tapu, which traces the coast. Three-quarters of Rarotonga is encircled by the ancient inner road, Ara Metua.
The Avatiu Punanganui Market Bridge is located on the northern side of the island, and is part of Ara Tapu (Main Road). The Avatiu Punanganui Market Bridge crosses the Avatiu Stream prior to it entering the Lagoon adjacent to the Avatiu Port.

With assistance from Local Government New Zealand (LGNZ) and the Ministry of Foreign Affairs, Civil Engineers from the Wellington City Council (WCC) assisted Infrastructure Cook Island (ICI) to perform bridge inspections on Rarotonga, Cook Islands.

The main island, Rarotonga has approximately 76 identified road structures within the transport network. Growth of industry and population has increased the vehicle loads on the current infrastructure. There is a lack of existing information and records on the original design of a majority of bridges (including the Avatiu Punanganui Market Bridge). This is a major concern for ICI with regards to being able to determine the structural capacity of the current bridge assets.

The Avatiu Punanganui Market Bridge was visually inspected with reference to the New Zealand Transport Agency (NZTA) bridge inspection and maintenance procedure which were adapted to the local environment. Refer to the Bridge Inspection Report Cook Islands Wellington City Council dated November 2016. This report recommended replacement, based primarily on the age of the arch section of the bridge and the unknown nature of its design. In addition to the criticality of the bridge to link the main business district, the Port and the rest of eastern Rarotonga.

The existing bridge has an approximately 11m wide carriage way which includeds a parking lane on the northern side, a 2.15 wide footpath on the southern side and 1.45m wide northern footpath. The bridge is skewed across the Avatiu stream and the current span between abutment faces is approximately 6.9m.
Photos of the existing Avatiu Punanganui Market Bridge

The Cook Island Government has made a commitment to rectify bridges with structural and stability issues around Rarotonga. The Cook Islands Government has allocated budget during the 2018/19 FY for the planning, design and construction of the replacement Avatiu Punanganui Market Bridge. It is key that...
critical bridges be replaced on a timely basis, ensuring a safe and durable road network structure consistent with the National Sustainable Goals, 2016 – 2020.

This TOR will provide a basis for a Proposal by suitably qualified suppliers to undertake design services for the Avatiu Punanganui Market Bridge Replacement project. This will enable the procurement of a physical works contractor for the construction of the Avatiu Punanganui Market Bridge during the 2018/2019 financial year in line with funding made available by the Cook Islands Government.
2 Scope of Services

The Cook Islands Government through Infrastructure Cook Islands is seeking suitably qualified suppliers to provide design services for the Avatiu Punanganui Market Bridge Replacement project.

The extent of the works is to include the existing Avatiu Punanganui Market Bridge, the waterway and associated retaining or support structures upstream and downstream of the bridge.

It is intended that while developing a design solution for the Avatiu Punanganui Market Bridge that the design outputs would also be suitable as a standardised design for bridges in Rarotonga. To this end it is expected that this standard design would include:

- Standardised Foundation design/requirements
- Abutments and pier design (where multiple spans are required).
- Pre-cast/Modular design encompassing the beam into a single modular unit able to be constructed in varying spans as required with either a separate or combined deck slab.
- Provision for pedestrian and cyclists.
- Standardised bridge barriers/rails. (NZTA TL3 minimum compliance).
- Provision for the installation of services (water, sewer, storm water, communications and electricity).

Conceptualised drawing for bridge replacement from Bridge Inspection Report Cook Islands Wellington City Council dated November 2016

The replacement bridge is expected to require an increased span to improve stream flow during storm events and reduce existing flooding. It is expected due to site constraints that the replacement bridge span would be increased to 9-10m with the eastern abutment reconstructed (if required) in the same position as the existing and the western abutment relocated.

2.1 Detailed Scope

The required scope of services is as detailed below and is to be read in conjunction with the other sections of the RFP and supporting documents.

1. Review the supplied project information and previous reports including concept design information and inputs from key project stakeholders. This is to include the potential to utilise existing
infrastructure such as the existing bridge foundations and abutments. Note ICI will provide required survey information and undertake geotechnical investigations agreed with the successful suppliers noting restricted on island capability in terms of geotechnical investigation.

2. Propose minimum design standards to be adopted for bridge structures in Rarotonga based on the NZTA Bridge manual and separately any specific requirements for the Avatiu Punanganui Market Bridge Replacement project. Liaise with ICI to confirm minimum requirements.

3. Finalise Avatiu Punanganui Market Bridge Replacement concept design. This is to include development of a construction methodology to maintain operation of one traffic lane throughout the physical works and is to be cognisant of the construction capabilities in Rarotonga. Final approval of the concept design is to be gained from ICI. It is noted that the finalisation of the Avatiu Punanganui Market Bridge Replacement concept design is to be undertaken with regard to the available physical works funds and is a key project constraint.

4. Undertake a cost estimate for the Avatiu Punanganui Market Bridge Replacement physical works contract based on the concept design and confirmed minimum design standards. ICI will facilitate access to local suppliers, contractors and shipping companies to assist with information required for costing.

5. Complete detailed design of the Avatiu Punanganui Market Bridge Replacement the waterway and associated retaining or support structures upstream and downstream of the bridge including; any required geotechnical and foundation design, hydraulic design, structural design, civil design, provision for services including future proofing, road safety including pedestrian and cyclist use and appropriate road safety barriers.

6. Provision of construction drawings suitable for incorporation into a physical works tender document, construction & material specifications and quality requirements, design report outlining the key aspects of the design with all required calculations and information to support the design and a building consent application. It is noted that the Avatiu Punanganui Market Bridge Replacement design is to be undertaken with regard to the available physical works funds and is a key project constraint.

7. Schedule of Quantities (SoQ), Completed Engineers estimate for the Avatiu Punanganui Market Bridge Replacement physical works contract based on the detailed design of the contract works.

8. (Provisional Item) Provision of tender documentation including; Contract documents utilising NZS3910:2013 form of contract, Request for tender documents including evaluation methodology in accordance with the COOK ISLANDS GOVERNMENT Purchase and Sale of Goods and Services Policy (Procurement Policy). Note it is intended that as part of the construction contract the contractor will be required to provide a suitable durable steel form for the Pre-cast/Modular deck and beam design which upon completion of the works would become the property of the Cook Islands Government for future use. ICI will provide standard NZS 3910:2013 Contract and RFT templates for completion by the suppliers.

2.2 Minimum Design Standards

Minimum design standards relating to the Avatiu Punanganui Market Bridge Replacement are to be developed as part of the suppliers design scope and approved by ICI. Adopted standards including departures from any applicable standards or international best practice are to be advised by the suppliers.

Specific Design and durability standards relating to the Avatiu Punanganui Market Bridge Replacement are expected to include but are not limited to:

1. Compliance with requirements of Cook Islands Building Code 1990 and associated legislation. Please note that the Cook Islands Building Code is currently under review and allowance is to be made to incorporate the outcomes of this review where practicable. Information in relation to these outcomes will be provided by ICI.

2. Design is to be generally in accordance with the NZTA Bridge manual (SP/M/022) latest edition. Including but not limited to the below;
3. Minimum design life of 100 years, the structure shall be sufficiently durable to ensure that, without reconstruction or major renovation, it will continue to fulfil its intended function throughout the design life.
4. The design loadings are to account for Port traffic and overloaded vehicles as well as cyclone events in terms of wind, flooding and sea surge.
5. Waterway crossing including upstream and downstream shall be designed to pass an appropriate average recurrence interval (ARI) flood and shall account for scour.
6. It is noted that the Avatiu Punanganui Market Bridge is on a primary lifeline route and is of high importance in terms of post disaster recovery.

2.3 Relevant reports/documentation
ICI are aware of the following documents which provide relevant background or information to the project.

- Site photos.
- Topographic survey
- Port Traffic loading information
- Available rainfall and Stream hydrology information.
- Additional Avatiu Punanganui Market Bridge inspection information collated during the Bridge Inspection Report Cook Islands Wellington City Council works.
- PACC TECHNICAL REPORT 12, Decision support tools for climate-resilient coastal development: A case study from the Cook Islands Pacific Adaptation to Climate Change (PACC) project. November 2014.

2.4 Issues and risks
There are a number of risks associated with the Avatiu Punanganui Market Bridge Replacement project. Those issues, risks or constraints that are considered to have a significant impact on the design services, should they eventuate, have been identified in below. Please note that this is not an exhaustive list and is provided for as part of the TOR.

It is further noted that due to the relative remoteness of the Cook Islands and Rarotonga and limited facilities, including plant, equipment and materials, that construction methodologies and the associated costing will be impacted.

2.4.1 Issues
- Limited access to the island due to transportation links and remoteness.
- Ability of design to be constructed on the island given available plant, equipment and labour
- Identifying and procuring suitable contractors.
- Available physical works funding. It is noted that funding for the construction of Avatiu Punanganui Market Bridge is limited to the available Government appropriations.
- Time frames to complete design and to undertake construction works. Physical works are required to be undertaken prior to June 2018.
- Available plant and machinery, limited on island resources (such as sand and aggregates.).
- Staging of the works to enable traffic flow during works.
2.4.2 Risks

- Limited geotechnical investigation for the site.
- Limited asbuilt data to assist design.
- Limited testing and quality assurance practices on the island.
- Construction cost exceeding available budget.
- Monitoring of the construction in line with design requirements. Provision of resources/personnel.
- Availability and quality of local and international contractors to undertake the construction works.
- Inclement weather impacting construction, impact of cyclone season on project and programme.
- Traffic Management and staged construction.
- National Environment Service approval of works.
2.5 Required Outputs & Timeframes

The following are the required outputs. Final due dates will be in consultation with the preferred supplier.

<table>
<thead>
<tr>
<th>No.</th>
<th>Output</th>
<th>Inputs/tasks</th>
<th>Timeframes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Detailed work programme</td>
<td>Signing of contract by both parties.</td>
<td>5 working days following signing of contract.</td>
</tr>
<tr>
<td>2</td>
<td>Minimum design standards.</td>
<td>Liaise with Infrastructure Cook Islands (ICI) and project stakeholders to develop and get approval of minimum design standards.</td>
<td>Week 2</td>
</tr>
<tr>
<td>3</td>
<td>Finalised concept design and cost estimate.</td>
<td>Liaise with Infrastructure Cook Islands (ICI) and project stakeholders to finalise the Avatiu Punanganui Market Bridge concept design and provision of cost estimate for the physical works. Finalised concept design is to be based on information provided with this TOR and inputs from key project stakeholders. It is noted that the finalised concept design is to be completed in line with the available physical works funding. The finalised concept design is to be provided to ICI for approval.</td>
<td>Week 4</td>
</tr>
<tr>
<td>4</td>
<td>70% Detailed Design and design report.</td>
<td>Provision of draft documents for approximately 70% detailed design including drawings, calculations, material requirements specifications and draft design report.</td>
<td>Week 6</td>
</tr>
<tr>
<td>5</td>
<td>Detailed Design and design report.</td>
<td>Complete detailed design including completion of construction drawings, calculations, material requirements specifications and design report. It is noted that the detailed design is to be undertaken with regards to the available physical works funding.</td>
<td>Week 8</td>
</tr>
<tr>
<td>6</td>
<td>Completed Engineers estimate</td>
<td>Schedule of Quantities (SoQ), Completed Engineers estimate for the contract works.</td>
<td>Week 10</td>
</tr>
<tr>
<td>7</td>
<td>(Provisional Item) Tender and contract documentation.</td>
<td>Provision of all required tender and contract documentation including: Request for Tender documents and Contract documents (NZS3910:2013)</td>
<td>Week 10</td>
</tr>
</tbody>
</table>
3 Proposal Requirements

3.1 Methodology and Programme

Suppliers are requested to submit their methodology for the achievement of the goals, outcomes and outputs included within this TOR.

External suppliers may elect to spend a portion of the project in the Cook Islands to undertake the required scope of works. Travel including all associated costs will be borne by the suppliers and is to be included within the suppliers provided costs to undertake the design services.

A draft work plan/programme is to be provided with the suppliers’s Proposal outlining the key activities, required inputs, outputs and time frames for the completion of activities. The work plan is to be finalised following awarding of the works and is to be approved prior to commencement of any substantive works.

3.2 Expected Competencies

It is expected that the suppliers will have the following key competencies:

- Comprehensive understanding of structural design and geotechnical design including compliance with design standards, legislation and suitable material specifications.
- Expertise in traffic safety in relation to bridge design.
- Expertise in relation to the bridge waterway design including; hydrology, flood flows, scour, storm surge etc.
- Competent in the provision of CAD drafting and detailing.
- Competency in quantity surveying in relation to scheduling and costing of construction projects particularly in the Pacific Islands.
- Proven ability and experience in similar projects.
- Project experience within the Pacific Islands, preferably in the Cook Islands.
- Understanding of expected future climate change and sea level rise impacts.

3.3 Team Composition

Suppliers are requested to submit an organisational chart, project experience and CV’s demonstrating their proposed team and organisation’s experience in delivering similar projects.

Suppliers are to provide at least 2 references as part of their Proposal.

3.4 Performance Standards

The resulting Avatiu Punanganui Market Bridge Replacement – Design Services contract will be managed and assessed in collaboration with the Principal’s representative, ICI. Quality standards adopted must comply with international good practice and published standards. Delivery standards will be reviewed and endorsed by the key technical ministries involved in this project - (NES, ICI, CIIC). Ongoing conformance with quality and design standards will be accessed as the works progress.

The suppliers is required to abide by the Cook Islands Government Public Sector Code of Conduct in particular to carry out their duties in a professional, transparent, participatory and culturally appropriate way.

The suppliers is to undertake the works in accordance with the applicable Cook Islands law, regulations and procedures, particularly the:

• The Cook Island Environment Act 2003 and all subsequent amendments.
• The Cook Island Building Code 1990 and associated legislation.

3.5 Budget and Price
It is noted that the available budget for the undertaking of the scope of services is **$60,000**.

Suppliers are requested to submit their price as part of their Proposal for the completion of the required scope of services, outcomes and outputs included within this TOR and RFP. Suppliers are to advise as part of their Proposal where services or scope will vary from that contained within this TOR and RFP.

3.6 Governance and Management
The successful suppliers will report to the Principal's representative, Infrastructure Cook Islands.

The Cook Islands Government will facilitate the project through Infrastructure Cook Islands who will contribute support and dissemination of information as well as providing project oversight.

<table>
<thead>
<tr>
<th>Project Participants</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrastructure Cook Islands</td>
<td>Implementing agency with primary project delivery responsibility.</td>
</tr>
<tr>
<td>Public &amp; Local Community</td>
<td>Key project stakeholders and project users</td>
</tr>
<tr>
<td>CI Ports Authority</td>
<td>Key project stakeholder and neighbour</td>
</tr>
<tr>
<td>Ministry of Finance and Economic Management</td>
<td>Development coordination including funding streams and project related engagement with Infrastructure Cook Islands.</td>
</tr>
<tr>
<td>National Environment Services</td>
<td>Critical project stakeholder in relation to development and environmental protection.</td>
</tr>
<tr>
<td>Cook Island Investment Corporation (CIIC)</td>
<td>Coordination and legal input into land issues including responsibility for ownership and asset management in conjunction with Infrastructure Cook Islands. Manager of the Punanganui Market</td>
</tr>
</tbody>
</table>
4 Additional Information

The following documents are provided as part of the RFP and TOR refer to Appendix 1.

- Site photos
- Rainfall Data
- Bridge Inspection Report Cook Islands Wellington City Council dated November 2016
- Additional Avatiu Punanganui Market Bridge inspection information collated during the Bridge Inspection Report Cook Islands Wellington City Council works.
- PACC TECHNICAL REPORT 12, Decision support tools for climate-resilient coastal development: A case study from the Cook Islands Pacific Adaptation to Climate Change (PACC) project. November 2014.