

Refurbishment of Fua'amotu International Airport

KA PROJECT REFERENCE: 16384T
INDUSTRY: Civil Infrastructure- Aviation
DISCIPLINES: Aviation Design, Architecture, Building Services, Structural and Civil Engineering, Interior Design, and Graphic Design (Directional Signage)

PROJECT SUMMARY

CLIENT

Tonga Airports Limited (TAL)
 (World Bank Funded)

LOCATION

Fua'amotu, Tongatapu Island,
 Kingdom of Tonga

PROJECT TYPE

Design and Documentation,
 Construction Supervision

YEAR COMPLETED

2019



PROJECT DESCRIPTION

The Tonga Aviation Investment Project (TAIP) is funded by the World Bank through the Pacific Aviation Investment Program (PAIP). The PAIP has the development objective to provide safe and secure air transport operations and environmentally sustainable and efficient airports. The previous Fua'amotu International Airport at Tongatapu comprised of a main runway, taxiways and 4000m² terminal building. Over time, the terminal has been subject of several modest upgrades which have resulted in a space that is inconsistent in passenger flow, décor and finishes. To create a more cohesive modern environment and provide more space for passenger movement and circulation, the interior and overall public signage was to be re-designed and updated to present a fresh invigorating space to welcome visitors to Tonga.

Kramer Ausenco brought its expertise gained on numerous other airport projects, particularly terminal building upgrades, to help deliver this project for the Fua'amotu International Airport Terminal Building Improvements. Similar recent experience was the delivery of the Jacksons Airport International Terminal Upgrade and more recently engineering consultancy services for Stage 1 of the Jacksons International Terminals Building Upgrade. Kramer Ausenco was able to use the intimate knowledge and understanding obtained from these consultancies to successfully deliver this project.

Total Floor Area - 1504m². Additional 2110m² of Architecture and Interior/Graphic design scope.

PROJECT ROLE

Phase 1: Design & Procurement Support to Tonga Airports Limited. Deliverables included, but not limited to, Design Report and Contract Documentation of proposed Refurbishment scope of works, see Phase 2.

Phase 2: Contract Administration and Construction Supervision: Arrivals Baggage Hall Improvements and Inbound Baggage Handling Extension with Aviation equipment coordination; Check-in Area Improvements and Outbound Baggage Handling Areas with Aviation equipment coordination; and extensive Signage Design throughout Airport for cohesive corporate identity.

Aviation Design Review:

- Architectural Design & Documentation (Including Interior Design and Graphic Design)
- Structural & Civil Design & Documentation
- Building Services Design & Documentation
- Contract Administration and Procurement Support
- Construction Supervision Services

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ASSIGNMENT NAME:	APPROX. VALUE OF THE CONTRACT:
Fua'amotu International Airport Terminal Building Refurbishment	USD\$522,508.50
LOCATION & COUNTRY:	DURATION OF ASSIGNMENT (MONTHS):
Fua'amotu, Tongatapu Island, Kingdom of Tonga	46 Months
NAME OF FUNDING AGENCY:	TOTAL NO. OF STAFF-MONTHS OF THE ASSIGNMENT:
Tonga Airports Limited (TAL) and (World Bank Funded)	75.4 Months
ADDRESS OF AGENCY:	APPROX. VALUE OF THE SERVICES PROVIDED BY YOUR FIRM UNDER THE CONTRACT:
Taufa'ahau Road Tofoa, Tonga and Washington, D.C., United States	AUD \$ 866,641
START DATE (MONTH/YEAR): COMPLETION DATE (MONTH/YEAR):	NUMBER OF PROFESSIONAL STAFF-MONTHS PROVIDED BY ASSOCIATED CONSULTANTS:
Design/Procurement: Jan 2016 – Jul 2018 Construction: Aug 2018 - Oct 2019	75 Person-months
NAME OF ASSOCIATED CONSULTANTS, IF ANY:	NAME OF SENIOR PROFESSIONAL STAFF OF YOUR FIRM INVOLVED AND FUNCTIONS PERFORMED:
N/A	Tahifisi Vehikite – Supervision Team Leader/Project Manager Fehoko Manu – Construction Manager Peni Gari – Senior Structural Engineer Jason Goddard – Project Director Barry Kitson – Principal Architect Charmaine Talei – Senior Architect

NARRATIVE DESCRIPTION OF PROJECT:

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DESCRIPTION OF ACTUAL SERVICES PROVIDED BY YOUR STAFF WITHIN THE ASSIGNMENT:

INCEPTION PHASE

PRELIMINARY ACTIVITIES

- Team management, communication protocols, systems and controls put in place in close collaboration with the Client, Tonga Airports Limited (TAL). Project management standard was established for the design, tender administration and evaluation, contractor procurement and construction phase to ensure an effective project process and to control cost and schedule for the effective implementation of the project.
- Project critical criteria including design and regulation standards of the International Civil Aviation Authority Organisation (ICAO), Federal Aviation Authority (FAA), Unified Facilities Criteria (UFC) and International Air Transport Association (IATA) were identified.
- Regulatory bodies governing development consent (Physical Planning Board) and environmental impact assessment legislation (Department of Environment and Conservation) in addition to the requirements under the Tonga National Building Code were consulted early to mitigate potential approvals permitting delays in later stages of the project implementation.

SITE RECONNAISSANCE AND ASSESSMENT

- Site Reconnaissance and Assessment undertaken to gauge the current site conditions and operational requirements that informed design team reviewing and evaluating the existing facilities and conditions.
- KA project team leader and the Architect met with the Client Briefing Team (CBT) to review the current building layout and décor.
- Designs or layouts derived from measurement and photographs of the existing facility in conjunction with discussions and information provided by CBT.
- A consultation process considered comments from the CBT, and the KA team queried site data available that might affect general layout issues from a construction engineering viewpoint.
- Facility Description formulated to aid with Concept design.
- KA offered comparative / alternative designs based on existing layouts for review.
- The Site Reconnaissance and Assessment provided the following:
 - a) Identify community stakeholder groups, and established protocols for meetings and other necessary stakeholder interactions/engagements.
 - b) Coordinated collaboration and communication protocols with end users and stakeholder groups prior to commencement of Works.
 - c) Identified safety and security issues for both project personnel and college personnel.
 - d) Identified any possible environmental issues.
 - e) Identified any hazards.
 - f) Reviewed for suitability and compliance with statutory codes and construction methodology.
 - g) Assessed possible constraints that might impact Contractor.
- The outcomes formed the basis for the preparation of the detailed Inception Report.
- Investigation of existing facilities and site condition will be essential work for carrying out the efficient management of the project including design and construction management. The construction work need to be carried out while Fua'amotu International Airport is fully operational. The Kramer Ausenco team will establish an improvement plan of the existing facilities based on the investigation results.
- Site Investigations include the following:
 - a) Investigation of flight movement in existing runway, parallel taxiway and apron
 - b) Land use pattern
 - c) Investigation of flight operation condition and cycle time in apron
 - d) Investigation of ALS-Approach Light System, Taxiway edge lights, Apron Ground Lights
 - e) Safe facilities investigation (NAVAIDS)
 - f) Parking situation and demand in parking lot and drainage facilities in parking lot over the last five years
 - g) Main entry way of aircraft and usage of taxi way
 - h) Investigation of existing road around airport which will be used for transportation of construction material
 - i) Investigation of borrow pit near project area and quarry area for airport pavement
 - j) Investigation of facilities around the airport to prevent damage during construction

PROJECT RISK ASSESSMENT & QUALITY MANAGEMENT

- A risk register, and risk assessment plan were produced after a risk workshop with key parties. They were revised and amended accordingly throughout the project.
- Kramer Ausenco's in-house Quality Assurance (QA)/Quality Control (QC) system has been third party certified to conform to the requirements of AZ/NZS ISO 9001. Our Quality Policy is based on the Quality Management Principles as outlined in ISO 9004:2000 'Quality Management Systems – Guidelines for Performance Improvements'. Our in-house QA/QC systems hosts all the quality management forms, registers, checklists, and other plans and sub-plans necessary for managing quality.

HEALTH, SAFETY, ENVIRONMENT AND COMMUNITY MANAGEMENT

- Personnel health, safety and security is a very critical part of everything we do at Kramer Ausenco. This safety, health and security emphasis is underpinned by one of our core company values – "Safety in all we do". Kramer Ausenco's Safety Policy has been developed to promote the safety culture we have today, and to bring "safety consciousness" to centre stage in everything we do as a company.
- Kramer Ausenco's Health & Safety Management Plan and Environment & Community Plan outlines the procedures and processes we follow on the job, both in the office and out on the field. We will review these plans with the successful DCF Contractor to make sure all parties are aware and aligned with the HSEC expectations to be adopted for this project. We will also make appropriate changes so that the plans for this Project meets health, safety, environment and community needs specific to this Project.
- Kramer Ausenco Health & Safety and Environment & Community Management Plans implemented the following:
 - a) Implemented appropriate safety and security measures prior to commencement of construction.
 - b) Reviewed the Contractor's Health, Safety, Environment and Community Plan for the Project.
 - c) Communicated the Health, Safety, Environment and Community measures to be undertaken on the Project to the all stakeholders.
 - d) Ensured the Health, Safety, Environment and Community measures comply with Workplace Health and Safety Regulations.
 - e) Ensured all project works are performed in a safe and secure manner, and that any activity relating to the Project does not compromise the health, safety and security of project personnel, visitors, bystanders, environment or the community in which project activities comes into contact with; and
 - f) Ensured Zero (0) Lost Time Injury (LTI) is achieved on the Project.

DESKTOP ANALYSIS AND REVIEW OF PREVIOUS STUDIES

- Reviewed all previous studies to find out any problems or improvements in view of the technical and economic justification especially in connection with the existing facilities and newly constructed facilities.
- The review of studies included all the airport facilities and covered;
- Functional Brief by Leigh Fisher and previous studies
 - a) Review adequacy of flight demand in previous studies
 - b) Review Design Standard in previous studies
 - c) Review size of airport facilities suggested in previous studies
 - d) Review the location of rapid taxiway suggested in previous studies
 - e) Review the improvement plan of existing facilities
 - f) Review the construction quantities and construction costs suggested in previous studies.
- Inception Report - Kramer Ausenco completed an Inception Report summarizing the outcome of the desktop analysis and above assessments.

DESIGN PHASE

- The design took into consideration cost factors to achieve a balance between capital cost and durability/ quality in space, material and fittings. Initial capital cost expenditure or savings were be rationalized against operational & maintenance costs.
- Passenger and staff safety and security were a prime consideration. They were integrated into all aspects of design, finishes and equipment selection, construction, procedures, maintenance and operations.
- Throughout the process KA provided:
 - a) Review preparation of designs for code compliance, safety in design, sustainability in design, and constructability;
 - b) Ensured designs are fit-for-purpose and met its functionality requirements;
 - c) Conducted value engineering on the designs.
 - d) Verified Required Permits:
- After review of the project drawings and specifications, provided assistance for obtaining the necessary construction permits from the local authorities concerned.
- All documentation was presented in the clearest possible form to maximise comprehension and minimize ambiguity. This was achieved by drawings having extensive explanatory notations, the signage, finishes and fittings were described with detailed schedules and specifications presented in clear descriptive language.
- Based on outcomes of the Inception Phase, the following outputs were provided:
 - a) Operational Plan
 - b) Staging Plan and Drawings
 - c) Construction Methodology and Management Plan
 - d) Health, Safety, Environmental and Quality Plan
 - e) Operational Readiness, Activation and Transfer Plan
 - f) Works Program and Schedule
 - g) Design Report
 - h) Technical Specifications
 - i) Outline Cost Plan
 - j) Concession Plan
 - k) Customer Service Plan
 - l) Other Documents

TENDER DOCUMENTATION AND EVALUATION ASSISTANCE

- Provided tender documentation
- Assisted the Client in the preparation of tender evaluation criteria, tender evaluation, contract negotiation and contracting.
- Supported with evaluations of submitted tenders, and recommendations for award.

CONSTRUCTION PHASE

- Undertook an independent Review of the Contractor's documents to verify that the documents comply with the requirements of the specifications included in the Contract documents.
- Developed and implemented an Independent Review Management Plan which described the management and integration activities undertaken which included the following:
 - a) Organize the review team.
 - b) Prepare the plan of review
 - c) Review the work by each discipline and prepare the comments by each engineer who reviewed.
 - d) Prepare the overall consolidated comments and prepare report(s) to the TAL PMU.
- Specialist attention was given to the following:
 - a) Airport specific fire protection and fighting system & lightning protection system.
 - b) Baggage handling automated system
 - c) Passenger boarding bridges
 - d) Electronic communications system
 - e) Aviation fuelling system

- Constructability reviews
 - a) Adequacy of construction time.
 - b) Scope of work and quality control of the field work.
 - c) Work difficulties.
 - d) Assess application of new construction methods and their risk.
- Conducted Value Engineering (VE) to maintain the quality of the work and complete the work within the approved project costs and time, perform the value engineering and make reports and recommendations to the TAL.

CONSTRUCTION SUPERVISORY & CONTRACT MANAGEMENT SERVICES

- Conducted Construction Meeting - Held pre-construction meeting, periodical meetings such as weekly, monthly, and quarterly meeting and construction progress meetings under the management of PMC team and prepared the minutes of meetings.
- Project Management Information System (PMIS) - Prepared the readiness and effective management of the project information system for the successful accomplishment of the project, including obtaining various criteria and record keeping.
- Control of Field Reports and other information - Construction shop drawings, quality control reports, laboratory test reports, quality control manuals, construction specifications, revisions on shop drawings, etc.
- Prepared the reports and record keeping - Reviewed various reports and manufacturers' catalogue cuts, technical data submitted by the contractor. Provided supervision of the field work, and prepare necessary reports concerned.
- Reports on delay of the field work - Made reports in case of delay of the field work or failure in the execution of the work based on the construction schedule and make requests of the delinquency payment to the Contractor, whenever required.
- Claim Management – facilitated certification of claims submitted by the contractor.
- Control of sub-contractor(s) - Control and evaluation of the sub-contractors qualifications including submission of the approval requests as sub-contractor and review their proposals and make necessary reports to the TAL.
- Payment Planning and Management - Prepared the payment plan to avoid over-payment or delay of payment, keeping pace with the construction progress.
- Payment Report and Control - For the effective payments of the contract, PMC team prepared the payment requests to the TAL in accordance with the normal practices and procedures in local construction markets.
- Review of the detailed construction schedule by each category of work - At the stage of contract procurement and based on the management standards, PMC team requested the contractor to prepare the detailed construction schedule and review it.
- Preparation of Construction Schedule by Category of Work - PMC team provided assistance to the Contractor in order to prepare the construction schedule in each category of work, based on design analysis, and other criteria and make appropriate revisions of the schedule, and perform the supervision and management.
- Convene the Construction Progress Meeting - PMC team conducted the progress meetings weekly or periodically for the efficient and successful construction work.
- Review of Shop Drawings - By construction phasing, PMC Team reviewed shop drawings prepared by the contractor and approval.
- Review of Modification and Change of Design - During the construction, all modifications and/or changes in design initiated either by the Contractor or TAL, PMC team reviewed and evaluated the proposals, analysing its necessities, alteration, adoptions, etc. and make recommendations to the TAL.
- Quality Control - Tests performed at the project sites or manufacturer's factory were verified to meet the requirements.
 - a) Planning of Construction Quality Control.
 - b) Review of the proposed laboratory tests and contractor's quality control plans and make comments and report to the TAL.
 - c) Quality control coordination board with the contractor for the efficiency of the Quality Control Plan.
 - d) Verification checks of laboratory tests.
- Measurement and Testing - Verification of measurements compared with drawings and test results in accordance with contract specifications and review of the test reports.
- Technical Review Comments - During construction, any technical issues made by the Contractor, directed by the TAL, or local construction authorities concerned, PMC team prepared the comment sheets in accordance with approved formats.
- Defects in Construction Quality - Took appropriate action for the correction of defective work in construction in accordance with contract drawings and specifications requirements.
- Review of the Contractor's Safety Plan - Reviewed and checked contractor's safety plan at the project site including existing airport safety conditions.
- Safety Management and Execution of Safety Plan - Checked the contractor's job site safety plan and its execution; and perform physical checks within the limit of the site.
- Environmental Management - Reviewed the contractors environmental control plan at the site and directs to prepared additional job site overall environmental control plan, if deemed necessary.
- Construction Completion Inspection And Corrective Action - Prior to final inspection of project completion, pre-final inspection was performed and the contractor directed to prepare punch list for the correction of all defective work.
- Completion Notice - Upon completion of the work, the contractor submitted project completion report to the PMC team for review and verification at the work site so that all defective work was corrected and verified.
- Commissioning And Training - For the satisfactory completion of the project, prior to final acceptance of the facility by TAL, commissioning of all equipment installed was performed and appropriate training shall conducted for the proper maintenance and operation by TAL personnel.
- Maintenance Manual - The Contractor prepared the maintenance & operation manual and submitted to the PMC Team.
- As-Built Drawings - PMC Team reviewed the Contractor's as-built drawings for final as-built drawings submission to the TAL.
- Final Acceptance - PMC Team took appropriate action including preparation of the final report to the TAL for acceptance.