SCOPE OF SERVICES – Aircraft PavementS

1. **Background**
   1. Defence aerodromes are a core capability for launching and recovering aircraft. The proper planning, development and delivery of aircraft pavement maintenance and capital works is paramount to ensure the Commonwealth maintains its Defence airfields in a serviceable condition to meet operational requirements and enable military aircraft to operate safely. A representative map showing the location of Defence airfields is presented in Annex A.
2. **Commonwealth Objectives** 
   1. The objectives of the Services provided by the Consultant are to:
      1. provide aircraft pavements designed to meet the operational requirements of Defence aircraft;
      2. provide aircraft pavements designed to meet the safety requirements of Defence aircraft and personnel; and
      3. maintain aircraft pavements to the required operational and safety standards in a cost effective manner.
3. **Skills and Qualifications**
   1. The Commonwealth requires suitably skilled personnel to be offered by the Consultant, matched to the specific needs of the Services. Skills that will be required to deliver the Services include:
      1. civil engineering design;
      2. geotechnical investigation and analysis;
      3. geotechnical design;
      4. hydrological investigation and analysis;
      5. hydrological design;
      6. presentation and communication;
      7. audit;
      8. inspection; and
      9. budgeting and forecasting.
   2. Additional qualification/s and/or minimum experience may be required for specific engagements.
   3. As a guide, the levels of Aircraft Pavement Design Consultants are based on relevant experience as follows:
      1. Junior Engineer <5 years relevant experience
      2. Assistant Engineer 5-10 years relevant experience
      3. Senior Technical 10-15 years relevant experience
      4. Technical Director >15 years relevant experience***.***
4. **Services**
   1. The Consultant must be able to provide the Services in accordance with the timeframes outlined by the Commonwealth's Representative.
   2. The Commonwealth requires specialist aircraft pavement consultants, either individually or as part of a team, to:
      1. Conduct aircraft pavement audits and inspections, including Aerodrome Technical Inspections (**ATIs**), refer to Annex B;
      2. Undertake aircraft pavement design (including master planning, scoping studies, design reports, drawings and specifications, and undertake technical construction monitoring), refer to Annex C;
      3. Provide aircraft pavement technical advisory services, including the conduct of third-party/independent auditor functions, refer to Annex D; and
      4. Perform aircraft pavement training and professional development services, refer to Annex E.
   3. Where Consultants are engaged to perform design services, the pavement scope of works may require interface works with Aeronautical Ground Lighting (**AGL**) that is likely to require specialist AGL design services for the associated works. If the scope of works requires both a pavement designer and an AGL designer, a lead consultant/designer will be identified/responsible for coordinating the design for both pavements and AGL. The lead designer is to only engage a subconsultant from the Aeronautical Ground Lighting Service Category under the Panel in respect of the interface works, eg a pavement lead is to engage a sub-consultant from the Aeronautical Ground Lighting Service Category under the Panel only.
   4. The Consultant must have and maintain for the term of the Engagement an in-depth understanding of all relevant Statutory Requirements and policy frameworks for the Services, including any relevant applicable Australian and international standards and Commonwealth policy, which may include:
      1. [Defence Aviation Safety Regulation](https://www.defence.gov.au/DASP/Docs/Manuals/DefenceAviationSafetyRegulation/DASRWeb/index.htm#8797.htm) ([DASR 139](https://www.defence.gov.au/DASP/Docs/Manuals/DefenceAviationSafetyRegulation/DASRWeb/index.htm#15303.htm)); URL:
         1. <https://www.defence.gov.au/DASP/Docs/Manuals/DefenceAviationSafetyRegulation/DASRWeb/index.htm#8797.htm>
         2. <https://www.defence.gov.au/DASP/Docs/Manuals/DefenceAviationSafetyRegulation/DASRWeb/index.htm#15303.htm>
      2. Airworthiness Design Requirements Manual (ADRM), [Section 6](https://www.defence.gov.au/DASP/Docs/Manuals/7001054/ADRMWeb/index.htm#25408.htm); URL:
         1. <https://www.defence.gov.au/DASP/Docs/Manuals/7001054/ADRMWeb/index.htm#25408.htm>
      3. Civil Aviation Safety Regulation Part 139 [Manual of Standards](https://www.legislation.gov.au/Details/F2020C00797) (latest version); URL:
         1. <https://www.legislation.gov.au/Details/F2020C00797>
      4. ICAO Annex 14 Volumes I and II (latest version available for a price at the [ICAO store](https://store.icao.int/en/shop-by-areas/safety/aerodromes)); URL:
         1. <https://store.icao.int/en/shop-by-areas/safety/aerodromes>
      5. Australian Building Codes Boards’ ([ABCBs](https://www.abcb.gov.au/Connect/Categories/National-Construction-Code)) National Construction Code of Australia; URL:
         1. <https://www.abcb.gov.au/Connect/Categories/National-Construction-Code>
      6. US Department of Defense Unified Facilities Criteria ([UFC](https://www.wbdg.org/ffc/dod/unified-facilities-criteria-ufc/ufc-3-260-01)) 3-260-1; URL:
         1. <https://www.wbdg.org/ffc/dod/unified-facilities-criteria-ufc/ufc-3-260-01>
      7. Defence Explosive Ordnance Publication ([DEOP](https://www.defence.gov.au/jcg/jlc/eDEOP_101.asp)) 101: Department of Defence Explosive Regulations. URL:
         1. <https://www.defence.gov.au/jcg/jlc/eDEOP_101.asp>
   5. The Consultant must provide deliverables as specified for a particular Engagement including reports, papers, reviews and advices.
   6. Deliverables from the Consultant should be applied in an appropriate context to enhance the Commonwealth's decision-making, reporting and public consultation.
   7. Specific deliverables that may be required for an Engagement include:
      1. Scoping study reports;
      2. Feasibility study reports;
      3. Geotechnical investigation reports;
      4. Hydrological investigation reports;
      5. Engineering design reports;
      6. Engineering drawings and specifications;
      7. Preparation of design documents as part of tender documentation;
      8. Technical Assessment and reporting on tendered documents;
      9. On site supervision of construction work including the confirmation of quality as detailed in the specification:;
      10. Commissioning witnessing and handover documentation review and clearance;
      11. Providing a consultant design certificate for the constructed works against the design; and
      12. Presentations and training materials.
   8. The Consultant may be required to arrange, attend, minute and participate in meetings as specified for a particular Engagement including project team meetings and meetings with stakeholders.
   9. The Consultant may be required to travel to Defence sites or other locations as part of delivering the Services.
5. **Technical Requirements**
   1. The Consultant is required to maintain a detailed knowledge of engineering best practice and relevant design policy and standards. Technical design aspects may be specified by the Commonwealth's Representative or in relevant Defence policy and may include design inputs or techniques to be used.
   2. Any spatial data developed by the Consultant during the term of the Engagement is to meet the Estate and Infrastructure Group’s Spatial Data Management Plan ([**SDMP**](http://intranet.defence.gov.au/EstateManagement/Governance/Policy/SDMP/default.asp)) and be uploaded into the Garrison Estate Management System and/or other platform as identified in the SDMP. The SDMP is available externally on the internet at <http://www.defence.gov.au/estatemanagement>.
6. **Works Safety Officer (WSO)**
   1. The designer is to engage a Works Safety Officer (WSO) to safely perform airside activities, such as asphalt coring, sub-grade testing, visual inspections, etc.
   2. The WSO is engaged, and paid by, the consultant but the WSO works on behalf of the Commonwealth (WSO Services Subcontract, Clause 2.2 (e) and 13.7 (g)) to ensure all airside works are performed safely. The WSO is not to do tasks that take away from the WSO’s ability to carry out its briefed services (WSO Consultant Deed Poll, Clause 2.2).
   3. The [WSO Services Subcontract](https://www.defence.gov.au/estatemanagement/Support/DIP/Templates/DIPWSOServicesSubcontract.DOC) and [WSO Consultant Deed Poll](https://www.defence.gov.au/estatemanagement/Support/DIP/Templates/DIPWSOConsultantDeedPoll.DOC) is available publically on DEQMS from the Defence Infrastructure Panel (DIP) webpage at: <https://www.defence.gov.au/estatemanagement/Support/DIP/Templates.asp>
7. **Interpretation**
   1. Unless the context otherwise requires, capitalised terms in the Scope of Services or Brief will have the meaning given to them by the Defence Infrastructure Panel 2022-2027 Terms of Engagement, Panel Conditions, Official Order, or the meaning given to them by the Commonwealth as published on the Defence Estate Quality Management System (**DEQMS**) website (<http://www.defence.gov.au/estatemanagement>), from time to time.

**Annexes:**

* + - * 1. Representative Locations of Defence Airfields including Defence Certification Status
        2. Aircraft Pavement Audits and Inspections
        3. Aircraft Pavement Design Services
        4. Aircraft Pavement Technical Advisory Services
        5. Aircraft Pavement Training and Professional Development Services

**Legend:**

City / Regional Centre

Local Council - Defence Lease

RAAF Base

Army Aviation Base

Navy Base

ADF Training Area

**RAAF Darwin (MOB)**

**Robertson Barracks (H)**

**Annex A – Representative Locations of Defence Airfields including Defence Certification Status**

**Mt Bundey (O)**

**Scherger (C)**

**Nackeroo (O)**

**Tindal (MOB)**

Cairns

**Edinburgh (MOB)**

**Defence Certification Status:**

**MOB**—Defence Certified Aerodrome/Main Operating Base – Aerodromes that will be certified for fixed wing aircraft in accordance with Defence Aviation Safety Regulation 139 (DASR.139) and the Airworthiness Design Requirements Manual (ADRM) that are key to the generation and maintenance of Defence capability

**C**—Defence Certified Aerodrome – Aerodromes that will be certified for fixed wing aircraft but are not Main Operating Bases.

**H**—Heliports – Aerodromes that will be certified as heliports in accordance with DASR.139 and the ADRM.

**O**—Other Defence Aerodromes – Aerodromes that will not be certified but are used to maintain Defence capability such as those located on ADF Training Areas.

**East Sale (MOB)**

**Richmond (MOB)**

**Townsville (MOB)**

**Amberley (MOB)**

**HMAS Albatross (C)   
Jervis Bay (C)**

**Puckapunyal (O)**

**Bindoon (O)**

**Wyoming Airfield (O)**

**Rockhampton:  
Williamson (O)  
Samuel Hill (O)**

**HMAS Stirling (H)**

**GinGin (C)**

**Holsworthy (H)**

Luscombe Field

Canberra

Melbourne

Sydney

**Wagga Wagga (O)**

**Williams  
(Point Cook) (C)**

Hobart

**Newcastle:  
Williamtown (MOB)**

Brisbane

**AAC Oakey (C)**

Adelaide

**Pearce (MOB)**

Perth

**Woomera (C)**

**Curtin (C)**

**Learmonth (C)**

**Annex B – Audit and Inspection Services**

1. **Aircraft Pavement Audits and Inspections**
   1. The Consultant must conduct pavement audits and inspections in accordance with the latest version of the Aircraft Pavement Maintenance Manual (**APMM**) available at <https://defence.gov.au/estatemanagement/governance/Policy/EngineeringMaintenance/AircraftPavement.asp>. The Services may include:
      1. identifying pavement defects;
      2. identifying defects in surface and sub-surface water control systems designed to protect the pavements;
      3. undertaking pavement and geotechnical testing and result analysis;
      4. identifying repair methods (taking into consideration location, material availability, operational requirements, etc);
      5. recommending repair methods (taking into consideration age of pavement, usage, forecasted maintenance, value for money, etc);
      6. scoping maintenance works;
      7. forecasting maintenance works;
      8. developing indicative budgets; and
      9. developing maintenance specifications and designs (including drawings).
   2. The Consultant must conduct compliance audits and inspections for aerodromes against relevant standards including Defences’ Airworthiness Design Requirements Manual (**ADRM**).
   3. The Consultant must produce documentation that addresses the following key areas:
      1. Exit Report;
      2. Pavement Condition Assessment;
      3. Key and typical distress report;
      4. Suitable to tender maintenance designs (including drawings and specifications, as required); and
      5. Capital planning forecasts.

**Annex C – Design Services**

1. **Aircraft Pavement Design Services**
   1. The Consultant must undertake various design activities to support the effective and safe delivery of capital or maintenance works. The Services may include the following:
      1. preparation of master plans;
      2. preparation of hydrological studies and reports, as follows:
         1. initial hydrological studies and associated report preparation or the updating of existing hydrological studies and reports for the ‘entire airfield catchment’ (which may extend beyond the Base boundary) to determine catchments, sub-catchments, design surface water flows, flow paths and recommended storage requirements; and
         2. modelling to be based on a stochastic or deterministic runoff routing model rather than a rational method approach;
      3. undertaking hydraulic analysis, as follows:
         1. initial hydraulic analysis of surface flows and report preparation or the updating of existing analyses and reports based on a “major/minor” approach, whereby for the minor event (approx. average recurrence interval (**ARI**): 1 in 10 years) open drains can run bank full, but for the major event (approx. ARI: 1:100 years) airfield operating surfaces are protected from inundation by an appropriate freeboard (eg min. of 200 mm clearance);
      4. undertaking groundwater studies and reports, as follows:
         1. initial preparation of groundwater studies and reports, or the updating of existing studies and reports, aimed at determining the requirement for subsoil drains (noting PFAS implications/interactions) and pump stations that may be required to suppress the phreatic surface to a level below the sub-base for a designated major groundwater event; and
         2. for such studies the hydraulic conductivity will be required and this will typically be determined by well recovery or pump testing to ensure a large sample volume is considered;
      5. development of scoping study reports;
      6. preparation of feasibility reports;
      7. provision of all geotechnical and hydrological test data—including associated drawings, and a certification statement for hydraulic analysis—in an electronic format agreed by the Commonwealth’s Representative;
      8. application of explosive ordnance requirements to design;
      9. preparation of tender documentation and specifications, including consultation with contractors during design development (if required);
      10. production of pavement design and surface/sub-surface water control measures design, as follows:
          1. production of pavement design along with the design of surface water and sub-surface water control measures required to protect the pavement, including basis of design reports, drawings and specifications;
          2. due to the strategic importance of Defence airfields, **all pavements are to be designed such that the subgrade is assumed to be saturated** but, notwithstanding this, measures are to be taken to ensure that the sub-base remains dry regardless of the use of non-plastic pavement materials; and
          3. any proposal to adopt new methods or methods that have not been routinely applied to airfields to determine subgrade design strength or pavement strength requirements are to be agreed by the Commonwealth's Representative;
      11. analysis and documentation of evidence to support safety case development for any differences between the Consultant’s design and the requirements of the ADRM;
      12. on-site construction quality monitoring and inspections during the construction phase;
      13. final inspection of the work including compliance and conformance checks and defect liability period inspections; and
      14. provision of a certificate that completed works meets the consultant’s design and specification. This certificate is to warranty the design used in construction by the contractor, and for all design changes that are approved by the design consultant during construction (irrespective of who suggested the design change).
   2. **Typical Certificate**

An example of the form of the certificate for para 1.1 (n) above is as follows:

*COMPLIANCE CERTIFICATE for CIVIL WORKS CONSTRUCTION*

*DATE*

*xx xx xxxx*

*CERTIFIER*

*Consultant Company Pty Ltd*

*Address*

*PROJECT DESCRIPTION*

*Project/Estate Number ADF Establishment name*

*New aircraft parking apron area, with associated drainage, fencing and flood lighting, reconstruction of the existing North/South access road with associated drainage, including an Airfield Lighting Equipment Building. Located off xxxx Drive within [insert ADF Establishment],*

*DESCRIPTION OF COMPONENTS CERTIFIED*

*Certification of the completed civil and building works has been constructed in accordance with paragraph 1.1 (n) in the Aircraft Pavement Scope of Services the [insert consultant company name] approves the design.*

*BASIS OF CERTIFICATION*

*Complete Civil, Electrical and Building works; Compliance with the paragraph 1.1 (n) in the Aircraft Pavement Scope of Services the [insert consultant company name] and accompanying specifications.*

*COMPETENT PERSON*

*[Insert full name]*

*Design office. [Insert address]*

*CERTIFICATION OF COMPETENT PERSON*

*The Consultant certifies that the Completed Civil and Building Works comply or the Works Package specified above (if any) carried out under the Construction Contract complies (as the case may be) with the Design Documentation which has not been rejected by the Contract Administrator.*

*~ [Signature]*

*Registered Professional Engineer Queensland [or wherever registered]. Reference No. xxxx*

* 1. These Services may be required in relation to maintenance or capital works.

1. **Key People**
   1. The Consultant must:
      1. employ at a minimum those positions required to provide an **expert level of design** or as-specified in the scope of work by the Principal’s Representative, including the Consultant's Representative, at the experience levels specified;
      2. subject to the following paragraph, not replace the people referred to in paragraph above without the Principal’s Representative's prior written approval;
      3. if any of the people referred to in paragraph above die, become seriously ill or resign from the employment of the Consultant, replace them with persons approved by the Principal’s Representative of at least equivalent experience, ability and expertise; and
      4. put in place sufficient succession planning, to the satisfaction of the Principal, to ensure that the Consultant is able to replace key people under paragraph above without any disruption to the Services.
2. **Removal of Persons**
   1. The Principal’s Representative may by notice in writing direct the Consultant to remove any person from the performance of the Services who in the reasonable opinion of the Principal’s Representative is guilty of misconduct or is incompetent or negligent.
   2. The Consultant must ensure that the person referred to in paragraph above is not again employed for the panel Services.

**Annex D – Technical Advisory Services**

1. **Aircraft Pavement Technical Advisory Services**
   1. The Commonwealth is required to provide short-notice technical advice regarding airfield pavements and their use by aircraft. The Consultant may be required to assist the Commonwealth in providing short notice technical advice. The Services may include the following:
      1. preparation of planning documentation;
      2. provision of advice regarding the appropriate major and minor average recurrence intervals (**ARIs**) and freeboards for surface water control measure design;
      3. provision of advice regarding the appropriate major ARI for sub-surface water control measure design;
      4. updating data for aircraft pavement concessions based on the ACN/PCN system, or ACR/PCR system when it is introduced, particularly following pavements inspections and maintenance or capital works;
      5. technical feasibility for using a new methodology of pavement construction and/or repairs;
      6. assessment of the suitability of a rated or unrated pavement at an airfield for specified aircraft types;
      7. assessment of the suitability of an airfield for the operation of an aircraft not currently included in the Defence Aircraft Pavement Strength Evaluation Manual (**APSEM**);
      8. reviewing project documentation, including providing independent expert advice on other Commonwealth contracted airfield pavement works, eg peer review or audits of specific projects;
      9. conducting investigative studies including surface and sub-surface water studies, for identified pavement issues;
      10. reviewing planning and operational documents for compliance with relevant engineering policy, standards and regulations;
      11. preparation of safety case documentation to address aerodrome non-compliances with the ADRM identified during design or inspection;
      12. provision of Technical Director level advice to support any Defence legal matters; and
      13. provision of a ‘Discipline Technical Lead’, being the most senior technical person in the company, for the resolution of difficult technical matters.
   2. The Services may include a role as an independent auditor pursuant to which the Consultant may be required to review design, specification and quality assurance (**QA**) documentation and to audit the construction, as required, to independently confirm the suitability of the design and the compliance of the construction with the design. The Consultant must include in their compliance assessment details of its review, audit and confirmation of the design’s compliance with the requirements of the WHS Legislation and that the design identifies and manages (via risk management strategies) any WHS issues arising from the design.
   3. The Consultant may also be required to provide assistance with policy development, maintenance and interpretation. This may include the following topics:
      1. surface and sub-surface water control measures;
      2. maintenance;
      3. surface texture and friction;
      4. aerodrome services;
      5. design philosophies;
      6. pavement management systems; and
      7. pavement strength limitations.

**Annex E – Aircraft Pavement Training and Professional Development Services**

1. **Training Services**
   1. The Consultant may be required to provide training services aimed at transferring specialist technical aircraft pavement knowledge to Commonwealth and civilian maintenance personnel including with respect to the following areas:
      1. aircraft pavement inspections;
      2. aircraft pavement design;
      3. aircraft pavement maintenance; and
      4. management strategies for flexible and rigid pavements (including safety).
   2. The Consultant may be required to assist with course development and delivery including on the job training, training packages and delivery of face-to-face instruction.
2. **Professional Development Services**
   1. The Consultant may be required to provide to Commonwealth employees in engineering fields relevant to aerodromes, mentoring and opportunities to develop their knowledge and experience in aircraft pavement systems, subsystems and components in order to aid in their professional development.
   2. The Consultant may be required to undertake industry reviews of engineering competency claims to aid Commonwealth employees in their professional development and achievement of charted status with Engineers Australia.