



Kim Ellis  
Director  
Australian Antarctic Division  
Department of Agriculture, Water and the Environment  
203 Channel Highway  
KINGSTON TAS 7050

Dear Mr Ellis

### **Terms of Reference**

#### **Davis Aerodrome Project, Vestfold Hills, East Antarctica**

I refer to the decision of 28 November 2019 that the Davis Aerodrome Project is likely to have more than a minor or transitory impact on the environment under Section 12K of the *Antarctic Treaty (Environment Protection) Act 1980* (ATEP Act), and the decision of 12 March 2020 that the Davis Aerodrome Project is a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The assessment of the environmental impacts of the proposal under both pieces of legislation will take place through a Comprehensive Environmental Evaluation (CEE) under the ATEP Act.

Regulation 8 of the *Antarctic Treaty (Environment Protection) (Environmental Impact Assessment) Regulations 1993* (ATEP Regulations) sets out the required contents of a draft CEE. For the purposes of paragraph 12k(2)(a) of the ATEP Act, a draft CEE for an activity must include:

- (a) a detailed description of the activity, including a statement of:
  - (i) the purpose; and (ii) the location; and (iii) the duration; and (iv) the intensity of the activity; and
- (b) a detailed description of possible alternatives to the activity, including the alternative of not carrying on the activity; and
- (c) a detailed description of the consequences of each possible alternative to the activity; and
- (d) a detailed description of the environmental reference state with which predicted changes are to be compared; and
- (e) a prediction of the future environmental reference state if the activity does not take place; and
- (f) an estimation of the nature, extent, duration and intensity of the likely direct impacts of the activity; and
- (g) detailed consideration of possible indirect impacts of the activity; and

(h) detailed consideration of the cumulative impacts of the activity in the context of other activities in the same area that are planned, in progress, or reasonably foreseeable when the evaluation is being prepared; and

(i) detailed consideration of the effects of the activity on scientific research and other uses and values, including historic values, of the areas that will be affected by the activity; and

(j) identification of unavoidable impacts of the activity; and

(k) a detailed description of the methods and data used to forecast the impacts of the activity; and

(l) identification of uncertainties and lack of knowledge relevant to preparation of the evaluation; and

(m) identification of measures, including monitoring programs, that are proposed to be taken:

(i) to minimise or mitigate impacts of the activity; and (ii) detect impacts of the activity that were not predicted in the evaluation; and (iii) to provide early warning of adverse effects of the activity; and (iv) to deal promptly and effectively with accidents; and (n) a summary, in language that is not technical, of the information described in paragraphs (a) to (m) inclusive; and

(o) a statement of the arrangements that will be made to report to the Minister the results of the monitoring; and

(p) the name and address of the person who prepared the evaluation; and

(q) the address to which comments on the draft should be sent.

The draft CEE must explain all regulatory requirements relevant to the proposed action. This includes an assessment of the proposed action against the Antarctic Treaty System principles and obligations. For example, this must include details of how all obligations of the Antarctic Treaty and Environment Protocol (e.g. ATCM and Committee for Environment Protection (CEP) resolutions and measures which Parties have agreed to implement), relevant to aerodrome construction, operation and associated environmental management, will be implemented through this project.

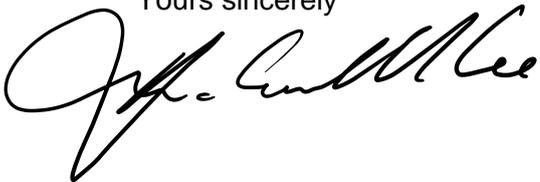
The draft CEE must address the requirements of *Annex I to the Protocol on Environmental Protection to the Antarctic Treaty: Environmental Impact Assessment*. These Guidelines are available on the Antarctic Treaty website at [https://documents.ats.ac/recatt/Att008\\_e.pdf](https://documents.ats.ac/recatt/Att008_e.pdf)

In addition to the Antarctic Treaty system requirements, the draft CEE must include the information specified in the *EPBC Act guidelines for the content of a draft Comprehensive Environmental Evaluation* at Attachment A and the *Additional Specific Matters to be addressed in a draft Comprehensive Environmental Evaluation* at Attachment B.

To avoid doubt and unnecessary duplication, the Environment Approvals Division expects the provision of a CEE under the ATEP Act which contains all the relevant detail required with an EPBC Act-focussed chapter that includes additional information addressing EPBC Act specific requirements.

If you have any questions about these terms of reference, please contact the Environment Approvals Division by email at [epbc.victas@awe.gov.au](mailto:epbc.victas@awe.gov.au).

Yours sincerely

A handwritten signature in black ink, appearing to read 'Andrew McNee', written in a cursive style.

Andrew McNee  
Assistant Secretary  
Assessments and Governance Branch  
Environment Approvals Division

28 May 2020

**GUIDELINES FOR THE CONTENT  
OF AN EPBC ACT CHAPTER OF A DRAFT  
COMPREHENSIVE ENVIRONMENTAL EVALUATION**

**Davis Aerodrome Project, Vestfold Hills, East Antarctica**

# TABLE OF CONTENTS

|  |          |
|--|----------|
| <b>PREAMBLE</b>  | <b>3</b> |
| <i>Environment Protection and Biodiversity Conservation Act 1999</i> ..... | 3        |
| <b>GENERAL ADVICE ON GUIDELINES</b>  | <b>4</b> |
| 1    GENERAL CONTENT .....   | 4        |
| 2    FORMAT AND STYLE .....  | 4        |
| <b>SPECIFIC CONTENT</b>  | <b>5</b> |
| 1    GENERAL INFORMATION .....   | 5        |
| 2    DESCRIPTION OF THE ACTION .....                                       | 5        |
| 3    FEASIBLE ALTERNATIVES .....   | 6        |
| 4    DESCRIPTION OF THE ENVIRONMENT .....                                  | 6        |
| 5    RELEVANT IMPACTS.....   | 6        |
| 6    PROPOSED SAFEGUARDS AND MITIGATION MEASURES .....                     | 7        |
| 7    RESIDUAL IMPACTS.....   | 8        |
| 8    OTHER APPROVALS AND CONDITIONS.....                                   | 8        |
| 9    CONSULTATION .....  | 9        |
| 10   ENVIRONMENTAL RECORD OF PERSON(S) PROPOSING TO TAKE THE ACTION        | 9        |
| 11   ECONOMIC AND SOCIAL MATTERS.....                                      | 9        |
| 12   INFORMATION SOURCES PROVIDED IN THE CEE .....                         | 10       |
| 13   CONCLUSION.....   | 10       |

**GUIDELINES FOR THE CONTENT OF AN EPBC ACT CHAPTER  
OF A DRAFT COMPREHENSIVE ENVIRONMENTAL EVALUATION FOR**

**Davis Aerodrome Project, Vestfold Hills, East Antarctica**

**PREAMBLE**

The Commonwealth of Australia represented by the Department of Agriculture, Water and the Environment (the **proponent**) proposes to construct and operate a 2700 m long paved runway and associated infrastructure, 4.5 km northeast of Davis Research Station, Australian Antarctic Territory (the **proposed action**).

***Environment Protection and Biodiversity Conservation Act 1999***

The proposal was referred under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) to the Minister for the Environment on 29 January 2020. The delegate of the Minister determined on 12 March 2020 that approval is required as the action has the potential to have a significant impact on the following matters of national environmental significance that are protected under Part 3 of the EPBC Act:

- Listed threatened species and communities (section 18 & section 18A);
- Listed migratory species (section 20 & section 20A);
- The environment in a Commonwealth marine area (section 24A);
- The environment where the proposal is a Commonwealth action (section 28);

The delegate of the Minister also determined, on 11 March 2020, that the proposed action be assessed by an accredited decision process, namely a 'comprehensive environmental evaluation' (**CEE**) under section 12K of the *Antarctic Treaty (Environment Protection) Act 1980 (ATEP Act)*.

Information about the action and its relevant impacts, as outlined below, is to be provided as a component of the CEE, hereinafter referred to as the EPBC chapter. This information should specifically address matters protected under the EPBC Act and may be additional to the ATEP Act requirements and guidelines for Environmental Impact Assessment in Antarctica. This information must be sufficient to allow the Minister for the Environment (the **Minister**) to make an informed decision on whether or not to approve, under Part 9 of the EPBC Act, the taking of the action for the purposes of each controlling provision.

## **GENERAL ADVICE ON GUIDELINES**

### **1 GENERAL CONTENT**

The EPBC chapter should be a document that contains sufficient information to avoid the need to search out previous or supplementary reports. Where relevant information is provided in the primary CEE document, incorporate or refer to this information as necessary.

This assessment should take into consideration the EPBC Act Significant Impact Guidelines that can be downloaded from the following web site:  
<http://www.environment.gov.au/epbc/guidelines-policies.html>.

The EPBC chapter should enable interested stakeholders and the Minister to understand the environmental consequences of the proposed development. Information provided in the EPBC chapter should be objective, clear, succinct and, where appropriate, be supported by maps, plans, diagrams or other descriptive detail. The body of the EPBC chapter is to be written in a clear and concise style that is easily understood by the general reader. Technical jargon should be avoided wherever possible. Cross-referencing should be used to avoid unnecessary duplication of text.

Detailed technical information, studies or investigations necessary to support the main text should be included as appendices to the EPBC chapter (or to the primary CEE document itself). Wherever possible, any additional supporting documentation and studies, reports or literature not normally available to the public from which information has been extracted must be made available at appropriate locations (including the web) during the period of public display of the EPBC chapter.

The level of analysis and detail in the EPBC chapter should reflect the level of significance of the expected impacts on the environment. Any and all unknown variables or assumptions made in the assessment must be clearly stated and discussed. The extent to which the limitations, if any, of available information may influence the conclusions of the environmental assessment should be discussed.

The EPBC chapter should assesses compliance of the action, where relevant, with the Principles of Ecological Sustainable Development as set out in the EPBC Act, and the objects of the EPBC Act.

### **2 FORMAT AND STYLE**

The EPBC chapter should comprise two elements, namely:

- the main text of the document
- appendices containing detailed technical information and other information that can be made publicly available.

The guidelines have been set out in a manner that may be adopted as the format for the EPBC chapter. This format need not be followed where the required information can be more effectively presented in an alternative way. However, each of the elements must be addressed to meet the requirements of these guidelines.

The EPBC chapter should be written so that any conclusions reached can be independently assessed. To this end all sources must be appropriately referenced using the Harvard standard. The reference list should include the address of any Internet “web” pages used as data sources.

The main text of the EPBC chapter should include a list of abbreviations, a glossary of terms and appendices containing:

- a copy of these guidelines
- a list of persons and agencies consulted
- contact details for the proponent
- the names of the persons involved in preparing the EPBC chapter and work done by each of these persons.

Maps, diagrams and other illustrative material should be included in the EPBC chapter. The EPBC chapter should be produced on A4 size paper capable of being photocopied, with maps and diagrams on A4 or A3 size and in colour where possible.

The proponent should consider the format and style of the document appropriate for publication on the Internet. The capacity of the website to store data and display the material may have some bearing on how the document is constructed.

## **SPECIFIC CONTENT**

### **1 GENERAL INFORMATION**

This should provide the background and context of the action including:

- (a) the title of the action
- (b) a clear outline of the objective of the action
- (c) the location of the action
- (d) the background to the development of the action
- (e) how the action relates to any other actions (of which the proponent should reasonably be aware) that have been, or are being, taken or that have been approved in the region affected by the action
- (f) the current status of the action
- (g) the consequences of not proceeding with the action.

### **2 DESCRIPTION OF THE ACTION**

All construction, operational and (if relevant) decommissioning components of the action should be described in detail. This should include the precise location (including

coordinates) of all works to be undertaken, structures to be built or elements of the action that may have relevant impacts.

The description of the action must also include details of how the works are to be undertaken (including stages of development and their timing) and design parameters for those aspects of the structures or elements of the action that may have relevant impacts.

### **3 FEASIBLE ALTERNATIVES**

Any feasible alternatives to the action to the extent reasonably practicable, including:

- (a) if relevant, the alternative of taking no action
- (b) a comparative description of the impacts of each alternative on the matters of national environmental significance protected by controlling provisions of Part 3 of the EPBC Act for the action
- (c) sufficient detail to make clear why any alternative is preferred to another.

Short, medium and long-term advantages and disadvantages of the options should be discussed.

### **4 DESCRIPTION OF THE ENVIRONMENT**

A description of the environment of the proposal site and the surrounding areas that may be affected by the action. It is recommended that, for the EPBC chapter, this include the following information:

- (a) listed threatened and migratory species that are likely to be present in the vicinity of the site, including the following details:
  - details of the scope, timing (survey season/s) and methodology for studies or surveys used to provide information on the listed species/community/habitat at the site (and in areas that may be impacted by the project)
  - other details required for site-specific species should be included here
- (b) a description of the Commonwealth Heritage values of the Commonwealth Heritage Places relevant to the action
- (c) a description of the Commonwealth Marine environment relevant to the action
- (d) a description of the environment relevant to the action.

### **5 RELEVANT IMPACTS**

- (a) the EPBC chapter must include a description of all of the relevant impacts of the action. Relevant impacts are impacts that the action will have or is likely to have on the environment, including on a matter protected by a controlling provision (as

listed in the preamble of this document). Impacts during the construction, operational and (if relevant) the decommissioning phases of the project should be addressed, and the following information provided:

- a detailed assessment of the nature and extent of the likely short-term and long-term relevant impacts
- a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible
- analysis of the significance of the relevant impacts
- any technical data and other information used or needed to make a detailed assessment of the relevant impacts.

(b) the EPBC chapter should also provide a detailed assessment of any likely indirect or facilitated impacts on the relevant controlling provisions at the local, regional and international scale.

In addition, the EPBC chapter should provide a detailed assessment of the likely impacts of the proposed action on the environment, as they relate to an action taken by a Commonwealth Agency.

## **6 PROPOSED SAFEGUARDS AND MITIGATION MEASURES**

The EPBC chapter must provide information on proposed safeguards and mitigation measures to deal with the relevant impacts of the action. Specific and detailed descriptions of proposed measures must be provided and substantiated, based on best available practices and must include the following elements.

- (a) a consolidated list of mitigation measures proposed to be undertaken to prevent, minimise or compensate for the relevant impacts of the action, including:
- a description of the environmental outcomes the measures are expected to achieve including details of any baseline data or proposed monitoring to demonstrate progress towards achieving these outcomes
  - a description of proposed safeguards and mitigation measures to deal with relevant impacts of the action, including details of who will implement the measures
  - assessment of the expected or predicted effectiveness of the mitigation measures
  - the cost of the mitigation measures.
- (c) an Environmental Management Plan (EMP) that sets out the framework for management, mitigation and monitoring of relevant impacts of the action, including any provisions for independent environmental auditing.

The EMP needs to address the project phases (construction, operation, decommission) separately. It must state the environmental objectives, performance criteria, monitoring, reporting, corrective action, responsibility and timing for each environmental issue.

The EMP should also describe contingencies for unforeseen events such as failure of waste and contaminant containment systems, extreme weather events and accidents. The Department's EPBC Act Environmental Management Plan Guidelines can be used and are available at:

<https://www.environment.gov.au/epbc/publications/environmental-management-plan-guidelines>

- (d) the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program.

## **7 RESIDUAL IMPACTS**

The EPBC chapter must describe any residual impacts on the environment that are likely to occur as a result of the proposed action in its entirety, if these are expected after proposed avoidance and/or mitigation measures are taken into account. If applicable, this must include the reasons why avoidance or mitigation of impacts cannot be reasonably achieved.

Where residual impacts are likely to be significant, the EPBC chapter must include a proposal to compensate for those impacts. This should consist of a proposal, key commitments and management actions (with specific responsibilities for these actions) for delivering and implementing the proposal (e.g. a management plan). Please note, any management plan should be prepared as a separate document and attached as an appendix to the EPBC chapter.

Proposals to compensate for residual impacts of the action must deliver an overall conservation outcome that improves or maintains the environment, as compared to what is likely to have occurred if neither the action nor the compensatory measures had taken place. Any proposal must consider the principles of the Department's EPBC Act Environmental Offsets Policy (October 2012) available at:

[www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy](http://www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy).

Any such proposal must not be inconsistent with any other requirements associated with the proposed action.

## **8 OTHER APPROVALS AND CONDITIONS**

The EPBC chapter must include information on any other requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action or components of the proposed action. This must include:

- (a) details of any local or State Government planning scheme, or plan or policy under any local or State Government planning system that deals with the proposed action, including:

- what environmental assessment of the proposed action has been, or is being, carried out under the scheme, plan or policy
  - how the scheme provides for the prevention, minimisation and management of any relevant impacts.
- (b) a description of any approval that has been or may be obtained from a State, Territory or Commonwealth agency or authority (other than an approval under the ATEP Act or EPBC Act), or international agency or authority, including any conditions that apply to the action or part thereof
- (c) a statement identifying any additional approval that is required
- (d) a description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.

## **9 CONSULTATION**

Any consultation about the action, including:

- (a) any consultation that has already taken place
- (b) proposed consultation about relevant impacts of the action
- (c) if there has been consultation about the proposed action, any documented response to, or result of, the consultation
- (d) identification of affected parties, including a statement mentioning any communities that may be affected and describing their views.

## **10 ENVIRONMENTAL RECORD OF PERSON(S) PROPOSING TO TAKE THE ACTION**

For the purposes of the EPBC Act, the EPBC chapter must include details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:

- (a) the person proposing to take the action
- (b) for an action for which a person has applied for a permit, the person making the application.

If the person proposing to take the action is a corporation, details of the corporation's environmental policy and planning framework must also be included.

## **11 ECONOMIC AND SOCIAL MATTERS**

For the purposes of the EPBC Act, the EPBC chapter must include details of the economic and social impacts of the action. Both positive and negative impacts must be analysed. Matters of interest may include:

- details of any public consultation activities undertaken, and their outcomes
- projected economic costs and benefits of the project, including the basis for their estimation through cost/benefit analysis or similar studies
- employment opportunities expected to be generated by the project (including construction, operational and decommissioning phases).

Economic and social impacts should be considered at all relevant levels. Details of the relevant cost and benefits of alternative options to the proposed action, as identified in section 3 above, should also be included.

## **12 INFORMATION SOURCES PROVIDED IN THE CEE**

For information given in the EPBC chapter, the document must state:

- (a) the source of the information
- (b) how recent the information is
- (c) how the reliability of the information was tested
- (d) what uncertainties (if any) are in the information.

## **13 CONCLUSION**

An overall conclusion as to the environmental acceptability of the proposal should be provided, including discussion on compliance with principles of ESD and the objects and requirements of the EPBC Act. Reasons justifying undertaking the proposal in the manner proposed should also be outlined.

# **ADDITIONAL SPECIFIC MATTERS TO BE ADDRESSED IN A DRAFT COMPREHENSIVE ENVIRONMENTAL EVALUATION**

## **Davis Aerodrome Project, Vestfold Hills, East Antarctica**

**Note: This is not meant to be an exhaustive list of all matters to be addressed. It should be read in conjunction with other ATEP Act and EPBC Act standard requirements for the CEE.**

# TABLE OF CONTENTS

|   |   |    |
|---|---|----|
| 1 | DESCRIPTION OF THE ACTION .....                                 | 3  |
| 2 | FEASIBLE ALTERNATIVES .....                                     | 5  |
| 3 | JUSTIFICATION OF THE ACTION .....                               | 7  |
| 4 | RELEVANT IMPACTS.....   | 8  |
| 5 | AVOIDANCE, MITIGATION AND MEASURES TO ADDRESS RESIDUAL IMPACTS. | 21 |
| 6 | FACILITATED IMPACTS OF THE ACTION.....                          | 23 |

## **ADDITIONAL SPECIFIC MATTERS TO BE ADDRESSED IN A DRAFT COMPREHENSIVE ENVIRONMENTAL EVALUATION FOR**

### **Davis Aerodrome Project, Vestfold Hills, East Antarctica**

#### **1 DESCRIPTION OF THE ACTION**

All construction, operational and (if relevant) decommissioning components of the action must be described in detail. This must include sufficient detail both to allow an understanding of the scope and scale of the proposed Davis Aerodrome Project in the context of the environment and location of the proposal, and to enable assessment of their likely potential environmental impacts.

The project description must include detailed descriptions of the following:

- 1.1 the geographical scope of the project including any components in Australia or otherwise outside of Antarctica including, but not limited to infrastructure and/or operations to support construction, shipping, and departure points for aircraft traveling to the proposed aerodrome
- 1.2 the footprint area encompassed within the Davis station limits including description of how this area was assessed and maps showing the footprint
- 1.3 construction and engineering challenges, including detailed review of previous large-scale infrastructure projects in Antarctica and measures to address those challenges
- 1.4 aircraft approach glide slope and flight path options including all potential inter-and intra-continental routes, the flight paths of any potential non-Australian Antarctic Program Davis Aerodrome Project users, and all alternative routes as far as possible, e.g. deviations for emergency and other operational purposes. Include measures for reporting any deviation from those defined paths and whether they occur for safety or discretionary reasons
- 1.5 assessment of the likelihood of the aerodrome operating in perpetuity, compared to a fixed operational life with associated decommissioning
- 1.6 maps should be provided to clearly show all aspects of the proposal and all places referenced in the text, including depicting flight paths in relation to all relevant environmental values and details of the projected or modelled noise footprint of aircraft as they relate to sensitive receptors, with reference to sound levels in relevant guidelines
- 1.7 project scope and relationship to other Australian Antarctic Program activities such as:
  - the operation of the Australian Antarctic Division's new research vessel, RSV Nuyina including the proposed use of that vessel for the purpose of this project

- all Australian Antarctic Program aviation, including intracontinental flights between stations, and Australian Defence Force flights
- Davis stabilisation project
- Davis modernisation project
- other redevelopment of Australian Antarctic Program facilities infrastructure upgrades and station population changes at Davis station and of other stations in the Princess Elizabeth Land region

including details of impact assessment approaches for those related activities not forming part of the Davis Aerodrome Project assessment

- 1.8 operational lifespan of the aerodrome including proposed sequencing of construction and operation, as well as details of contingency plans should aspects of this sequencing change over time
- 1.9 explanation as to how any changes to the broader Antarctic aviation system would remain consistent with specific approvals and authorisations of Antarctic aviation operations associated with the project
- 1.10 the position of the helicopter landing pads and hangars
- 1.11 the fencing and other statutory requirements of the Civil Aviation Safety Authority
- 1.12 quarrying requirements for haul and access road construction
- 1.13 the project's plant and equipment and where this fleet of construction and operational equipment will be serviced and garaged in winter
- 1.14 the additional volume of water needed for construction and other activities
- 1.15 the extra fuel needed each year to desalinate seawater, and to prevent water stores from freezing and associated spill mitigation measures
- 1.16 the total amount of fuel proposed to be stored at the aerodrome, and management systems for this fuel
- 1.17 the location of the enabling infrastructure required at Davis station
- 1.18 details of the road to the remote explosives store and the amount of explosives and number of detonations likely to be required
- 1.19 the proposed construction method of concrete pavers, including paver joints. Details should be provided of how the paver joints will cater or respond to:
  - infrequent sweeping
  - low temperatures and possible contraction
  - refreezing of seeped water

- movement of the permafrost or melting
- the impact of aircraft landing on individual pavers
- penetration of meltwater and wind erosion into the cracks between the pavers with freeze/thaw action
- the Department of Defence Airfield Pavement Maintenance Manual, which states; “Concrete slab thicknesses can be up to 500mm for the heaviest aircraft loading cases, though 350mm to 450mm is more typical, both in Australia and overseas, to cater for most modern large aircraft”. “These thicknesses compare with 230mm to 250mm thick slabs typically used for major highway pavements.” The description of the proposal should address how these standards relate to the proposed pavers and aircraft types to be used at the Davis Aerodrome and the possibility of any revision of runway specifications to cater for heavier loads, with a potential greater impact than that currently stated.

## **2 FEASIBLE ALTERNATIVES**

To the extent reasonably practicable provide all feasible alternatives in detail, with estimations of environmental impacts associated with alternatives.

Assessment of feasible alternatives to the action should include:

- 2.1 constructing an ice runway on the Antarctic Plateau, including accessibility from Davis station compared to access to Wilkins Aerodrome
- 2.2 upgrading the existing Australian Antarctic Program ice runway facilities at Wilkins Aerodrome to operate year round
- 2.3 explanation of the extent to which other Antarctic runway types (e.g. ice, hard substrate) comply with recommendations for horizontal and vertical separation from the coastline, in order to allow a comparison of the compliance of different runway types with the various guidelines for aircraft operations, including those developed under the Antarctic Treaty System and for the Australian Antarctic Program
- 2.4 upgrading the stations and facilities to allow the same year-round science and lower medical risk profile afforded by the proposed activity, maintaining the status quo in terms of aviation
- 2.5 increases in shipping presence and capability allowing year round delivery of scientific personnel and equipment through the use of additional shipping capability coupled with improved ship to shore services (e.g. long range heavy lift helicopters)
- 2.6 establishing a smaller runway with a year round, intra-continental air link between Australian stations
- 2.7 alternative locations of the enabling infrastructure other than within Davis station limits

- 2.8 the assessment should include justification for determining a location for the project before completing a detailed assessment (such as through this CEE) of all potential impacts to the Vestfold Hills and its surrounding region, including the Antarctic Conservation Biogeographic Region (ACBR) 7: East Antarctica
- 2.9 the likelihood of autonomous systems replacing people and the possibility of such technology or other factors further reducing the demand for transport to Antarctica
- 2.10 possible aircraft alternatives that might be available in 2040 when the first flight to the aerodrome is scheduled to occur. The discussion of alternatives should consider:
- a 2040 operating environment including detailed consideration of operational lifespan of current aircraft and likely aircraft technology at that time
  - the feasibility of a ski equipped C130J Hercules aircraft operation, the civil Federal Aviation Administration certified C130J (known as the LM100J), Lockheed LC-130 aircraft. Consideration of costs and/or benefits should include but not be limited to:
    - use of existing sea ice runways and skiways at all Australian stations
    - how intercontinental and intracontinental logistics may be influenced by local weather
    - ability to support deep field research by airdrops
    - ability to undertake medivac retrieval/search and rescue at any time
    - evidence of operational success or otherwise of different options by other nations in Antarctica or similar environments
    - opportunities for collaboration with other nations e.g. see [https://www.nsf.gov/geo/opp/usap\\_special\\_review/usap\\_brp/rpt/antarctica\\_07232012.pdf](https://www.nsf.gov/geo/opp/usap_special_review/usap_brp/rpt/antarctica_07232012.pdf) including consideration of how increased capability may affect Antarctic programs of other nations
    - opportunity for the Australian Antarctic Program to widely access East Antarctica, including in support of Antarctic Treaty system commitments
    - opportunities to support science both as an airborne platform (observation and/or remote sensing) and in deep field operations
    - potential for broader Australian Government capabilities (roll on/roll off aerial firefighting, search and rescue, disaster support capabilities)

- assessment of total flight durations/distances to undertake operations based out of Hobart to other East Antarctic stations, in comparison to using the proposed Davis Aerodrome as a hub
  - assessment of likely operational requirements e.g. upgrade of existing snow groomers, tractors and transition to use of alternative larger more efficient and/or safer refuelling and fuel storage systems
  - consideration of likely infrastructure required to support the operation at Hobart Airport
- 2.11 any relevant combinations of the above and the option of not proceeding with the project
- 2.12 a full cost/benefit analysis of the project, including sustainability and carbon emission accounting, against other feasible alternatives.

### **3 JUSTIFICATION OF THE ACTION**

Justify and describe the assumptions and level of uncertainty associated with the project. This should include the following:

- 3.1 detailed assessment and justification that the proposed benefits of the project outweigh the potential environmental impacts
- 3.2 discuss how the proposed overall benefits to science would offset negatives in the construction phase, including consideration of the opportunity cost of funding for the proposed Davis Aerodrome
- 3.3 discuss how the project will provide the opportunity for scientists to study wildlife across the full annual lifecycle of key species including krill, penguins, seals and seabirds including consideration of the absence of wildlife during the winter months, severe weather conditions, including extremely low temperatures, blizzards, and the absence of sunlight during the winter months
- 3.4 how severe weather conditions during the winter months may affect operation of the aerodrome
- 3.5 discuss how/whether sea level rise predictions will be enhanced as a result of the proposed additional science to be associated with the proposed Davis Aerodrome
- 3.6 provide details of scientific advice supporting the need (or otherwise) for year-round access to East Antarctica
- 3.7 assess the likelihood of increased Antarctic science to be associated with the proposal, including likely new research proposals and funding sources, and discuss how proposed capabilities differ from or improve on what is already possible for scientists overwintering at Davis station

- 3.8 discuss how constructing the aerodrome could affect the long-term, ongoing monitoring programmes that are providing globally important data from weather observations, through tide gauges and ice measurements, to atmospheric measurements.

#### 4 RELEVANT IMPACTS

A description of all the relevant impacts of the action must be included. Relevant impacts are impacts that the action will have or is likely to have on the environment. The assessment must include consideration of which impacts are likely and justify any assessment that particular impacts are not likely. Impacts during both the construction, operational and (if relevant) the decommissioning phases of the project must be addressed, and the following information provided:

- justification for the studies undertaken to support the impact assessment, including detailing why additional studies were not necessary
- a detailed assessment of the nature and extent of the likely short-, medium- and long-term impacts of the proposed action
- a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible
- analysis of the significance of the relevant impacts
- any technical data and other information used or needed to make a detailed assessment of the relevant impacts.

A detailed assessment should be provided of any likely impact (including both direct and indirect impacts) that this project may facilitate. The assessment must address:

- 4.1 the ice-free areas in East Antarctica used for nesting by:
- Southern Giant Petrel (*Macronectes giganteus*) – Endangered, Marine, Migratory
  - Wilson's Storm Petrel (*Oceanites oceanicus*) – Marine, Migratory
  - South Polar Skua (*Catharacta maccormicki*) – Marine, Migratory
  - Adélie Penguin (*Pygoscelis adeliae*) – Marine
  - Cape Petrel (*Daption capense*) – Marine
  - Snow Petrel (*Pagodroma nivea*) – Marine
  - Antarctic Petrel (*Thalassoica antarctica*) – Marine
- 4.2 the breeding colony of the Southern Giant Petrel located on Hawker Island (Antarctic Specially Protected Area, ASPA 167) and their nesting habitat in relation to aircraft noise, wake turbulence and emissions from aircraft engines

- 4.3 the population of the Southern Giant Petrel in the Vestfold Hills and their nesting habitat from construction and operations
- 4.4 foraging habitat for the Southern Giant Petrel including in relation to potential disruption and displacement of the prey it relies upon. This should include the following:
- provide information on the known history of aviation and construction activities resulting in impacts on Antarctic Southern Giant Petrel populations
  - provide a review noting the internationally established need to protect Southern Giant Petrels from disturbance from aviation, as reflected in the designation of Hawker Island as an Antarctic Specially Protected Area (ASPA 167). This information should consider the existing restrictions on overflights of the island
  - details of all possible runway alignments, flight paths and type of aircraft, including proximity of the colony of Southern Giant Petrels on Hawker Island. The lowest required safe altitude and, vertical and lateral distance minimums for long haul jets and heavy aircraft such as C-17 and B787 Dreamliner and A330 should also be explained. These details should consider the technical and operational needs of the projects and the requirements of Airservices Australia and Civil Aviation Safety Authority, while avoiding the need to fly over or close to the colony
- 4.5 the population of the Wilson’s Storm Petrel in the proposed aerodrome site and their nesting habitat from construction, operations, aviation activities and earthworks including the use explosives, drilling and blasting, including:
- provision of mitigation measures including further studies to identify potential translocation sites. Following on from the studies, a management plan should be provided for Wilson’s Storm Petrel populations potentially impacted by the proposal, including ongoing monitoring and reporting of the population and measures to respond to changes.
- 4.6 breeding habitat of the Wilson’s Storm Petrel within the aerodrome site and adjacent to the coast at Adams Flat including confirming the number of nests that would be destroyed and timing of proposed activities. An assessment should consider the potential for cumulative impacts of the project on the population of Wilson’s Storm Petrel and habitat in conjunction with other existing and proposed projects in the area and also for the species continent-wide including from climate change impacts
- 4.7 population of the South Polar Skua in the proposed aerodrome site and their nesting habitat from construction and operations
- 4.8 Adélie Penguin rookeries located on Donskyie Islands from construction and operations including the flight path of aircraft approaching the runway,

aircraft noise, wake turbulence and emissions from jet engines. The assessment should consider that the rookeries located on Donskyie Islands have been designated an Important Bird Area for Adélie Penguin rookeries (IBA 133-unnamed island, and IBA134 - Warriner Island)

- 4.9 Adélie penguins that breed along the Vestfold Hills coastline and on 27 offshore islands from the Vestfold Hills, including Hawker Island, Kazak Island, Gardner Island, Magnetic Island and Tryne Islands. An assessment should consider:
  - disruption of adults can cause stress to individuals, energetically expensive diversions from the normal routes travelled between the ocean and nest sites, mass movements of frightened birds, egg abandonment, egg loss to predators, injury to adults and chicks.
- 4.10 Emperor Penguins transiting through the Vestfold Hills using moulting sites
- 4.11 the breeding colony of the Cape Petrel located on Hawker Island and their nesting habitat from aircraft noise, wake turbulence and emissions from jet engines
- 4.12 the population/s of the Snow Petrel in the Vestfold Hills and their nesting habitat in relation to potential impacts from construction, operations, aviation activities and earthworks including the use of explosives, drilling and blasting. This should include reference to studies or surveys to establish whether the Snow Petrel breeding occurs in the project area
- 4.13 consideration of fauna phenology (timing of life cycle events) in relation to the impact of the Davis Aerodrome Project. For example, Adélie Penguins moulting periods and susceptibility to disturbance during this period in particular, while in the Davis station region
- 4.14 aircraft approach and departure altitudes, the probable routes of contingency circles, and the magnitude of the noise to which wildlife will be exposed including details of noise modelling that has been undertaken and the type of aircraft considered when detailing separation distances of aircraft from wildlife
- 4.15 potential impacts relating to approaches and departures of large aircraft during the entire year based on the runway orientation
- 4.16 population of Southern Elephant Seals (*Mirounga leonina*) that moult at wallows at Davis station (Station Beach), Old Wallow and other wallows between Davis station and Law Cairn, in relation to potential impacts from construction of the wharf, ground operations, noise from aircraft, ingestion of waste materials and increased movement of people, cargo and equipment
- 4.17 known moulting site of Southern Elephant Seals including consideration of the species site fidelity and preventing access to the haul out locations, including potential for cumulative impacts of the project on the population of

Southern Elephant Seals and habitat in conjunction with other existing and proposed projects in the area

- 4.18 population of the Weddell Seals and breeding habitat located under proposed flight paths from aircraft noise emissions and visual stimulus provided by low-flying aircraft
- 4.19 important Weddell Seal habitat at Long and Tryne Fjords, immediately to the north-east of the proposed runway, and the potential for impacts from construction, operations, aviation activities and earthworks including the use explosives, drilling and blasting
- 4.20 the known habitat and populations of:
  - Fin Whale (*Balaenoptera physalus*) – Vulnerable, Migratory
  - Humpback Whale (*Megaptera novaeangliae*) – Vulnerable, Migratory
  - Sei Whale (*Balaenoptera borealis*) – Vulnerable, Migratory
  - Blue Whale (*Balaenoptera musculus*) – Endangered, Migratory
  - Southern Right Whale (*Eubalaena australis*) – Endangered, Migratory
  - Antarctic Minke Whale (*Balaenoptera bonaerensis*) – Migratory
  - Killer Whale (Orca) (*Orcinus orca*) – Migratory
  - any additional cetaceans detected during surveys or considered likely to occur
  - including consideration of:
    - anthropogenic noise resulting from construction of the wharf as well as industrial, shipping and aircraft operations
    - vessel strike and disturbance from the construction of coastal infrastructure
    - ingestion of waste generated by construction and operational activities such as offloading of cargo
    - the importance of the waters around Davis station, including the Australian Whale Sanctuary
  - provide an assessment of noise-generating activities based on a noise propagation model in the region and under the conditions in which the activity is taking place. The assessment should be undertaken in accordance with the *Conservation on Migratory Species' Guidelines on Environmental Impact Assessment for Marine Noise-generating Activities*, particularly using modules V and VII. This assessment should also include an understanding of the ambient or natural sound in the proposed area

- provide an assessment of the increased number of vessels using the waters adjacent to Davis Station and increased risk of vessel strike for cetaceans. This assessment should be undertaken in accordance with the *National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna*. This should include a description of data that has been/ will be collected to determine the risk of vessel strike, and details of how any vessel strike risk will be reduced
- 4.21 the effects of the proposed aerodrome on workers at Davis station, including:
- a description of the construction worker population
  - impacts to scientists at Davis during the construction period
  - any impacts to demand for, or availability of, community services or infrastructure
  - the direct or indirect impacts on the environment, including water supply, power supply, roads, waste disposal, and housing
  - effects on the health, safety, welfare or quality of life of the members of a community, through factors such as noise, odours, fumes, smoke, or other pollutants.
- 4.22 impacts of lights on wildlife, including seabirds from project operations and infrastructure, including but not limited to light from the ground-based augmentation system (GBAS) and Precision Approach Path Indicator (PAPI) and alternatives. This assessment should be completed in accordance with the National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds. This assessment must consider:
- avian phototaxis risk posed by bright lighting
  - impacts on low-light adapted plant life, terrestrial, lacustrine and marine
  - potential for bird strikes on the runway including associate with the use of aircraft landing lights
  - the potential for increased risks during the extended darker periods of the year
  - suitability of proposed mitigation measures for potential bird strike impacts.
- 4.23 vegetation in ice-free areas, particularly where the flora has the potential to be unique to the area and surrounds. This should include details of surveys to determine if the vegetation within the project footprint is distributed across the broader area. The assessment should outline the proposed response actions if unique vegetation is found specific to the impacted area

- 4.24 measures to be undertaken if new species are identified within the project area (that, for example, may be likely to be eligible for listing as a threatened species)
- 4.25 All species of lichens and mosses in the area, including any which may have been previously unrecorded. This assessment should include details of surveys to adequately characterise the flora of the region, detail what species will be disturbed and whether they are unique and/or rare
- 4.26 survey data for species including numbers of individuals, areas surveyed, survey effort and other relevant information. Survey reports should be attached or otherwise made available
- 4.27 the likely combined and cumulative impacts of this project, the Davis Stabilisation Project, and any other Davis station upgrade proposals on the biodiversity of the Vestfold Hills and associated coastal areas
- 4.28 the potential for impacts (e.g. relating to construction-related shipping) to the values of the proposed East Antarctic Marine Protected Area, including consideration of the likelihood of the Area being agreed and established before or during the construction or operation of the aerodrome
- 4.29 the impact to novel microbial communities recently identified at Adam's Flat and the potential for these communities to exist elsewhere within the Project area
- 4.30 consideration of biosecurity risks relating to the connections between all intercontinental and flights, relevant to the project
- 4.31 species impact assessments should include tables that compare relevant attributes for each species, such as the location/site under consideration, and includes both the global population and the percentage of the global population thought to reside at these locations
- 4.32 the microbial community and the meromictic lake ecological communities within the Project area
- 4.33 the lakes in the Vestfold Hills:
- contamination and change of lake chemistry and biology in lakes in the vicinity of the proposed runway, including but not limited to Weddell Lake, Camp Lake, Lake Dingle, Lake Stinear, Deep Lake and Club Lake from aviation fuels and combustion by-products of aviation fuels
  - impacts to the patterning and diversity of shapes and intensity of colouring, and other wilderness attributes of Halfway Lake
  - impacts to other flora and fauna of lakes.
- 4.34 risks to fjords and other receiving marine water quality and associated benthic ecosystems, including:

- impacts to diverse, long-lived, slow-growing cold water communities present offshore from Davis station
  - effects due to increased fresh water deposition into the marine environment off the station
  - effects due to dust and sedimentation from construction
  - effects from introduced chemical pollutants to the local marine environment from aviation fuels, emergency de-icing chemicals and firefighting chemicals positioned at the aerodrome, including detailed commentary on the likely effects of bioaccumulation and transfer to higher order organisms and environmental persistence
  - other contaminants from the construction and subsequent operation of this runway
  - the assessment should consider the contribution of the clarity of water in fjords to its aesthetic and wilderness values.
- 4.35 drainage of Camp Lake Valley, including intrusions necessary to provide access to the north-eastern approach lighting site. This assessment should consider the overflow of Camp Lake into Camp Lake Valley and consequences for the continued safe use of the intruding runway. The following should also be considered:
- assessment and modelling of run-off and sediment from the Camp Lake Valley into the marine environment over time. This assessment should include consideration of the evident increase in temperature and resultant melt water drainage from the cap, or Vestfold Hills snow cover and recent rapid melts in the Antarctic
  - provide an analysis, including reviewing previous studies, of potential impacts to the Camp Lake Valley hydrology. This analysis should also consider any associated potential biological impacts of the hydrological changes
  - consideration of the potential impacts to seabird and seal foraging habitat and populations in the area including through alterations to drainage patterns via Camp Lake Valley or the introduction of aerodrome related pollutants into West Bay.
- 4.36 the broader hydrology of the Vestfold Hills area, including ground and surface water resources
- 4.37 impacts to the marine environment and benthic communities from the construction of a wharf and changes to local hydrology, including any required dredging of the seabed alongside the reclaimed area to increase depth

- 4.38 clearly describe the application of any CCAMLR requirements to the marine environment aspects of the proposal, such as legislative requirements, and potential impacts on CCAMLR related management, conservation and research
- 4.39 impacts to life functions of marine mammals including foraging, mating, nursing, resting and migrating as a result of impaired hearing sensitivity, masked acoustic signals, behavioural responses, and physiological stress from underwater and pile driving related noise during construction of the new wharf
- 4.40 diverse, long-lived, slow-growing cold water communities present offshore from Davis station
- 4.41 risk of impacts to Antarctic biodiversity from non-native species, including comprehensive details about proposed biosecurity procedures and protocols
- 4.42 consideration of biosecurity risks during construction and operation particularly in relation to vessel movements including arrangements for the cargo and ballast
- 4.43 impacts to the integrity of the Vestfold Hills, in relation to the understanding of this region as an unparalleled and outstanding environment from a global perspective. Consideration should be given to the sensitivity, value and quality of the environment of this region.

The CEE must also include:

- 4.44 a cumulative impact assessment based on a recognised and comprehensive risk framework
- 4.45 a comprehensive hydrological and hydrogeological investigation of the project area and surrounds to understand current conditions, model likely impacts, and to act as a baseline for future monitoring. Initially this should include, as a minimum:
  - mapping to characterise present ground water and surface water flow pathways across the Project footprint
  - quantification of flow rates and flow rate change throughout the annual melt-cycle
  - characterisation of ground and surface water chemistry throughout the project area. This should include standard water chemistry parameters such as: pH, DO, redox, temp, EC, cations and anions as well as selected baseline analysis for potential chemical contaminants such as hydrocarbons, de-icing chemicals, per- and poly-fluoroalkyl substances (PFAS) and metals

- detailed quantitative modelling to illustrate how proposed earthworks will change both the quantity and quality of surface and ground water across the project area and surrounds
  - quantification of the sediment and nutrient reduction in drainage lines (surface hydrology) and the significance of this reduction to the ecosystem of West Bay. This should include assessment of any shallow groundwater systems including the 'groundwater' flow that occurs after soil warming.
- 4.46 detailed description of the uniqueness of the Vestfold Hills area (410 km<sup>2</sup>) in hosting more than 300 lakes ranging from ultra-freshwater through saline to hyper-saline, plus hundreds of other unique water bodies. This should include consideration of these values in relation to other areas, such as a comparison to the largest ice-free area in Antarctica, the McMurdo Dry Valleys Antarctic Specially Managed Area (ASMA; 15,000 km<sup>2</sup>), which hosts around 20 permanent lakes and ponds; and consideration of the exceptionality of these values (for example, that some of the lakes in the Vestfold Hills rank among the world's most saline)
- 4.47 an assessment should take into account the diversity of other (heterotrophic) flagellated protozoa, bacteria, viruses, metazoans and crustaceans when considering the diverse phytoplankton communities of the saline lakes. For example, consideration of factors such as that photosynthetic, flagellated protozoa in Vestfold Hills lakes (such as Ace Lake), have been shown to exhibit high levels of mixotrophy (mixing autotrophy/photosynthesis with heterotrophy/ingesting or absorbing food) when compared to similar species in lakes in other parts of the world
- 4.48 sufficient detail to understand the physical and biological attributes of Halfway Lake including assessment of the potential for unique physiological traits (cf. mixotrophy) of the organisms living in it
- 4.49 details of the intensification and expansion of the overall human footprint in Antarctica as a result of an increase in intercontinental flights and intracontinental flights as well as year-round aviation operations
- 4.50 A detailed description of Antarctica's coastal ice free areas, including the significance of the Vestfold Hills ice-free area in both an Antarctic and a global context. This should include consideration of the following attributes, and how impacts to these will be avoided or mitigated:
- an estimated 660,000 Adélie penguins – including tens of thousands nesting within 5-10 km of the proposed runway, and large populations of other seabirds
  - hundreds of saline and freshwater lakes – the continent's largest concentration and of worldwide scientific interest
  - the world's largest concentration of stratified lakes

- immense aesthetic value
  - a unique series of fjords
  - outstanding fossil fauna and rare geological features
  - the significance of the region's natural attributes in a global context, which may, for example, be considered to:
    - have superlative natural phenomena and areas of exceptional natural beauty and aesthetic importance
    - outstandingly represent a major stage in the earth's history, and display significant on-going geological processes in the development of landforms, and significant geomorphic and physiographic features
    - display significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals
    - contain important and significant natural habitats for in-situ conservation of biological diversity, including habitat containing threatened species.
- 4.51 consideration of the impacts of unexpected high winds and blizzards on stockpiled materials or construction activities. This should also include consideration of packaging and other plastics which can be swallowed by Antarctic wildlife, leach chemicals, and cause entanglement. In addition, consider the impact that material littering has on the environment and Antarctica's wilderness and aesthetic values
- 4.52 assessment of fresh water requirements not only to service the personnel and station requirements but also the runway construction. This should include consideration of whether the existing reverse osmosis plant can deliver the quantities of fresh water needed, and details of proposed locations where the extracted salt will be deposited
- 4.53 provide data on estimated annual emissions of greenhouse gases consistent with methodology under the *National Greenhouse and Energy Reporting Act 2007*, including but not limited to the *National Greenhouse and Energy Reporting (Measurement) Determination 2008*
- 4.54 a detailed, whole of project, sustainability and carbon emissions assessment. This should include specific accounts for carbon and other emissions expected over the full construction and operational lifespan of the project including facilitated and cumulative impacts as far as possible and appropriate, including, but not limited to consideration of:

- climate change related impacts to and from the project, and how these may interact with other impacts
  - the concrete production and transport
  - the inter- and intra- continental flights
  - the proposed support voyages
  - the machinery use
  - the cargo drops
  - the construction of the new wharf
  - diesel powered generators
  - the removal/disruption of permafrost and thus loss of its natural carbon sequestration
  - the impacts on biodiversity
  - potential loss of greenhouse gas sequestration by impacted ecosystems (marine, lake, terrestrial)
  - any proposed avoidance and/or mitigation measures.
- 4.55 impact of dust from construction and aerodrome operation on local albedo and any ramifications from increased snow melt and associated thawing of normally frozen soils
- 4.56 impacts of the proposed flight paths and any predicted alternative flight paths that may be used in the case of emergency or operational requirement
- 4.57 assessment of fauna behavioural responses to aircraft noise and movements. This should include an investigation and a detailed description of potential faunal behavioural responses plus details of the mitigation measures (including full cessation of aviation activities) that would be triggered by each observed behavioural response
- 4.58 detailed commitments to ongoing, long-term monitoring of faunal behaviour and population health prior to, during construction and during operation of the Davis Aerodrome, including to control for cumulative impacts on faunal populations and/or habituation to aviation activities
- 4.59 a comprehensive assessment of bedrock within the excavation footprint (including access road), to the depth of planned excavation, to determine the potential for acid rock drainage and leaching from disturbed substrate during the construction of the Davis Aerodrome Project and associated access roads and other infrastructure. Relevant Australian and international guidance should be considered for the assessment and classification of the rock as potentially acid forming (PAF) or non-acid forming (NAF). This

should include consideration of impacts on the terrestrial, marine and lake environments from the cumulative impacts of acid rock drainage and altered hydrology

- 4.60 consideration of dust creation and impacts on the health and well-being of wildlife and humans including dust generated by the earthworks establishing this infrastructure, and that from ongoing usage of the access road
- 4.61 an assessment of impacts related to pollution from aviation fuel combustion, the washing and cleaning of aircraft and airport service equipment, and the use of de-/anti-icing agents. This is to include a review of all viable de-/anti-icing agent alternatives with reference to their environmental risks. The proponent should commit to monitoring levels of pollutants emitted into the environment and measuring their toxicity on a continuous basis
- 4.62 a detailed presentation of the proposed fuel management system, including:
  - a complete description of all fuel storage and transfer facilities associated with the Project
  - the proposed measures and theoretical capacity for spill containment at all stages of the fuel storage and transfer system
  - a detailed explanation of the intended response measures in the event of an uncontained fuel spill
  - fate and transport modelling to identify the scale of environmental impacts from worst case fuel spill scenarios for those components of the system where complete containment is not possible
  - a proposed monitoring methodology to detect low rate persistent leaks.
- 4.63 specific details of how aviation rescue firefighting capability will be delivered at the aerodrome and across the fuel handling facilities at Davis station generally. This is to include a review of all viable alternatives with reference not only to their fire suppression performance but also their environmental risks. Specific details of the intended fire suppression system are to be provided, including the specific chemicals to be used and their expected impact on the receiving environment, human health and infrastructure. Any suppression system incorporating PFAS compounds, whether the compounds are currently banned under the Stockholm Convention of Persistent Organic Pollutants or not, must contain descriptions of:
  - how the material is to be transported to and from the aerodrome
  - intended chemical storage and equipment washdown systems
  - expected application volumes when deployed

- post deployment containment and clean-up methodologies
  - fate and transport modelling to provide a realistic understanding of the chemicals fate in the environment following deployment at various key locations along the runway.
- 4.64 detailed information on the proposed chemicals to be imported, stored, used, transported, and disposed of, and the proposed policies and procedures to limit chemical releases into the environment during the construction and operational phases of the project Any chemicals currently listed, proposed for listing or likely to be listed under the Stockholm Convention of Persistent Organic Pollutants must be clearly identified and their management explained in detail
- 4.65 detailed information should be provided on potential impacts associated with additional wastewater and solid waste, together with the proposed management strategies to address potential for chemical contamination of the environment
- 4.66 an assessment of site contamination be conducted to determine if there is existing contamination within or adjacent to the project area, particularly in areas subject to previous development and use. The assessment should be consistent with the requirements set out in the PFAS National Environmental Management Plan (HEPA 2018 and 2019) and the National Environment Protection (Assessment of Site Contamination) Measure 1999 (ASC NEPM)
- 4.67 a visual survey of the directly and indirectly impacted development areas of the seafloor, for example conducted using a Remotely Operated Vehicle. In addition to gathering relevant environmental data, such surveying should also ascertain if any cultural heritage material is present
- 4.68 information on any potential impacts to listed heritages places in Antarctic areas outside of the Vestfold Hills, such as whether or not there is any possibility of increased visitation facilitated by the operations of the project, impacting on the historic values of the Mawson's Huts Historic Site
- 4.69 reference to previous EPBC Act decisions, such as EPBC 2002/801 Antarctic Air Transport System, and status of compliance with these
- 4.70 review of environmental incidents and impacts as a result of past Australian Antarctic Program or associated activities which may be relevant to the proposal, such as biosecurity, contamination and disturbance incidents, and development of measures to prevent reoccurrence as a result of the project. This must also include:
- details of relevant standards, plans and training of personnel including environmental orientation; the strict biosecurity, environmental and behavioural protocols to be followed; and any penalties for non-compliance by personnel

- consideration of the potential for environmental risks to arise from broader organisational / systemic weaknesses, such as inadequate communication processes, resource or expertise constraints, or insufficient risk management systems.

## **5 AVOIDANCE, MITIGATION AND MEASURES TO ADDRESS RESIDUAL IMPACTS**

Information must include details of avoidance and mitigation measures to deal with the relevant impacts of the action. Specific and detailed descriptions of proposed measures must be provided and substantiated, based on best available practices.

This information must include a description of any residual impacts on the environment that are likely to occur as a result of the project in its entirety, after proposed avoidance and/or mitigation measures are taken into account. If applicable, this should include the reasons why avoidance or mitigation of impacts cannot be reasonably achieved.

The following elements should be included:

- 5.1 the criteria and definition of a precautionary approach as applied to this proposal
- 5.2 details for the project scope and alternatives considered to reduce potential environmental impact associated with the project activities
- 5.3 details of a long-term environmental monitoring program to assess the effectiveness of the implemented mitigation measures with an adaptive management framework
- 5.4 specific commitments to monitor irreversible impacts, such as levelling of rocky ridges and hills and disruption of wildlife, including description of how this would enable mitigation measures to be revised and refined over the course of the project and into the operation
- 5.5 consideration of proposed activities that may not be able to be avoided or mitigated, for example increased disturbance of the seafloor through anchor chains over a period of several years
- 5.6 the process and protocols in the event of locating potential heritage items
- 5.7 mitigation of science program impacts, in particular how core science programs at Davis Station will be maintained during the project, and any implications for science projects that may be undertaken at Mawson or Casey stations
- 5.8 demonstrate how waste such as plastics that may increase as a direct or indirect result of the project, will be managed to avoid wildlife ingestion impacts

- 5.9 plans for monitoring potential noise disturbance to Southern Giant Petrel colony undertaken prior to commencing work on the runway with criteria for enactment of mitigation measures
- 5.10 explanation of how management of environmental impacts would be consistent with Antarctic Treaty system principles and agreements
- 5.11 details of dust management practices including likely effectiveness, and any likely indirect impacts of dust management activities e.g. use of chemicals
- 5.12 the methods that will be used to clear the area of wildlife ahead of construction activities such as blasting and operations including aircraft arrivals and departures
- 5.13 assessment of how contamination will be prevented, managed, and remediated to determine risks to the environment from moving or remobilizing any existing contamination, or from any potential new contaminating activities
- 5.14 details of any proposed monitoring programs including the ability of these systems to identify and address impacts (including details of thresholds, trigger points and responses, which values will be monitored and managed, any need for operational shutdowns, long term responsibilities and resourcing, and relationships with other relevant Australian Antarctic Program research and operating procedures)
- 5.15 where Australian Antarctic Program environmental management and monitoring systems are presented as a central means of mitigating impacts, provide details on these may need to be amended or supplemented to address any limitations in current Australian Antarctic Program environmental management and monitoring. This information should give consideration to the significantly greater scale of monitoring and management that may be required in relation to the impacts of this project, compared to existing activities and conditions
- 5.16 details of which impacts are likely to require compensatory measures, and commitments regarding when these would be undertaken in relation to the timing of the commencement of the project.

## 6 FACILITATED IMPACTS OF THE ACTION

The entire scope of the action should be described in detail. This should include consideration of all facilitated activities, such as tourism, use by other nations/third parties or other commercial activities. The proponent should consider the full operational lifespan of the project, the duration of the approval that is sought, all impacts of this activity and the need for such activities to be subject to assessment and public consultation.

Include assessment of:

- 6.1 the expected total number of aircraft movements (landings and take offs by Australian and other foreign nations), passengers and types of aircraft inbound at the aerodrome, including from other nations
- 6.2 the potential impacts associated with the increased human activity on the Vestfold Hills and wider region, including the potential impacts of increased wildlife disturbance (noise and proximity), increased pollution from the increased number of people utilising the station and scientists transiting to other stations (human waste, carbon emissions, grey water, fuel), increasing physical impacts (trampling) and introduction of non-native species
- 6.3 any potential for tourism or private use to occur in relation to the proposal, and if so, an assessment of its direct and indirect/ facilitated environmental impacts, including how this would interact with existing environmental pressures
- 6.4 the potential for the proposal to facilitate increased science or logistics activities by other nations in East Antarctica, and associated additional environmental impacts. For example, the extent to which the aerodrome would increase the likelihood of other nations building new and/or similar facilities in the region
- 6.5 any other potential, foreseeable outcomes of creating year round aviation access into Antarctica, and the associated cumulative and facilitated environmental impacts of these outcomes.