

Project Plan – sea ice

1. **Name and details of the Principal Participants:**

Principal Participants are the Parties to the Formal Collaboration Agreement, including the Collaboration Delegate. They provide the core Antarctic science capability to deliver on the objectives of this agreement. They are directly involved in the AAPP governance including funding and resource allocation decisions to implement the collaborative Antarctic research partnership. Principal Participants are expected to collectively contribute significant cash and/or in-kind support for AAPP activities. The Principal Participants for this Project are:

The Commonwealth of Australia represented by the Australian Antarctic Division, a Division of the Department of the Environment and Energy (ABN 34 190 894 983), 203 Channel Highway, Kingston, TAS 7050 (“AAD”)

The Commonwealth of Australia represented by the Bureau of Meteorology (ABN 92 637 533 532), Head Office Melbourne, GPO Box 1289, Melbourne VIC 3001 (“BoM”)

Commonwealth Scientific and Industrial Research Organisation (ABN 41 687 119 230), Castray Esplanade, Battery Point, TAS 7004 (“CSIRO”)

University of Tasmania (ABN 30 764 374 782), Private Bag 3, Hobart, TAS 7001 (“UTAS”)

2. **Names of the Associate Participants:**

Associate Participants provide additional niche and specialist capability to implement the AAPP activities. Through contribution of their additional capability, they provide cash and/or in-kind support to the AAPP. In some instances, they may receive AAPP funds. Where this is the case, they will be required to sign an Associate Participant Agreement including Project Terms, the form of which will be endorsed by the Management Committee, prior to being entered into by the Associate Participant and Collaboration Delegate (at the direction of the Principal Participants). The Associate Participants for this Project are:

Geoscience Australia (ABN 80 091 799 039) (“GA”)

Department of State Growth (ABN 36 388 980 563)

Integrated Marine Observing System (ABN 30 764 374 782) (“IMOS”)

3. **Project Commencement Date:**

01/07/2019

4. **Project Completion Date:**

30/06/2029

5. Project Leader's name and contact details:

Project Leaders: Klaus Meiners (AAD) and Alex Fraser (UTAS)

Klaus Meiners:

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203 Channel Highway, Kingston, TAS 7050
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University of Tasmania
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6. Project Funds required:

Total funds required for the Sea Ice project is \$4,607,224 as per ANNEX 1.

A summary of eligible expenditure by projects for the life of the AAPP is provided in ANNEX 2 with the CSIRO payment schedule listed in ANNEX 3.

7. Other Contributions required:

In-kind staff contributions (FTY/y):

UTAS: Delphine Lannuzel (0.05), Stuart Corney (0.05), new appointments (0.3)

AAD: Petra Heil (0.6), Sean Chua (0.6), Rob Massom (0.6) and Klaus Meiners (0.3)

BoM: Phil Reid (0.4) (and 1-2 in-kind FTE with approval of BoM Antarctic plans)

8. Justification for the Project Funds requested:

Salaries (\$3,854,738):

- **Postdoctoral Research Associate — Sea-Ice Remote Sensing [8.0FTE].** Key role in analysis of change/variability in fast-ice extent, marginal ice zone characteristics and wave/sea-ice interaction, sea-ice seasonality, coastal/cross-cryosphere interactions, sea-ice and snow-cover thickness. Algorithm development and refinement.
- **Postdoctoral Research Associate — Sea-Ice Biogeochemical Modeller [4.0FTE].** To play a key role in analysis and synthesis of observations, using a biogeochemical sea-ice model to identify the key physical and biogeochemical drivers of ice algal biomass evolution in Antarctic sea ice (including fast ice). This position will also work closely with the biogeochemistry program of Theme 2.
- **Postdoctoral Research Associate – Sea Ice Quantitative Biogeochemist [4.0FTE].** To synthesize field observations (from the MIZ Study), using biogeochemical sea-ice model outputs and remote sensing products to identify the key physical and biogeochemical drivers of ice-associated primary production (ice algae and phytoplankton) and the associated production of

climate-active gases. This position will also work closely with the biogeochemistry program of Theme 2.

- **Postdoctoral Research Associate — Sea-Ice/Ocean Interaction Scientist** [4.0FTE]. Key Theme 3 role in investigating the role of the Southern Ocean in sea-ice change, and feedbacks; the detection and attribution of Antarctic sea-ice change (including coastal fast ice); improving sea ice/ocean biases in climate models; and the role of sea ice in modulating ocean/ice-shelf interaction processes. This position will also work closely with oceanography streams of Themes 1 and 2.
- **Postdoctoral Research Associate – Sea Ice in the Ocean-Atmosphere System Scientist** [4.0FTE]. Investigate variability and trend in observed and simulated Antarctic sea-ice extent and thickness (volume) [focus on recent 1.5 decades] to identify drivers and connections into mid- and low latitudes. Identify key variables to explore different sea-ice zones, focusing on data obtained during the MIZ Study. This position will work closely with the atmosphere and oceans projects of themes 1 and 2.

Research Operating (\$752,486):

\$547,486 will be used towards high performance computing and storage. \$60,000 will cover duty at Sea allowances payable under relevant EBAs. \$120,000 is needed over the lifetime of the project for sea-ice sample analysis (physics, oxygen isotopes, nutrients, iron). \$25,000 is needed for field consumables.

9. How the proposed work aligns to the scientific plans of AAPP:

The overall objective of Theme 3 is to integrate research on (East) Antarctic sea ice and krill-based ecosystems in order to: (1) identify mechanisms driving observed change and variability in the Antarctic sea-ice environment; and 2) explore the likely nature of future sea-ice change and its physical and ecological effects. Within Theme 3, Project 6 will provide the current status of sea-ice characteristics and its interactions within the ocean-ice-atmosphere-biogeochemistry-ecology system as a timestamp along a trajectory of change. Together with research results from Project 7 on Krill & Ecosystems, information from Project 6 will be used to assess the impact of changes within the sea-ice--ocean environment (e.g., sea-ice loss, warming, acidification, iron supply) on the structure, functioning and productivity of Southern Ocean ecosystems, ranging from the base of the food web (ice algae and phytoplankton) up to krill. Project 6 also informs and links into AAPP projects: (i) 1 Atmosphere; (ii) 3 Ice Shelves (i.e., sea-ice/ice-shelf processes); (iii) 4 Oceanography (i.e., ocean-ice processes in a changing climate); and (iv) 5 Biogeochemistry (impact of changing sea ice on biogeochemical processes).

10. Project Objectives and Outcomes:

The key science questions for this project are:

- How and why is the Antarctic sea-ice environment changing (especially the East Antarctic), how and why will it change in the future, and what are the local and global impacts of that change?

- Where within the Antarctic sea-ice system are the most important changes, both horizontally (i.e., Marginal Ice Zone [MIZ], polynyas) and vertically (e.g., snow cover)?
- How do sea-ice processes and change interact with and affect Southern Ocean water masses, waves, and the (East) Antarctic coastal system (including ice shelves)?
- What are the effects of sea-ice change on primary productivity and biogeochemical processes in the Southern Ocean?

Activities and deliverables

Years 1 and 2:

- Design and conduct field program at a coastal East Antarctic station - coupled fast ice physics-biology-biogeochemistry seasonal measurements (AAS #4546; Note: 2yrs + delay due to COVID19). [P1, P5, P7] (Field work postponed to Yr4.)
- Complementary to this, use historic physical, biological and biogeochemical [BGC] data to develop a biogeochemical component for a state-of-the-art 1D sea-ice model as means of identifying the drivers of primary productivity in and below sea ice - in order to investigate how ecosystem's processes may change under future scenarios. [P5]
- Characterise krill under-ice habitat quality in the pack-ice zone using existing observations and models. [P5, P7]
- Seek resourcing for sustained long-term sea-ice monitoring by developing a satellite-data analysis system, to be integrated with autonomous instrumentation (including instrumentation for the new icebreaker) to characterise the sea ice. [P1]
- Develop/refine strategies for future marine-science voyages, including analysing historic observations and output from numerical models to guide fieldwork.
- Carry out an initial assessment of the role of the Southern Ocean in Antarctic sea-ice change and variability using climate and ocean-sea ice models. [P1, P3, P4]
- High-quality publications delivering against key research questions.

Years 3 to 4:

- Conduct field program on East Antarctic fast ice (originally planned for Yr 2). [P5]
 - Characterise krill under-ice habitat quality in the pack-ice zone using existing observations and models. [P5, P7]
 - Implement biogeochemical parameters in a 1D sea-ice physics model as means of identifying critical links in the coupled physical-biological sea-ice system and how these may be affected in a changing environment. [P5]
 - Explore satellite-derived climatological patterns of coastal Antarctic fast ice using atmospheric reanalysis to identify the determinants (with view to investigate the drivers) of observed change and variability since 2000. [P1]
 - Conduct a multi-variable analysis using observations and numerical simulation to identify the processes driving observed sea-ice change (extent, concentration, advance, retreat and duration) across Antarctica. [P1, P3, P4, P5, P7]
- Subject to approval by partner agency [BoM] and their funding, the AAPP partner agency implement a numerical weather prediction model suitable for the AAPP

marginal sea-ice zone [MIZ] field work in year 5, with AAPP scientists providing advise as required on the implementation for MIZ.

Years 5 to 6:

- Conduct a cross-disciplinary research cruise to the East Antarctic MIZ focussing on sea-ice physical processes, ocean processes, sea-ice and marine biogeochemistry, air-sea-ice interactions and food-web dynamics. (Intended for Sep-Nov 2023) [P1, P3, P4, P5, P7]
- Partner agency (BoM; subject to funding approval) to complete numerical weather forecasts of the East Antarctic region for the period before, during and after the MIZ experiment and provide these forecasts and analyses to AAPP staff.
- Investigate sea ice-ice sheet linkages around the East Antarctic coast, including the effects of sea ice on iceberg calving - through analysis of satellite data combined with modelling and *in situ* observations acquired by P3 and P4. [P3, P4]
- Use numerical models and analyses of year-round *in situ* observations (i.e., from mass-balance units), aerial and satellite data to quantify the relative contributions of thermodynamic, kinematic and advective processes to sea-ice and snow thickness to explore the oceanic and atmospheric contributions to changes in sea-ice volume. [P1, P4]
- High-quality publications delivering against key research questions.
- Contribute to regular public engagement through social, broadcast and print media and educational outreach.

Years 7 to 8:

- Conduct a multi-disciplinary sea-ice drift experiment to characterise the East Antarctic ocean-ice-atmosphere-biogeochemistry-ecology system and its evolution in space and time. Possible multi-nation and multi-ship campaign to capture seasonal change. Tie in with modelling/forecasting and satellite studies (including satellite data calibration and validation, e.g., for sea-ice and snow thickness). [P1, P3, P4, P5, P7]
- Analyse new gap-filling time series information from shipborne instruments on key sea-ice variables and processes (floe-size distribution, ice and snow thickness, ice-algae distribution, wave-ice interaction etc.) from multiple seasons and years, and their variation across the (East) Antarctic sea-ice zone (repeat transects) - in concert with meteorological, hydrographic and satellite data. [P1, P4]
- Continue multi-variable analysis using new observations and updated numerical simulation including focus on Antarctic fast-ice, polynya and BGC processes. [P1, P3, P4, P5, P7]
- High-quality publications delivering against key research questions.
- Continue to contribute to regular public engagement through social, broadcast and print media and educational outreach.

Years 9 to10:

- Conduct a cross-disciplinary research cruise to the East Antarctic interior pack focussing on sea-ice physical processes, ocean processes, sea-ice and marine biogeochemistry, air-sea-ice interactions and food-web dynamics. [P1, P3, P4, P5, P7]

- Synthesise project findings on the nature and drivers of change and variability in the East Antarctic sea-ice zone (including the role of the Southern Ocean) - to improve model predictions of future sea-ice change and its impacts on marine ecosystems, ice shelves and climate. [P1, P3, P4, P5, P7]
- Synthesise findings for a non-technical audience (e.g., a Position Statement) to communicate how change in Antarctic sea ice will influence regional and global climate, biogeochemical cycles, marine ecosystems (including krill, its food sources and predators), and the stability of the East Antarctic Ice Sheet coastal margins. This will further highlight key points of leverage for future research investment, policy development and management measures. [P1, P3, P4, P5, P7]
- High-quality publications delivering against key research questions.
- Continue to contribute to regular public engagement through social, broadcast and print media and educational outreach.

11. Brief review of the science and intellectual property background, including Background IP and any relevant third-party IP:

- Numerical models, algorithms, parameters and associated code.
- Satellite-derived reanalyses, modelled and new observational data.
- Methods and data derived during the investigation of sea-ice variability and change.
- Sensor technique and instrument IP, including for autonomous instrumentation (i.e., RSV Nuyina, ROV/AUV technology)

Project participants acknowledge and agree that all project IP forms part of AAPP IP and will be owned and licensed in accordance with the Formal Collaborative Agreement as is outlined in the Project Terms (ANNEX 4).

12. Proposed methodology:

Focus of Years 1 to 2

(NB: no AAD logistics available in first two years):

- Use a combination of model output and observational data for an initial assessment of the role of the Southern Ocean in driving variability and change in sea-ice coverage, including recent climate variability events. [P1, P4]
- Implement a biogeochemical module into a 1D sea-ice physical model and test model performance against historical data collected from landfast sea ice. [P5]
- Use a combination of satellite observations, model output and meteorological data to assess the nature and drivers of change and variability in circum-Antarctic coastal fast ice coverage since 2000. [P1, P4]

Focus of Years 3 to 4

- Conduct coupled fast ice physics-biology-biogeochemistry seasonal measurements at Antarctic coastal location (AAS #4546) including sample and data analyses, and write up.
- Derive spatio-temporal variability of pack-ice and fast-ice characteristics using relevant satellite imagery and auxiliary data to derive, identify, test and verify multi-variable algorithms for satellite sensors.

- Use existing observational data and model output to characterize and quantify under-ice habitat quality for Antarctic krill
- Synthesize project findings from the first 2 years and communicate to the climate modelling community. [P1, P3, P4, P5, P7]

Focus of Years 5 to 6

- Conduct a multi-disciplinary sea-ice field campaign to collect *in situ* data on the coupled system to characterise the ocean-ice-atmosphere-biology-biogeochemistry system:
 - Assess key processes driving MIZ conditions, how these relate to algae blooms as well as to habitat of krill, fish and higher trophic species through research collaborations. (Yr5) [P1, P3, P4, P5, P7]
- Use a combination of underway observations, automated *in situ* sensors and remote-sensing products to investigate characteristics of the MIZ and sea-ice/wave interaction processes. [P1, P4]
- Combine remote sensing products, underway data and results from field experiments to investigate the effects of emerging sea-ice characteristics on primary producers (ice algae, phytoplankton) and pelagic herbivores. [P5, P7]

Focus of years 7-8

- Carry out a second and third multi-disciplinary sea-ice field campaign to collect *in situ* information of the coupled system to characterise the ocean-ice-atmosphere-biology-biogeochemistry system:
 - Identify near-coastal processes at the sea-ice/ice-sheet margin including polynyas driving the physical system and impacts on the embedded ecosystems. (Yr7) [P1, P3, P4, P5, P7]
 - Full zonal transect to assess the role of the MIZ in driving seasonal East Antarctic sea-ice advance and retreat extent and phytoplankton blooms, and as a habitat for krill, fish and higher species. This activity is likely to require a multi-ship and multi-nation collaboration. (Yr9) [P1, P3, P4, P5, P7]
- Use satellite and other remote sensing data combined with AAPP oceanographic and atmospheric data and modelling to investigate coastal cryosphere interactions. [P1, P3 P4]
- Synthesise and publish advances in the first five years regarding processes driving East Antarctic sea-ice variability and trends. [P1, P3, P7]
- Undertake analysis of ocean and sea-ice processes using a combination of observational data and model output.

Focus of Years 9 to 10

- Publish Position Statements and review articles assessing how change in Antarctic sea ice influences regional and global climate [P1, P4], biogeochemical cycles [P5], marine ecosystems (including krill, its food sources and predators) [P7], and the stability of (East) Antarctic ice shelves [P3, P4].

Planned field work:

Years 1-2 (no AAD logistics available in first two years):

- Mawson (or Davis) integrated fast-ice physical and biological process study (AAS #4546) – deferred due to COVID-19.
- Davis spring 2020 (AAS #4496) Airborne sea-ice thickness assessment – deferred due to COVID-19.

Years 3 to 4:

- Oct-Nov 2022 [TBC]: Davis integrated fast-ice physical and biological process study (AAA4546); autonomous instruments deployed the previous autumn. [P4, P5, P7]
- Sep-Nov 2021 [TBC]: Davis Airborne sea-ice thickness assessment (AAS4496). Or Scott Base in Oct 2021 and Davis Sep-Nov 2022 – TBC. [P1, P4]
- Continued operation of multi-disciplinary fast-ice observatories (AAS4506). [P1, P4]

Years 5 to 6:

- Sep-Nov 2023 [*RSV Nuyina*; planned]: East Antarctic MIZ voyage focussing on sea-ice physics, biogeochemistry, air-sea-ice interaction processes and food-web dynamics.
- Jan – Mar 2024 DEFIANT participation (AAS 4635, 2 berths for AAD on RSS Sir David Attenborough).
- Pending AAPP negotiations with AAP (AAD SP&C) about logistics support. Jan - Mar 2025, Summer Weddell Outflow Study (RV Polarstern, 2 berths for AAPP)

Years 7 to 8:

- Continued operation of multi-disciplinary fast-ice observatories (AAS4506). [P1, P4]
- Aug-Dec 2025 [*RSV Nuyina plus OTHER*; planned] Trans-disciplinary sea-ice drift experiment focussing on investigating processes contributing to changes in sea-ice volume and to characterise the ocean-ice-atmosphere-biogeochemistry-ecology system and its evolution in space and time. Plan for a multi-nation and multi-ship campaign to capture seasonal change. – To be negotiated with AAP and proposed internationally.
- Apr – Jun and Sep – Dec 2028 [*RSV Nuyina plus OTHER*; planned] Characterisation of the outer (MIZ) ocean-ice-atmosphere-biogeochemistry-ecology system encapsulating sea-ice advance (autumn) and retreat (spring) – via an international multi-ship/multi-platform approach. – To be negotiated with AAP and proposed internationally.

13. Milestones, tasks, any proposed stop/go milestones in relation to deployment and (as applicable) recovery / maintenance of equipment:

Annual Milestones include:

- completion of the field programs listed in section 12
- research outputs from this work
- integration of outputs through synthesis and modelling

Milestones will be established in project proposals and voyage/activity specific workplans, which will include stop/go progress assessments to inform adaptive project management.

All partners recognise that logistical arrangements are not the responsibility of a single agency and if any requests set out in this project plan indicate that logistical support will be provided by one or more partners, such logistical support requires administrative processes and approvals by the host agency. It is the responsibility of the Chief Investigators to ensure logistical arrangements are in place to deliver their research projects, including through applications to the AAS, MNF and international collaborators. The partners acknowledge that this plan is not directive and does not override the host agencies' decision regarding provision, or not, of logistical support.

14. Deliverables, in relation to availability of near-real-time and delayed mode data (as applicable); plus quality controlled data delivery:

Data for physical sea-ice characterisation from direct and indirect measurements

- Quality-assessed underway, *in situ* and related data will be made public within 18-24 months of acquisition via the appropriate data sites [e.g., IceBox, AADC]. Data DOI's as relevant.
- Data and/or information derived from autonomous instrumentation, remote-sensing datasets and assessments will be disseminated through the appropriate data centres, including the AADC. Data DOI's as relevant.
- Algorithms and associated data used to derive sea-ice variables such as coastal exposure will be made available in conjunction with relevant publications. Data DOI's as relevant.
- Biological and biogeochemical data will be available through the AADC (within 24 months of sample collection). Data DOI's as relevant.

Numerical simulations

- The global ocean model ACCESS-OM2 is developed as part of COSIMA model-development effort [Heil is PI, Hobbs is CI]. Close collaboration with COSIMA for numerical experiments and consequent analysis.
- Sea-ice BGC module within ACCESS-OM2 or in standalone sea-ice model, i.e., LIM1D [Wongpan].

15. Risk analysis and how identified risks will be managed:

A risk register has been set up to track project risks. Risks have been analysed to identify the qualitative and quantitative impact of the risks on the project so that appropriate steps can be taken to mitigate them. The risk register is reviewed at least annually with the 'live' risk register located on the [AAPP Teams site](#).

16. Relevance and benefits, including alignment to the Australian Antarctic Strategy and 20 Year Action Plan explaining what will be provided to end-users and how they will benefit from the outcomes derived from the AAPP Project:

The AAPP research strategy directly addresses key science questions identified in the *Australian Antarctic Strategy and 20 Year Action Plan*:

Stream 1.2: Oceans and marine ice in the Southern Hemisphere

AAPP P6 will contribute data, analysis and synthesis to address the stream goal of understanding the regional scale change of the (East) Antarctic physical sea-ice system. This includes evaluation of simulations from coupled ocean-sea ice models, *in situ* observations and remotely-sensed data to explore the variability in pack-ice and fast-ice extent, and changes in ice concentration and volume. Our aim is to increase process knowledge and to provide credible new information to improve numerical parameterisations for forecasting and climate simulations.

Stream 3.1: Marine ecosystem change

The AAPP will contribute to this stream by combining field observations, laboratory studies and remote sensing to assess the likely response of krill and other components of the marine ecosystem to environmental change, including sea-ice change, warming, acidification, and changes in the supply of essential trace elements as a result of changes in ocean circulation and stratification and changes in the cryosphere.

The partners acknowledge a new Australian Antarctic Strategy and 20 Year Action Plan was released in 2022. Consistent with section 5.1 of the Formal Collaborative Agreement the AAPP seeks to enable science under the Australian Antarctic Strategy and 20 Year Action Plan. Upon release of the Strategy and Action Plan, the AAPP management committee will review alignment with the updated Strategy and Action Plan and advise researchers across all partner agencies of any inconsistencies, and the implications of any inconsistencies, between this plan and the Strategy and Action Plan.

17. Special Conditions:

No variation to the project terms as per ANNEX 4.

ACKNOWLEDGEMENT

The Project Participants acknowledge and agree that, subject to the approval of the project as an AAPP Project, they will participate in and contribute to the AAPP Project under the leadership of the Principal Participants in accordance with this Project Plan and Project Terms.

Signed *University of Tasmania* by an authorised officer

Signature of officer

Name of officer

Office held

Signed *Commonwealth of Australia represented by the Bureau of Meteorology* by an authorised officer

Signature of officer

Name of officer

Office held

Signed *Commonwealth of Australia represented by the Australian Antarctic Division* by an authorised officer

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Signed *Commonwealth of Australia represented by Geoscience Australia* by an authorised officer

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Office held

Signed *Integrated Marine Observing System* by an authorised officer

Signature of officer

Name of officer

Office held

Signed *Department of State Growth* by an authorised officer

Signature of officer

Name of officer

Office held

The Program Leader acknowledges and agrees that this project has been approved as an AAPP Project by the Management Committee.

Program Leader at the direction of the Management Committee

Signature of Program Leader

Name of Program Leader

Collaboration Delegate

Signature of Collaboration Delegate

Name of Collaboration Delegate

ANNEX 1: PROJECT BUDGET

14 October 2020 variation – revised as per Management Committee approval dated 14 October 2020.

Summary of variation(s):

- No budgetary change for this project
- Sea Ice 'Plant and Equipment' budget item of \$25,000 moved to 'Research Operating – Field consumables' budget item

5 May 2021 variation – revised as per Management Committee approval dated 5 May 2021.

Summary of variation(s):

1. Application budget versus revised budget.

4 May 2022 variation – revised as per Management Committee approval dated 4 May 2022.

Summary of variation(s):

1. 'Labour' salaries updated to reflect extensions and promotions (across all Projects).
2. Move of Year 2 unspent funds to Year 3 (Projects impacted are: Ice Cores; Ice Shelves; and Sea Ice)

ELIGIBLE EXPENDITURE	FTE* Years	Year 1	Year 1	Year 2	Year 2	Year 3	Year 3	Year 4	Year 4	Year 5	Year 5	Year 6	Year 6	Year 7	Year 7	Year 8	Year 8	Year 9	Year 9	Year 10	Year 10	TOTAL	TOTAL		
		Application Budget	Actuals	Application Budget	Actuals	Application Budget	Revised Budget	Application Budget	Revised Budget	Application Budget	Revised Budget	Application Budget	Revised Budget	Application Budget	Revised Budget	Application Budget	Revised Budget	Application Budget	Revised Budget	Application Budget	Revised Budget	Application Budget	Revised Budget	Application Budget	Revised Budget
		2019/20		2020/21		2021/22		2022/23		2023/24		2024/25		2025/26		2026/27		2027/28		2028/29					
Labour																									
Research Associate — Sea Ice Remote Sensing	8.00	74,357	- 32,763	151,688	- 136,004	154,722	- 160,877	157,816	- 168,746	160,972	- 176,869	164,192	- 185,239	167,476	- 193,833	170,825	- 201,717	87,121	- 154,313				1,289,167	- 1,410,411	
Research Associate — Sea Ice Biogeochemical Modeller	4.00	148,714		151,688	- 119,536	154,722	- 142,515	157,816	- 150,067	160,972	- 144,665	164,192		167,476		170,825								1,276,403	- 556,783
Research Associate - Sea Ice Quantitative Biogeochemist	4.00												- 164,192		- 167,476		- 170,825		- 174,242						- 676,734
Research Associate — Sea Ice-Ocean Modelling	4.25	74,357	- 77,535	151,688	- 157,367	154,722	- 170,001	157,816	- 178,046	160,972	- 139,766	164,192		167,476		170,825		87,121						1,289,167	- 722,715
Research Associate - Sea Ice (coupled with ocean and atmosphere) Numerical Analyst	3.75												- 164,192		- 167,476		- 170,825		- 130,681						- 633,174
Total	24.00	297,427	- 110,298	455,063	- 412,907	464,165	- 473,393	473,448	- 496,859	482,917	- 461,300	492,575	- 513,622	502,427	- 528,834	512,475	- 543,367	174,242	- 459,236	-	-	-	3,854,738	- 3,999,816	
Plant and Equipment																									
Trace metal sea ice corer				5,000		5,000	0	5,000		5,000		5,000												25,000	-
<i>As approved by MC 14/10/20</i>				- 5,000		- 5,000		- 5,000		- 5,000		- 5,000													-
Total		-	-	5,000	-	5,000	-	5,000	-	5,000	-	5,000	-	-	-	-	-	-	-	-	-	-	25,000	-	
Research Operating																									
High performance computing and storage		50,000	-	51,000	- 24,125	52,020	- 78,895	53,060	- 53,060	54,122	- 54,122	55,204	- 55,204	56,308	- 56,308	57,434	- 57,434	58,583	- 58,583	59,755	- 59,755			547,486	- 497,486
<i>Carry forward as approved by MC 14/10/20 - TEMPO (see P7)</i>																									
Duty at Sea allowances payable under relevant EBAs								20,000	- 20,000			20,000	- 20,000			20,000	- 20,000							60,000	- 60,000
Sea ice sample analysis (physics, oxygen isotopes, nutrients, iron, etc)								40,000	- 40,000			40,000	- 40,000			40,000	- 40,000							120,000	- 120,000
Field consumables (from Plant & Equipment 'Trace metal sea ice corer' - approved by MC 14 Oct 2020)					- 4,552		- 5,448		- 5,000		- 5,000		- 5,000												-
Total		50,000	-	51,000	- 28,677	52,020	- 84,343	113,060	- 118,060	54,122	- 59,122	115,204	- 120,204	56,308	- 56,308	117,434	- 117,434	58,583	- 58,583	59,755	- 59,755	-	-	727,486	- 702,486
Total		347,427	- 110,298	508,563	- 441,584	518,685	- 557,736	589,008	- 614,919	539,538	- 520,422	610,279	- 633,826	558,735	- 585,142	629,909	- 660,801	232,825	- 517,819	59,755	- 59,755	-	4,607,224	- 4,702,302	

ANNEX 2: EXPENDITURE SUMMARY

A summary of eligible expenditure by projects.

14 October 2020 variation – revised as per Management Committee approval dated 14 October 2020.

Summary of variation(s):

1. Biogeochemistry ‘Research Operating’ budget item addition of \$10,000 per year from year 2 to year 10, total \$90,000 (note that this is matched by CSIRO)
2. Ice Shelves ‘Research Operating’ budget items reallocated with no change in total research operating funds (see Project Plan – Ice Shelves Annex 1)
3. Sea Ice ‘Plant and Equipment’ budget item of \$25,000 moved to ‘Research Operating’ budget item
4. Ice Cores ‘Labour – Research’ co-investment in CSIRO scientists reduced as the Palaeo-Atmospheric Composition was approved in August 2019 as a UTAS position with 50% co-investment from CSIRO. New budget line item ‘Research Associate – Palaeo-atmos composition’ created reflecting this change including correcting FTE
5. Ice Cores ‘Research Operating’ wording changed to reflect clause 8
6. Krill and ecosystems ‘Research Operating’ wording changed to reflect clause 8 (note that the funds for activities on the 20/21 SOLACE (\$25,000) and TEMPO (\$161,000) voyages were funded from year 1 (19/20) carry forward from this project and other projects, and the science management project.
7. Administration budget item reduced by \$10,000 per year from year 2 to year 10, total \$90,000 to fund Biogeochemistry ‘Research Operating’ (see point 1 above)
8. Other Eligible Expenditure ‘Leased High Perf Laptops Replaced ~ 3 yrs’ revised to ‘Software/Licensing’ with no change in budget

5 May 2021 variation – revised as per Management Committee approval dated 5 May 2021.

Summary of variation(s):

1. Application budget versus revised budget.
2. Ice Cores ‘Labour - Technician Ice Core Analysis’ 0.5FTE years 3-6 changed to 1FTE in years 3-4 only.
3. Ice Cores ‘Research Operating’ budget item additional of \$80,300 in year 3 for air sample preparation lines for CO₂ and N₂O concentrations and isotopes on mass spec.
4. Oceanography ‘Labour – SWOT position’ reduced to 3FTE years with addition of 2FTE ACC Analysis oceanographer position in years 6-7.
5. Revised budget for ‘Other Eligible Expenditure’ items related to data management, general administration expenses, communications, management committee, visiting fellowships, publications, software/licensing, data workshops/conferences, and science conference sponsorship have been reduced by 30% in years 3-8 and 90% in year 2.

4 May 2022 variation – revised as per Management Committee approval dated 4 May 2022.

Summary of variation(s):

1. ‘Labour’ salaries updated to reflect extensions and promotions (across all Projects).

2. Ice Cores 'Research Operating' budget items additional of \$15,000 in year 4 for operation and measurements of new mass spectrometer and freight of ice core samples.
3. Move of Year 2 unspent funds to Year 3 (Projects impacted are: Ice Cores; Ice Shelves; and Sea Ice)

Table with columns: ELIGIBLE EXPENDITURE SUMMARY, Year 1 application budget, Year 1 actuals, Year 2 application budget, Year 2 actuals, Year 3 application budget, Year 3 revised budget, Year 4 application budget, Year 4 revised budget, Year 5 application budget, Year 5 revised budget, Year 6 application budget, Year 6 revised budget, Year 7 application budget, Year 7 revised budget, Year 8 application budget, Year 8 revised budget, Year 9 application budget, Year 9 revised budget, Year 10 application budget, Year 10 revised budget, TOTAL application budget, TOTAL revised budget. Rows include Atmosphere, Ice cores, Ice shelves, Biogeochemistry, Oceanography, Sea ice, Ecosystems/krill, Scientific Program Management, Travel and Accommodation, Administration, Audit cost, and Other Eligible Expenditure (Excl Research Operating).

ANNEX 3: CSIRO PAYMENT SCHEDULE

The CSIRO payment schedule is shown below by project and is to be paid as two equal 6-monthly instalments.

14 October 2020 variation – revised as per Management Committee approval dated 14 October 2020.

Summary of variation(s):

1. Project 2 – Ice Cores ‘Labour – Research’ reduced as the Palaeo-Atmospheric Composition was approved in August 2019 as a UTAS position with 50% co-investment from CSIRO
2. Project 5 - Biogeochemistry ‘Operating’ budget item addition of \$10,000 per year from year 2 to year 10, total \$90,000 (note that this is matched by CSIRO)

AAPP-CSIRO PAYMENT SCHEDULE BY PROJECT											
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	TOTAL
	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	
	\$ Ex GST	\$ Ex GST	\$ Ex GST	\$ Ex GST	\$ Ex GST	\$ Ex GST	\$ Ex GST	\$ Ex GST	\$ Ex GST	\$ Ex GST	\$ Ex GST
Project 1 - Atmosphere											
Labour - Research	94,896	97,573	100,329	103,163							395,961
TOTAL Project 1	94,896	97,573	100,329	103,163							395,961
Project 2 - Ice Cores											
Labour - Research	122,078	125,520	129,069	132,712							509,379
TOTAL Project 2	122,078	125,520	129,069	132,712							509,379
Project 4 - Oceans											
Labour - Research	330,846	338,763	396,861	397,967	396,728	372,812	416,391	388,417	354,094		3,392,879
Plant and Equipment - Research	800,000	300,000	450,000	450,000	450,000	150,000	150,000	150,000	150,000	150,000	3,200,000
<i>Other Eligible Expenditure (incl Research Operating)</i>											
Operating	20,000	20,400	20,808	21,224	21,649	22,082	22,523	22,974	23,433	23,902	218,994
Duty at Sea Allowance			42,336	30,240	30,240	0	30,240	30,240	30,240	0	193,536
TOTAL Project 4	1,150,846	659,163	910,005	899,432	898,616	544,894	619,154	591,630	557,767	173,902	7,005,409
Project 5 - Biogeochemistry											
Labour - Research	224,828	231,174	237,701	244,419	251,326	258,427	265,742	273,263	104,622		2,091,503
Plant and Equipment - Research	300,000	300,000									600,000
<i>Other Eligible Expenditure (incl Research Operating)</i>											
Operating	20,000	30,400	30,808	31,224	31,649	32,082	32,523	32,974	33,433	33,902	308,994
Duty at Sea Allowance	4,320	16,416	55,728	64,800	34,560	4,320	42,120	64,800	4,320	4,320	295,704
TOTAL Project 5	549,148	577,990	324,237	340,443	317,535	294,829	340,385	371,037	142,375	38,222	3,296,202
Total	1,916,968	1,460,246	1,463,640	1,475,750	1,216,151	839,723	959,540	962,668	700,142	212,124	11,206,951

ANNEX 4: PROJECT TERMS

1 INTERPRETATION AND DEFINITIONS

- 1.1 Unless otherwise defined in this Agreement, the words and expressions in this Agreement have the same meaning as those in the Australian Antarctic Program Partnership (**AAPP**) Formal Collaborative Agreement.
- 1.2 The interpretation rules set out in Schedule 1 of the Formal Collaborative Agreement apply to this Agreement.
- 1.3 In this Agreement:
- (a) **Agreement** means these Project Terms and the approved Project Plan and includes the schedules and annexures to this Agreement;
 - (b) **Budget** means the budget for the AAPP Project as set out in the Project Plan;
 - (c) **Financial Statement** means a statement of all receipts, income, outgoings and expenditure received, derived or incurred in carrying out the AAPP Project in an Approved Form;
 - (d) **Final Report** means the final report required under clause 9.4 and as specified in clause 9.5;
 - (e) **Formal Collaborative Agreement** means the Australian Antarctic Program Partnership Formal Collaborative Agreement for the establishment and operation of AAPP;
 - (f) **Milestones** means the milestones set out in the Project Plan;
 - (g) **Principal Participant** means the Party leading the AAPP Project and named as the Principal Participant as specified in the Project Plan
 - (h) **Project Background IP** means the Background IP which Project Participants make available for the conduct of the AAPP Project;
 - (i) **Project Funds** means that part of the AAPP Funds that the Management Committee has determined will be made available to the Principal Participant for the conduct of the AAPP Project;
 - (j) **Project Commencement Date** means the commencement date for the AAPP Project as set out in the Project Plan or such other date as the Project Participants agree to in writing;
 - (k) **Project Completion Date** means the completion date for the AAPP Project as set out in the Project Plan or such other date as the Project Participants agree to in writing;
 - (l) **Project Contributions** means the money, assets, personnel, facilities and services to be contributed to the AAPP Project by a Project Participant as detailed in the Project Plan;
 - (m) **Project IP** means Intellectual Property arising from the conduct of the AAPP Project;
 - (n) **Project Leader** means the person who will lead the AAPP Project and identified as such in the Project Plan;
 - (o) **Project Objectives** means the objectives of the AAPP Project as detailed in the Project Plan;
 - (p) **Project Participants** means the Parties involved in the AAPP Project and identified as the Project Participants in the Project Plan (and for the

purposes of this Agreement, includes the Principal Participant as the context requires);

- (q) **Project Plan** means the Project Plan approved by the Management Committee and any variation subsequently agreed to it;
- (r) **Progress Report** means a progress report as required under the Commonwealth Agreements;
- (s) **Project Term** means the period referred to in clause 15.
- (t) **Special Conditions** means any special or additional terms or conditions agreed by the Project Participants and set out in the Project Plan;

2 APPLICATION OF FORMAL COLLABORATIVE AGREEMENT

- 2.1 The Project Participants acknowledge that the approved AAPP Project forms part of the Activities under the Formal Collaborative Agreement and that it must be carried out in a manner that conforms to the Formal Collaborative Agreement.
- 2.2 The provisions of the Formal Collaborative Agreement that expressly or by necessary implication apply to the conduct of the Activities will apply to the conduct of the approved AAPP Project and to the Associate Participants, national collaborators, international collaborators and other funding parties as if they were Principal Participants under the Formal Collaborative Agreement.

3 SPECIAL CONDITIONS

- 3.1 In the event of any inconsistency between the provisions of this Agreement and the Special Conditions, the Special Conditions will prevail to the extent of the inconsistency.

4 TERM

- 4.1 The AAPP Project will commence on the Project Commencement Date and, subject to the terms of this Agreement, will terminate on the Project Completion Date.

5 PROJECT FUNDS AND CONTRIBUTIONS

- 5.1 Subject to clauses 5 and 20, the Collaboration Delegate must pay the Project Funds to the Principal Participant from the AAPP Funds in the manner set out in the Project Plan.
- 5.2 Each Project Participant must make its Contribution to the AAPP Project for the purpose of pursuing the AAPP Project in the manner set out in the Project Plan or as otherwise reasonably required to ensure the Milestones and Project Objectives are met.
- 5.3 The Principal Participant will enter into any agreements it deems necessary to secure contributions from third parties.
- 5.4 The Collaboration Delegate may, on direction of the Management Committee, withhold a payment to the Principal Participant under clause 5.1 if the Principal Participant is primarily responsible for a Milestone that has not been met or a Deliverable that has not been delivered until such time as the Milestone is met or the Deliverable is delivered to the reasonable satisfaction of the Management Committee.
- 5.5 If AAPP Funds are identified in the Financial Statement provided at the Project

Completion Date as unexpended, those funds must be repaid to the Collaboration Delegate.

6 BACKGROUND INTELLECTUAL PROPERTY

- 6.1 Project Background IP remains in the ownership of the Project Participant making it available.
- 6.2 Each Project Participant agrees to make its Project Background IP available to the AAPP Project in accordance with clause 16 of the Formal Collaborative Agreement.

7 CONDUCT OF THE AAPP PROJECT

- 7.1 Each Project Participant will carry out its part of the AAPP Project diligently and in accordance with generally accepted professional, scientific and ethical principles and standards in the conduct of the AAPP Project.
- 7.2 The Project Participants will:
 - (a) cooperate with each other and the Project Leader; and
 - (b) use all reasonable endeavours to ensure;the AAPP Project meets the Project Objectives, Milestones and Deliverables as specified in the Project Plan.
- 7.3 The Project Participants acknowledge that the AAPP Project forms part of the Activities and that the AAPP Project will be managed by the Project Leader through the Principal Participant, the Program Leader and the Management Committee.

8 COMPLIANCE

- 8.1 Each Project Participant will ensure that all applicable codes of conduct and guidelines in carrying out the AAPP Project including any codes and guidelines with respect to research involving humans or animals adopted by the National Health and Medical Research Council (including without limitation the National Statement on Ethical Conduct in Research involving humans and the Australian Code of Practice for the care and use of animals for scientific purposes) and by the Office of the Gene Technology Regulator, are observed at all times.
- 8.2 Each Project Participant will, where necessary or appropriate, undertake research using a relevant ethics committee or committees constituted in accordance with the codes and guidelines referred to in clause 8.1, to oversee all ethical clearances which may be required under those codes and guidelines. In addition to usual approvals/ethics approvals:
 - For all projects on Macquarie Island, the approval of the Tasmanian Government is also required;
 - All projects within Antarctica and the Southern Ocean below 60S must comply with the requirements of the Australian Antarctic program for environmental and ethics approvals; and
 - All projects on Australian sub Antarctic islands must comply with the relevant Government requirements. E.g. Macquarie Island Tasmanian Government and Heard and Macdonald Islands (Australian Government laws administered by AAD).
- 8.3 Each Project Participant must comply with all applicable acts, ordinances, rules,

regulations and by-laws applicable to the conduct of the AAPP Project in its state or territory including but not limited to State/Territory legislation about working with children and vulnerable people, and will also comply with the Antarctic Treaty and its 4 international agreements including all Commonwealth legislation relating to Antarctica.

- 8.4 When requested by the Program Leader or Collaboration Delegate, each Project Participant must provide evidence of the matters referred to in this clause 8 to the Program Leader or Collaboration Delegate as requested.

9 REPORTING

- 9.1 The Principal Participant will ensure that the Project Leader prepares and provides to the Program Leader the Progress Reports annually or otherwise upon the dates required to enable the Collaboration Delegate to comply with the reporting requirements under the Commonwealth Agreement(s) on the conduct of the AAPP Project and the Milestones and Deliverables set out in the Project Plan.
- 9.2 Each Progress Report will be in writing and in an Approved Form with a level of detail reasonably acceptable to the Management Committee and will include:
- (a) the name of the AAPP Project and the Project Leader;
 - (b) a description of each Milestone and the date on which it was reached or the reasons why it was not reached;
 - (c) a report on the activities conducted by the Project Participants to achieve the Milestones and Deliverables;
 - (d) details of expenditure incurred to date;
 - (e) any knowledge or discoveries and contributions to end users, including Project IP, made since the last Quarterly Progress Report;
 - (f) any variation which the Project Participants would like to make to the AAPP Project's methodology or Milestones; and
 - (g) any further information reasonably requested by the Program Leader.
- 9.3 The Program Leader may reasonably require the Project Leader to provide interim reports. Such interim reports will be in an Approved Form and address matters specified by the Program Leader from time to time. Interim reports must be provided to the Program Leader within 30 Business Days of the Project Leader receiving a request from the Program Leader to provide such a report.
- 9.4 The Project Leader must within 30 Business Days of the Project Completion Date prepare and provide to the Program Leader a Final Report.
- 9.5 The Final Report will be in writing in a format and content to be agreed unanimously by the Management Committee and subject to requirements of the Commonwealth Agreement.
- 9.6 The Final Report will be the final Milestone of the AAPP Project.
- 9.7 The Final Report must be in an Approved Form and in a level of detail reasonably acceptable to the Management Committee.
- 9.8 A Project Participant must promptly give any information it holds in relation to the AAPP Project in the form reasonably requested:
- (a) to the Project Leader as reasonably necessary to enable the Project Leader to meet the reporting obligations under this Agreement; and
 - (b) to the Program Leader as reasonably necessary to enable the obligations under the Formal Collaborative Agreement and the Funding Agreements to

be met.

10 RECORDS AND ACCOUNTS

- 10.1 Each Project Participant will keep full and accurate accounting records of its expenditure of Project Funds and its Contributions to the AAPP Project and will provide copies of those records to the Program Leader on request.
- 10.2 The Management Committee or the Collaboration Delegate may appoint a qualified person to audit the records referred to in clause 10.1 and each Project Participant will give the person undertaking the audit access at all reasonable times to the records and will provide such information and explanations as the person desires for the purposes of the audit.
- 10.3 The Principal Participant will provide to the Program Leader, at the times Progress Reports are required to be provided under clause 9.1, a Financial Statement covering the period since the last Progress Report.
- 10.4 A final Financial Statement must be provided to the Program Leader at the same time as the Final Report.

11 VARIATION OF PROJECT

- 11.1 An AAPP Project may, following a request to vary the AAPP Project from the Management Committee or from the Principal Participant to the Program Leader, be varied by the Program Leader issuing a Document in Writing to the Project Participants confirming the requested variation or a variation substantially in compliance with the requested variation.

12 OWNERSHIP OF PROJECT IP

- 12.1 The Project Participants acknowledge and agree that all Project IP forms part of AAPP IP and will be owned and licensed in accordance with the Formal Collaborative Agreement.
- 12.2 Not Used
- 12.3 Each Project Participant must ensure that all Project IP is disclosed to the Project Leader as soon as practicable after its creation.

13 INDEMNITY AND INSURANCE

- 13.1 The Project Participants must maintain adequate product liability, third party liability and other reasonable insurance cover, including professional indemnity insurance, for the conduct of the AAPP Project for the Term and for a reasonable run-off period after expiry of the Term.
- 13.2 Each Project Participant (the Indemnifier) hereby releases and indemnifies and agrees to keep released and indemnified the other Project Participants and their respective officers and employees agents and representatives (the Indemnified) from and against any Loss howsoever arising that the Indemnified may directly suffer, incur or sustain as a result of any breach of this Agreement by the Indemnifier or any unlawful or negligent act or omission of the Indemnifier or any of its officers employees agents or representatives arising out of the conduct of the AAPP Project.
- 13.3 The liability of the Indemnifier under clause 13.2 will be reduced having regard to

the extent to which the Indemnified contributed to the Loss in respect of which it seeks indemnity.

- 13.4 The obligations under this clause 13 will survive expiration or earlier termination of this Agreement.
- 13.5 Clause 13.1 does not apply to a Project Participant which is an agency or instrumentality of the Commonwealth or a State or Territory which self-insures.

14 CONFIDENTIALITY

- 14.1 A Project Participant's Confidential Information may only be:
- (a) disclosed to another Project Participant's officers, employees and students who need access to the Confidential Information for the conduct of the AAPP Project and to another Project Participant's financial or legal advisers provided that they are subject to a legal obligation to maintain the confidentiality of the Confidential Information; and
 - (b) must only be used for the purposes of the AAPP Project.
- 14.2 The obligations under this clause 14 will survive expiration or earlier termination of this Agreement.
- 14.3 Despite clause 14.1, a Party or a Minister may disclose a Project Participant's Confidential Information to Parliament, Cabinet or a Parliamentary or Cabinet committee or subcommittee.

15 TERM AND TERMINATION

- 15.1 This Agreement will commence on the Project Commencement Date and, subject to this clause 15, terminate on the earlier of:
- (a) the Project Completion Date; or
 - (b) the termination of the Principal Participants Agreement.
- 15.2 The Management Committee may terminate the AAPP Project on 20 Business Days written notice to the Principal Participant if:
- (a) a Milestone has not been met by the due date and is not met within 20 Business Days after the Program Leader gives written notice to the Principal Participant;
 - (b) a Deliverable has not been supplied by the due date and is not supplied within 20 Business Days after the Program Leader gives written notice to the Principal Participant; or
 - (c) in the reasonable opinion of the Management Committee, the Project Objectives are unlikely to be met.
- 15.3 If the AAPP Project is terminated under clause 15.2 and there are sufficient Project Funds, the Collaboration Delegate will reimburse each Project Participant from the Project Funds for its reasonable expenses, as agreed by the Management Committee, necessarily incurred because of the early termination of the AAPP Project.
- 15.4 A Project Participant who is reimbursed under clause 15.3 must take reasonable steps to mitigate the expenses it incurs.
- 15.5 The total amount paid to each Project Participant must be no more than the balance of the Project Funds payable to the Project Participant if the AAPP Project had not terminated.
- 15.6 If there are insufficient Project Funds to reimburse all expenses, each Project

Participant will be reimbursed on a pro rata basis.

- 15.7 Termination of the AAPP Project for any reason is without prejudice to the continuing enforceability of any rights and obligations of the Project Participants existing at the termination date.
- 15.8 The obligations in relation to confidentiality, indemnities, Project IP and any other obligations that expressly or by implication are intended to survive the operation of this Agreement will continue beyond termination of this Agreement.

16 EXPULSION OF A PROJECT PARTICIPANT

- 16.1 The Management Committee may expel a Project Participant from an AAPP Project if Due Cause exists and is not remedied within 20 Business Days after the Program Leader gives written notice to the Project Participant.
- 16.2 In clause 16.1, 'Due Cause' means:
- (a) not making Project Contributions;
 - (b) unauthorised use of Project IP, Project Background IP or Confidential Information;
 - (c) any other material breach of the Principal Participants Agreement or this Agreement in conducting the AAPP Project, including not meeting Milestones;
 - (d) a change or proposed change of personnel that is likely to adversely affect the Project Participant's participation in the AAPP Project; or
 - (e) not resolving to the Management Committee's reasonable satisfaction, a conflict of interest in relation to the AAPP Project.
- 16.3 A Project Participant who is expelled from an AAPP Project ceases to be a Project Participant from the date on which the expulsion takes effect under clause 16.1.
- 16.4 The expulsion of a Project Participant from an AAPP Project does not affect:
- (a) the enforceability of other obligations of the Project Participant under the Formal Collaborative Agreement or other AAPP Projects;
 - (b) rights against the Project Participant accrued at that time or arising from the withdrawal or expulsion;
 - (c) the obligation on the Project Participant to supply its Project Background IP for the AAPP Project; or
 - (d) the obligations on the Project Participant in relation to confidentiality, indemnities, Project IP and any other obligations that expressly or by implication are intended to survive the operation of this Agreement.
- 16.5 The withdrawal or expulsion of a Project Participant from the AAPP Project does not relieve the other Project Participants of their obligations under this Agreement.

17 NOTICES

- 17.1 The addresses for service of Notices to the Project Participants are those set out in the Project Plan.

18 FURTHER ASSURANCES

- 18.1 Each Project Participant must do all things and execute all documents

necessary to give effect to the provisions and intent of this Agreement.

19 NO AGENCY OR PARTNERSHIP

- 19.1 The Project Participants enter into this Agreement as independent contractors and nothing in this Agreement will result in a Project Participant being constituted as an agent or partner of another Project Participant.

20 GST

- 20.1 Unless otherwise expressly stated, all amounts payable under this Agreement are expressed to be exclusive of GST.
- 20.2 If GST is payable on a Taxable Supply, the amount payable for that Taxable Supply will be the amount expressed in this Agreement plus GST.
- 20.3 If GST is payable on a Taxable Supply made by one party to another party, then that other party will not be required to pay any amount to the first party in respect of that Taxable Supply unless it has first received a Tax Invoice.
- 20.4 For the purposes of this clause 20, the terms GST, Taxable Supply and Tax Invoice have the meaning given to those terms in the A New Tax System (Goods and Services Tax) Act 1999 (Cth).