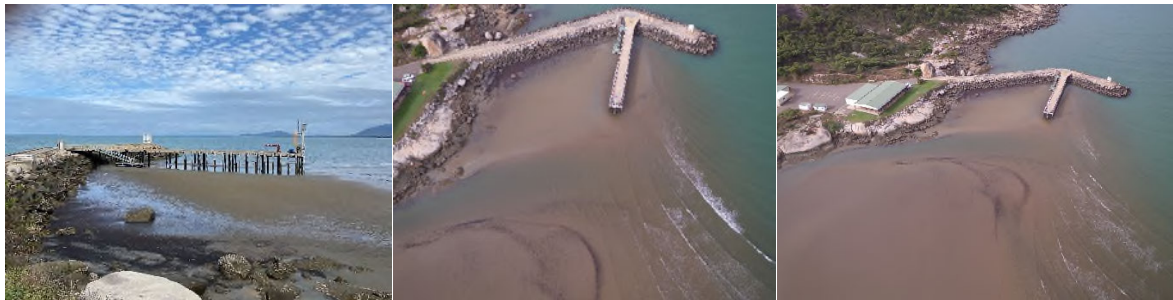




Proposal for remediation of the Wharf at the Australian Institute of Marine Science to support research for protecting the Great Barrier Reef

Part A: Identification of the Need **Part B: Technical Information**



Statement of Evidence to the
Parliamentary Standing Committee on Public Works

Australian Institute of Marine Science
Cape Cleveland, Townsville, QLD

Submission no. 1
Date: 15 July 2022

Remediation of the Wharf at the
Australian Institute of Marine Science

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PART A – IDENTIFICATION OF THE NEED

1 Introduction

- 1.1** This evidence to the Parliamentary Standing Committee on Public Works (PWC) presents a proposal for the remediation of the wharf and harbour at the Australian Institute of Marine Science (AIMS) to support research for protecting the Great Barrier Reef and AIMS operations more generally. The need for remediation is due to natural siltation exacerbated by the Townsville flooding event in 2019 and the age, condition, and restricted capability of the existing facility. The facility has not been functional since 2019 and is a fundamental requirement of a marine science organisation running field operations as required and expected of AIMS. For example, it provides the link between field work in the Great Barrier Reef Marine Park and the specialised on-site laboratories and support functions at AIMS including the advanced National Sea Simulator. This project will re-establish the capability required for the next 40 years and support advances in science, technology and knowledge, boost productivity, create jobs, and deliver economic growth.
- 1.2** On the 22nd of March the Prime Minister's Office announced \$63M in funding to support Great Barrier Reef Science. This package included \$26.5M to remediate the AIMS Cape Cleveland Wharf. This funding consists of \$24.94M for design and construction works and \$1.6M for operational funding until 2024-25. A further \$1.5M pa is for funding beyond 2025-26

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- 1.3** AIMS' location, approximately 50km east of Townsville on Cape Cleveland, was selected in the 1970's to ensure that research could be conducted with access to sea water that had the lowest impact from human activities (industrial and agricultural runoff) and with unrestricted access to the Great Barrier Reef (GBR). The AIMS campus is surrounded by national park and is located away from urban, and industrial activities. A key component of AIMS' infrastructure is the wharf located at its Cape Cleveland headquarters. Originally constructed in 1976, the wharf is critical to AIMS' operations, allowing research vessels direct access to specialised on-site laboratories and the National Sea Simulator, and for AIMS and partners to directly access the GBR.
- 1.4** The wharf is located within the Great Barrier Reef Marine Park – within a Scientific Research Zone. In addition to vessel access, the location in a protected research zone enables the wharf to be used as a platform for conducting critical research activities in clean water, distant from the influences of port and other vessel activities. Examples include water quality research, behavioural studies of marine animals, small-scale oceanographic studies, and testing of instrumentation. Access to the area is generally only allowed under a permit from the Great Barrier Marine Park Authority (GBRMPA). This restricted general access means that instruments and experiments are not subject to interference from activities such as fishing, trawling, boating, and diving. The location and level of protection significantly reduces the cost of developing and testing instrumentation and larger scale experimental systems prior to broad-scale deployment and usage in the adjacent Marine Park and other remote areas. This is the only wharf located in a dedicated scientific research zone in Mainland Australia, enabling a truly unique marine science capability.

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- 1.5** In the last three years, due to a change in coastal sediment transport conditions, the waters surrounding the wharf have experienced significant sedimentation such that the wharf is no longer accessible to vessels. AIMS has been able to implement temporary working arrangements that reduced the impact of not having a functional wharf, however these arrangements can only address aspects of the loss. AIMS has a leased facility in Townsville used for berthing its vessels, and so has moved what it can of the operations previously occurring at the wharf to this location. However, this is expensive, time consuming (e.g., > 3 hrs by vessel, 50 km by road), increases AIMS' safety risks, and some aspects simply cannot be transferred, reducing our research outputs and impact. While it has been essential for AIMS to use these temporary arrangements to maintain its research capability, they do not deliver the full capability of the AIMS Cape Cleveland wharf, they are costly, and are not sustainable in the medium to long term.
- 1.6** An options study carried out during 2020-21 by BMT Global for remediation of the AIMS Cape Cleveland wharf identified a range of potential solutions. Accounting for environmental guidelines around disposal of dredge material in the Great Barrier Reef World Heritage Area, a preferred option emerged, which is to significantly reduce initial dredging by extending the existing sea wall, forming a new wharf on the protected side in deeper water and maintaining berth depth across its useful life. At a capital cost estimated to be \$24.94M, AIMS believes this option represents the lowest environment risk, both for the capital works and ongoing maintenance activities.
- 1.7** The current design approach includes a sustainable maintenance response for the life of the asset to manage ongoing sedimentation through the use low impact sediment movement processes (sand shifter or similar) on a progressive as required basis.

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- 1.8** This cost assumes that the wharf construction can be delivered in the same timeframe as the scheduled sea water intake works, which form part of the National Sea Simulator expansion project (funded through NCRIS and approved by the PWC in 2021). AIMS received approval from the PWC (on 31st of March) to run a market testing Expression of Interest (EOI) to identify a short list of suitable construction contractors to enable the project team to realise the potential savings. Creating synergies between these two projects results in significant savings in project management, mobilisation, and rework. The wharf project can exploit synergies and scale from the sea water intake works for the National Sea simulator expansion projects to deliver approximately \$2 million in savings between the two projects by using the same project team, reducing mobilisation costs, eliminating rework and through co-design. Concurrent works significantly reduces the cost risk that already exist because of supply chain and resourcing issues that are being driven by COVID, war and flooding.
- 1.9** The wharf remediation project is expected to support around 44 full time equivalent jobs on average for three years (DoF Jobs Calculator, 2022). Independent socio-economic analysis (Aurecom, 2020) estimated the project would also have an impact of \$66m of total economic output over a 10-year period.
- 1.10** The following detailed statement of evidence outlines the need for, and the plan to, re-establish the AIMS Cape Cleveland wharf, restoring AIMS' critical research and operational capability for approval from the Parliamentary Standing Committee on Public Works. The project will be managed within a well-established project governance framework that enables issue escalation and reporting through the organisation to the AIMS Council (the Accountable Authority).

2 Background

- 2.1** The harbour and wharf at Cape Cleveland are a foundational capability for AIMS. Due to sedimentation, the wharf has been inaccessible to large vessels since November 2018 and to small vessels since mid-2019. The wharf and boat ramp facilities are currently unusable. When the harbour was constructed (1976), depth of water at the wharf was 4m (lowest astronomical tide), providing all tide access to the facility. At the present time, the wharf becomes dry at low tide and is unsafe for vessel access at high tide.
- 2.2** An engineering review of the current wharf, conducted in 2021 as part of preparing this business case, indicates that the wharf is at end-of-life. The weight bearing capacity of the wharf has been downgraded, meaning that it can no longer safely support trucks and other loads required to deliver AIMS' operations. These operations include loading and unloading equipment for scientific voyages to and from vessels using trucks and cranes, unloading research samples for immediate transfer to specialised aquaria and laboratories for analysis and experimentation, deployment of equipment for testing and data collection for AIMS and other agencies/research programs (BOM, Qld DES, IMOS, CSIRO, GBRMPA).
- 2.3** The proposed upgrade will re-establish weight bearing capacity to support existing and future operations with a design life of 40 years.

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Figure 1: Aerial photos of AIMS' harbour showing deep water, all-tide access (2007)



Figure 2: Photo of the RV Cape Ferguson when it ran aground in October 2018. This incident was reportable to the authorities and resulted in the harbour being closed by the Regional Harbour Master

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Figure 3: Aerial photo of AIMS' harbour showing the impact of sedimentation (2021). The wharf is now unusable, even at high tide.

- 2.4** AIMS is temporarily operating from a facility at the Port of Townsville, but it is logistically more complex, carries increased safety risks and significantly increases operational costs. Furthermore, it does not meet all of AIMS' capability needs in terms of sample and organism handling, storage, and processing. It is only a partial, temporary solution.

- 2.5** Without remediation of the AIMS wharf, new nationally critical programs (e.g., Reef Restoration and Adaptation Program, Reefworks – a test range to develop trusted autonomous systems) will be compromised, negatively impacting science quality, outputs and scope and diminishing AIMS' future external revenue generation. The Reef Restoration and Adaptation Program requires access to the wharf to reduce risk of failure of live organism experimentation or deployments due to time, temperature, and vibration impacts. Reefworks requires access to secure marine technology test and evaluation facilities to safely develop and assess marine technologies, autonomous systems, and new sensors to support regulatory approval for the use of autonomous marine systems in Australian waters.

Project Objectives

- 2.6** The key objective is to re-establish all-tide access to AIMS Cape Cleveland wharf, restoring AIMS' critical research and operational capability for the next 40 years.

3 Need for the Works.

- 3.1** The Project responds to the urgent need to re-establish critical capability required to deliver AIMS' research for key stakeholders.
- 3.2** The location of the AIMS campus and wharf were selected to provide research access to unpolluted sea water. The wharf is in a Scientific Research Zone within the Great Barrier Reef Marine Park – an area that has been identified specifically for conducting marine science. The Scientific Research Zone helps to manage research activities and separates research activities from conflicting, high impact activities. This helps to ensure research and data gathered is less influenced by human activity. As such, it provides scientific capability and supports scientific activities that cannot be replicated at other wharf facilities.

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- 3.3** The wharf is essential capability required to deliver on the *Australian Institute of Marine Science Act 1972* and AIMS' Ministerial Statement of Expectations. AIMS utilises its scientific, data and infrastructure capabilities (including large-scale and long-term ocean monitoring, environmental risk analyses, and forecasting) to deliver on its legislative functions and meet its Ministerial Statement of Expectations: a healthy and resilient Great Barrier Reef; sustainable coastal ecosystems and industries across tropical Australia; and environmentally sustainable offshore oil and gas development.
- 3.4** The AIMS wharf is a critical part of AIMS' scientific operations, allowing delivery of organisms direct to the National Sea Simulator, testing and deployment of equipment and loading and unloading of field research missions within proximity of essential specialised laboratories and support services. It minimises mobilisation logistics and costs for Townsville-based field work (including additional leasing costs), reduces transit time to monitoring sites and improves operational safety by reducing mobilisation effort, travel time, fatigue, and exposure to vibration. Reinstatement of this capability is critical to AIMS' current and future operations as current operations, without this capability, are unsustainable without additional inputs of capital, facilities, and people. AIMS would need to duplicate facilities and services which already exist within the AIMS campus.
- 3.5** The AIMS wharf remediation is expected to contribute the following benefits and impact over the next 10 years: -
- Provide key logistical support for field work required to deliver critical research supporting the Reef 2050 long term sustainability plan.
 - Provide key logistical support and a test platform for the design and deployment of reef restoration and adaptation activities across the Great Barrier Reef as this research field matures and moves towards larger scale implementation.

- Development of a world class autonomous technology testing and proving range to accelerate development of verified safe autonomous systems. AIMS will provide a national test and evaluation facility to enable the streamlined regulatory approval and commercialisation of next generation marine technologies in Robotics, Autonomous Systems and Artificial Intelligence (RAS-AI). It will be a catalyst for marine RAS-AI innovation in Australia, serving the needs of the Australian Government and Industry.
- Training and skills development in field operations for the next generation of marine scientists and support staff including traditional owners

4 Options Considered

- 4.1** BMT Global were engaged to provide an options study to address the site constraints and functional requirements considering the current and expected sedimentation rates and sediment properties. Sediment sampling, oceanographic data collection and sediment transport modelling were conducted to gain an understanding of the best options. At the same time initial consultation was conducted with key stakeholders. The conclusion of the study was that only one option met all AIMS functional requirements, practical limitations, and regulatory standards.
- 4.2** This study detailed the characteristics and potential causes of the siltation. It then provided a description of potential options for future management of the marine facilities so that functionality of the wharf and boat ramp is maintained. Each of the options considered was assessed at a workshop held at the AIMS facility at Cape Cleveland in November 2019, using a multi-criteria analysis approach. As a result of that workshop and further options refinement, options were ranked in order of preference. Following the provision of further information regarding sedimentation rates and cost estimates, the multi criteria analysis was further revised in May 2021.

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- 4.3** A “Do Nothing” option (Temporary operations out of Port of Townsville to become permanent) was included in the study but the significant loss of capability, increased safety risk, lost opportunity costs, difficulty in accessing suitable land, duplication of facilities and staffing increases made this option infeasible as a permanent solution.
- 4.4** The BMT report assessed eight different design responses, and 6 wharf configurations and concluded that the Breakwater Reconfiguration (extending the existing breakwater with a new wharf on leeward side) is the preferred option based on the assessment framework defined within the report. To avoid the need for extensive dredging to maintain access to existing infrastructure, it is proposed to extend the existing jetty into deeper waters. The proposed works consist of the wharf extension (by breakwater/seawall extension), provision of new floating pontoon access, and a new boat ramp.

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Option	Criteria
New wharf constructed off the end of existing breakwater	<ul style="list-style-type: none"> ✓ Functional capability reinstated for water and vessel access at AIMS Cape Cleveland site ✓ Minimal environmental impact and regulatory requirements ✓ Low estimated ongoing depth maintenance costs ✓ Improved safety outcome ✓ Reduced reputational impact associated with dredging
<u>Do nothing option (THIS OPTION DOES NOT MEET FUNCTIONAL REQUIREMENTS)</u>	
Do not reinstate wharf. Operate from AIMS Vessel Facility	<ul style="list-style-type: none"> ✗ Functional capability reinstated for water and vessel access at AIMS Cape Cleveland site ✓ Minimal environmental impact and regulatory requirements ✓ Low estimated ongoing depth maintenance costs ✗ Improved safety outcome ✓ Reduced reputational impact associated with dredging
<u>Alternate Options (THESE OPTIONS DO NOT MEET FUNCTIONAL REQUIREMENTS)</u>	
Sand Shifter	<ul style="list-style-type: none"> ✓ Functional capability reinstated for water and vessel access at AIMS Cape Cleveland site ✗ Minimal environmental impact and regulatory requirements ✓ Low estimated ongoing depth maintenance costs ✓ Improved safety outcome ✗ Reduced reputational impact associated with dredging
Dredging	<ul style="list-style-type: none"> ✓ Functional capability reinstated for water and vessel access at AIMS Cape Cleveland site ✗ Minimal environmental impact and regulatory requirements ✗ Low estimated ongoing depth maintenance costs ✓ Improved safety outcome ✗ Reduced reputational impact associated with dredging
New breakwater to the east of existing harbour	<ul style="list-style-type: none"> ✓ Functional capability reinstated for water and vessel access at AIMS Cape Cleveland site ✗ Minimal environmental impact and regulatory requirements ✗ Medium estimated ongoing depth maintenance costs ✓ Improved safety outcome ✓ Reduced reputational impact associated with dredging
New breakwater to the west of existing harbour	<ul style="list-style-type: none"> ✓ Functional capability reinstated for water and vessel access at AIMS Cape Cleveland site ✗ Minimal environmental impact and regulatory requirements ✗ High estimated ongoing depth maintenance costs ✓ Improved safety outcome ✗ Reduced reputational impact associated with dredging

Table 1: Options Analysis: Extracted from presentation to DISER (AIMS, 2021)

- 4.5** Although the Breakwater Reconfiguration option has significant upfront capital costs, it is not the most expensive option and is considered to have the least environmental impact because it removes the requirement for substantial volumes of initial dredging, although ongoing maintenance material removal will still be required. There are also significant synergies in terms of construction, costs, and project management if the AIMS wharf remediation project can be delivered alongside the construction of new sea water intakes for the National Sea Simulator expansion project that was approved for construction last year.
- 4.6** Initial discussions with regulators indicate that the proposed option is likely to receive all relevant environmental approvals and AIMS is working with relevant regulators to meet all requirements.

5 Economic Impacts

- 5.1** In 2021 AIMS commissioned Aurecon to provide an Economic Impact Assessment of a series of investments in new equipment and infrastructure, including remediation of the AIMS harbour and wharf. Aurecon estimated the preferred breakwater reconfiguration option for the Project to have a direct economic benefit for Townsville, support around 44 full time equivalent jobs on average for three years. This number has been confirmed using the Treasury Job Calculator and represents a significant financial benefit and return on investment to the Townsville community.
- 5.2** The completed facilities will provide the necessary infrastructure for AIMS to meet the projected demand for scientific outcomes and thus enable the employment and collaboration of additional staffing within the facilities as AIMS expands with increased monitoring demands for the Reef 2050 plan, projected upscaling of the Reef Restoration and Adaptation Program and the implementation of the Reefworks autonomous testing range.

- 5.3** The potential multiplier effect of wider employment in Australia due to the research outcomes to be achieved within the new facilities should also not be discounted. Further, an expected outcome of the Reefworks test range will be to propel Australian marine technology innovation into a sustainable, sovereign technology market sector.

6 Environmental Considerations

- 6.1** The AIMS harbour site is located within a 'brownfield site' that was constructed with approvals under section 86 of the Harbours Act in 1976. The wharf is situated in a Scientific Research Zone within the Great Barrier Reef Marine Park – an area that has been identified specifically for conducting marine science during an extensive study conducted when AIMS was formed in the 1970's. The Scientific Research Zone helps to protect research activities and separates research from conflicting, high impact activities. This helps to ensure research and data gathered within the Great Barrier Reef Marine Park is less influenced by human activity. As such, it provides scientific capability and supports scientific activities that cannot be replicated at the Port of Townsville.
- 6.2** AIMS has developed the concept design for the infrastructure Project in accordance with AIMS' environmental policy and procedures and in consultation with environmental consultants and regulators. The design as developed to date has assessed various design responses and has progressed those providing a relatively low environmental impact. The works will also be subject to a Project-specific environmental and heritage impact assessment, with environmental compliance triggers already identified. The environmental impact assessment will further identify potential environmental impacts of the Project and will identify appropriate mitigation measures.

- 6.3** As part of the design response AIMS is developing a method for long-term maintenance which reduces environment impact from dredging plumes and reduces the 'life of asset' maintenance costs significantly. Learnings from this exercise may be useful in reducing both impacts and costs for maintaining ports in tropical waters in the future.

7 Heritage Implications

- 7.1** AIMS will undertake an assessment to evaluate the heritage implications associated with the proposed new facilities. However, based on consultation with Traditional Owners and prior planning and reports undertaken on site, AIMS considers the likelihood of heritage implications to be low.

8 Social and Community Impacts

- 8.1** The Project will employ skilled marine construction workers from the Townsville and adjoining regions, providing a positive impact to local small and medium businesses. It is estimated that the works will support around 44 full time equivalent jobs on average for three years.
- 8.2** The contractors will be required to provide environment and site management plans for approval by AIMS.
- 8.3** Given the remote location of the Cape Cleveland site, and that much of the works will be conducted from the sea, there will be minimal disruption to the local community during the construction period.

9 Longer Term Planning / Related Projects

- 9.1** AIMS has developed the concept designs with a view to the 40-year design life of the infrastructure and considered potential future research related activities, configuration of future research vessels, materials handling, logistics and maintenance of the facility.

10 Consultation

- 10.1** AIMS develops its infrastructure plans in consultation with its stakeholders. Collaboration is central to AIMS' organisational culture and has been the key mechanism for increasing critical mass and broadening the skill base required to investigate complex research questions around the sustainable use and protection of marine resources. This approach includes national and international collaborations, strategic alliances and strong links to industry and community. In this way, AIMS makes its facilities available to a broad cross-section of the marine science community and coordinates its effort and resources with other research organisations.
- 10.2** AIMS has, and will continue to, consult with marine, technology and research partners and collaborating institutions in the development and implementation of this Project. For example, in developing preliminary functional specification for the wharf with existing and potential users. This consultation will continue throughout the design process through user groups comprising selected experts in the areas of logistics, technology deployment and science for which the facility will be utilised.
- 10.3** Discussions with the various statutory bodies governing water catchment, power and emergency services are in this instance regarded as unnecessary as a consequence of there being no impact of the Project beyond the AIMS Cape Cleveland site.
- 10.4** . Authority engagement has been proactive and progressive and in excess of the environmental approval requirements and processes required. Relevant authorities remain fully informed as to environmental impacts and requirements of the development. AIMS continues to develop the design to mitigate these environmental impacts and incorporate the feedback of the associated authorities

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10.5 There is ongoing engagement with Traditional Owners regarding heritage issues and impacts on country. This engagement has included direct onsite briefings in line with our AIMS Indigenous Partnerships programme.

10.6 No other local community or other interest groups have been identified that would be affected by the Project works at Cape Cleveland.

11 Revenue

11.1 No revenue will be derived in the construction of the Project.

PART B – TECHNICAL INFORMATION

12 Project Location

12.1 The Project elements within the existing AIMS Cape Cleveland Site are located approximately 50km south-east of the Townsville CBD as shown in Attachment 2. The site sits adjacent to the centre of the Great Barrier Reef Marine Park and is surrounded by a national park and contained within a Scientific Research Zone within the Great Barrier Reef Marine Park. The harbour site encompasses an area of 2.0 hectares. The works are in the Electorate of Dawson and Mr Andrew Willcox MP is the sitting Member. Most of AIMS' staff and local business is in the Electorate of Herbert - Mr Phillip Thompson OAM MP is the sitting Member.

13 Project Scope

13.1 The work scope comprises the following project elements:

- Extension of the existing Seawall reinstating capacity for trucks carrying sea containers and material handling equipment
- Berthing facilities for research vessels up to 40m in length and 3.5M draft across all tides.
- A floating pontoon providing safe personnel access to berthed vessels, power and water services
- Reinstatement capability for instrument deployments and enable deployment and retrieval of autonomous marine technologies.
- Boat ramp and pontoon to support small vessel operations
- Sustainable berth pocket and wharf maintenance infrastructure

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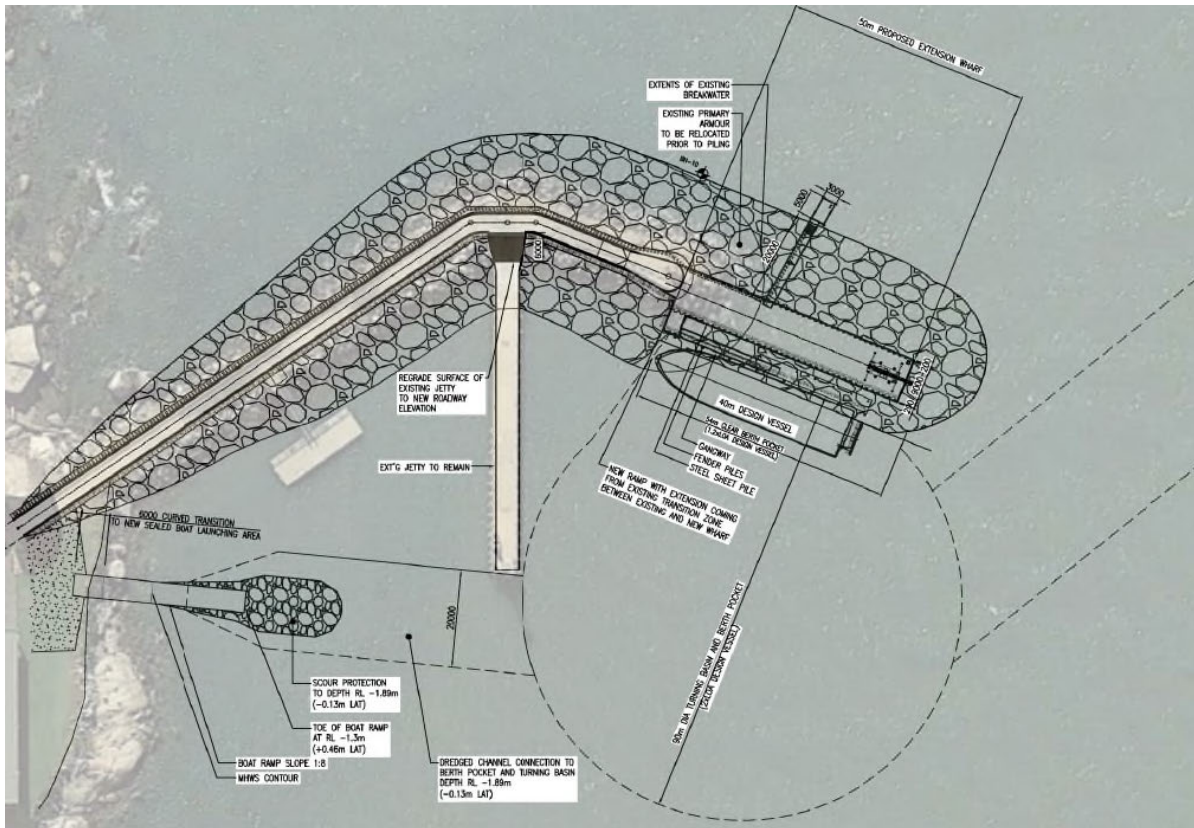


Figure 4: Concept design showing seawall extension, floating pontoon with vessel alongside and boat ramp

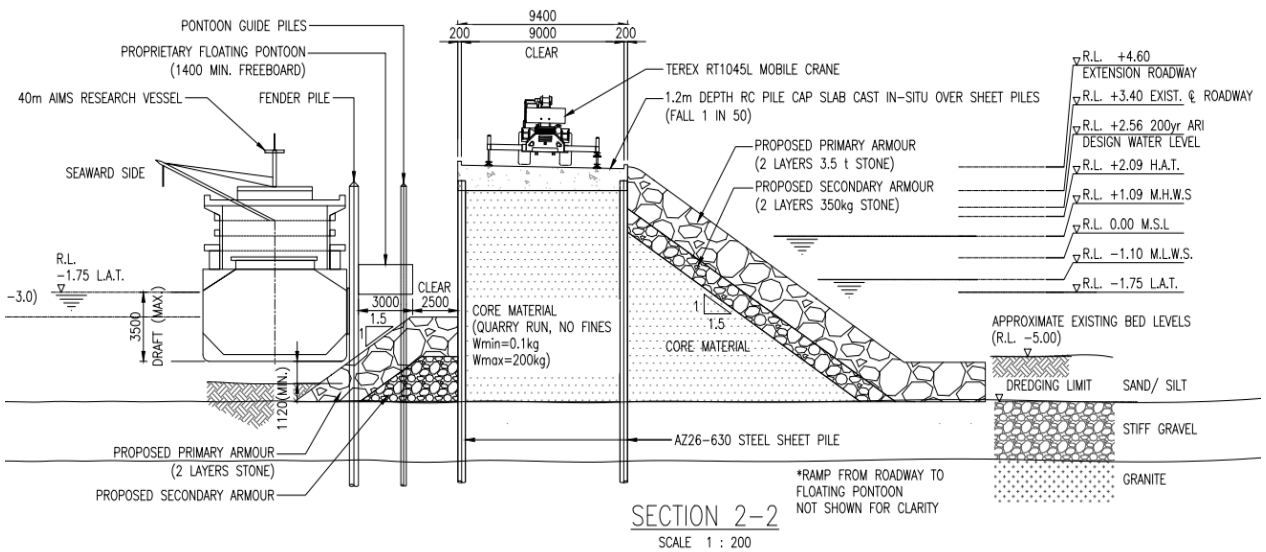


Figure 5: Section view of seawall and floating pontoon with vessel alongside

14 Site Selection and Description

14.1 The AIMS Cape Cleveland site location is detailed in Attachment 2 and is 50km south of Townsville.

14.2 The proposed site for the Project is shown in the below figure.

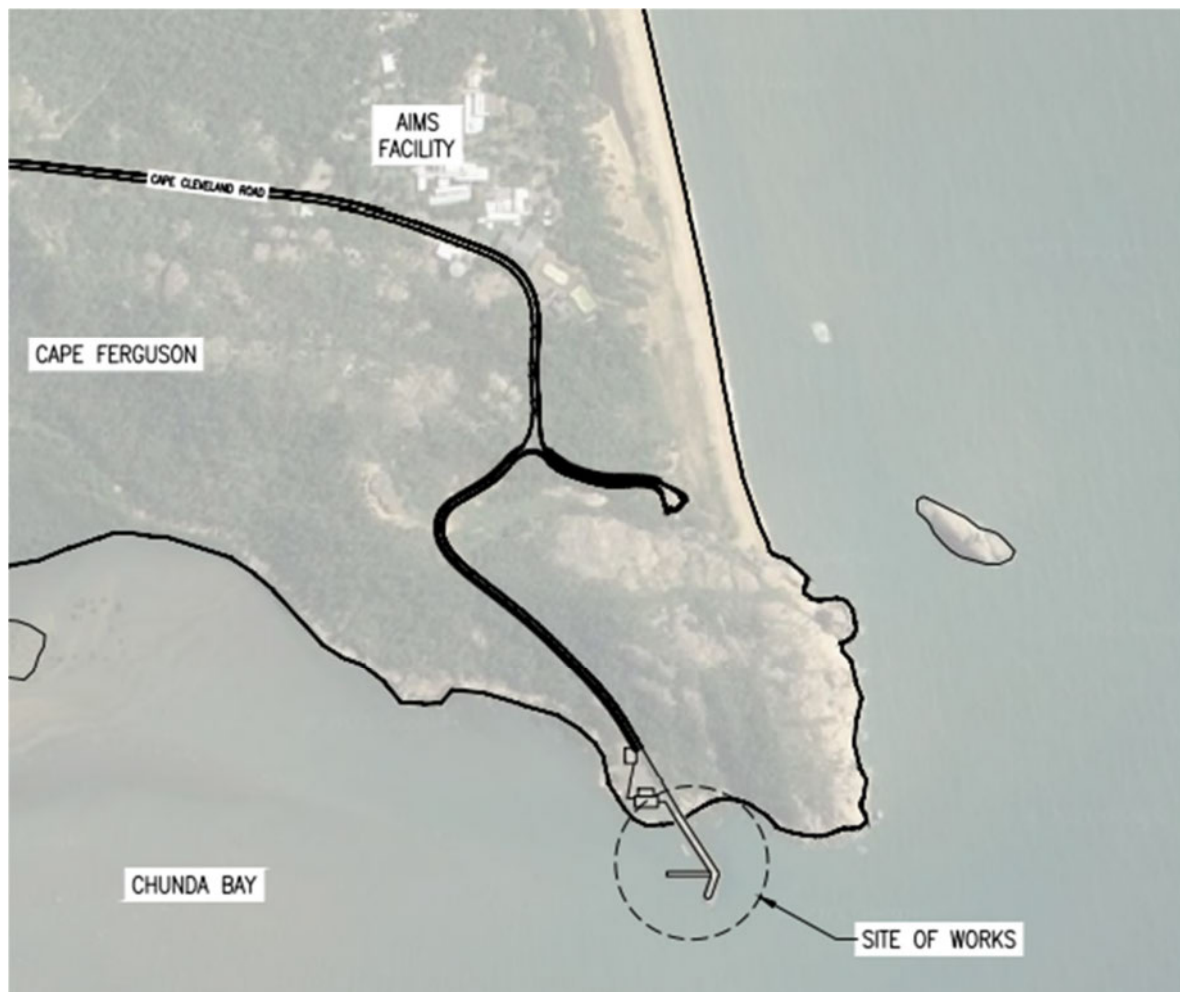


Figure 6: Site of works in relation to AIMS Campus

14.3 The site connects the AIMS Cape Cleveland boundary and a Scientific Research Zone within the Great Barrier Reef Marine Park.

- 14.4** AIMS is the registered owner of the land side site (Lot 35 of CP EP1474) under a deed of grant in trust for scientific purposes (under the *Land Act 1994* (Qld)). The land is accessed from Cape Cleveland Road via the Bruce Highway.
- 14.5** The existing seawall and wharf and most of the proposed works are situated in a Scientific Research Zone within the Great Barrier Reef Marine Park – an area that has been identified specifically for conducting marine science.
- 14.6** Site selection was undertaken in the 1970's when AIMS was established. As a scientific research area within a protected zone, it represents a capability that is unique in coastal Australia

15 Zoning and Approvals

- 15.1** The existing harbour and wharf area have pre-existing approvals and permits for their construction and operation from the relevant authorities. Most of the proposed area for the works is below the Mean Low Tide level which delineates the sea from the land. AIMS is working with the state regulators and the Great Barrier Reef Marine Park Authority to secure appropriate variations to existing permissions and tenure, as required. The AIMS land is held under a deed of grant in trust and the works are in accordance with the purposes of the trust. AIMS is working with the Townsville City Council, the State Assessment and Referral Agency (Qld) and the Great Barrier Reef Marine Park Authority (Cth.) to progress the additional approvals required.
- 15.2** This proposal does not require the acquisition of additional land yet requires GBRMPA approval of the wharf extension within the Marine Park. Disposal of dredge spoil is likely at sea yet may be, with the Port of Townsville's consent, be placed on Port of Townsville land reclamation area. There will be no change to existing land use at the Cape Cleveland or harbour site.

16 Applicable Codes and Standards

16.1 Where appropriate, the design and construction of the proposed works and services will comply with any relevant and applicable sections of the following Standards and Regulations:

- (a) AS 1170.0-2002 - Structural design actions - Part 0: General Principals
- (b) AS 1170.1-2002 - Structural design actions - Part 1: Permanent, imposed and other actions
- (c) AS 1170.2-2011 - Structural design actions - Part 2: Wind actions
- (d) AS 1170.4-2007 - Structural design actions - Part 4: Earthquake actions in Australia
- (e) AS 1428.1-2009 - Design for access and mobility - Part 1: General requirements for access - new building work
- (f) AS 1657-2018 - Fixed platforms, walkways, stairways and ladders - Design, construction and installation
- (g) AS 2758.6:2019 - Aggregates and rock for engineering purposes Guidelines for the specification of armour stone
- (h) AS 3600:2018 - Concrete structures
- (i) AS 4100:1998 - Steel structures
- (j) AS 4678-2002 - Earth-retaining structures
- (k) AS 4997-2005 - Guidelines for the design of maritime structures
- (l) ACI 440.1R-15 Guide for the Design and Construction of Structural Concrete Reinforced with Fibre Reinforced Polymer Bars, American Concrete Institute.
- (m) ACI 440.6-08(17) Specification for Carbon and Glass Fibre-Reinforced Polymer Bar Materials for Concrete Reinforcement, American Concrete Institute.
- (n) Building Code of Australia (2019) National Construction Code. Building Code of Australia
- (o) Occupational Health, Safety and Welfare
- (p) Commonwealth and State legislation

16.2 A qualified and practicing specialised building certifier will certify that the design and the finished construction of the facilities meet the requirements of the Building Code of Australia, Australian Standards, and any applicable State and Local Government policies. Additional specialist engineering consultants will continue to be engaged by AIMS to ensure quality of completed works in accordance with the developed design documentation.

17 Planning and Design Concepts

17.1 The Project will provide safe, secure, and efficient work and training facilities designed to meet the function of the Project.

17.2 During the preliminary design stage, consideration was given to the selection of materials, equipment, finishes, construction techniques and buildability. All were considered for an ability to deliver economies and environmentally sustainable efficiencies on a whole-of-life basis.

17.3 Consideration was given to achieving the necessary functional requirements, workflow patterns and work environment required to fulfil the Project design criteria.

17.4 The selection of engineering services and associated equipment and energy systems, capital costs were assessed against the operational and maintenance costs.

18 Ecologically Sustainable Development, Water and Energy Conservation

18.1 The Commonwealth is committed to Ecologically Sustainable Development (ESD) and the reduction of greenhouse gas emissions. AIMS reports annually to Parliament in its Annual Report on progress in meeting statutory obligations under the *Environmental Protection and Biodiversity Conservation Act 1999* to protect and maintain the biodiversity and heritage under AIMS' control. AIMS also implements policies and strategies in energy, water, and waste management to improve natural resource efficiency and to support its commitment to reducing energy consumption, potable water consumption and waste diversion to landfill. This Project has addressed these requirements by adopting cost-effective ESD as a key objective in the design development and delivery of the Project.

18.2 The ESD targets and measures for the Project have been balanced with other requirements for AIMS buildings (e.g., security, heritage considerations, Work Health and Safety) to ensure that AIMS' operational capability is not compromised. All Infrastructure included in this Project will be designed, constructed, operated, and maintained to ensure they use energy efficiently. Where applicable, the use of the Green Star and NABERS Energy design rating tool has been adopted.

19 Provision for People with Disabilities

19.1 The Project is intended to reinstate access to field work at AIMS. AIMS has specific requirements around fitness to work at sea which excludes personnel with physical disabilities. Disabled access will not be provided to the floating pontoon or research vessels via the refurbished AIMS wharf.

20 Occupational Health and Safety

- 20.1** The proposed facility will comply with the requirements of the Work, Health and Safety Act, the AIMS Health and Safety Manual, and applicable Queensland Government Health and Safety legislation. The construction contractors will be required to develop and implement an approved Health and Safety Plan incorporating compliance with the law and AIMS Health and Safety policies.
- 20.2** The site will be secured to prevent unauthorised public access during the construction period. No special or unusual public safety risks have been identified.
- 20.3** The facility proposed to be delivered under this project will comply with the AIMS Work Health Safety Manual and the *Work Health and Safety Act 2011* (Cth).
- 20.4** The facility is not known to contain any contaminated substances, such as asbestos.
- 20.5** In accordance with the *Building and Construction Industry (Consequential and Transitional Provisions) Act 2016* (Cth), for works greater than \$4 million, contractors will also be required to hold full work health and safety accreditation from the Office of the Federal Safety Commissioner under the Australian Government Building and Construction Work Health and Safety Accreditation Scheme.
- 20.6** Safety aspects of this proposal have been and will continue to be addressed during the design process and will be documented in the Safety in Design Report completed by a Design Consultant. The successful construction contractors will also be required to submit respective Safety Plans for the construction phase prior to the start of any construction activities.

21 Structural Design

21.1 Structural design will ensure that all works are designed to the current applicable design codes (including cyclonic wind loadings, tide, and wave actions under projections for climate change) and be suited to long-term durability for exposure to seawater in a tropical environment. The height of the seawall has been increased to account for climate change impacts.

21.2 Existing structural systems will likely be replicated given they have been proven to be fit for purpose in their application and use.

22 Materials and Finishes

22.1 The materials and finishes to be utilised will largely replicate those existing which have proven suitable and fit for their associated purposes. All marine materials will be marine grade and suited to the tropical environment.

22.2 Materials and finishes will be selected from those readily available locally for their functionality, durability, low maintenance and Ecologically Sustainable Development properties. Commonwealth Government policy requires that Australian or New Zealand goods, materials and associated services will be sought and assessed in terms of value for money before seeking any overseas supply.

23 Mechanical Services

23.1 The facility expansion requires that construction services and associated equipment must achieve an economic balance between capital cost, and operation and maintenance costs. Selection will be based upon a life cycle costing analysis and particular consideration will be given to energy efficient design solutions.

24 Hydraulic Services

24.1 Domestic water supply and sanitary drainage from fixtures located within the new facilities will be via new connection to the existing site services infrastructure.

24.2 New stormwater drainage pipelines will be provided where necessary to collect stormwater runoff and direct it into the existing infrastructure system.

25 Electrical Services

25.1 The AIMS Cape Cleveland site receives electricity from the Ergon Energy substation, which connects to the AIMS Cape Cleveland site. This supply is sufficient to meet the increased load requirement to accommodate the new infrastructure within the AIMS Cape Cleveland site.

25.2 Related concurrent works (funded through NCRIS) will, however, occur within the AIMS site to complete the National Sea Simulator Seawater intakes. This will help meet AIMS needs for additional sea water for the expanded Sea Simulator facility

25.3 Lighting, power, lightning protection, and fire protection will be provided to the infrastructure in accordance with the relevant Australian Standards. Electrical infrastructure and switchboards will have spare capacity to allow for future growth or increased demand.

26 Fire Protection

26.1 All construction and fire protection requirements will, as a minimum, be in accordance with the provisions of the Building Code of Australia (BCA) and all other applicable Codes and Standards. .

27 Civil Works

27.1 Civil assessments were carried out during the early design stage at the site location. There were no site conditions identified that pose any major civil engineering requirements; however, the site will be the subject of further survey and geotechnical investigation during detailed design.

27.2 New wharf access roadways will be constructed of concrete, which is deemed the most cost effective and appropriate pavement solution for the Project.

28 Landscaping

28.1 Minor landscaping works will focus on the restoration of areas disturbed during construction.

29 Security

29.1 In accordance with Government initiatives to improve physical security arrangements across Departments, advice from designated security authorities will be incorporated into the design solutions for the proposed facility as appropriate. The security threat assessment will be reviewed during the detailed design phase and the new facility will be secured as appropriate to the classification level required for the activities to be conducted. Appropriate security protection will be provided in accordance with AIMS security policies and specific Project requirements e.g., Video surveillance.

30 Noise and Acoustics

30.1 The acoustic performance within the facility will comply with the Building Code of Australia (BCA), relevant Australian Standards, Worksafe National Standard for Occupational Noise (NOHSC:1007(2000)), National Code of Practice for Noise Management and Protection of Hearing at Work (NOHC:2009(2000)) and the EPA Noise Policy.

30.2 It is not envisaged that this Project will increase noise output and therefore will not adversely affect the surrounding environments. Externally located mechanical plant will be appropriately selected and treated to minimise noise impact on the environment within a suitable internal and external noise range.

31 Information Communication and Technology

31.1 Passive and active information communication and technology infrastructure works will be provided for the Project. The existing site communications fibre optic cable and cable infrastructure will be extended to support the anticipated information, communication and technology services required for the new facilities.

32 Project Cost

- 32.1** The estimated out-turned cost for the Project is \$24,940,000 (excluding GST). This cost estimate includes the construction costs, professional fees, fittings and equipment, IT infrastructure and equipment, contingencies, and an escalation allowance.
- 32.2** A modest increase in net operating costs is expected due to the construction of the new facilities and the associated increases in facilities maintenance, and utilities expenses.
- 32.3** There will be net benefit for the community through reduced road traffic on the Bruce highway, increased availability of scarce port resources and improved science outcomes as AIMS scientists spend additional time on their work rather than field logistics.

33 Project Delivery System

- 33.1** AIMS has engaged a Project Manager to manage the design phase through to completion of 100% design. This Project Manager is the same Project Manager that is delivering the National Sea Simulator Expansion project as there are cost and operational synergies that can be exploited in Project Management and construction activities projected to be approximately \$1M per project. These savings have been accounted for in both project budgets.
- 33.2** A Project Manager and Contract Administrator will be appointed to manage the procurement and construction phase of the project through to the completion of construction, including the defects liability period.
- 33.3** Subject to Parliamentary approval of the project, the works will progress to construction via a single construction contract. The construction contractors will be actively consulted during detailed design.
- 33.4** AIMS has implemented Internal Project Governance via the establishment of a Project Board. Comprising relevant senior management and specialist staff with technical expertise, the Project Board will oversee the specifications for the proposed works and communications with staff as well as external stakeholders.
- 33.5** The AIMS Executive Director Strategic Development is the project sponsor and will report to the AIMS Chief Executive Officer, AIMS Leadership Team and the AIMS Council.

34 Risks

- 34.1** The project is considered medium risk given this is an expansion to an existing facility with demonstrated technologies and processes with known lessons learned but construction is progressing in a materials and labour constrained environment where some construction volumes are changing.

34.2 Following risk workshops and risk registers being developed the following key risks have been identified:

- The cost risk if the project is delayed by bureaucratic (PWC, tenure) or environmental approvals. This has implications for both the National Sea Simulator and this project as there are significant cost savings associated concurrent delivery of these projects.
- Significant cost escalation exceeding current budget allocations. Whilst contingency and escalation allowances are factored into both project budgets, the extent of escalation is subject to significant uncertainty. In the past 12 months, significant price escalation in the building and civil construction industries has occurred. This price escalation has flowed through the marine infrastructure projects. There is a significant risk that the current escalation allowances within the budget do not account for the potential market response. This risk is being mitigated through progressive pricing by the independent quantity surveyor throughout key phases of the design programme as well as market engagement via early contractor engagement sessions during the detailed design.
- Cost risk associated with uncertainty of dredge volumes. The marine environment is constantly changing the certainty of volume of material to be removed needs to be finalised closer to the commencement of construction activities. AIMS have identified a potential dredging solution that will reduce costs, but this is yet to be approved by regulators.
- The project interface risk to AIMS, given the project aligns with the Seawater Intake phase of the Sea Simulator expansion. It is intended to tender both projects together to reduce risk and gain advantages of synergy.
- The reputation risk to AIMS should the Project fail to achieve its objectives.
- Geotechnical risk from variable ground conditions. Additional geotechnical assessments will be completed to mitigate this risk.

- Environmental approvals associated with varied license conditions may impact project timelines. AIMS has progressed early engagement with key authorities to mitigate this risk.

35 Project Schedule

35.1 Subject to Parliamentary approval of the Project, construction works are expected to commence in September 2022, with staged completion of the facilities occurring from then until the end of June 2024.

35.2 The project will submit a post-implementation report within three months of the completion of the project.

36 Attachments

Attachment 1: List of Abbreviations

Attachment 2: Location Map

Attachment 1 – List of Abbreviations

AIMS	Australian Institute of Marine Science
BCA	Building Code of Australia
EPA	Environmental Protection Agency
ESD	Ecologically Sustainable Development
JCU	James Cook University
HV	High Voltage
IT	Information Technology
NCRIS	National Collaborative Research Infrastructure Strategy
Project	AIMS Wharf Remediation
PWC	Parliamentary Standing Committee on Public Works
Reefworks	Tropical Marine Autonomous Technology Testing Range
RRAP	Reef Restoration and Adaption Program

Attachment 2: Location Map

