



Australian Government

**Department of Infrastructure,
Regional Development and Cities**

Proposed Replacement of the Wharf Crane and Mooring Systems

Christmas Island, Indian Ocean Territories

**Statement of Evidence
to the
Parliamentary Standing Committee
on Public Works**

**Canberra, ACT
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Proposed Replacement of the Wharf Crane and Mooring Systems on Christmas Island

Summary

1. The Australian Government, represented by the Department of Infrastructure, Regional Development and Cities (the Department) is responsible for the provision, management and operation of the port facilities (the Port) on Christmas Island.
2. This submission by the Department provides evidence to the Parliamentary Standing Committee on Public Works (PWC) on the proposed replacement of the wharf crane and mooring systems on Christmas Island (the proposed works).
3. Ageing and increasingly unreliable Port assets continue to impact the Australian Government's capacity to safely and effectively provide Port operations, to support the social and economic well-being of the community, and Australia's strategic capability in the Indian Ocean region.
4. The proposed works will provide a significant positive impact by addressing safety and operational risks to the Australian Government, ensuring the adequacy of critical infrastructure and supporting Australia's strategic interests. The proposed works will also promote the physical well-being, social welfare and economic stability of the Christmas Island community.

Purpose of the Works

5. This proposal will address identified safety and operational concerns associated with the Port's ageing wharf cranes and mooring systems, in order to:
 - a. ensure the Port can continue to operate with a higher level of safety and with increased reliability;
 - b. provide greater capacity and increased operational flexibility into the future; and

- c. reduce the escalating ongoing repair costs.
- 6. Through undertaking these capital works, the Department will also be meeting its obligation to provide this remote and isolated community with access to a level of services comparable to similar mainland communities, such as regular deliveries of essential supplies.

Identification of the Need

Background

- 7. Australia's Indian Ocean Territories (IOT) comprise the non-self-governing territories of Christmas Island (CI) and the Cocos (Keeling) Islands (CKI). Both territories are governed directly by the Australian Government, which fulfils the role of Commonwealth and State Government.
- 8. Being remote and isolated island communities, the IOT are heavily dependent upon reliable Port facilities for access to regular deliveries of essential supplies by sea-freight.
- 9. The Australian Government owns all of the IOT Port's onshore assets (fixed and mobile) and a number of offshore assets and vessels. The assets are maintained on behalf of the Australian Government, by Linx Stevedoring Pty Ltd (Linx), under a service delivery contract with the Department for the provision of Port facilities management services.
- 10. On CI, the Port infrastructure is located across three discrete locations: Flying Fish Cove (FFC), Smith Point and Norris Point (Nui Nui). A Locality Plan is included at **Attachment 1**.
- 11. Port operations currently take place in FFC and at Smith Point. The Nui Nui facility commissioned in December 2004, and intended to be an alternate freight off-loading facility, had been used on only four occasions before storm damage to the mooring system effectively rendered the facility non-operational in 2014.
- 12. While the original design concept for Nui Nui included a landing and stairs to facilitate vessel access, they were not constructed at the time due to budget restrictions. Without

these landing facilities and an access road suitable for heavy vehicles, the Port could not be safely and effectively utilised.

13. Currently there are two wharf cranes (one operational and one non-operational) and six mooring berths (five operational and one non-operational) located across the three sites utilised, as follows:
 - a. Flying Fish Cove:
 - (i) Wharf crane - a Favelle Favco M760 wharf-mounted tower crane.
 - (ii) Mooring Systems - comprising an outer mooring system and an inner mooring system, with shared componentry, which services the Rock and Crane Berths.
 - a. Rock Berth - a six-point mooring for vessels loading phosphate via two cantilever loaders that are owned and operated by the local phosphate mine.
 - b. Crane Berth - a six-point mooring for freight and bagged phosphate vessels.
 - b. Smith Point:
 - (i) Tanker One Berth - a five-point mooring.
 - (ii) Tanker Two Berth - a three-point mooring.
 - (iii) Passenger Berth - a two-point/two heading mooring (or a single point mooring between the span extensions for large cruise ships).
 - c. Norris Point (Nui Nui):
 - (i) Wharf crane - a Favelle Favco M440 tower crane (non-operational).
 - (ii) Nui Nui Berth - a two point/two head mooring (non-operational).
14. In 2017, the Port received 179 vessels at berth; 51% of which moored at Smith Point, 34% at the Rock Berth in FFC, and 15% at the Crane Berth.
15. Of the vessels berthed, 48% were Royal Australian Navy and Australian Border Force vessels, 42% phosphate vessels (servicing the phosphate mine operated by Phosphate Resources Ltd.), 7% general cargo vessels, and 3% fuel tankers.

Need for the Work

16. Technical investigations and ongoing consultation with major users of the Port have identified a range of concerns regarding the safety, capability and adequacy of key elements of the existing infrastructure.
17. In addition, the wharf crane and mooring systems in FFC both recently experienced critical failures, requiring costly emergency repairs, and disrupting Port operations. Without immediate replacement, these ageing assets will continue to fail and severely impact Port operations, which support Australia's strategic capability in the region, and ensure the sustainability of this isolated island community.
18. Addressing these operational and safety risks is also a high priority for the Department in order to meet its obligations under the *Services to Territories Program 4.1*, by delivering essential infrastructure to support the provision of a comparable level of services to similar communities.
19. Beyond the local impact, are the significant costs associated with undertaking urgent and unplanned repairs, as well as the costs of putting in place interim measures to enable limited Port operations while the critical infrastructure is unavailable. Over the past eighteen months, these costs have exceeded \$3.2 million. Capital investment now will help mitigate the risk of further unplanned and expensive repairs, the costs for which may continue to accrue if the replacement works are delayed.
20. Furthermore, the phosphate export industry on CI, a major user of the Port, is moving towards the utilisation of larger vessels for reasons of safety, environmental impacts and commercial viability. As such, there is also a requirement for the Port infrastructure to evolve to accommodate these larger vessels, in order to support the export operations of the mine and maintain the economic viability of the island.

Existing Infrastructure

FFC Wharf Crane

21. The existing Favelle Favco M760D wharf-mounted tower crane at FFC, which is the primary freight-handling crane for the Port, was not built specifically for marine purposes and operates in an exposed and harsh marine environment.
22. The existing crane's limited reach also constrains vessel size and Port operations, and introduces risk due to vessels being required to be moored close to the cliff face and the potential for swell at the rock face.
23. To minimise the risk, ships' captains position the vessels at the limit of the crane capacity for each lift. This practice, whilst reducing the operational risks to vessels, increases the forces on the crane structure and reduces its life.
24. The replacement of the existing crane with an upgraded marine crane will provide a safer solution with regard to vessel and crane operation, reduce the number of lifts at full capacity, reduce ongoing maintenance costs, and provide greater operational reliability and increased flexibility with regard to reach and load capacity.

FFC Mooring Systems (inner and outer moorings)

25. FFC is the main cargo facility on CI and comprises two mooring systems: an outer mooring system and an inner mooring system, with shared componentry, which services the Rock and Crane Berths.
26. The outer mooring system is used predominantly for bulk phosphate operations, while the inner mooring system is used both for bagged phosphate operations and vessels coming alongside for general cargo supply.
27. The FFC mooring systems are currently serviceable, however since 2016 they have required urgent repairs on at least four occasions to return the moorings to their full operational capacity. In addition, the existing components and configuration no longer meet the current or future operational requirements of the Port users, and the outer

mooring system is now four years beyond its six-year design life (having been due for replacement in 2014).

28. The inner mooring system was replaced in 2013, following the wrecking of the *MV Tycoon*. According to the findings of the Australian Transport Safety Bureau (ATSB) investigation into the incident,¹ one of the mooring lines holding the vessel in position came free from its anchor in heavy sea conditions, contributing to the ship being pounded against the rock face.
29. The inner mooring system is now approaching the end of its design life and requires replacing. If, as is proposed, the existing FFC wharf crane is replaced by a crane with greater reach and lifting capacity, the mooring layout will also require reconfiguration to suit.

Smith Point Mooring System

30. The Smith Point mooring system supports fuel bunkering and large vessel refuelling, handling bulk distillate and medium fuel oil for both power generation and the operations of Phosphate Resources Ltd (PRL).
31. This mooring system is primarily used to moor tanker vessels while discharging bulk fuel for on-island consumption by the community, industry and the Australian Government. For example, diesel is delivered in bulk to provide for power generation, fuel for passenger and commercial vehicles and plant, oil to support commercial mining operations and for the refuelling of Australian Border Force (ABF) and Royal Australian Navy (RAN) vessels on station as part of Operation Sovereign Borders. Occasionally, Smith Point is also used to moor ABF and RAN vessels when weather and swell conditions allow.
32. In 2009, driven by a need to diversify the island's economy, the Smith Point mooring system was re-configured to accommodate cruise ships up to the size of the *Pacific Sun* (approximately 47,000 tonne and passenger capacity of 1,500). At the time, it was

¹ ATSB, *Foundering of the general cargo ship Tycoon*, May 2013

intended that the cruise ships would moor at Smith Point, with passengers being transferred to and from the ship via a tender vessel to the jetty in FFC. However, only three cruise ships have moored at Smith Point in that time, mainly due to the cruise ships visiting during the swell season, making it challenging to safely access and/or approach CI.

33. The 2009 alterations to the Smith Point mooring system inadvertently resulted in less safe berthing operations for vessels off-loading fuel or refuelling, due to the repositioning of the buoys. Further, the type of breast buoys installed during the reconfiguration have proven not to be sufficiently robust to withstand the onset of north-westerly swells; and have insufficient deck surface area to facilitate safe buoy jumping operations to catch and release mooring lines.

Nui Nui Wharf Crane and Mooring System

34. The Nui Nui facility at Norris Point was constructed in 2004 as a fuel off-loading facility to support the now defunct Asia-Pacific Space Centre (APSC) project. Following the termination of the APSC project, the intention was for Nui Nui to be used as an emergency off-loading facility for cargo and fuel.
35. The Nui Nui mooring system has only been used four times in the last fourteen years, and the intended purpose of the system as an emergency off-loading facility is now largely redundant, due to the Department since putting in place measures to reduce the risk of running low on aviation fuel supplies and perishable food stocks. These measures included increasing the bulk storage capacity of aviation fuel at the airport, and introducing a regular air-freighter service.
36. In 2014, the Nui Nui moorings failed after being impacted by severe weather and damaging swell conditions associated with Cyclone Gillian; effectively rendering the system non-operational. To prevent further damage to the system, three buoys were removed from the water in early 2015. At present, the Nui Nui mooring system remains inoperable.

37. The Favelle Favco M440D wharf-mounted tower crane installed at Nui Nui is now 25 years old. Following an inspection undertaken in May 2016, the manufacturer recommended the crane not be operated in its current state.
38. While the Port operator continues to undertake routine inspections of the crane as required under the agreed maintenance schedule, there are no financially viable repair options available to reinstate the crane into operation.
39. Removal and off-island disposal of the crane and remaining mooring system componentry will relieve the Australian Government of the ongoing maintenance liability for these assets, and remove the potential for unauthorized and high-risk use of remaining mooring componentry.

Description of the Proposal

40. In order to address the safety and operational concerns identified in the previous section, a variety of replacement, upgrade, decommissioning and off-island disposal works are proposed.
41. The proposed works are categorised into three project elements, based on location:
 - **Project Element 1 - Flying Fish Cove.** Comprises replacement of the existing wharf crane and upgrade of the crane foundation and mooring systems.
 - **Project Element 2 - Smith Point.** Comprises replacement, upgrade and reconfiguration of the mooring system.
 - **Project Element 3 - Nui Nui.** Comprises decommissioning and the off-island disposal of the wharf crane and remaining components of the moorings system.
42. The infrastructure works proposed reflect the key operational and maintenance requirements of the Port operators and major Port users.

Options Considered to Fulfil the Identified Need

43. To meet the identified need, the Department has considered a range of options for the respective project elements, including re-use or upgrade of existing infrastructure, where appropriate. The options development and analysis process involved user consultation to define the functional requirements, and investigation of the existing infrastructure and conditions at the respective locations.
44. For each of the project elements, a Status Quo (or ‘do nothing’) approach was considered during the investigation and option analysis process. However, in each case the ‘do nothing’ approach was determined not to be a feasible option to meet the identified need, and was eliminated from further consideration.
45. Where appropriate, a qualitative and quantitative comparative assessment of the options was undertaken to determine the preferred option, taking into consideration assessment criteria such as: ability to meet user requirements; estimated capital and operating costs; operational safety and efficiency outcomes; and environmental impacts.

FFC Wharf Crane Options

46. Given reach limitations and the aged condition of the existing wharf crane, there is no financially viable option to refurbish the existing crane to meet the ongoing needs of the Port.
47. An assessment of various options to replace the existing FFC wharf crane was undertaken in 2015. Based on the specified user requirements and selection criteria at that time, it was determined that replacement of the existing Favelle Favco M760D tower crane needed to meet the following minimum operational requirements:
 - a. Lift capacity of 45 tonne (t) at a reach of 45 metres (m) to provide flexibility and options for vessel orientation,
 - b. Hoist speed greater than 25 m per minute; and
 - c. Designed for marine operations.

48. Subsequent stakeholder consultation undertaken in 2017 confirmed that the key capacity and operational requirements on which the 2015 assessment was based remain valid. Accordingly, consideration of further replacement crane requirements was not required.

FFC Crane Foundation Options

49. Although a ‘do nothing’ option was considered (for completeness), the new crane proposed will impose substantially larger loads on its supporting foundation; as such, a more robust foundation is required.
50. Accordingly, the primary driver for options associated with the crane foundation related to the location of the existing foundation. The foundation options considered included:
- a. **Option 1 - Upgrade existing crane foundation to allow for new crane.** Install the new crane in the same location as the existing and upgrade the existing foundation platform.
 - b. **Option 2 - New offshore foundation.** Build a new piled foundation offshore from the existing cliff line. This would allow the crane to be moved further south (seaward) and increase the clearance of the ships to the existing structure supporting the phosphate loader. Personnel access to the foundation would be via a trussed walkway between the wharf and the foundation.
 - c. **Option 3 - New landward foundation.** This option would see the crane installed on a new foundation across the existing wharf space, and require the installation of 16 rock anchors around the perimeter of a concrete foundation. While this option simplifies the construction requirements compared to the offshore foundation option (Option 2), it has two significant drawbacks:
 - (i) the outreach of the new crane would only be improved by approximately 5 metres (m), instead of the 15 m improvement achieved by installing the new crane in the existing crane location (Option 1); and
 - (ii) it would reduce the (already limited) operational hardstand space available on the wharf, which is considered an unacceptable outcome by key project stakeholders.
51. Based on a qualitative and quantitative comparative assessment of the options, **Option 1 - Upgrade existing crane foundation to allow for new crane** was determined to

represent the best value for money solution, as it meets the operational requirements while minimising construction related risks (including geotechnical constructability risks, potential environmental impact and impact on wharf operations).

FFC Moorings Options

52. The options considered for the FFC (inner and outer) moorings primarily related to the extent of modification to the existing moorings configuration, and the extent of new versus re-use of some of the existing mooring components, to accommodate the larger vessels.
53. The options were developed on a progressive basis as the specific user requirements for the moorings system were refined during the Concept Design phase (mid-to-late 2017). A summary of the overall options considered is as follows:
 - a. **Option 1: Simultaneous Mooring Configuration.** This option involved separate mooring systems for the Rock and Crane Berths, to allow mooring of vessels at the Rock Berth and Crane Berth simultaneously. This option generally required new mooring elements to be installed, with use of existing elements where practicable. While this option is preferred by a key user of the Port (PRL), catering for simultaneous mooring of vessels at the Rock and Crane Berths is not deemed critical to achieving the project objectives, and introduces additional operational safety risks.
 - b. **Option 2: Shared Mooring Configuration (Single Vessel Mooring) - Adaptive re-use of existing mooring components.** This option primarily utilised existing mooring components at the Crane and Rock Berths, and involved only minimal new mooring componentry while allowing for berthing of a 200 metre (m) vessel at the Rock Berth, or a 110 m vessel at the Crane Berth.
 - c. **Option 3: Shared Mooring Configuration (Single Vessel Mooring) - Combination of New and Adaptive Re-use.** This option involved utilising a combination of new and existing mooring componentry across the Rock and Crane Berths. This option is similar to Option 2, however, involved a greater amount of new componentry (versus re-use of existing componentry), and provided greater operational flexibility as it also enables berthing of a 130 m vessel at Rock Berth.

54. Following a qualitative and quantitative comparative assessment of the options (in late 2017) and review of the criticality (or otherwise) of simultaneous mooring capability at the Port, **Option 3: Shared FFC Mooring Configuration - Combination of New and Adaptive Re-use** was determined to represent the best value for money solution. This assessment took into consideration capital and operating (Whole of Life) costs, as well as its ability to meet users' requirements while minimising operational safety risks and impact on Port operations.
55. Re-use of existing componentry, where the condition is uncertain, is considered too high a risk.
56. At PRL's request, the Simultaneous Mooring Configuration option (Option 1) was reconsidered by the Department during the design development process in early 2018. However, as simultaneous mooring of two vessels at FFC increases operational safety risks, which would have additional implications for Port operations and is not considered critical to meeting the objectives of the project, Option 3 remains the recommended option.

Smith Point Moorings Options

57. The primary driver for options associated with the moorings at Smith Point relates to vessel berthing orientation. The options considered included:
- a. **Option 1 - Parallel berthing.** A six-point mooring system which facilitates mooring of a 150 metre (m) tanker or 150 m cruise ship parallel to the shore.
 - b. **Option 2 - Parallel or perpendicular berthing.** A six-point mooring system which facilitates mooring of a 150 m cruise ship or 150 m tanker parallel to the shore (as with the previous option), or mooring of a 150 m tanker perpendicular to the shore (using a four-point mooring configuration). Providing the perpendicular mooring functionality improves the operational safety of fuel bunkering and vessel refuelling operations, particularly during adverse weather conditions (i.e. during swell season).
58. Based on a qualitative and quantitative comparative assessment of the options, **Option 2 - Parallel or perpendicular berthing** was determined to represent the best value for

money solution, by addressing operational safety risks and facilitating year-round access to the fuel facility (including during swell season).

Nui Nui Wharf Crane and Moorings Disposal

59. In December 2016, the Department undertook an options assessment for the Nui Nui moorings system which considered (amongst other matters):
- the current condition of the residual moorings componentry which is not operational; and
 - the reduced need for an ‘emergency off-loading facility’ on CI (as a result of the Department’s recent ‘Fuel Consolidation Project’, which increased the bulk quantity of aviation fuel maintained at the airport).
60. Based on the findings of this options assessment, it was recommended that the remaining salvageable mooring componentry be removed and disposed of (off island).
61. Given the basis upon which this recommendation was made remains valid, and both the existing crane and the moorings system at Nui Nui are currently inoperable, further options investigation and consideration was not required.
62. Accordingly, it is recommended that the crane and remaining salvageable mooring componentry be decommissioned and disposed of (off-island).

Other Issues

Environmental Impact Assessments

63. Based on the outcome of an environmental assessment undertaken in 2017 using initial concept designs, referral of the project to the Department of the Environment and Energy (DotEE) under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) is not considered necessary.
64. Site-specific Construction Environmental Management Plans will be developed, which will outline management procedures to minimise and mitigate environmental impacts during the construction of the project.

65. In accordance with the findings of the environmental assessment, a marine fauna spotter will be engaged by the Construction Contractor to monitor the project area prior to piling commencing to ensure the area is free of marine mammals and turtles when pile driving commences.

Heritage Considerations

66. The environmental assessment also considered archaeological and heritage considerations, and concluded that the proposed works are not expected to result in negative impacts on any terrestrial or marine heritage sites.

Key Legislation

67. The following legislation is relevant to this project:
- a. *Building and Construction Industry (Consequential and Transitional Provisions) Act 2016* (Cth);
 - b. *Building and Construction Industry (Improving Productivity) Act 2016* (Cth);
 - c. *Work Health and Safety Act (WH&S) 2011* (Cth);
 - d. *Fair Work Act 2009* (Cth); and
 - e. *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

Details of Applicable Codes and Standards

68. The design of the proposed works will comply with all relevant and current Australian standards, codes and guidelines.
69. The latest edition of the following design standard codes will be the basis of the design for the crane foundation:
- a. AS 4997: Guidelines for the Design of Maritime Structures;
 - b. AS 1170: Structural Design Actions – Loading Codes;
 - c. AS 3600: Concrete Structures;
 - d. AS 4100: Steel Structures;
 - e. AS 1554: Structural Steel Welding;
 - f. AS 2159: Piling Code;

- g. AS 1657: Fixed Platforms, Walkways, Stairways and Ladders;
 - h. AS/NZS 2312 Guide to the Protection of Structural Steel against Atmospheric Corrosion by the use of Protective Coatings; and
 - i. As2832.3: Cathodic Protection of Metals – Part 3: Fixed Immersed Structures.
70. There are no Australian Standards governing the design of moorings. The following documents shall be used to inform the design.
- a. GL Noble Denton guidelines for moorings 0032/ND;
 - b. BS6349-6 (withdrawn in 2014): Maritime structures. Design of inshore moorings and floating structures;
 - c. ISO 19901-7 : Petroleum and natural gas industries -- Specific requirements for offshore structures -- Part 7: Station keeping systems for floating offshore structures and mobile offshore units;
 - d. API-2SK (superseded by the ISO document): Design and Analysis of Station keeping Systems for Floating Structures; and
 - e. PIANC Guidelines for the design of fender systems (for vessel parameters).

Details of Consultation Carried Out Among Relevant Stakeholders

71. The Department recognises the importance of providing Port users and other interested stakeholders an opportunity to provide input into, or raise concerns relating to infrastructure projects such as this.
72. Consultation has occurred with the following key Australian Government stakeholders:
- a. Australian Border Force (ABF): has responsibility for delivery of customs services and border protection functions for CI and related waters on behalf of the Australian Government.
 - b. Australian Federal Police (AFP): has responsibility for delivery of policing services on CI on behalf of the Australian Government.
 - c. Royal Australian Navy (RAN): undertakes naval operations in the vicinity of CI on behalf of the Australian Government.
73. Consultation has occurred with the following key industry stakeholders:
- a. Linx Stevedoring Pty Ltd (Linx): the manager of the CI Port assets on behalf of the Australian Government;

- b. Indian Ocean Stevedores (IOS): responsible for the delivery of marine pilot services for the CI Port;
 - c. Complete Stevedoring & Freight Services (CSFS): responsible for the delivery of stevedoring services;
 - d. Zentner Shipping: operates commercial sea freight services to Christmas Island;
 - e. Phosphate Resources Limited (PRL): the major user of the Port infrastructure; and
 - f. Indian Ocean Oil Company (IOOC): a subsidiary of PRL and current holder of the Australian Government's Diesel Fuel Supply Contract for Christmas Island.
74. The Harbourmaster, who acts as the Port Users' Representative, has been actively consulted on an ongoing basis during the development of the designs and proposed scope of works, including attendance at key stakeholder workshops and meetings, and involvement in design reviews at key design milestones. Ongoing engagement with key stakeholders has, and will continue through the Port Users' Representative's involvement in the review process for key project documentation.
75. Consultation has occurred with the following individuals and organisations with an interest in the project:
- a. Shire of Christmas Island (SOCI);
 - b. Christmas Island Tourism Association (CITA);
 - c. Christmas Island Phosphate (CIP): a subsidiary of PRL;
 - d. Local business;
 - e. IOT Administrator; and
 - f. The broader Christmas Island community.

Scope of Works

Details and Reasons for Project Location and Site Selection

76. The purpose of the project is to address identified safety and operational concerns associated with the Port's ageing wharf cranes and mooring systems, and as such, the works relate to demolition, replacement and upgrade of assets within the established Port sites at FFC, Smith Point and Nui Nui.
77. As identified previously, the Port facilities at FFC and Smith Point are currently in operation, with established wharf facilities at FFC and established fuel bunkering facilities and storage tanks at Smith Point.
78. The Department is in the process of developing a Masterplan for the Port facilities. However, there is no intent on behalf of the Commonwealth, or at the recommendation of key stakeholders, that the location of these Port facilities be reconsidered in the foreseeable future; particularly given that supporting infrastructure for Port operations has already been established in the vicinity.
79. Conversely, the Nui Nui infrastructure, which previously enabled the Nun Nui site to serve as an 'emergency offloading facility', is currently inoperable and reinstatement of operations at this location is not considered appropriate by the Department, given the greatly reduced need of such a facility and the fact that reactivation of the Norris Point facility is subject to strict environmental, safety and heritage controls. Accordingly, demolition works are proposed to be carried out at the Nui Nui site to remove damaged and redundant infrastructure.

Description of Works

80. The works proposed to be delivered under the project comprise a variety of replacement, upgrade, decommissioning and off-island disposal works. The following sections outline the works proposed at each of the locations.

Project Element 1 - Flying Fish Cove

81. The proposed scope of works at FFC is detailed in the drawings included at **Attachment 2**, and comprises:
- a. Replacement and upgrade of the existing wharf crane to meet operational requirements, including:
 - (i) decommissioning and off-island disposal of the existing crane;
 - (ii) upgraded crane foundation; and
 - (iii) installation of a new wharf crane.
 - b. Upgrade of the FFC Moorings System to increase capacity (to safely accommodate larger vessel sizes) and align with upgraded wharf crane, including:
 - (i) installation of new componentry for outer mooring system;
 - (ii) combination of new mooring components and adaptive re-use of existing components for inner mooring system; and
 - (iii) decommissioning and off-island disposal of the existing mooring components (where not suitable for re-use within the new system).

Project Element 2 - Smith Point

82. The scope of works at Smith Point comprises reconfiguration of the moorings system to ensure safe fuel bunkering and vessel refuelling, while maintaining the ability to moor cruise ships (up to 150 m). This scope includes:
- a. Replacement, upgrade and reconfiguration of the existing mooring system; and
 - b. Decommissioning and off-island disposal of the existing components no longer required as part of the upgraded mooring system.
83. Drawings summarising the proposed works are included at **Attachment 3**.

Project Element 3 - Nui Nui

84. The scope of works at Nui Nui is detailed in the drawing included at **Attachment 4** and comprises:
- a. Decommissioning and off-island disposal of the existing wharf crane; and
 - b. Removal and off-island disposal of the remaining components of the Nui Nui mooring system.

Public Transport, Local Road and Traffic Concerns

- 85. There will be no significant permanent impact on local roads or increase in traffic as a result of this project.
- 86. Due to the location and nature of the proposed works, there will be minimal increase in traffic during construction. Contractual arrangements within the construction contract will mitigate the effects of this increase on the local road network through the development of traffic plans within the Site Management Plan.

Information on Zoning and Local Approvals

- 87. Since all proposed works will occur on Commonwealth land or in Commonwealth waters, there will be no change to existing land and water use conditions.

Impact on Local Community

- 88. The proposal will generate short-term employment opportunities, predominantly in the construction labour market on CI. The proposal will also generate some off-site job opportunities through the manufacture and transportation of materials over the construction period. This will provide a positive economic stimulus for small and medium enterprises on CI and in areas where manufacture and transportation is proposed.
- 89. The proposed works will provide a significant positive benefit to the local community by addressing safety and operational risks, ensuring the adequacy of critical infrastructure and providing more reliable freight off-loading operations on the island.
- 90. To ensure that any disruption to business continuity is minimised, the proposed construction works will be staged appropriately and existing back-up mobile plant infrastructure can be utilised to assist with Port operations.

Planning and Design Concepts

- 91. The general design philosophy for the proposed port infrastructure incorporates the following considerations:

- a. provision of cost effective and functional infrastructure suitable for the climate of the site;
- b. maximum use of existing infrastructure and facilities to minimise capital costs;
- c. use of readily available and durable materials that combine long life while minimising maintenance;
- d. structural design taking into account future flexibility and projected demand; and
- e. recognition of site constraints and functional relationships to existing facilities.

Structural Design

- 92. The proposed new crane foundation will be an extension of the existing crane foundation with strengthening to the existing backstay arms and installation of two new piles. The proposed works will also include infill of the existing cliff undercut directly under the crane foundation.
- 93. The design will comply with the relevant Australian Standards.

Materials

- 94. Materials and finishes are to be selected to provide durability and ease of maintenance in a marine environment, in a tropical climate.

Mechanical Services

- 95. The proposed crane is designed and constructed by the crane manufacturer to comply with the design requirements.
- 96. There is no requirement for design of mechanical services or amendments to existing services proposed as part of the proposed works.

Hydraulic Services

- 97. No new hydraulic services or amendments to existing hydraulic services are proposed as part of the proposed works.

Electrical Services

98. The new FFC crane will not require external power supply from site. As such, there is no requirement for electrical services as part of the proposed works.

Acoustics

99. The new facilities will comply with the National Construction Code - Building Code of Australia and Australian Standards for noise and acoustics.
100. During construction, there is expected to be some short-term noise impacts associated with the use of heavy construction equipment and marine pile driving works in FFC.
101. Noise impacts during the construction period will be limited in duration and are unlikely to significantly impact community members, with the closest residential dwelling being approximately 500 m from the project site in FFC. The community will, however, be informed of the project and notified of the dates and times that construction activity will be undertaken.
102. Construction noise and vibration (particularly under water pile driving) may also affect marine fauna.
103. In accordance with the Environmental Assessment undertaken in 2017, a marine fauna spotter will be engaged by the Construction Contractor to monitor the project area prior to piling commencing to ensure the area is free of marine mammals and turtles when pile driving commences.

Landscaping

104. Due to the nature of the project, there is no requirement for landscaping works.

Civil Works

- 105. The civil works proposed for the crane replacement works will include excavation of the existing wharf slab to expose the crane foundation backstay arms and anchors to allow for strengthening works to the arms, and reinstatement of the ground and wharf slab.
- 106. All debris resulting from excavation shall be removed off island in compliance with local government requirements.
- 107. Materials to be used as fill will be obtained from excavation cutting in works, or imported from approved sources off-site.

Environmental Sustainability

- 108. A key Department project requirement is to deliver a sustainable outcome for the Australian Government by improving the safety and efficiency of existing Port operations where appropriate through upgrade of existing infrastructure where required and removal of unnecessary infrastructure, which presents safety hazards and ongoing maintenance liability.

Energy Targets

- 109. There are no applicable energy targets for this proposal.

Measures to Reduce Energy and Water Use

- 110. Due to the nature of the proposed works, no measures to reduce energy or water use are applicable.

Re-use of Existing Structures

- 111. Re-use of existing infrastructure has been considered where appropriate throughout the design development and options review process.
- 112. Although the aged condition of the existing infrastructure has generally rendered it unsuitable for re-use, the proposed works include upgrading the existing FFC crane foundation, which is still well within its design life, and minimal re-use of some mooring componentry at FFC where the condition of such componentry is suitable for re-use.

Demolition and Disposal of Existing Structures

113. All crane and moorings infrastructures demolished as part of the proposed works will be undertaken in accordance with AS 2601, removed from island, and disposed of at appropriately licenced facilities off island.

Master and Site Planning

114. Proposed works are consistent with the port Masterplan under development for the respective locations, and usage remains consistent with existing marine and land usage.

Provisions for People with Disabilities

115. In accordance with the National Construction Code – Building Code of Australia 2016 Section D3, the nature of proposed works are not required to provide access for people with a disability. The crane foundation is considered class 10b which is a non-habitable structure and is not applicable for BCA.

Childcare Provisions

116. Due to the nature of the proposed works, there is no requirement for additional childcare facilities.

Security

117. Due to the nature of the proposed works, there is no requirement for additional security works as part of the Project. Existing security arrangements at the Port remain appropriate for the proposed new infrastructure.

Fire Protection

118. All construction and fire protection requirements will be in accordance with the provisions of the National Construction Code 2016, and all other applicable Codes and Standards.

Workplace Health and Safety Measures

- 119. The facilities proposed to be delivered under this project will comply with the Department's WHS Policy and the *Work Health and Safety Act (WHS) 2011* (Cth).
- 120. In accordance with Section 11(4) of the *Building and Construction Industry (Consequential and Transitional Provisions) Act 2016* (Cth), 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.
- 121. Safety aspects of this proposal have been addressed during the design process and are documented in the Safety in Design Report completed by the 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.

Cost Effectiveness and Public Value

Outline of Project Costs

- 122. The estimated out-turned cost of this project is \$26.2 million, excluding Goods and Service Tax. The cost estimate includes the construction costs, management and design fees, locality allowance, contingencies and escalation allowance.
- 123. Net operating costs resulting from the proposed project will decrease due to the construction of new infrastructure and removal of redundant inoperable infrastructure.

Details of Project Delivery System

- 124. A Project Manager has been engaged by the Commonwealth to manage the design phase through to completion of 100% design.
- 125. 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.

126. Subject to Parliamentary approval of the project, the works will progress under a single Head Contract arrangement, with specialist subcontractors for the crane and mooring works.

Construction Program

127. Subject to Parliamentary approval of the project, construction is expected to commence in April 2019, with staged completion of facilities occurring between mid-April 2020 and mid-February 2021.
128. Anticipated key milestone dates, subject to Parliamentary approval of the project, are provided in table 1.

Table 1: Anticipated key milestone dates

Ser.	Task	Completion Target Date
1	Head Contractor (HC) Engagement	21/03/19
2	Construction Complete – Smith Point	27/04/20
3	Construction Complete – Nui Nui	10/07/20
4	Construction Complete – FFC	10/02/21
5	End of HC Defects Liability Period	10/02/22

Public Value

129. This proposal will contribute significantly to addressing safety and operational risks to the Australian Government, ensuring the adequacy of critical infrastructure, and supporting Australia's strategic capability in the Indian Ocean region.
130. The proposal will also promote the physical well-being, social welfare and economic stability of the community of Christmas Island.

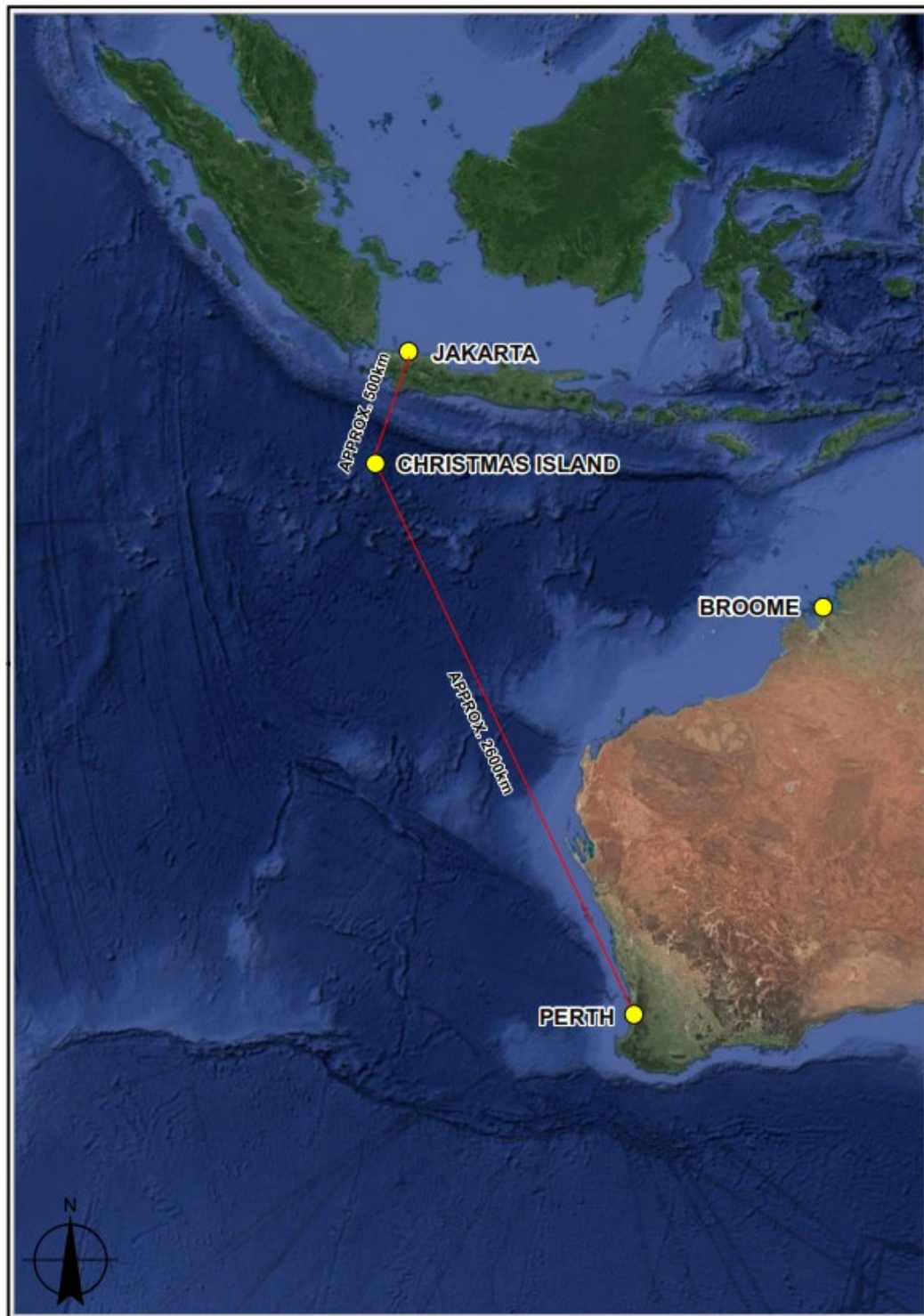
Revenue

131. Revenue will be derived from this project as the Port operator collects revenue from crane hire and berthing fees. However, the fees are applied in accordance with fees gazetted under the *Christmas Island Marine Traffic and Harbour Facilities Determination 2015*, and not on a cost recovery basis.

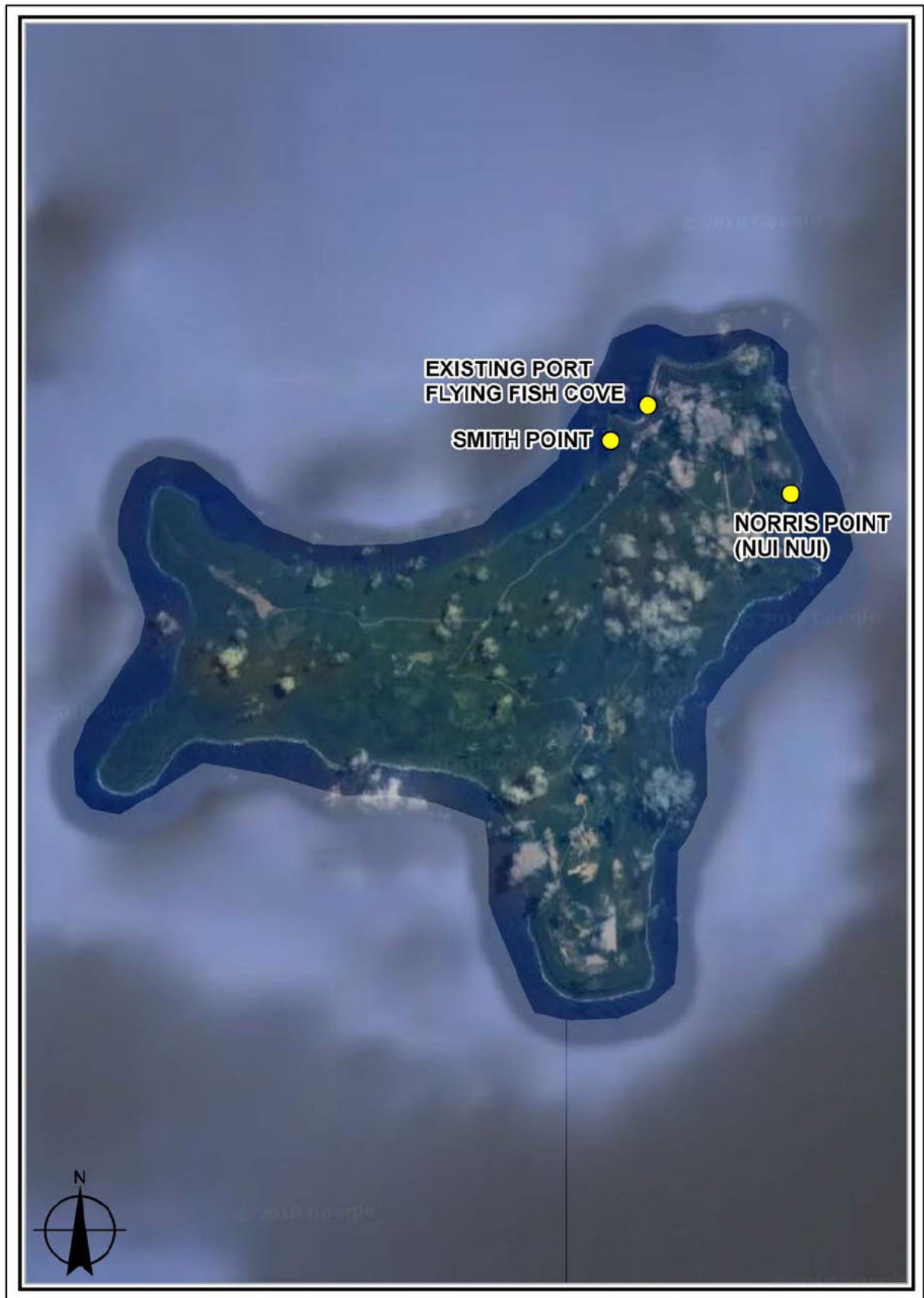
Attachment 1

Locality Plans

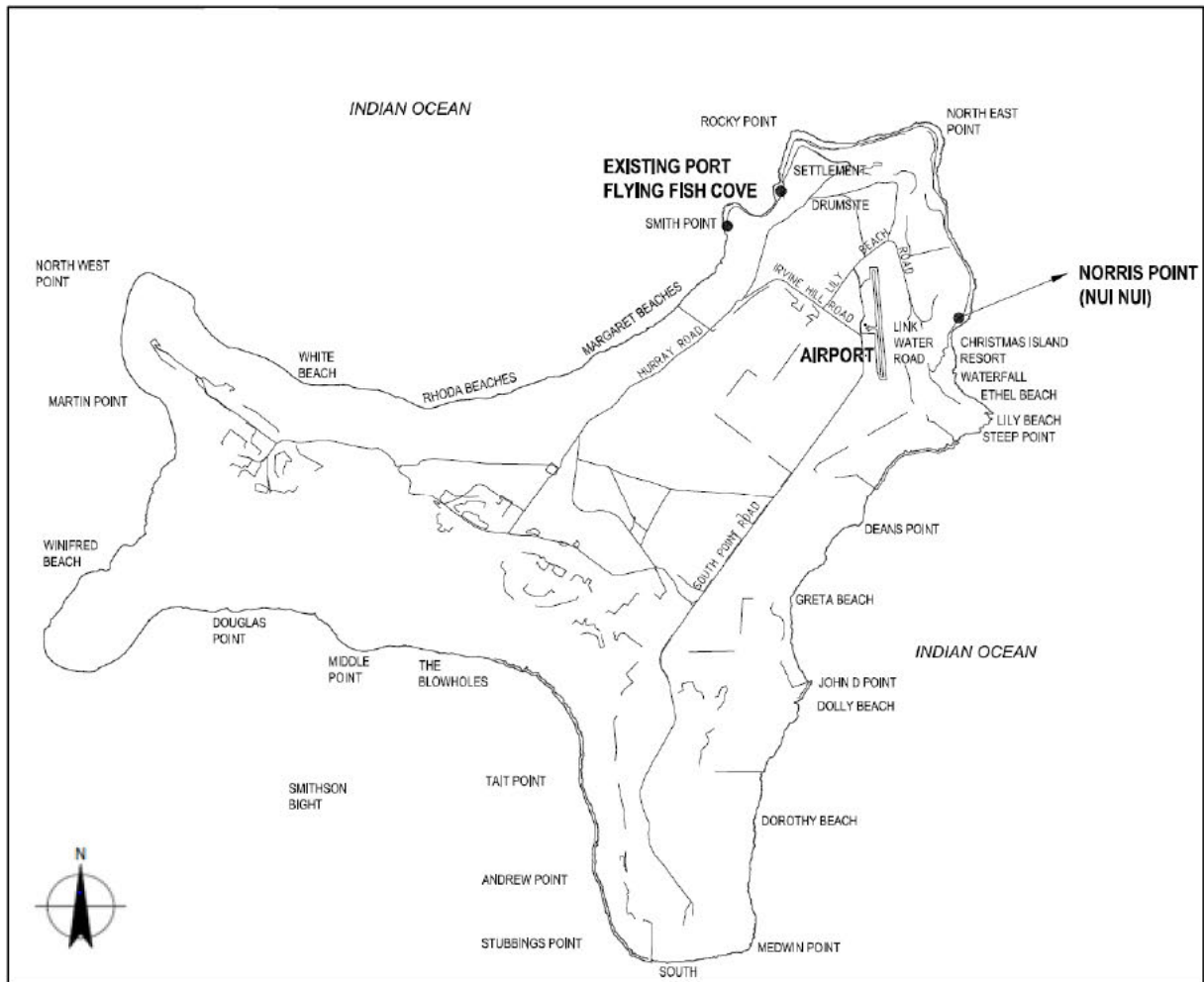
- 01-01 Christmas Island Locality Plan
- 01-02 Christmas Island Site Locations
- 01-03 Christmas Island Site Key Locations



Attachment 01-01 | Christmas Island Locality Plan



Attachment 01-02 | Christmas Island Site Locations



Attachment 01-03 | Christmas Island Site Key Locations

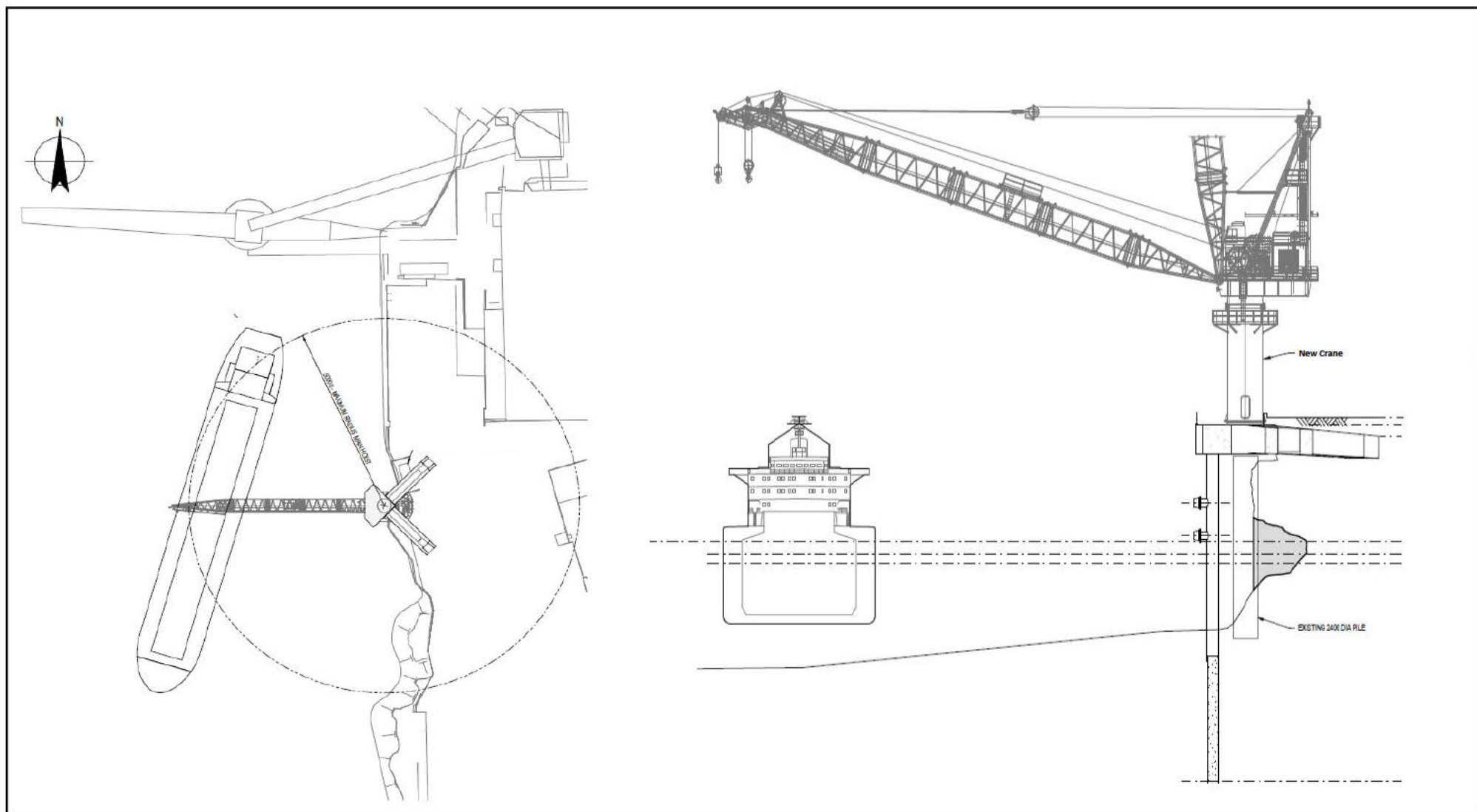
Attachment 2

Flying Fish Cove Crane and Moorings Layout Plans

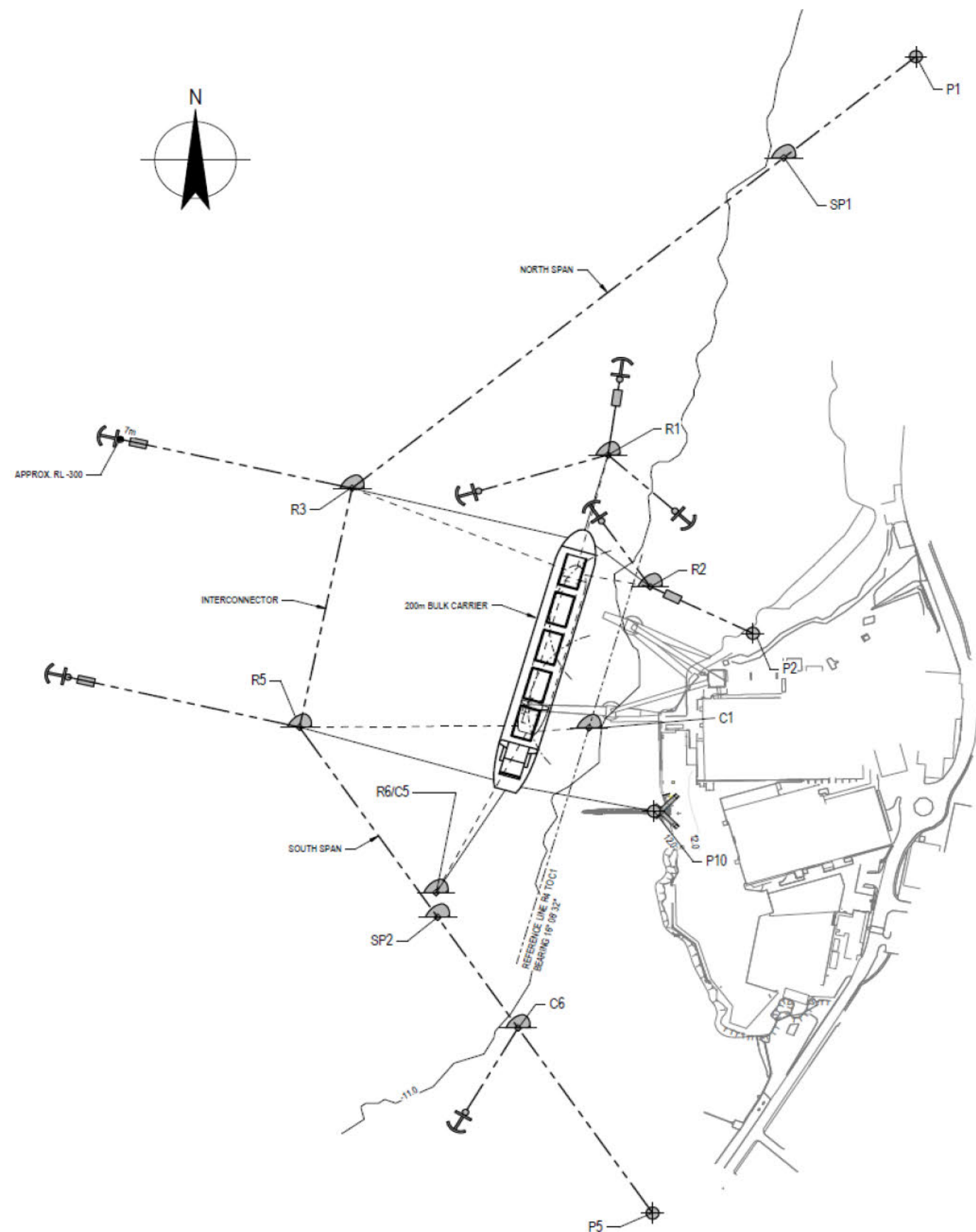
02-01 Flying Fish Cove Crane Foundation and Crane General Arrangement Section

02-02 Flying Fish Cove Rock Berth Moorings

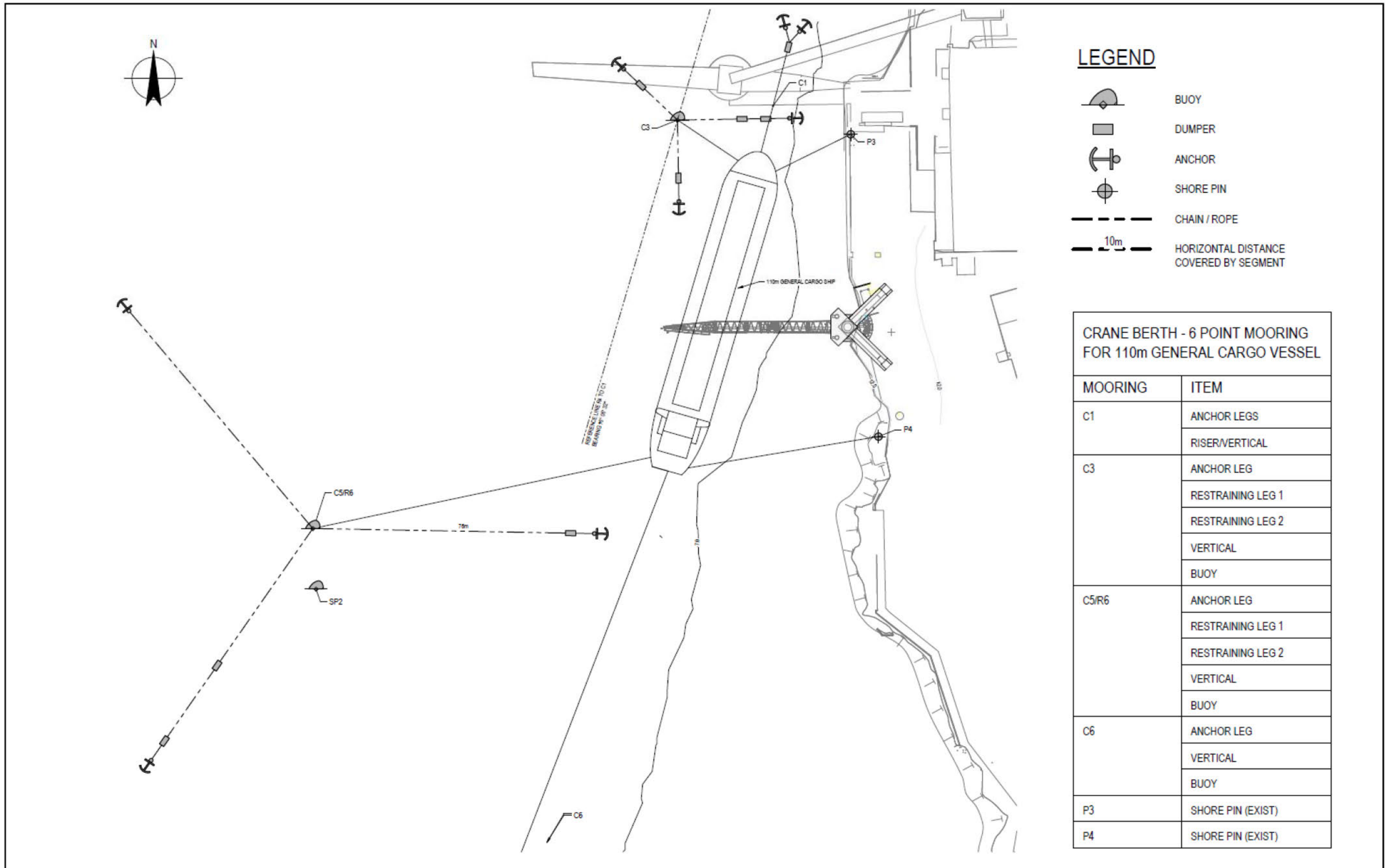
02-03 Flying Fish Cove Crane Berth Moorings



Attachment 02-01 Flying Fish Cove New Crane Foundation and Crane General Arrangement and Section



Attachment 02-02 Flying Fish Cove Rock Berth Moorings

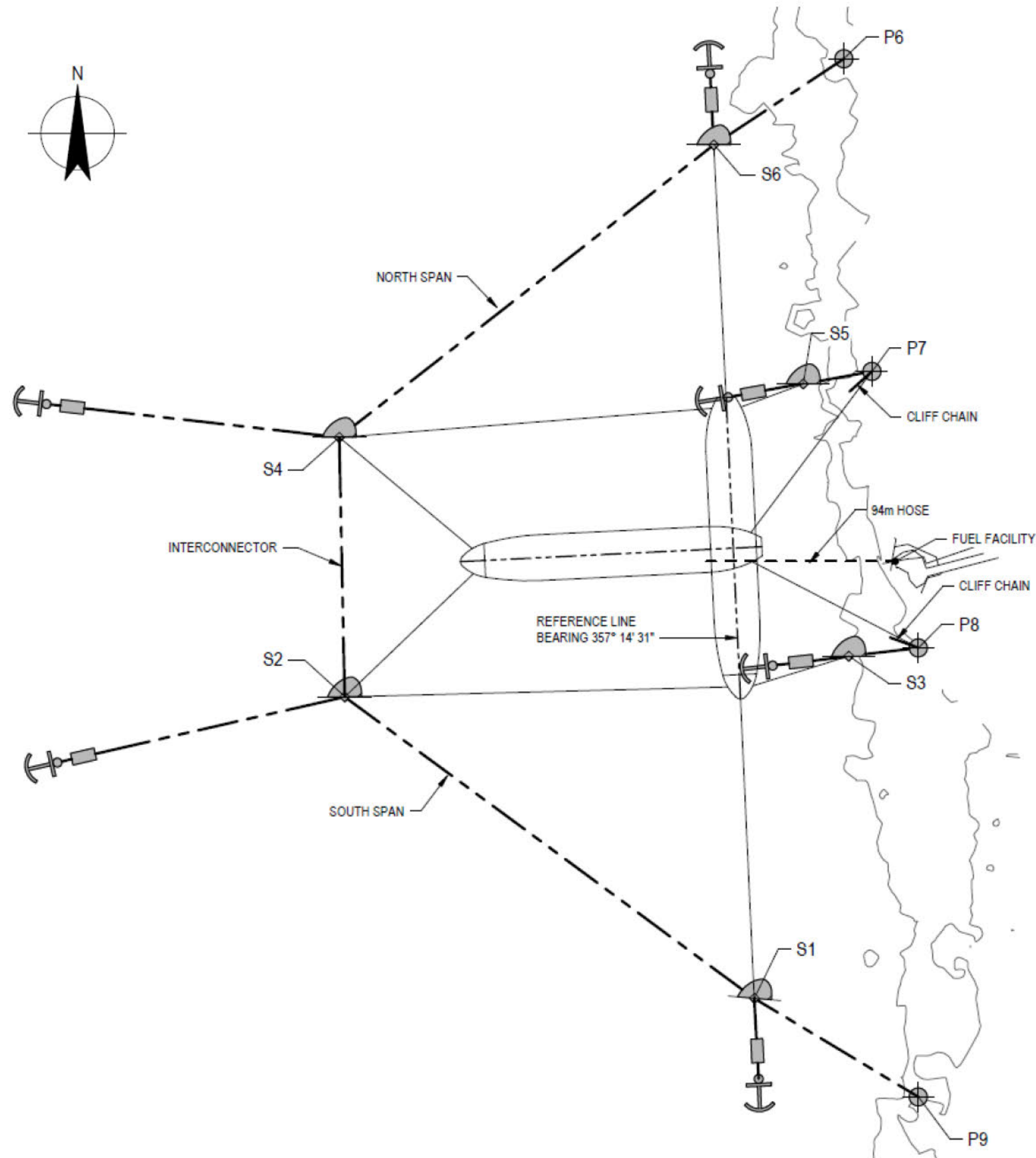


Attachment 02-03 Flying Fish Cove Crane Berth Moorings

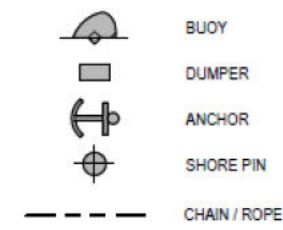
Attachment 3

Smith Point Moorings Layout Plan

03-01 Smith Point Moorings



LEGEND



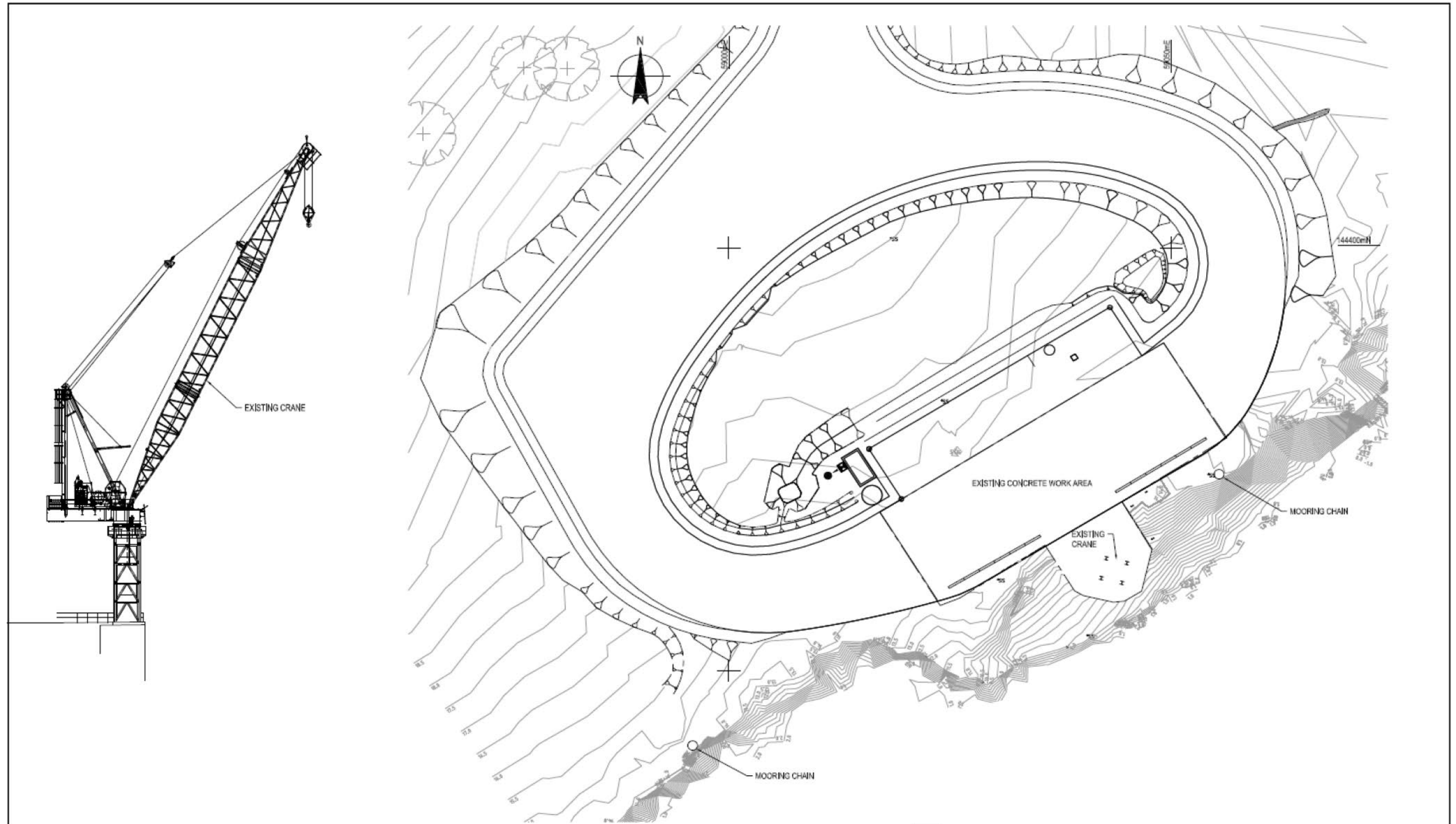
SMITH POINT BERTH - 6 POINT MOORING FOR 150m TANKER (PARALLEL), OR 4 POINT MOORING FOR 150m TANKER (PERPENDICULAR)

MOORING	ITEM
S1	ANCHOR LEG
	VERTICAL
	BUOY
S2	ANCHOR LEG 1
	SOUTH SPAN
	INTERCONNECTOR
	VERTICAL
	BUOY
S3	ANCHOR LEG 1
	RESTRAINING LEG
	VERTICAL
	BUOY
	CLIFF CHAIN
S4	ANCHOR LEG 1
	NORTH SPAN
	VERTICAL
	BUOY
S5	ANCHOR LEG 1
	RESTRAINING LEG
	VERTICAL
	BUOY
	CLIFF CHAIN
S6	ANCHOR LEG
	VERTICAL
	BUOY
P6	SHORE PIN NORTH
P7	SHORE PIN NORTH BREAST
P8	SHORE PIN SOUTH BREAST
P9	SHORE PIN SOUTH

Attachment 4

Nui Nui Crane and Mooring Layout Plan

04-01 Norris Point (Nui Nui) Crane and Moorings Removal



Attachment 04-01 Norris Point (Nui Nui) Crane and Mooring Removal