A4.0 Description of the proposed scheme

A4.1 Introduction

In summary, the proposed scheme comprises the removal and dismantling of FIPASS (including its causeway), localised removal of surficial silt from the bed of the harbour and construction of a new access road, causeway and quay. In order to undertake these works, it will be necessary to establish the following on the hinterland:

- Site offices.
- Workshop, stores, material and waste laydown areas (including temporary aggregate / rock storage areas).
- Remediation areas.
- Accommodation facilities.
- Concrete batching plant and pre-cast storage area.
- Access road.

In addition to the above, it will be necessary to temporarily divert the existing coastal path and construct a slipway and access track to support with the dismantling of FIPASS.

A full description of the proposed scheme, covering the construction and operational phase activities, as well as the alternative options which were considered, is presented below. The subsequent sections include references to phasing which is detailed in **Section A4.3**; however in summary, the proposed scheme is proposed to be implemented in two phases, with the works currently scheduled to take place between 2023 and 2025.

A4.2 Construction phase activities

A4.2.1 Establishment of site offices, workshop, stores, material and waste laydown areas, remediation areas, accommodation facilities and concrete batching plant and pre-cast storage yard

As shown on **Figure 4.1**, various parcels of land are required for the establishment of office space, laydown areas (including areas for waste material), storage areas, accommodation facilities, a concrete batching plant, pre-cast storage yard and remediation facilities. Further detail regarding these various requirements is provided below:

- Office space / plant workshop (area 5 on **Figure 4.1** and **Drawing BAS2051-BNL-CE-LS-SP-WA-0005**) – a modular open plan office, up to two stories high with parking facilities. A plant workshop and containers for plant spares will also be within this area.
- Workshop, stores, material and waste laydown areas (refer to **Drawings BAS2051-BNL-CE-LS-SP-WA-0004**, **BAS2051-BNL-CE-LS-SP-WA-0006** and **BAS2051-BNL-CE-LS-SP-WA-0007**) – various parcels of land are required to support these facilities.
- Remediation area – an area of land south-east of the Temporary Dock Facility (TDF) to manage surficial silt removed from the bed of the harbour and temporarily store the sludge and water from inside the FIPASS ballast tanks. The sludge from inside the FIPASS tanks is not proposed to be subject to remediation due to the known presence of asbestos within it. Further testing of the sludge for asbestos, as well as the FIPASS structure itself has been undertaken during Stage 1B. The detailed results are pending and a management plan will be developed to control the safe removal of asbestos in the dismantlement stage.
- Accommodation facilities(**Drawing BAS2051-BNL-CE-LS-SP-WA-0002**) – facilities for up to 70 employees in an area to the south of Airport Road.

Key

- Construction phase site layout
- Proposed Temporary Footpath Diversion

Construction Phase

1. Stores and materials laydown area
2. Laydown and stockpile area
3. Mobile concrete batching plant
4. Pre-cast storage area
5. Site offices / plant workshop
6. Welfare stores and laydown area
7. Bioremediation area
8. Working area on land
9. Proposed temporary footpath diversion
10. Slipway
11. Rock armour laydown area
12. Container storage
13. Accomodation

REV	DATE	DESCRIPTION	BY	CHK	APP
P02	01.12.21	SECOND ISSUE	GC	MS	SR
P01	10.05.21	FIRST ISSUE	FC	MS	SR

CLIENT

bam nuttall

PROJECT

New Port Facility at the Falkland Islands

TITLE

Construction Phase Site Layout

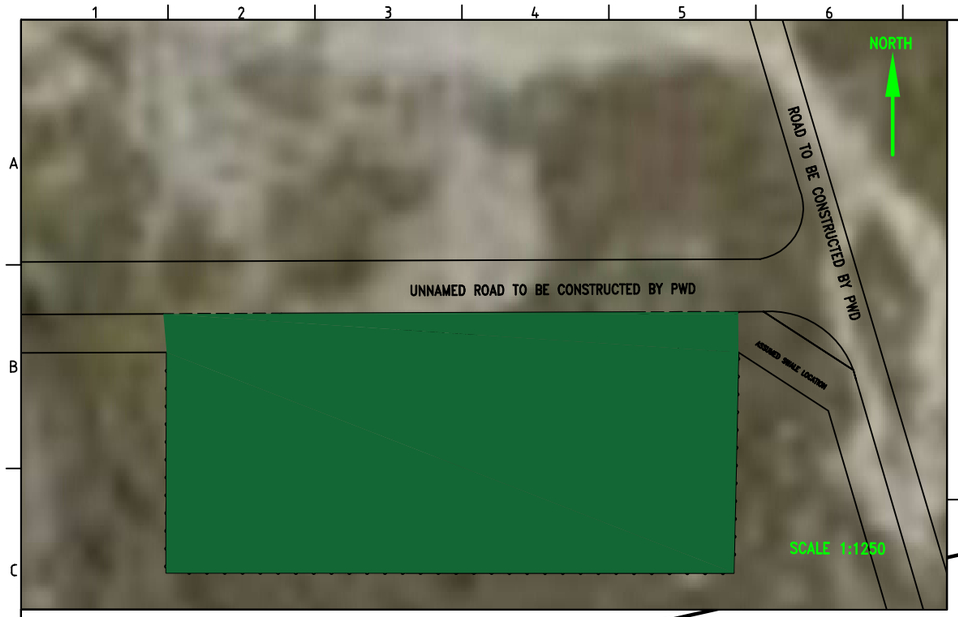
Marlborough House, Marlborough Crescent
Newcastle upon Tyne, NE1 4EE
Tel +44(0)191 2111300
Email: info.newcastle@rhdhv.com
Website: www.royalhaskoningdhv.com

Royal HaskoningDHV
Enhancing Society Together

DRAWN	CHECKED	APPROVED
FC	MS	SR
DATE: 01.12.21	SCALE: 1:6,000	REF.
FIGURE No.: 4.1	SUITABILITY: S2	REVISION: P02

Path: I:\N522004\Technical_Data\Projects\Falklands\MXDs\ES\Fig_4_1_ConstructionPhaseSiteLayout_RH_20211201.mxd

DO NOT SCALE THIS DRAWING.



SCALE 1:400

NEW ROAD ENTRANCES REQUIRED AS PART OF NEW ROAD CONSTRUCTION

UNNAMED ROAD TO BE CONSTRUCTED BY PWD

SURFACE WATER DISCHARGE SHOWN INDICATIVELY

PWD TO PROVIDE SERVICE CONNECTIONS INDICATIVE LOCATION SHOWN

DRAINAGE DITCH FILLED FOR ACCESS. CULVERT INSTALLED AT BOTH ACCESS POINTS

ASSUMED SWALE LOCATION

PARKING BAYS AND ROADWAY TO BE CONSTRUCTED OF STONE. PWD TO INSTALL STONED SURFACE

EXISTING VEGETATION COVER TO BE LEFT INSIDE TURNING AREA

CAR PARKING FOR 20NO VEHICLES INC 1NO DISABLED BAY

PEDESTRIAN WALKWAY

LIGHTING COLUMNS (CAST CONCRETE BASES)

ONE WAY SYSTEM

45m

DOUBLE WIDTH GATE TO ALLOW BINS TO BE COLLECTED/EMPTIED

LIGHTING FIXED TO ACCOMMODATION BLOCK WALLS

CONCRETED PEDESTRIAN WALKWAY (PINK SHADED AREA)

PEDESTRIAN WALKWAY

ACCOMMODATION BLOCK
SLEEPS 62NO PERSONNEL
13.5M HIGH

14.5m
14.6m
14.5m
43.8m
14.5m

SEGREGATED BIN STORAGE AREA

PEDESTRIAN WALKWAY

DISCHARGE FROM BIO-TANKS. INDICATIVE POSITION

FRESH WATER, COMMS AND ELECTRICITY CONNECTIONS TO ACCOMMODATION UNIT (INDICATIVE LOCATION)

BIO-TANK PUMP

116m

INDOOR RECREATIONAL AREA
13.5M HIGH

CONNECTING CORRIDOR COVERED WITH PORCHED TIMBER STRUCTURE

PEDESTRIAN FENCE AROUND WALKWAYS TO SEGREGATE PEDESTRIANS

TEMPORARY FENCE

GROUND FLOOR ACCESS TO ACCOMMODATION BLOCK. STAIRS TO FIRST FLOOR VIA EXTERNAL STAIRCASE SECTION

FOUL WATER SEPTIC TANKS (INDICATIVE SIZING; 4.5m radius; 2.5m height; 567m³ capacity)

Notes

PW REF FOR STAGE 1A:
BAS2050-BNL-ZZ-YYY-SK-WA-0014

Ecological surveys of area covered by PWD Power Station design.

Refer to:
BAS2051-BNL-CE-LS-SP-WA-0008 P01,
BAS2051-BNL-CE-LS-SP-WA-0009 P01
for elevation and layout of accommodation block

Rev.	Description	Dr'n	Chk	Date
P05	For Planning Approval	KRS	–	09/12/21
P04	Updated from comments	KRS	–	02/12/21
P03	Updated from comments	KRS	–	01/12/21
P02	Updated from comments	KRS	–	30/11/21
01.2	Update with change of layout	KRS	–	19/11/21
01.1	Update with PWD layouts	KRS	–	03/11/21
01	Original Sketch	CCa	–	12/10/20

DRAWING STATUS
S4

bam

Contract: BAS.2051 New Port Facility at the Falkland Islands

Title: Stage Two Proposed Compound Areas: Area 1 - BAM Accommodation Area

Scales	1:400 and 1:12500	Sheet Size	A3
Drawn	KRS	Checked	-
Date	09/12/21		
Drg. No	BAS2051-BNL-CE-LS-SP-WA-0002	Revision	P05

DO NOT SCALE THIS DRAWING.

AIRPORT ROAD

NEW ROAD ENTRANCE TO AIRPORT ROAD REQUIRED

IN

~11,000m³ vol for 4m high stockpile

PROPOSED POSITION FOR NEW ROAD TO POWER STATION

OUT

PWD TO CONSTRUCT

PWD TO CONSTRUCT TEMPORARY FENCE

N

Notes

PW REF FOR STAGE 1A:
BAS2050-BNL-ZZ-YYY-SK-WA-0014

PWD to fence area and create suitable surfacing prior to BAM use.

Rev.	Description	Dr'n	Chk	Date
P04	For Planning Approval	KRS	–	02/12/21
P03	Updated from comments	KRS	–	01/12/21
P02	Updated from comments	KRS	–	30/11/21
01.3	Updated from comments	KRS	–	26/11/21
01.2	Update with change of layout	KRS	–	19/11/21
01.1	Update with PWD layouts	KRS	–	03/11/21
01	Original Sketch	CCa	–	12/10/20

DRAWING STATUS

S4

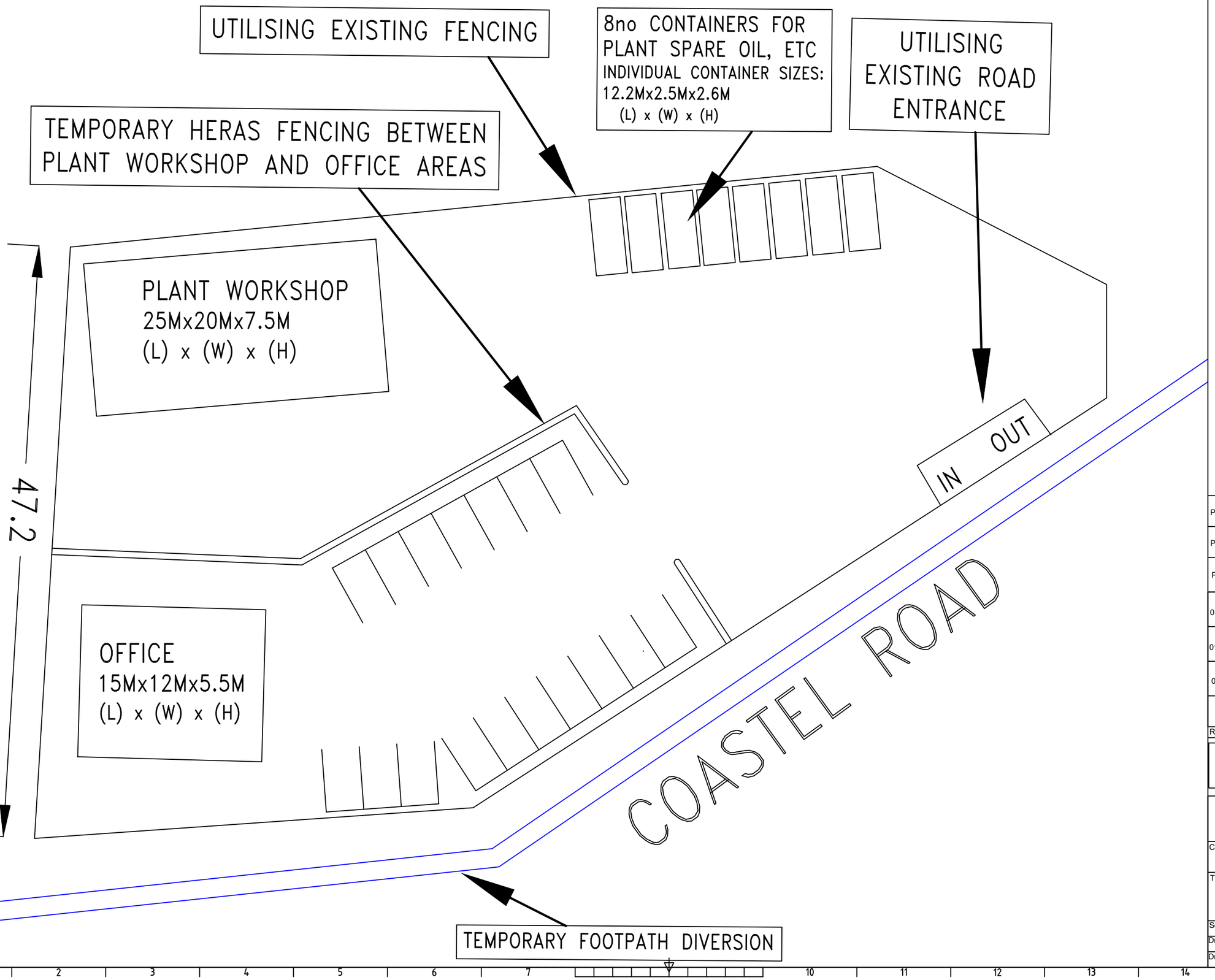
bam

Contract: BAS.2051
New Port Facility at the
Falkland Islands

Title:
Stage Two
Proposed Compound Areas:
Area 7 - Rock Area Stockpile Area

Scales 1:450			Sheet Size A3
Drawn KRS	Checked -		Date 02/12/21
Drg. No. BAS2051-BNL-CE-LS-SP-WA-0004			Revision P04

DO NOT SCALE THIS DRAWING.



Notes

PW REF FOR STAGE 1A:
BAS2050-BNL-ZZ-YYY-SK-WA-0014

Measurements are in metres unless stated otherwise.

Area is existing hardstanding and fenced. PWD to repair fenced area and ensure suitable surfacing prior to BAM use.

Rev.	Description	Dr'n	Chk	Date
P04	For Planning Approval	KRS	–	02/12/21
P03	Updated from comments	KRS	–	01/12/21
P02	Updated from comments	KRS	–	30/11/21
01.3	Updated from comments	KRS	–	26/11/21
01.2	Update with change of layout	KRS	–	19/11/21
01.1	Update with PWD layouts	KRS	–	03/11/21
01	Original Sketch	CCa	–	12/10/20

DRAWING STATUS

S4

bam

Contract: BAS.2051
New Port Facility at the
Falkland Islands

Title:
Stage Two
Proposed Compound Areas:
Area 8 - BAM Office and Plant Workshop

Scales 1:300			Sheet Size A3
Drawn KRS	Checked -		Date 02/12/21
Drg. No BAS2051-BNL-CE-LS-SP-WA-0005			Revision P04

DO NOT SCALE THIS DRAWING.

A3.

NEW ROAD ENTRANCE TO AIRPORT ROAD REQUIRED

AIRPORT ROAD

OUT

~6,000m³ vol for 4m high stockpile

~15,800m³ vol for 4m high stockpile

~30,000m³ vol for 4m high stockpile

~6,000m³ vol for 4m high stockpile

~15,000m³ vol for 4m high stockpile

~20,000m³ vol for 4m high stockpile

IN

PROPOSED POSITION FOR NEW ROAD TO POWER STATION

TEMPORARY FENCE

FIG Proposed Power Station

Notes

PW REF FOR STAGE 1A:
BAS2050-BNL-ZZ-YYY-SK-WA-0014

Ecological surveys of area covered by PWD Power Station design.

PWD to fence area and create suitable surfacing prior to BAM use.

Rev.	Description	Dr'n	Chk	Date
P03	For Planning Approval	KRS	–	02/12/21
P02	Updated from comments	KRS	–	30/11/21
01.3	Updated from comments	KRS	–	26/11/21
01.2	Update with change of layout	KRS	–	19/11/21
01.1	Update with PWD layouts	KRS	–	03/11/21
01	Original Sketch	CCa	–	12/10/20

DRAWING STATUS

S4

bam

Contract: BAS.2051
New Port Facility at the Falkland Islands

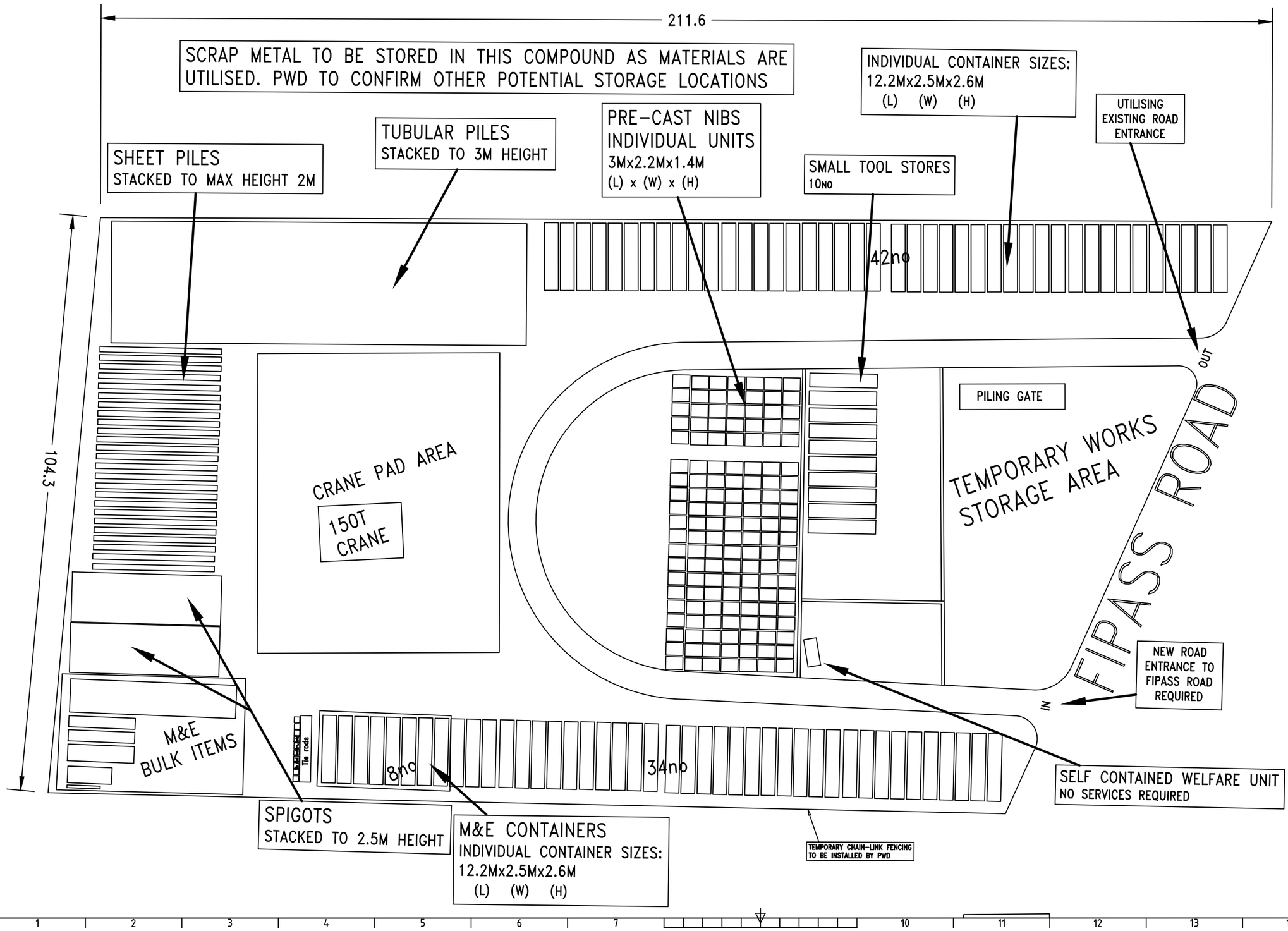
Title: Stage Two
Proposed Compound Areas:
Areas 6 - Stockpile Area

Scales: 1:700 | Sheet Size: A3

Drawn: KRS | Checked: - | Date: 02/12/21

Drg. No.: BAS2051-BNL-CE-LS-SP-WA-0006 | Revision: P03

DO NOT SCALE THIS DRAWING.



Notes

PW REF FOR STAGE 1A:
BAS2050-BNL-ZZ-YYY-SK-WA-0014

Measurements are in metres unless stated otherwise.

Area is existing hardstanding. PWD to fence area and create suitable surfacing prior to BAM use.

Rev.	Description	Dr'n	Chk	Date
P04	For Planning Approval	KRS	–	02/12/21
P03	Updated from comments	KRS	–	01/12/21
P02	Updated from comments	KRS	–	30/11/21
01.3	Updated from comments	KRS	–	26/11/21
01.2	Update with change of layout	KRS	–	19/11/21
01.1	Update with PWD layouts	KRS	–	03/11/21
01	Original Sketch	CCa	–	12/10/20

DRAWING STATUS

S4

bam

Contract: BAS.2051
New Port Facility at the Falkland Islands

Title: Stage Two
Proposed Compound Areas:
Area 3 - BAM Material Laydown Area

Scales 1:700		Sheet Size A3	
Drawn KRS	Checked -	Date 02/12/21	
Drg. No. BAS2051-BNL-CE-LS-SP-WA-0007		Revision P04	

- Concrete batching plant (refer to **Drawing BAS2051-BNL-CE-LS-SP-WA-0003**) – due to the volume of concrete required, an area of land to the south of Airport Road is required to house a temporary concrete batching plant to produce concrete for cast in-situ and precast elements required for the proposed scheme. The concrete specification will be tailored to the environment to increase workability, prolong curing, limit shrinkage / cracking and ensure durability in the Falkland Islands. This process will involve the use of locally sourced materials.
- Pre-cast fabrication area (area 4 on **Figure 4.1**) (**Drawing BAS2051-BNL-CE-LS-SP-WA-0003**) – a pre-cast fabrication area is required and is proposed to be located adjacent to the proposed concrete batching plant.

A number of these areas of land are currently occupied by hardstanding; however, some are currently vegetated. All areas will be stoned up prior to construction commencing. It is proposed that any vegetation present within the various parcels of land which are not currently hardstanding will be stripped outside of sensitive ecological windows and following an ecological walkover survey to allow creation of hardstanding without harming protected species. Should any species of nature conservation importance be identified during walkover surveys, consultation will be undertaken with F.I.G. to agree appropriate working practices to avoid harming such species.

The provision of accommodation for site workers ensures that the proposed scheme does not negatively impact on the limited accommodation available to Falkland Islands residents and tourists in the local market.

A4.2.2 Diversion of the coastal path

Prior to the main construction works proceeding, it will be necessary to temporarily divert the existing coastal footpath outside of the main construction area. The proposed route of the diverted footpath is shown on **Figure 4.1.** Diversions will be clearly signposted, including a public information point overlooking the construction area. The diverted footpath will be appropriately lit and surfaced. The revised permanent position of the coastal path is explained in **Section A4.3.2**.

A4.2.3 Transport of construction plant and machinery to site

The majority of construction materials and plant required to construct the proposed scheme will be transported from the UK to the Falkland Islands via commercial vessels. Commercial vessels will berth at either Mare Harbour (located approximately 50km to the south-west of the proposed scheme footprint) or FIPASS. Cargo will be transported from Mare Harbour to the proposed scheme footprint by road (specifically Mare Harbour Road and Darwin Road).

It is recognised that traffic movements from Mare Harbour to the proposed scheme footprint would have a very short-term impact on existing flows along the proposed access route until all plant / machinery is transported to site (with consequent impacts to air quality and generation of noise). However, the traffic movements generated by this activity would not affect the peak (worst case) traffic flows on which the traffic assessment has been based because the peak traffic flow occurs at a later stage in the construction programme. Furthermore, traffic, air quality and noise sensitive receptors do not appear to be present along the majority of the proposed route given its remote location.

Specific impact assessment associated with movement of plant and equipment from Mare Harbour to the proposed scheme footprint has not, therefore, been undertaken.

A4.2.4 Provision of fuel, power and water

Fuel for construction will be supplied by Stanley Services to static tanks located in the office and accommodation areas, as well as the plant and laydown areas. Mobile bunded bowsers will be used to fuel plant and equipment on site. Static tanks and mobile bowsers will be double-walled and bunded to 110% of the volume of the tanks.

DO NOT SCALE THIS DRAWING.

AIRPORT ROAD

ROADWAY INDICATED BY DOTTED LINES. REMOVABLE BARRIERS TO BE IN PLACE TO ALLOW ACCESS TO CONTAINERS WITH PLANT

NEW ROAD ENTRANCE TO AIRPORT ROAD REQUIRED

INDIVIDUAL CONTAINER SIZES: 12.2Mx2.5Mx2.6M (L) (W) (H)

INDICATIVE LIGHTING POSITIONS. ALL LIGHTING TO BE SHONE AWAY FROM RESIDENTIAL AREAS.

IN/OUT

Proposed Wool Warehouse

TEMPORARY FENCE TO BE INSTALLED BY PWD TO SEGREGATE WOOL WAREHOUSE AND BAM LAYDOWN AREAS

28no

13no

BATCHING PLANT

Welfare unit

25no

CONTAINER STORAGE AREA

TURNING AREA

25no

TURNING AREA

22no

PRE-CAST CASTING AREA

6NO BEDS, 4NO NIBS EACH BED

174.8

Notes

PW REF FOR STAGE 1A:
BAS2050-BNL-ZZ-YYY-SK-WA-0014

Measurements are in metres unless stated otherwise.

Service connections provided by PWD to areas for batching plant, welfare services and lighting.

PWD to fence area and create suitable surfacing prior to BAM use.

Maintenance of unbound surfacing to be carried out throughout lifetime of works area.

Ecological surveys carried out by FIG where required.

Rev.	Description	Dr'n	Chk	Date
P04	For Planning Approval	KRS	–	02/12/21
P03	Updated from comments	KRS	–	01/12/21
P02	Updated from comments	KRS	–	30/11/21
01.3	Updated from comments	KRS	–	26/11/21
01.2	Update with change of layout	KRS	–	19/11/21
01.1	Update with PWD layouts	KRS	–	03/11/21
01	Original Sketch	CCa	–	12/10/20

DRAWING STATUS

S4

bam

Contract
BAS.2051
New Port Facility at the Falkland Islands

Title
Stage Two
Proposed Compound Areas:
Areas 2, 4 & 5 - Batching Plant, Container Storage & Pre-cast Fabrication Yard

Scales	1:600	Sheet Size	A3
Drawn	KRS	Checked	-
Date	02/12/21		
Drg. No.	BAS2051-BNL-CE-LS-SP-WA-0003	Revision	P04

Potable water will be taken from the existing water main, whilst power will be sourced from the main grid after construction of a new causeway substation by PWD. Water supply to the port is to be derived from a valved connection to the 'low-level' main provided at the head of the causeway. The freshwater system will be separated into two distinct networks, one serving the quay for ships and washdown facilities, and the other serving the port buildings and the wholesome supplies. Backflow prevention will be installed to prevent contamination of the local supply and consumable water for the port buildings.

It is assumed that foul water to be generated from the site compound and accommodation areas will be disposed of by connecting (temporarily, for the duration of the construction phase) to the local sewerage system, directing sewage through pipework. If this is not possible, foul water will be collected into tanks that will be emptied on a regular basis by a local contractor.

A temporary internet network connection with be established by connecting into the Sure network. Diesel generators will be available for back-up power and emergency use only.

A4.2.5 Access road

A new access road is proposed to connect the new quay to the existing highway network (shown on **Drawing PB7829-RHD-CE-LS-DR-C-0028**). The access road will be typically 9m wide, with a surfaced carriageway (3.5m lane in each direction with a 1m hard shoulder on both sides). Kerbs are proposed on the north side of the road in the vicinity of the pond, on both sides of the road within the gatehouse area and where there are walkways along the road. Pedestrians are to be routed away from the access road to improve the walking environment and reduce health and safety risks by moving them away from the traffic hazard (refer to **Section A4.2.2**).

Where required, cut slopes and fill embankments will be provided at 1:3 slopes; it is proposed that approximately 500m^3 of fill material will need to be transported to site to balance the cut/fill volumes. The fill material is to be sourced from Pony's Pass quarry.

Construction of the access road will impact the agricultural land at Stanley Growers. Up to 6,200m^2 of agricultural land and seven polytunnels are predicted to be affected. Discussions are ongoing between F.I.G. and Stanley Growers in relation to this, with F.I.G.'s intention being to ensure that any loss of land (either temporarily during the construction stage or long term when the new port becomes operational) can be offset by the offer of provision of alternative land at a suitable nearby location, and assist with re-siting or re-provision of polytunnels. In addition, it is proposed to offer to enhance agricultural areas on the remaining Stanley Growers land through the relocation of peat and topsoil generated from excavations to construct the access road,

Walkers along the realigned coastal footpath will be segregated from construction works by the installation of fencing along the landside edge of the access road.

A4.2.6 Dismantling of FIPASS

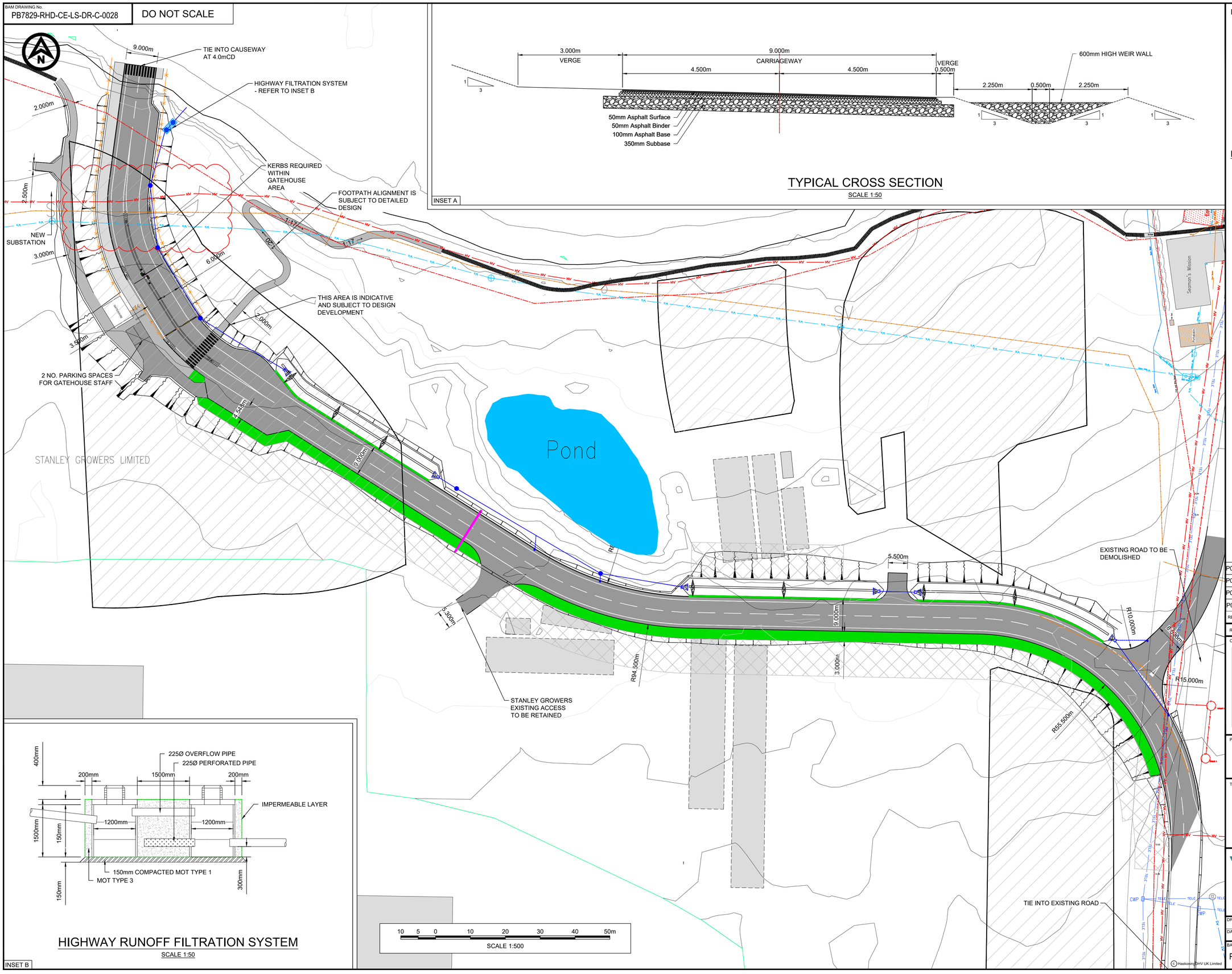
A4.2.6.1 Overview

FIPASS consists of seven barges containing up to 20 ballast tanks per barge; these tanks are either empty or routinely part-filled and replenished with sea water. In order to construct the proposed scheme, it will be necessary to remove the FIPASS barges.

It is proposed that removal of the FIPASS barges will be undertaken in a staged manner as the construction of the proposed new quay progresses (refer to **Drawing PB7829-RHD-MA-BA-DR-ME-0033** for the currently envisaged phasing, however it should be noted that other options for phasing are being considered by F.I.G. which are intended to shorten the overall construction programme).

BAM DRAWING No.
PB7829-RHD-CE-LS-DR-C-0028

DO NOT SCALE



TYPICAL CROSS SECTION

SCALE 1:50

INSET A

HIGHWAY RUNOFF FILTRATION SYSTEM

SCALE 1:50

INSET B

10 5 0 10 20 30 40 50m

SCALE 1:500

NOTES

1. ALL DIMENSIONS ARE IN METERS UNLESS STATED OTHERWISE.
2. IT IS INTENDED THAT THE ROAD DRAINAGE FOR OPTIONS 1 AND 2 WILL BE CONNECTED TO A SWALE SYSTEM LOCATED TO THE NORTH OF ITS ALIGNMENTS.
3. ALL SERVICES LOCATIONS, STRUCTURES AND LEVELS MUST BE CHECKED ON SITE PRIOR TO COMMENCEMENT OF WORKS.
4. THE JUNCTION LAYOUTS PRESENTED IN THIS DRAWING ARE INDICATIVE ONLY. JUNCTION LAYOUT MODELING WILL TAKE PLACE UPON RECEIPT OF TRAFFIC DATA.
5. CAR PARK ACCESS SHOWN INDICATIVELY ON ALL LAYOUTS. PROPOSED LOCATIONS FOR CAR PARK DEEMED LEAST DISRUPTIVE TO STANLEY GROWERS.

EXISTING LEGEND:

- BOUNDARY
- FOOTPATH ALIGNMENT
- FOUL WATER DRAINAGE
- WATER MAIN
- DITCH
- HIGH VOLTAGE ELECTRIC
- LOW VOLTAGE ELECTRIC
- TELECOMS
- SURFACE WATER DRAINAGE
- BUILDING / STRUCTURE
- AGRICULTURAL LAND

PLAN LEGEND:

- CARRIAGEWAY
- FOOTWAY ACCESS (PUBLIC)
- FOOTWAY ACCESS (PORT)
- VERGE
- TADPOLE
- CONCRETE SLAB
- 10m WIDE NO BUILD ZONE
- STOPPING SIGHT DISTANCE 2.4m x 33m @ 25mph
- PROPOSED STORM WATER MANHOLE AND NETWORK
- PROPOSED STORM WATER GULLY AND CONNECTION
- PROPOSED SWALE INLET - REFER TO ACO SUDS SWALES INLET FOR DETAILS
- PROPOSED HIGHWAY RUNOFF FILTRATION SYSTEM - REFER TO INSET B FOR DETAILS
- STANLEY GROWERS SERVICES CULVERT

REV	DATE	DESCRIPTION	BY	CHK	APP
P04	25/11/21	SERVICES SLAB REMOVED	MS	PPV	DP
P03	02/11/21	UPDATED TO CLIENT COMMENTS	MS	PPV	DP
P02	07/10/21	UPDATED TO CLIENT COMMENTS	MS	PPV	DP
P01	19/02/21	FOR APPROVAL	JBW	PPV	DP

REVISIONS

CLIENT

bam nuttall

DESIRE THE RIGHT

PROJECT

NEW PORT FACILITY AT THE FALKLAND ISLANDS

TITLE

ACCESS ROAD
GENERAL ARRANGEMENT

Marlborough House, Marlborough Crescent
Newcastle upon Tyne, NE1 4EE
Tel +44(0)191 2111300
Email: info.newcastle@rhdhv.com
Website: www.royalhaskoningdhv.com

Royal HaskoningDHV
Enhancing Society Together

DRAWN	CHECKED	APPROVED
JBW	PPV	DP
DATE 10/02/2021	SCALE 1:500	RHDHV DRAWING No.

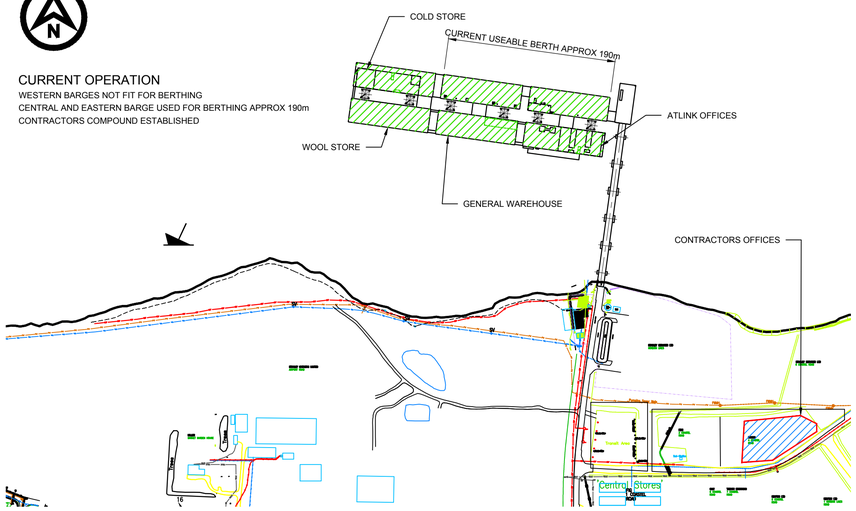
BAM DRAWING No.	SUITABILITY	REVISION
PB7829-RHD-CE-LS-DR-C-0028	S4	P04

BAM DRAWING No.
BAS2051-RHD-MA-BA-DR-ME-0033

DO NOT SCALE

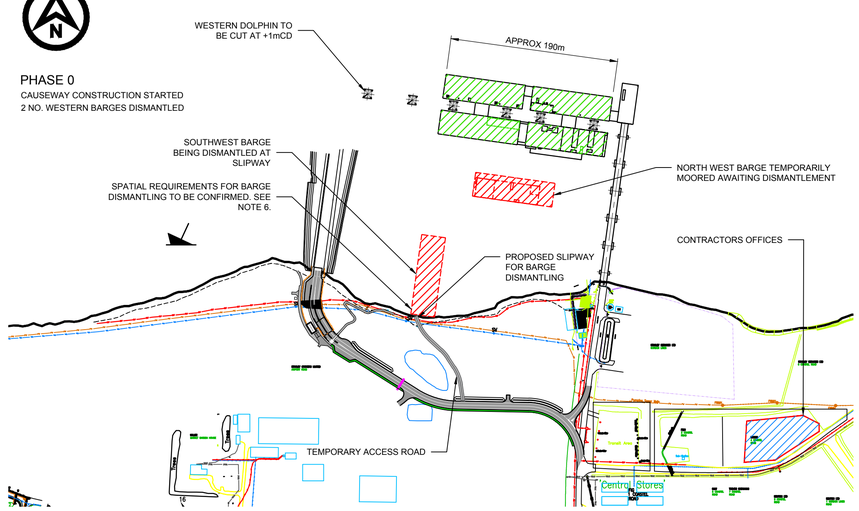
CURRENT OPERATION

WESTERN BARGES NOT FIT FOR BERTHING
CENTRAL AND EASTERN BARGE USED FOR BERTHING APPROX 190m
CONTRACTORS COMPOUND ESTABLISHED



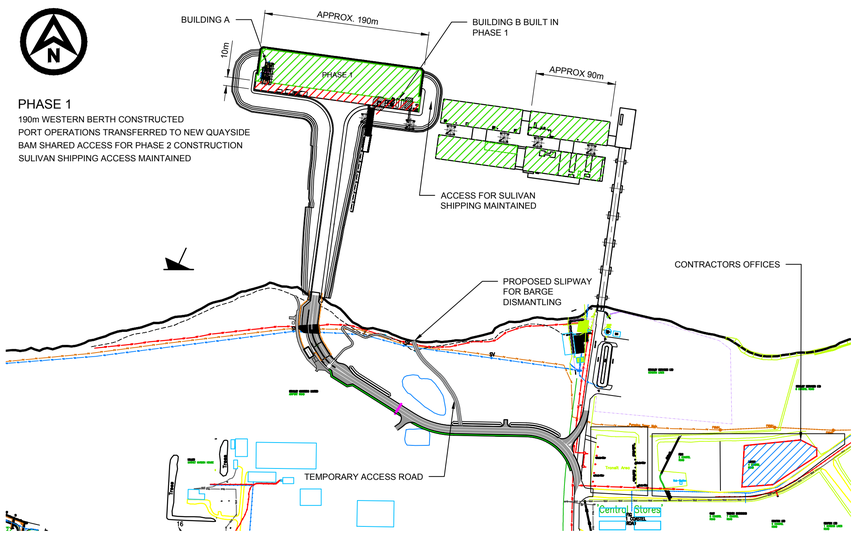
PHASE 0

CAUSEWAY CONSTRUCTION STARTED
2 NO. WESTERN BARGES DISMANTLED



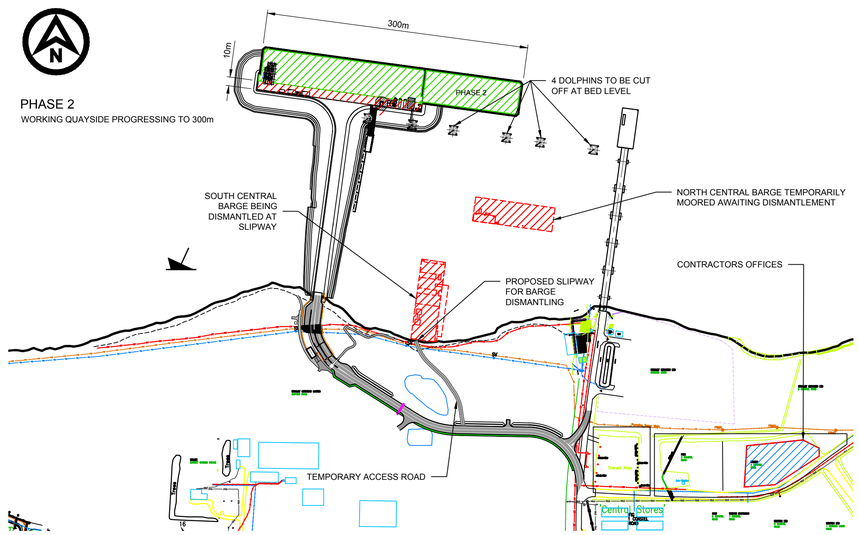
PHASE 1

190m WESTERN BERTH CONSTRUCTED
PORT OPERATIONS TRANSFERRED TO NEW QUAYSIDE
BAM SHARED ACCESS FOR PHASE 2 CONSTRUCTION
SULIVAN SHIPPING ACCESS MAINTAINED



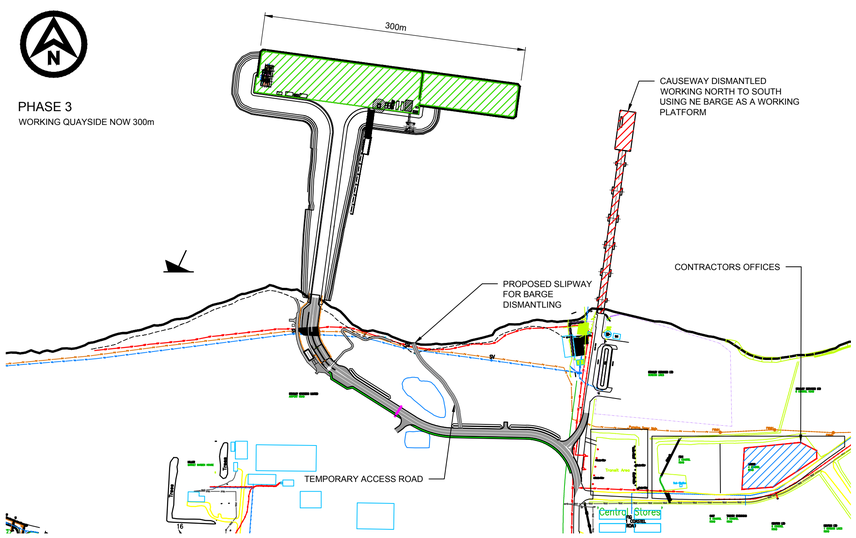
PHASE 2

WORKING QUAYSIDE PROGRESSING TO 300m



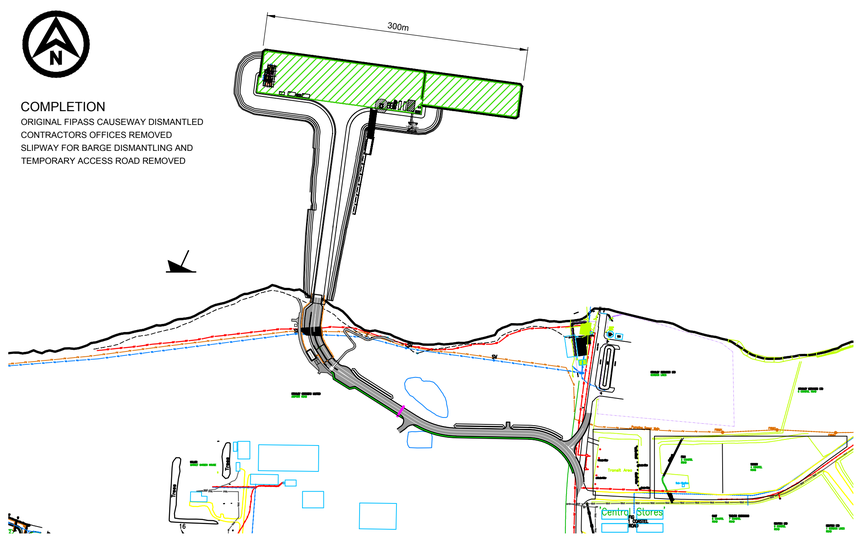
PHASE 3

WORKING QUAYSIDE NOW 300m



COMPLETION

ORIGINAL FIPASS CAUSEWAY DISMANTLED
CONTRACTORS OFFICES REMOVED
SLIPWAY FOR BARGE DISMANTLING AND
TEMPORARY ACCESS ROAD REMOVED



NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES TO CHART DATUM (mCD) UNLESS NOTED OTHERWISE.
3. ALL COORDINATES RELATIVE TO SAPPERS HILL 1943 / UTM ZONE 21S.
4. DRAWING TO BE READ IN CONJUNCTION WITH THE DISMANTLING STRATEGY BAS2050-BNL-ZZ-YYY-RP-W-0002 (HOLD)
5. PROVISIONAL PORT AREA AND BOUNDARY WITH BAM WORKING SPACE TO BE AGREED WITH PORT OPERATOR.
6. LOCATION SHOWN FOR BARGE DISMANTLING IS PROVISIONAL THIS IS SUBJECT TO ENVIRONMENTAL IMPACT ASSESSMENT AND IS ILLUSTRATIVE ONLY AT CONCEPT DESIGN STAGE.
7. AREA SHOWN FOR CONTRACTORS OFFICES IS ILLUSTRATIVE ONLY - REFER ALSO TO DRAWING BAS 2050-STAGE1A-SK-CMO-014.

KEY

BAM WORKING SPACE

AREA AVAILABLE FOR PORT USE

NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	BY	CHK	APP
P04	08.12.21	ADDRESSING BAM COMMENTS	CH	DP	RCBP
P03	01.12.21	ADDRESSING BAM COMMENTS	BM	CH	DP
P02	22.03.21	ADDRESSING BAM COMMENTS	CH	DP	RCBP
P01	15.03.21	FOR INFORMATION	CH	DP	RCBP

REVISIONS

CLIENT

DESIRE THE RIGHT

bam nuttall

PROJECT

NEW PORT FACILITY AT THE FALKLAND ISLANDS

TITLE

STAGING AND PHASING DRAWING

Marlborough House, Marlborough Crescent
Newcastle upon Tyne, NE1 4EE
Tel +44(0)191 2111300
Email: info.newcastle@rhdhv.com
Website: www.royalhaskoningdhv.com

Royal HaskoningDHV
Enhancing Society Together

DRAWN	CHECKED	APPROVED
CH	DP	RCBP
DATE: 11.03.21	SCALE: N.T.S	RHDHV DRAWING No.: PB7829-RHD-MA-BA-DR-ME-0033

BAM DRAWING No.	SUITABILITY	REVISION
BAS2051-RHD-MA-BA-DR-ME-0033	S2	P04

This approach will ensure that adequate berthing capacity remains available at all times, either at FIPASS or at the proposed new quay (or a combination of the two) until the proposed new quay is fully constructed and commissioned.

A4.2.6.2 Removal of water and sludge from inside FIPASS tanks

The sludge and water within the FIPASS tanks (which is known to contain some contaminants (see **Section A16**)) will be removed using a lorry-mounted gulley pump and tank (tanker). Prior to the sludge and water removal process commencing, a procedure will be put in place to classify the level of contamination present within each of the tanks. Depending on the level of contamination present, the water will either be de-ballasted into the sea (where the level of contamination is considered to be suitable to allow this to be undertaken) (as current practice), or removed using the tanker and transported to a holding tank (as opposed to being placed in geotubes) in the remediation area shown on **Figure 4.1** for subsequent disposal/treatment.

For tanks which are classified as contaminated, a pump and hose will be lowered into the tanks through the hatches to extract the sludge and water. Once full, the tanker will transport and discharge the sludge and water into a holding tank to be located in a bunded and lined area adjacent to Stanley Harbour (shown as 'remediation area' on **Figure 4.1**). The water draining from the holding tank will be captured and passed through a hydrocarbon separator and treated as required (to remove the known contaminants present within the water) prior to discharging back into the harbour. The sludge will remain within the holding tank.

This process will be repeated until the water and sludge from inside the FIPASS tanks has been removed. This activity will be undertaken in a controlled manner to ensure equal de-ballasting of the tanks to maintain their stability.

Any sludge remaining within the tanks following pumping / de-ballasting will require an operative to enter the tanks to assist with the removal process, ensuring appropriate personal protection equipment (PPE) is used and venting is achieved. Sludge will be removed using a power washer, pump and shovel. Residue will be washed from the inside of the tank walls and floors, prior to being pumped out using the tanker. Fluid arisings from this process will be transported to the remediation area.

Given the range of contaminants present within the sludge, it is proposed that it will be stored in a holding tank for subsequent disposal to a suitable waste management facility on the Falkland Islands (which is assumed will be either, or both of, a new inert landfill site or incinerator (to be agreed with PWD)). Should the sludge not be suitable for disposal into either the new inert landfill site or the incinerator (based on the concentrations of contaminants present), it would be transported off island for disposal at an appropriate facility.

A4.2.6.3 Disconnection of existing services and warehouse / superstructure dismantlement

There are several services on FIPASS which will need to be disconnected individually prior to dismantling, starting with the services on the south-western and north-western barges in Phase 1 of the proposed scheme (refer to **Drawing PB7829-RHD-MA-BA-DR-ME-0033** and **Section A4.3**). Services on the remaining barges would be disconnected in Phase 2.

The north-western barge currently contains Aids to Navigation; these will be re-positioned (lift and shift for re-use) on the northern-central barge prior to removal of the north-western barge to ensure navigation aids are provided until FIPASS is fully decommissioned.

Fuel disconnection and decommissioning is to be undertaken by the owner - Stanley Services Limited (SSL) for salvage and reuse, with fuel lines purged ahead of progressive dismantlement (by parties other than the main contractor). This approach will minimise the risk of pollution incidents to the harbour during the fuel disconnection process, as SSL already has existing approved safe systems of work in place to reduce the risk of pollution incidents occurring. The pollution risk management procedures defined by the safe systems of work are outside the scope of the EIS.

Once the services have been disconnected, a soft strip will be undertaken of remaining fixtures and fittings. The building superstructure on FIPASS will be removed using cutting shears mounted on excavators sited on the barges. Waste will be separated from salvage and the waste generated as a result of this process will be disposed of within the Falkland Islands (i.e. a combination of incineration at the proposed new incinerator and disposal into existing or new landfill sites).

A4.2.6.4 Towing/winching to land-based dismantling facility

Following disconnection of services, the barges will be winched (individually and in sequence) to the location shown on **Figure 4.1** for dismantlement.

It will be necessary to undertake construction works to provide the appropriate facilities to support the safe dismantling of the FIPASS barges. Specifically, a new slipway and winch will be required to dismantle the barges (shown as area 10 on **Figure 4.1**).

It is proposed that the slipway will remain during the operational phase of the proposed scheme, providing long-term legacy benefit. It is proposed that the slipway will be constructed with a crushed stone foundation and a concrete tongue (with an impermeable interceptor trench).

Interception trenches will be installed within the slipway to capture any materials / contamination arising during the dismantling process to ensure materials from dismantlement activities are not able to enter the water. Periodically, the trenches will be cleaned out using land-based plant, with waste materials loaded onto a lorry and transported to one of the laydown areas for storage prior to disposal.

In order to transport the barges to the dismantling location, tow lines will be secured to an appropriate bollard point on each barge. Floating plant will be used to secure the tow lines. Tow lines will be secured directly to the land-based winch. Once the barges are secured to the tow lines and have been de-ballasted, the moorings to the dolphin structures will be removed and the towing process will commence. The barges will be transported at high tide to enable minimum grounding up the slipway. Once the barge has grounded on the slipway, it will be secured in place.

As shown on **Drawing PB7829-RHD-MA-BA-DR-ME-0033**, it is proposed that the north-western and south-western barges are removed during Phase 1 (refer to **Section A4.3** for further detail). The north-central, south-central barges and eastern barges (as well as the causeway) will be removed during Phase 2.

An unbound access track to the slipway will be required, feeding from the proposed new permanent access road. The access track will enable lorries to access the slipway and transport the dismantled tanks to the holding compound. On completion of the dismantling activity, the unbound access track will remain *in situ* providing the ability for legacy benefit.

It is anticipated that dismantling of FIPASS will be undertaken predominantly using land-based plant.

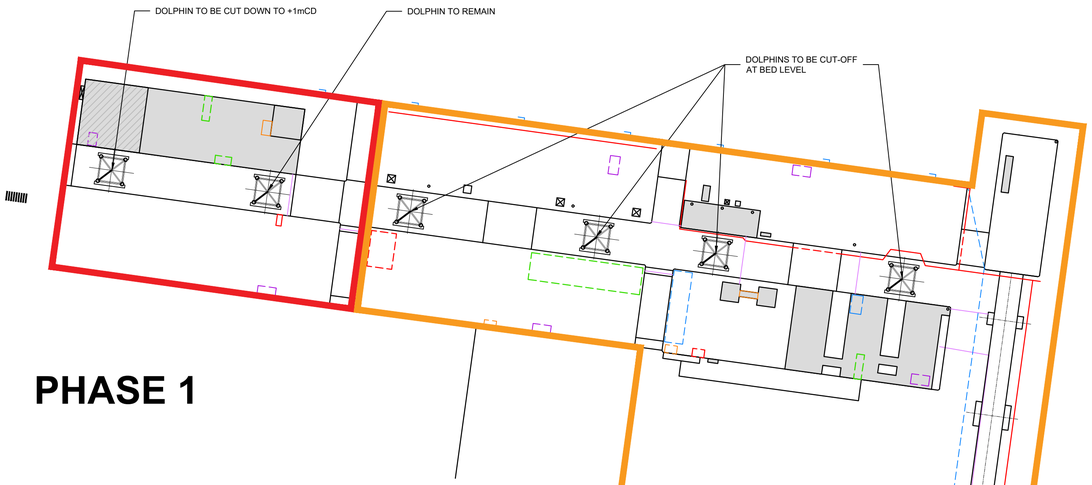
A4.2.6.5 Dismantling of the FIPASS barges

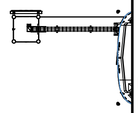
Due to the size of the FIPASS barges, it will be necessary to dismantle each barge in a phased manner (see **Drawing PB7829-RHD-MA-BA-DR-ME-0034**). Initially, the bow end will be removed using excavators with shear attachment. The bulkheads will be left intact to prevent ingress of water.

Once a section has been dismantled, cut up and removed from the dismantling location, the barge will be winched further up the slipway and secured in place. The next section of the barge will then be dismantled. This process will continue until the barge has been completely dismantled.

BAM DRAWING No.
BAS2051-RHD-MA-BA-DR-ME-0034

DO NOT SCALE





PHASE 1

1.1 TENANTS TO REMOVE ASSETS IN NW & SW BARGES.
1.2 CARRY OUT SURVEYS.
1.3 DE-CONTAMINATE NW & SW BARGES.
1.4 REMOVE SUPERSTRUCTURES (WAREHOUSES).
1.5 CREATE SHORESIDE ACCESS TRACK AND SLIPWAY / WINCH.
1.6 WINCH / TOW SW BARGE TO SLIPWAY AND DISMANTLE.
1.7 WINCH / TOW NW BARGE AND ANCHOR SOUTH OF EXISTING FIPASS.
1.8 ONCE SW BARGE COMPLETELY DISMANTLED, REPEAT 6. FOR NW BARGE.
1.9 DISMANTLE PLOY TUNNELS ON ACCESS ROUTE

PHASE 2

2.1 TENANTS TO REMOVE ASSETS IN NC, SC, NE AND SE BARGES.
2.2 CARRY OUT SURVEYS.
2.3 DE-CONTAMINATE NC, SC, NE AND SE BARGES.
2.4 REMOVE SUPERSTRUCTURES (WAREHOUSES).
2.5 CREATE SHORESIDE ACCESS TRACK AND SLIPWAY / WINCH.
2.6 WINCH / TOW SC BARGE TO SLIPWAY AND DISMANTLE.
2.7 WINCH / TOW NC BARGE AND ANCHOR SOUTH OF EXISTING FIPASS.
2.8 ONCE SC BARGE COMPLETELY DISMANTLED, WINCH / TOW NC BARGE TO SLIPWAY AND DISMANTLE.
2.9 CREATE SHORESIDE ACCESS TRACK AND SLIPWAY / WINCH.
2.10 WINCH / TOW SE BARGE TO SLIPWAY AND DISMANTLE.
2.11 REMOVE CAUSEWAY LINKSPAN BRIDGE AND TOW RORO BARGE TO SLIPWAY AND DISMANTLE.
2.12 DISMANTLE CAUSEWAY N TO S USING NE BARGE AS WORKING PLATFORM.
2.13 ONCE SE BARGE COMPLETELY DISMANTLED, WINCH / TOW NE BARGE TO SLIPWAY AND DISMANTLE.
2.14 REMOVE SECURITY HUT AT THE BASE OF THE CAUSEWAY.
2.15 REMOVE ACCESS TRACK AND SLIPWAY AND MAKE GOOD.

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES TO CHART DATUM (mCD) UNLESS NOTED OTHERWISE.
3. ALL COORDINATES RELATIVE TO SAPPERS HILL 1943 / UTM ZONE 21S.
4. FOR FURTHER DETAILS OF STAGING AND PHASING REFER TO DRAWING PB7829-RHD-MA-BA-DR-ME-0033.
5. DISMANTLEMENT STRATEGY ONLY COVER F.I.G ASSETS. SSL ASSETS AND DISMANTLEMENT TASKS ON FIPASS AND WITHIN THE TANK FARM ARE TO BE ACTIONED BY SSL. THIS INCLUDES DESIGN, CONSENTS AND DISMANTLING/RECYCLING/REUSING.

KEY

PHASE 1
PHASE 2

NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	BY	CHK	APP
P05	08.12.21	ADDRESSING BAM COMMENTS	CH	DP	RCBP
P04	01.12.21	ADDRESSING BAM COMMENTS	BM	CH	DP
P03	15.03.21	ADDRESSING BAM COMMENTS	CH	DP	RCBP
P02	09.03.21	ADDRESSING BAM COMMENTS	TC	DP	RCBP
P01	09.03.21	FOR INFORMATION	TC	DP	RCBP

REVISIONS

CLIENT

DESIRE THE RIGHT

bam nuttall

PROJECT

NEW PORT FACILITY AT THE FALKLAND ISLANDS

TITLE

DISMANTLEMENT STRATEGY DRAWING

Marlborough House, Marlborough Crescent
Newcastle upon Tyne, NE1 4EE
Tel +44(0)191 2111300
Email: info.newcastle@rhdhv.com
Website: www.royalhaskoningdhv.com

Royal HaskoningDHV
Enhancing Society Together

DRAWN	CHECKED	APPROVED
TC	DP	RCBP
DATE	SCALE	RHDHV DRAWING No.
09.03.21	1:1000	PB7829-RHD-MA-BA-DR-ME-0034

BAM DRAWING No.	SUITABILITY	REVISION
BAS2051-RHD-MA-BA-DR-ME-0034	S4	P05

To avoid transportation to Mare Harbour, it is proposed that the steel which makes up the barges will be stored in a holding area (area 1 and potentially other storage areas shown on **Figure 4.1**) until the proposed new quay is operational. The steel will be transported to the new quay once operational and loaded onto a vessel for transport overseas where it is intended that the material will be recycled.

As detailed in **Section A16.2.7.2**, samples of rust inside the FIPASS barges have been recovered to determine the presence of iron sulphide (to inform the approach to dismantling the barges from a health and safety perspective). Iron sulphide is a pyrophoric material which can spontaneously combust when exposed to air. It is created when iron oxide (rust) is converted to iron sulphide in an oxygen-free atmosphere where hydrogen sulphide gas is present or where the concentration of hydrogen sulphide exceeds that of oxygen. When pyrophoric iron sulphide is exposed to air, it oxidises back to iron oxide and either sulphur or sulphur dioxide gas is formed. This chemical reaction can generate heat which has the potential to ignite flammable mixtures (such as hydrocarbons, which are also present within the sludge and water within some of the tanks (see **Section A16.2**)).

Pyrophoric iron sulphide was not present in any of the rust samples analysed. This would suggest that in the ventilated tanks that have been entered and from which rust samples have been tested, there is unlikely to be a potential risk of sulphur or sulphur dioxide gases being formed in these tanks (and, therefore, unlikely to be a risk of creating a flammable atmosphere). Note that conditions do exist on FIPASS based on feedback from Atlink on monitoring for current ongoing maintenance activities in secondary structures on the deck. However, prior to dismantling, the atmosphere within each tank / other voided spaces is to be monitored to assess whether it presents a fire and explosion hazard. The use of hot works (the creation of sparks or use of flames whilst cutting, welding, riveting, grinding, etc.) will be prohibited if an explosive or flammable atmosphere is identified within the tanks to prevent possible ignition.

Ventilation, source hydrocarbons and rust levels will need to be monitored closely to ensure that conditions remain suitable for safe dismantlement and environmental conditions do not develop to generate gas in the time leading up to dismantlement. If conditions do develop and gas is detected, cleaning will need to be undertaken (as FIPASS Pyrophoric control works from 2019) in any affected tanks / voids.

A4.2.6.6 Removal of FIPASS mooring dolphins

Some of the existing mooring dolphins will be removed (cut off at bed level), with one dolphin remaining *in situ* to be re-used to support the fire water pumphouse (refer to **Drawing PB7829-RHD-MA-BA-DR-ME-0034**). Each dolphin consists of four driven concrete-filled tubular piles connected at the top by a steel frame.

A4.2.6.7 Removal of the Ro-Ro and causeway dismantlement

The FIPASS barges are currently connected to the shoreline by a causeway approximately 190m in length. The causeway is made up of five bridge units with end connecting ramps to the Ro-Ro barge at the seaward end and to the shore.

The approach to dismantling the Ro-Ro will be as described in **Section A4.2.6.1** to **A4.2.6.5** for the FIPASS barges.

All services to FIPASS run along or under the causeway and, therefore, these will need to be isolated and removed prior to towing/winching. The Ro-Ro and causeway are to be removed during Phase 2 of the proposed scheme (see **Drawing PB7829-RHD-MA-BA-DR-ME-0034**).

In order to dismantle the bridge sections of the causeway, it is proposed that one of the main FIPASS barges will be re-used to create a temporary working platform to support the dismantling plant (avoiding the need for use of temporary pontoons, which is beneficial from a waste hierarchy perspective). The barge will be towed and anchored / moored to the side of the causeway and the plant used to cut manageable sections of the bridges, working from north to south. The bridge pier sections will also be cut down using plant from the deck of the barge.

Waste from the demolition process will be stored on the deck of the barge for transport to shore. The barge will then be towed / winched to the shoreline, the decks cleared and dismantled as described for the FIPASS barges, working towards the shoreline.

The bridge piers are supported by pontoons that have been ballasted with sea water and sit on the seabed. It is proposed that air is pumped into the submerged pontoon tanks in order to re-float them and ensure all areas are vented ahead of dismantlement. Once afloat, the pontoons will be individually towed to the shoreline and dismantled on the slipway as described for the FIPASS barges.

A4.2.6.8 Removal of surficial silt

Site-specific marine ground investigation has confirmed the presence of surficial silts within the footprint of the proposed scheme, overlying the natural seabed deposits. These surficial silts were found to be very soft / low density and were noted to have a strong sulphur and hydrocarbon odour during ground investigation work undertaken in 2020. As discussed with F.I.G. Planning and Building Services, these surficial silts essentially comprise sewage which has been discharged into the harbour in raw form for a number of decades. As detailed in **Section A8.2**, it has been agreed with F.I.G. that the assumption to use within this EIS is that the surficial silt (i.e. sewage) within the harbour is heavily biologically contaminated with faecal coliforms, including *E. coli*. There is also some low level chemical contamination of the sediments within the harbour which has been identified through testing of sediments (detailed in **Section A8.2.2**). F.I.G. is undertaking its own sampling exercise of the surficial silt to analyse it for a range of chemical parameters and bacteriological contamination; however, the results of that exercise were not available to inform this EIS and, therefore, this currently represent an area of uncertainty.

In order to avoid excessive settlement of the proposed new quay structure and to provide access to the southern berth of the proposed new quay structure (described in **Section A4.2.10**), it is necessary to remove up to 50,000m^3 (wet volume) of surficial silts from within its footprint as the material is geotechnically unsuitable. It is proposed that the surficial silts are removed using suction techniques (from a vessel), with the silt pumped directly into geotubes on land, located to the east of the TDF within the remediation area shown on **Figure 4.1**. The bags are sealed to control and manage repeated filling and odour generation.

An example illustration of a geotube being filled is provided in **Plate 4.1**. **Drawing BNL-CE-BA-SP-WA-52** shows the layout of the proposed geotube area.

Plate 4.1 Example illustration of geotube being filled

DO NOT SCALE THIS DRAWING.

Drg. No. - Rev. A

Floating pipework to input material from dredging into this inline pumping station fuel will be required and regular servicing

Pipes to run under existing access

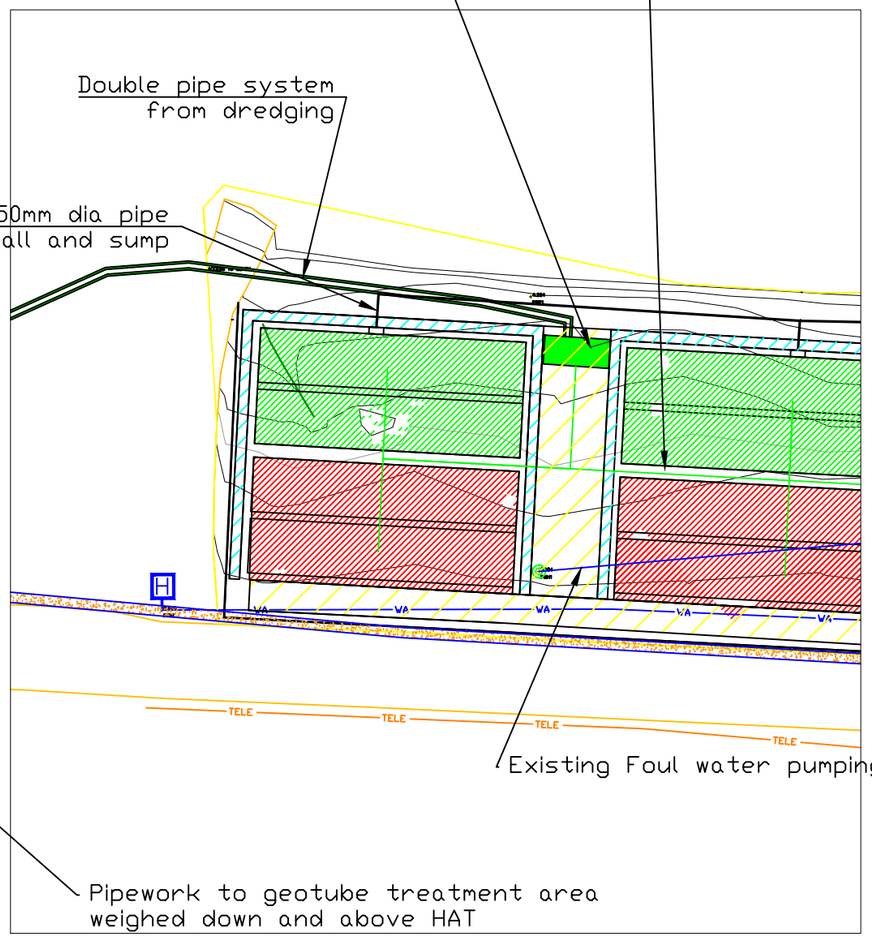
Pumping station

Pump and flocculator

Hoses to fill each bag, valve system to allow remote filling

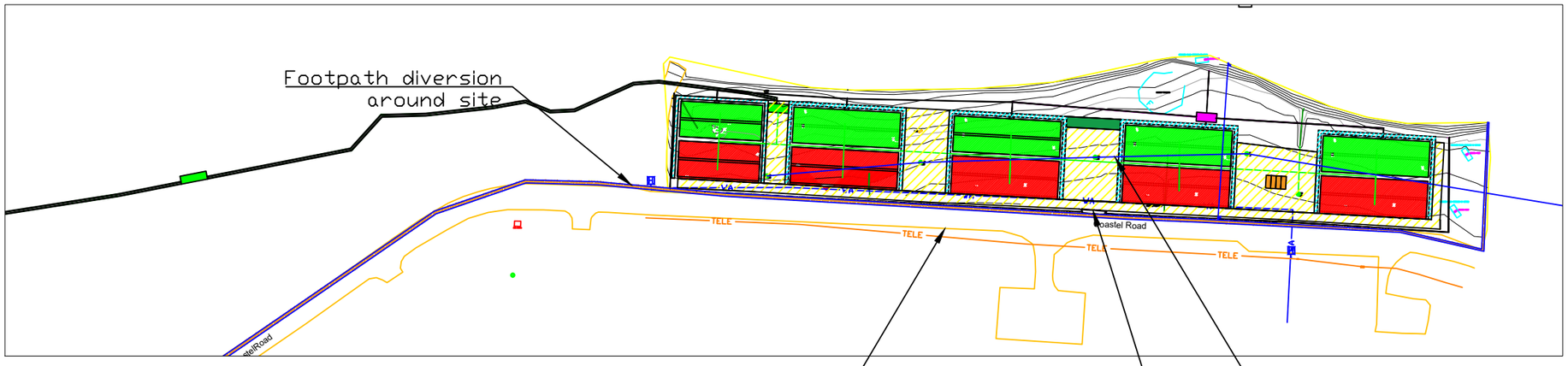
Double pipe system from dredging

150mm dia pipe outfall and sump



Detailed layout of Geotube location 1:900

Footpath diversion around site



Plan showing the pumping line and Geotube layout 1:2500

Coastel road to be used to access site

Plant to turn left out of compound when using coastal road

Service depth to be confirmed, levels of platforms to avoid areas directly above the services

NOTES

- Proposal for the layout of the geotube laydown area
- Pumping station from the dredging area to include 2No lines and pumps in case of breakdown or blockage
- A second pumping station has been included incase extra pressure is required
- Pump and flocculator station set up within the compound, to allow for multiple lines to be set up within the compound and filling controlled by valves to each bag
- 2m boundary chain-link fencing around compound
- care to be taken that water remains separated from the ground to avoid cross contamination between existing land and infiltrate returning back to the harbour
- Footpath diversion for coastal path maintained throughout works
- surface water runoff to be captured in each bund, runoff from the road into the non bunded areas should drain via swales.
- access to the foul main sewers to be maintained for maintenance
- Pipe system from the dredging to the compound should pass under any overpass areas.
- Plant to be refueled using fuel bowser
- 50,000m3 of material is a wet volume. Dry volume is expected to be 10% of the wet volume
- Ecology Surveys to confirm any ecological constraints.

Rev.	Description	Dr'n	Chk	Date
P01	Submission for planning	WJ		1/12/21
Rev 1	Original sketch	WJ	-	23/11/21

DRAWING STATUS
S4

bam nuttall

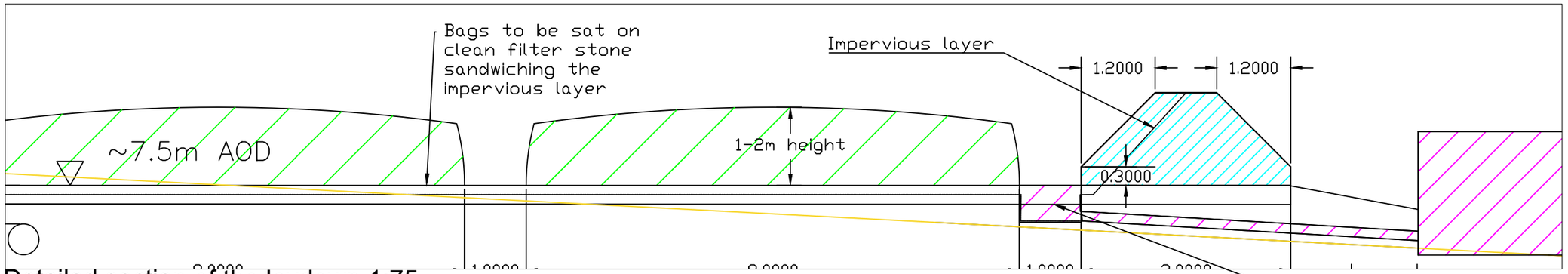
Contract: BAS.2051
New Port Facility at the Falkland Islands

Title: Stage Two
Proposed Compound Areas:
Area 9 - silt management

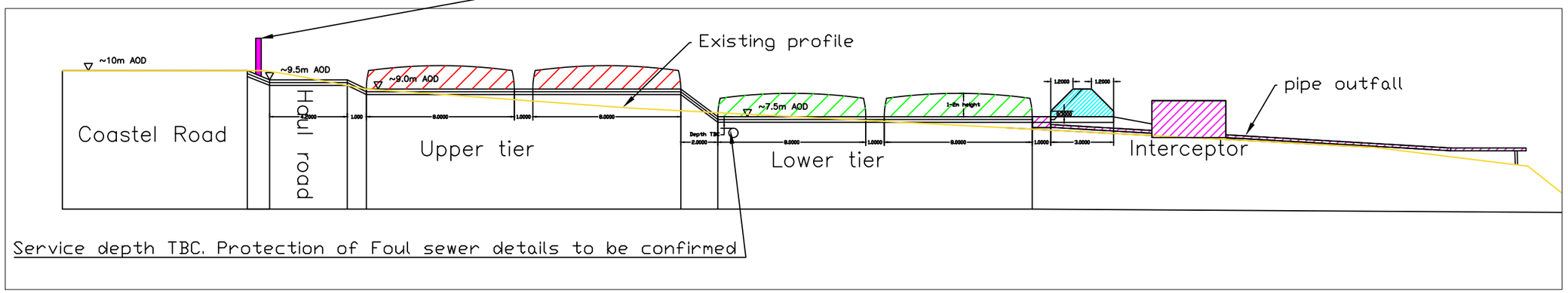
Scales	1:2500 and 1:900	Sheet Size	A3
Drawn	WJ	Checked CC	Date 1/12/21
Drg. No.	BNL-CE-BA-SP-WA-52	Revision	P01

DO NOT SCALE THIS DRAWING.

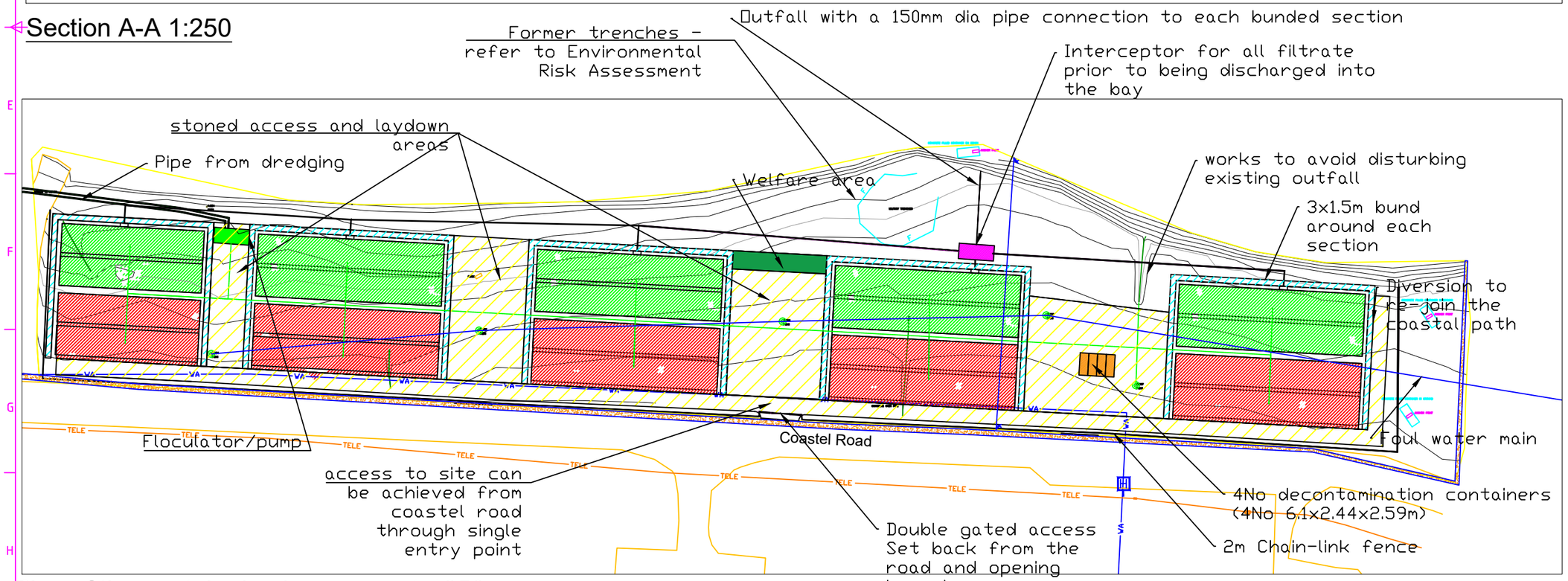
Drg. No. - Rev. A



Detailed section of the laydown 1:75



Section A-A 1:250



Plan of the geotube laydown area 1:1250

NOTES

- Proposal for the layout of the geotubes to be placed in the laydown area of the site.
- This design includes 20No tubes, 16No at 50m length and 4No at 39m length
- 2No bags per coloured section
- A cut fill exercise has been completed and the volumes with a 1.1 cut and 0.9 fill gives a total fill of 170.13m3
- this design includes the tubes placed at 2 different heights to reduce the cut/fill, with an upper haul road running parallel to the coast road.
- Additional controls to ensure hydrocarbons do not enter the harbour include interceptors at each outfall from each sealed bund.
- There are a number of manholes throughout the site for a foul pumping main. This main will be protected pending on confirmation of service depth.
- Ground levels to be reinstated after completion of works
- Interceptor has been placed to control outfall water and filter any contaminants if required.
- Foul water main across site, depth to be confirmed so that works do not impact normal flow.
- 4No decontamination containers placed on site for separate dewatering activities.
- This drawing is for planning proposal

Rev.	Description	Dr'n	Chk	Date
P02	Submission for planning formatted	WJ		3/12/21
P01	Submission for planning	WJ		1/12/21
Rev 1	Original sketch	WJ		23/11/21

DRAWING STATUS
S4

bam nuttall

Contract: BAS.2051
New Port Facility at the Falkland Islands

Title: Stage Two
Proposed Compound Areas:
Area 9 - silt management

Scales	1:1250, 1:75 1:250	Sheet Size	A3
Drawn	WJ	Checked	CC
Date	1/12/21		
Drg. No.	BNL-CE-BA-SP-WA-52	Revision	P02

Odours in sewage are produced by a variety of substances including compounds of sulphur and nitrogen, chlorinated compounds, phosphorous and other organics. The capture rate of compounds within the geotubes can be summarised as follows:

- Suspended solids – 99.6%
- Phosphorous – 98.2%
- Nitrogen – 82.3%
- *E.coli* - 99.9%

The above illustrates the geotubes are very effective at capturing both suspended solids and compounds which generate odour and therefore very minimal odour generation is expected.

The proposed remediation area where the geotubes would be located (shown on **Figure 4.1**) has been deliberately selected to take account of the prevailing westerly winds. The limited gases not contained in the bag will blow away from the residential areas of Stanley, minimising impacts on the local community, albeit that recreational and tourism areas (e.g. Surf Bay and Cape Pembroke) would be downwind of the proposed remediation area.

The proposed removal of surficial silt will adopt the 'just in time' approach, whereby surficial silt will be removed just ahead of construction, as required. The removal would be undertaken in a controlled and progressive manner as the construction of the quay progresses, minimising the risk of repeated removals being required in the event that surficial silt migrated back into the construction footprint.

In order to minimise reductions in water quality within Stanley Harbour as a result of the geotube de-watering process, the remediation area will be bunded and any water flowing from the geotubes will be contained to enter an interceptor prior to discharging back into the harbour. It is proposed that a flocculent is used within the geotubes to facilitate the solidification process.

Once remediated, and subject to suitable control testing in the construction stage, the solids could be used as a fertiliser (assuming there is demand for such use). Should there be no requirement / demand for use of the product on the Islands, or if testing confirms it is not suitable for such use, it could be deposited within a landfill site (referred to as the 'megabid' site shown on **Figure 4.2**)**,** located approximately 2km to the south-east of the proposed scheme footprint. Material would remain within the geotubes until a decision has been made regarding disposal or re-use.

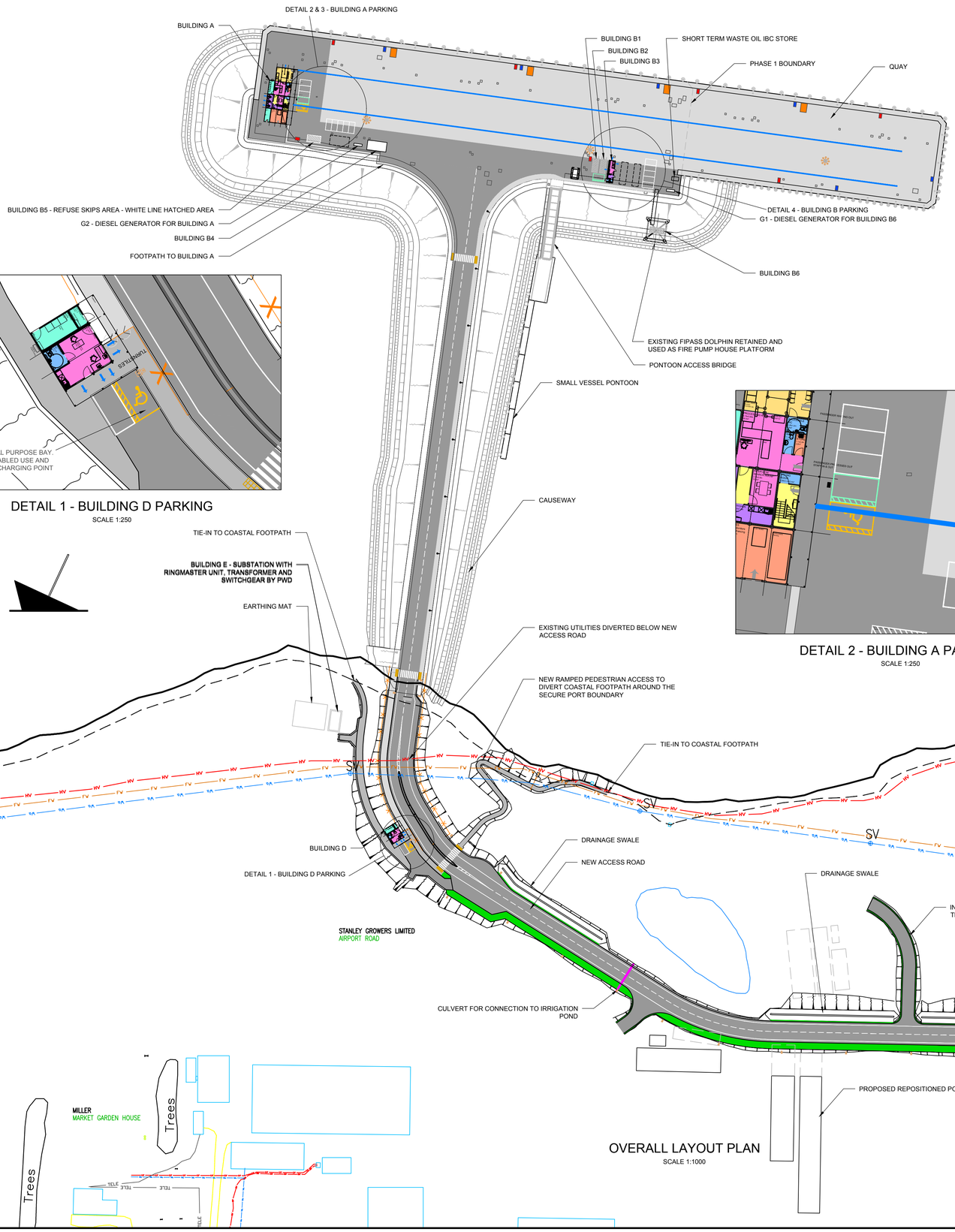
A4.2.7 Causeway

A causeway is proposed to provide vehicular access to the quay. The causeway will be constructed using rock fill sourced from Pony's Pass quarry, with a rock armour layer constructed on top of the fill on its side slopes (see **Drawing PB7829-RHD-ZZ-ZZ-DR-Z-0016, Drawing PB7829-RHD-ZZ-ZZ-DR-C-0109** and **Drawing PB7829-RHD-ZZ-ZZ-DR-C-0108**).

In order to construct the causeway, it will be necessary to locally remove marine growth on the bed of the harbour within the footprint of the causeway. Quarry-run material and armour stone will be transported from Pony's Pass quarry to a stockpile area by PWD to construct the causeway (shown on **Figure 4.1**). The transport of rock from the quarry to the stockpile area will be undertaken by PWD in advance of construction commencing. This stockpiling approach will allow construction of the causeway to continue irrespective of quarry maintenance regimes, haul operations or unplanned events. It will also allow for PWD to forward plan its quarry production operations to ensure an adequate supply of materials is maintained not just for the proposed scheme, but for other private sector construction activity and F.I.G's wide Capital Programme.

BAM DRAWING No.
BAS2051-RHD-ZZ-ZZ-DR-Z-5016

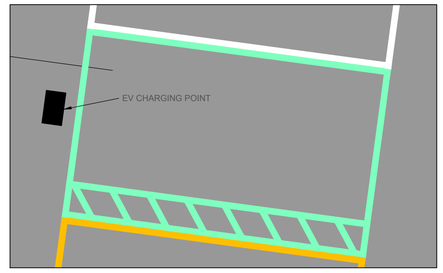
DO NOT SCALE



OVERALL LAYOUT PLAN
SCALE 1:1000

DETAIL 1 - BUILDING D PARKING
SCALE 1:250

DETAIL 2 - BUILDING A PARKING
SCALE 1:250



DETAIL 3 - EV CHARGING BAY & CHARGE POINT
SCALE 1:250

DETAIL 4 - BUILDING B PARKING
SCALE 1:250

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES TO CHART DATUM (mCD) UNLESS NOTED OTHERWISE.
3. ALL COORDINATES RELATIVE TO SAPPERS HILL 1943 / UTM ZONE 21S.
4. THIS DRAWING REPRESENTS LAYOUT FOR PLANNING. MECHANICAL AND ELECTRICAL SERVICES ARE NOT SHOWN.

BUILDING SCHEDULE	
REF	NAME
A	FACILITIES BUILDING
B1	STORES 1
B2	STORES 2
B3	WELFARE BLOCK
B4	QUAY SUBSTATION
B5	REFUSE SKIPS AREA
B6	FIRE PUMPHOUSE CONTAINER
D	GATEHOUSE
G1	DIESEL GENERATOR FOR BUILDING B6
G2	DIESEL GENERATOR FOR BUILDING A

LEGEND

- SURFACE WATER SLOT DRAINS
- INDICATIVE FRESH WATER BUNKERING PITS
- INDICATIVE FUEL BUNKERING PITS
- INDICATIVE FIRE HYDRANT PITS
- 30m HIGH LIGHTING MAST
- SERVICE ROAD CORRIDOR
- ROAD CONSTRUCTION (SUITABLE FOR VEHICLES WHICH USE THE ACCESS ROAD)
- CONCRETE QUAY SURFACING SUITABLE FOR CARGO HANDLING AND FISH TRANSHIPMENT (MOBILE CRANES AND OPERATING SIDE LIFTERS)
- DISABLED PARKING BAY
- EV CHARGING BAY

NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	BY	CHK	APP
P02	1.01.22	FOR PLANNING PERMISSION	CH	DP	RCBP
P01	14.01.22	FOR PLANNING PERMISSION	CH	DP	RCBP

REVISIONS

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bam nuttall

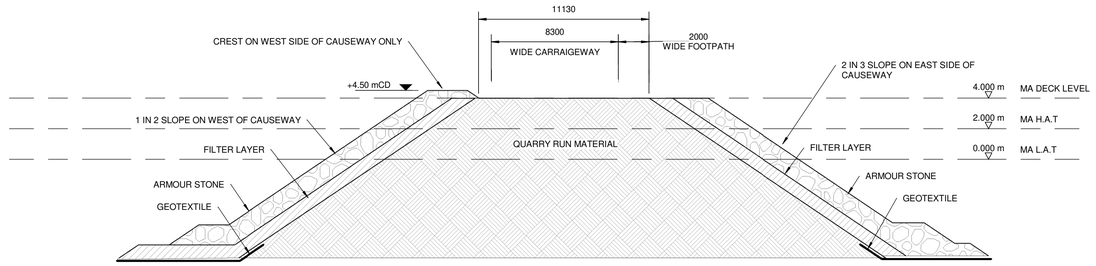
PROJECT
NEW PORT FACILITY AT THE FALKLAND ISLANDS

TITLE
OVERALL LAYOUT DRAWING FOR PLANNING PRESENTATION SHOWING CAR PARKING AREAS

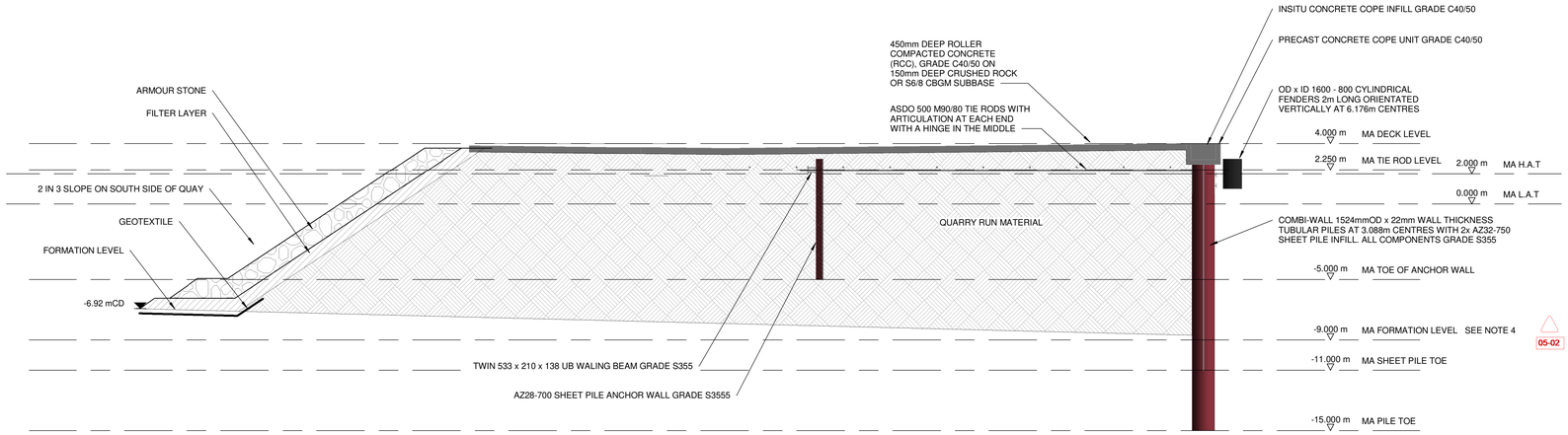
Royal HaskoningDHV
Enhancing Society Together
Marlborough House, Marlborough Crescent
Newcastle upon Tyne, NE1 4EE
Tel +44(0)191 2111300
Email: info.newcastle@rhdhv.com
Website: www.royalhaskoningdhv.com

DRAWN	CHECKED	APPROVED
CH	DP	RCBP
DATE: 19.01.22	SCALE: AS SHOWN	RHDHV DRAWING No.: PB7829-RHD-ZZ-ZZ-DR-Z-5016
BAM DRAWING No.: BAS2051-RHD-ZZ-ZZ-DR-Z-5016	SUITABILITY: S4	REVISION: P02

BAS2051-RHD-ZZ-ZZ-DR-C-0109



SECTION 1-1
1 : 200



SECTION 2-2
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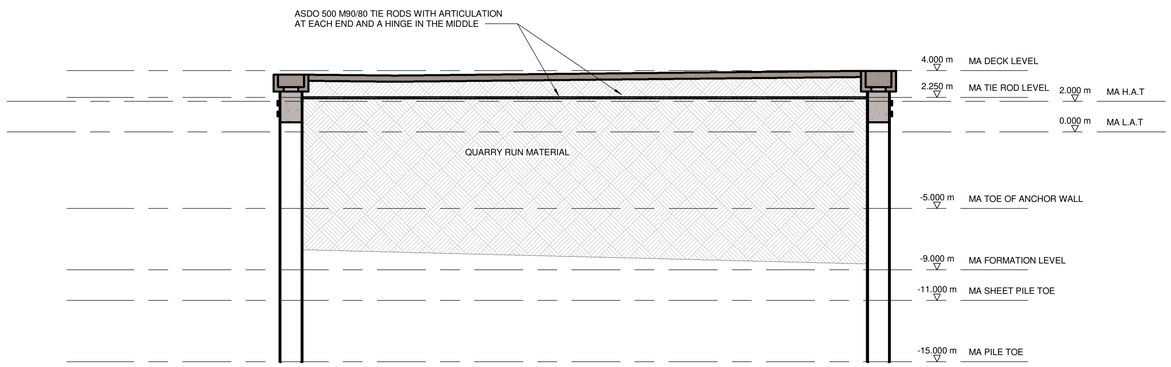

SECTION 3-3
1 : 200

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES RELATIVE TO CHART DATUM (mCD) UNLESS NOTED OTHERWISE.
3. ALL COORDINATES RELATIVE TO SAPPERS HILL 1943 / UTM ZONE 21S.
4. FOR SECTION LOCATIONS REFER TO DRG NO. PB7829-RHD-ZZ-ZZ-DR-0107
5. A WEAK AND HIGHLY MOBILE LAYER OF SURFICIAL SEDIMENT IS PRESENT AT THE SITE WHICH WILL BE REMOVED PRIOR TO CONSTRUCTION. REFER TO DRG NO. PB7829-RHD-MA-BA-DR-ME-0032
6. THE ASSUMED CONSTRUCTION SEQUENCE IS SET OUT IN THE CONCEPT DESIGN REPORT PB7829-RHD-ZZ-ZZ-RP-Z-0045
7. SERVICES ARE SHOWN WITHIN THE FEDERATED PROJECT INFORMATION MODEL PB7829-RHD-ZZ-ZZ-M3-Z-0069. CLASH RESOLUTION WILL BE CARRIED OUT DURING STAGE 1B.

LEGEND

△ 05-02 FOR HAZARDS REFER TO CDM DESIGNER'S RISK ASSESSMENT PB7829-RHD-ZZ-ZZ-HS-Z-0048

NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	BY	CHK	APP
P03	02.12.21	PART OF PLANNING SUBMISSION PACKAGE	CH	DP	RP
P02	26.03.21	ADDRESSING BAM COMMENTS	CH	DP	RP
P01	18.03.21	FOR INFORMATION	CH	DP	RP

REVISIONS

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PROJECT

NEW PORT FACILITY AT THE FALKLAND ISLANDS

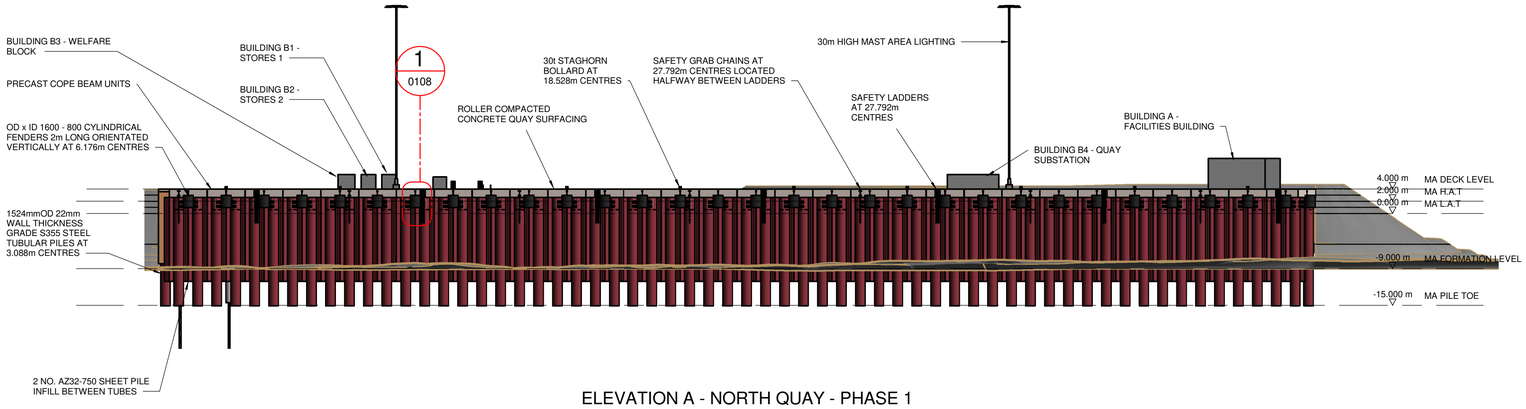
TITLE

QUAY AND CAUSEWAY CROSS SECTIONS DRAWING

Marlborough House, Marlborough Crescent
Newcastle upon Tyne NE1 4EE
Tel: +44 (0)191 211 1300
Email: info@rhdhv.com
Website: www.royalhaskoningdhv.com

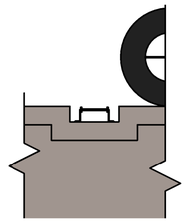
DRAWN	CH	CHECKED	DP	APPROVED	RCBP
DATE	15.03.21	SCALE	1 : 200	RHDHV DRAWING No..	PB7829-RHD-ZZ-ZZ-DR-C-0109
BAM DRAWING No.	BAS2051-RHD-ZZ-ZZ-DR-C-0109			SUITABILITY	S2
				REVISION	P03

BAS2051-RHD-ZZ-ZZ-DR-C-0108



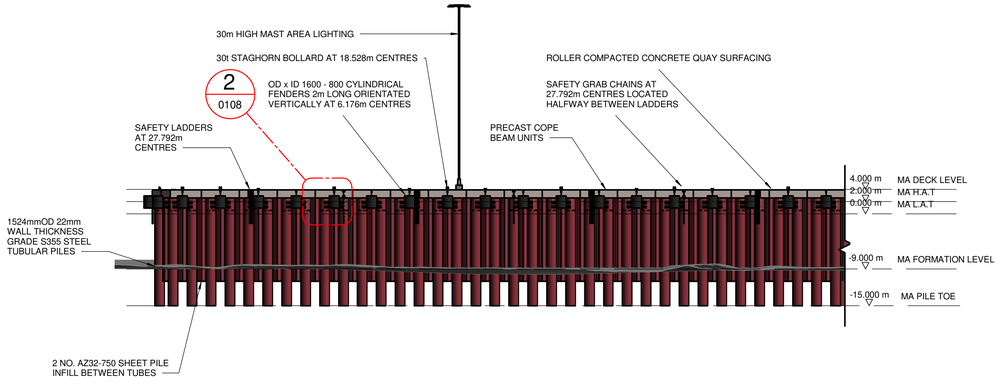
ELEVATION A - NORTH QUAY - PHASE 1

1 : 500



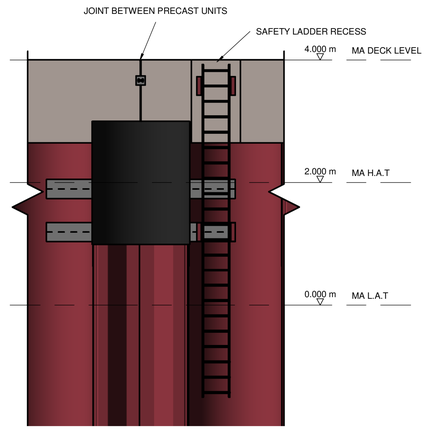
PLAN ON LADDER RECESS

1 : 50



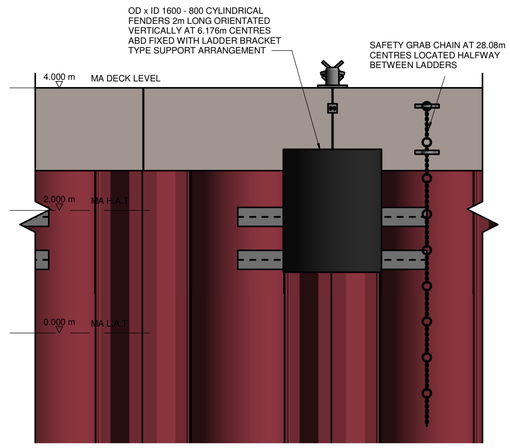
ELEVATION A - NORTH QUAY - PHASE 2

1 : 500



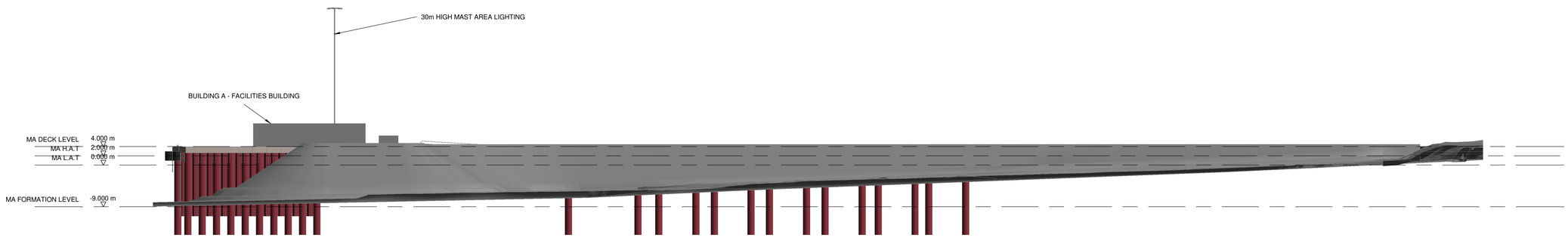
DETAIL 1 - TYPICAL ELEVATION ON QUAY LADDER

1 : 50



DETAIL 2 - TYPICAL ELEVATION ON SAFETY GRAB CHAIN, BOLLARD AND FENDER

1 : 50



ELEVATION B - WEST QUAY AND CAUSEWAY

1 : 500

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES RELATIVE TO CHART DATUM (mCD) UNLESS NOTED OTHERWISE.
3. ALL COORDINATES RELATIVE TO SAPPERS HILL 1943 / UTM ZONE 21S.

NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	BY	CHK	APP
P04	02.12.21	PART OF PLANNING SUBMISSION PACKAGE	CH	DP	RP
P03	30.03.21	LADDER & GRAB CHAIN SPACING AMENDED	CH	DP	RP
P02	26.03.21	ADDRESSING BAM COMMENTS	CH	DP	RP
P01	18.03.21	FOR INFORMATION	CH	DP	RP

REVISIONS

CLIENT

DESIRE THE RIGHT

bam nuttall

PROJECT

NEW PORT FACILITY AT THE FALKLAND ISLANDS

TITLE

QUAY AND CAUSEWAY ELEVATIONS DRAWING

Marlborough House, Marlborough Crescent
Newcastle upon Tyne NE1 4EE
Tel: +44 (0)191 211 1300
Email: info@rhdhv.com
Website: www.royalhaskoningdhv.com

Royal HaskoningDHV
Enhancing Society Together

DRAWN	CHECKED	APPROVED
CH	DP	RCBP
DATE	SCALE	RHDHV DRAWING No..
15.03.21	As indicated	PB7929-RHD-ZZ-ZZ-DR-C-0108

BAM DRAWING No.	SUITABILITY	REVISION
BAS2051-RHD-ZZ-ZZ-DR-C-0108	S2	P04

Material will be loaded by excavator from the stockpile onto all-terrain dump trucks (ATDs). These will reverse along the causeway and tip material in pre-defined locations. As the core of the causeway progresses seaward, a filter layer and armour stone will be placed on the western face and positioned by an excavator. This will minimise the risk of material being washed away during construction (as it protects the working face from the prevailing wind and waves).

The causeway will be brought to level, surfaced with crushed material and compacted to act as a temporary surface. The final scheme comprises two vehicle lanes and one segregated pedestrian walkway. The final surface course will be completed and road markings added prior to handover.

At the seaward end of the causeway, a working platform (bund) will be constructed from fill material. This will be used to install the quay wall. The level of fill will be 3.5m above Chart Datum (CD) to allow construction operations to continue at all states of tide.

The crest of the causeway will be positioned above the level of Highest Astronomical Tide (HAT). It is understood and accepted that the causeway (and also the quay) will overtop during extreme flood events (**Ref. 19**), however the facility would be closed anyway during such events due to high winds and threat to human life.

The causeway will is predicted to be constructed using predominantly land-based plant, with works commencing from the landward end to avoid working in the water where possible.

The causeway is proposed to be lit using street lighting, similar to the existing street lighting on the adjacent road network. The lights are proposed to be located on the eastern side of the causeway in order to minimise road safety issues for vehicles travelling along the causeway, as well as to allow for lighting of the pontoon on the southern side of the quay. Such lighting will provide an average maintained horizontal luminescence of 20 lux (discussed further in **Section A15**).

A4.2.8 Seawater pump station

A seawater firefighting pump station will be constructed on top of one of the existing dolphins from the FIPASS structure; the pump station will contain two fire pumps. The proposed use of seawater for the fire pumps avoids the risk of disruption to the freshwater supply, meaning that water should be available to safeguard both visiting vessels and port facilities. The firefighting system will use electric pumps; one powered by an independent diesel generator and the other connected to the main supply with a diesel generator as standby.

It is envisaged that marine growth will need to be removed during the operational phase around the seawater firefighting pump station to ensure effective operation of the pump station should it be required.

A4.2.9 Quay

It is proposed that the quay be constructed as a mass fill structure, supporting a roller compacted concrete surface (over the areas designed to be trafficked by heavy plant, equipment and vehicles) with dimensions 300m x 50m (**Drawing PB7829-RHD-ZZ-ZZ-DR-Z-0016, Drawing PB7829-RHD-ZZ-ZZ-DR-C-0107, Drawing PB7829-RHD-ZZ-ZZ-DR-C-0109, Drawing PB7829-RHD-ZZ-ZZ-DR-C-0108**). The width of the quay is to reduce to 40m at the eastern end. The quay will have an approximate deck level of 4m above CD at its seaward face, reducing to around 3.4m CD at the landward face.

A tubular / sheet piled combi-wall will be constructed along most faces of the proposed quay to constrain the mass fill (**Drawing PB7829-RHD-ZZ-ZZ-DR-C-0107** and **Drawing PB7829-RHD-ZZ-ZZ-DR-C-0109)**.

The tubular piles will be driven to rock head with a pin pile drilled into the underlying bedrock. The sheet pile infill of the combi-wall will consist of two sheet piles driven to rock head (**Drawing PB7829-RHD-ZZ-ZZ-DR-C-0109**).

A primary crawler crane and support crane will be utilised to support with quay construction. The primary crane will be sited on a bund (i.e. an area at the back of the proposed new quay which is to be reclaimed first) in order to construct the combi-wall. The support crane will be sited at the base of the causeway to load piles and other construction material from the stockpile area onto a tractor and trailer for transport to the worksite. Both cranes will have fenced exclusion zones around them.

The combi-wall will be tied back to a sheet piled anchor wall using high level ties along most of its length. At the eastern end of the proposed quay, an anchor wall will not be required; the tie rods will be able to connect the front face and back face of the quay together in this location directly without the need for an anchor wall.

Locally sourced rock armour is proposed along the rear of the quay to retain the mass fill. The sheet piled anchor wall will be installed using a piling hammer attached to an excavator. Once the tie rods have been installed and tensioned, the fill material will be placed in between.

It is proposed that rock armour, aggregate and fill materials required to construct the quay will be sourced from Pony's Pass quarry. For the purposes of the EIA, it has been assumed that all works required at the quarry to source rock are already covered under the existing licences and permits held by the quarry operator.

Heavy Goods Vehicles (HGVs) will be required to transport construction materials from the quarry. It should be noted that the transport of rock from Pony's Pass quarry to the stockpile area shown on **Figure 4.1** will be managed by PWD at F.I.G. The construction Contractor would then transport the rock from the stockpile area to the construction area.

It is anticipated that the proposed construction works will require significant movement of materials by road during peak production (described in full in **Section A14**). It should be noted that the new machinery to be transported to the Falkland Islands to construct the proposed scheme will comply with the UK emission standards which, when compared to the specification of the existing and older HGVs currently used in the Falkland Islands, represents an environmentally preferable approach in terms of exhaust emissions to air.

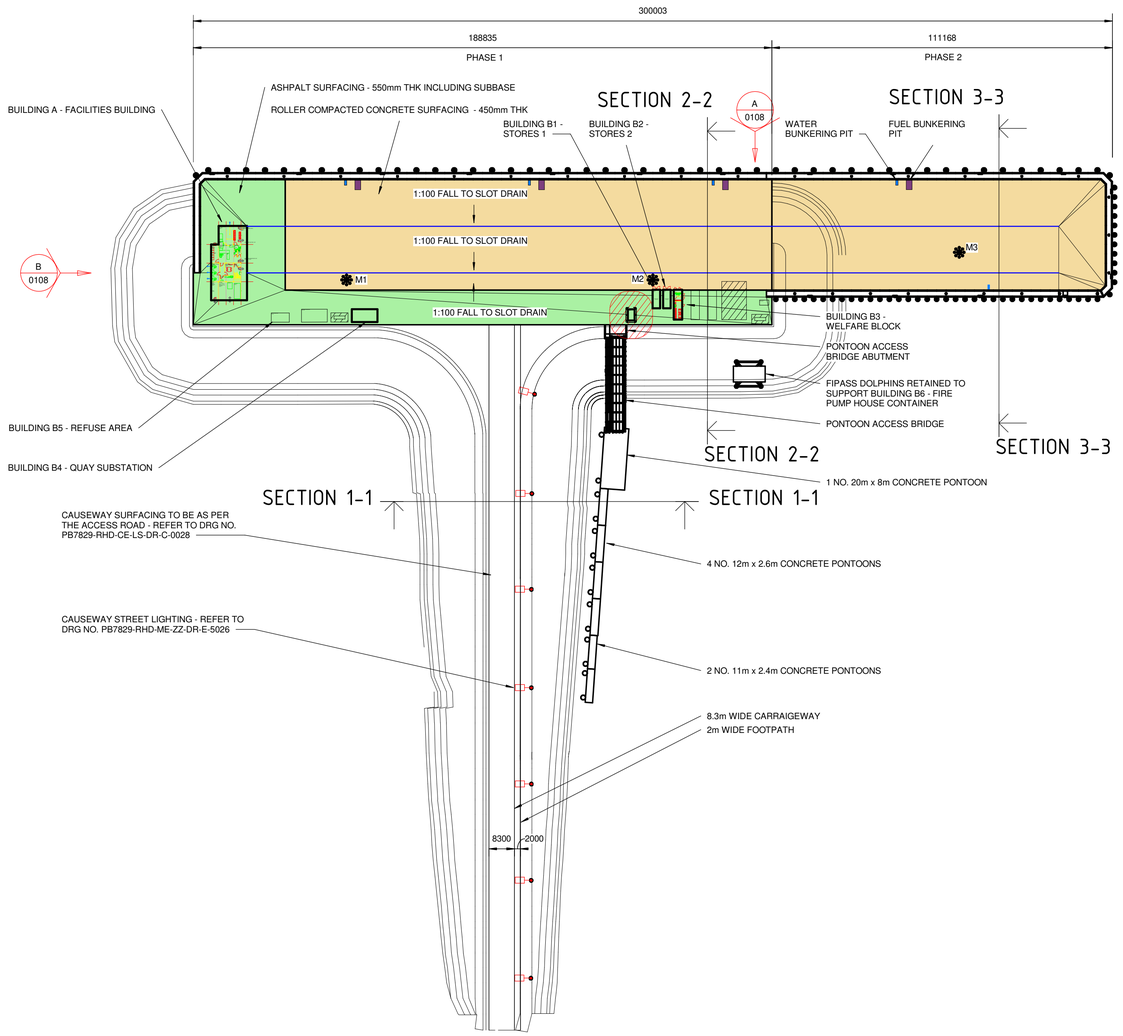
The combi-wall will have a pre-cast concrete capping beam which will be cast at the proposed batching plant shown on **Figure 4.1**. A flatbed lorry will be used to transport the beam units to site, where they will be lifted into position using a crane. Once secured in place, *in situ* concrete infill will be cast and the quayside furniture will be installed, including bollards, fender rings, lighting columns and services.

A pontoon with an access bridge (**Drawing PB7829-RHD-ZZ-ZZ-DR-C-0107**) will be provided on the landward side of the quay to provide the ability to load launches with a telehandler. The pontoon is proposed to comprise of a heavy-duty pontoon with dimensions of 8m x 20m and approximately 70m of further light pedestrian only pontoons. Power and water points at regular intervals along its length. The pontoon system will be restrained by a number of monopiles. The heavy-duty pontoon will include a diesel fuel supply to re-supply small boats.

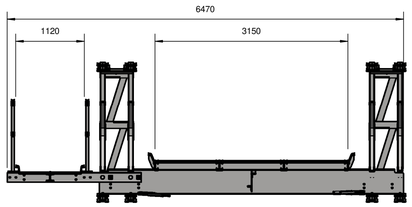
The proposed quay will incorporate linear drains to collect surface water which will be connected to an underground piped network which will convey flows to an outfall for discharge into Stanley Harbour. The flows will pass through an oil interceptor prior to discharge.

The majority of the construction works will be undertaken using land-based plant. The only marine vessel anticipated during the construction phase are is a safety boat and a vessel to support with removal of the surficial silt (with a FIPASS barge re-used temporarily to support with causeway demolition).

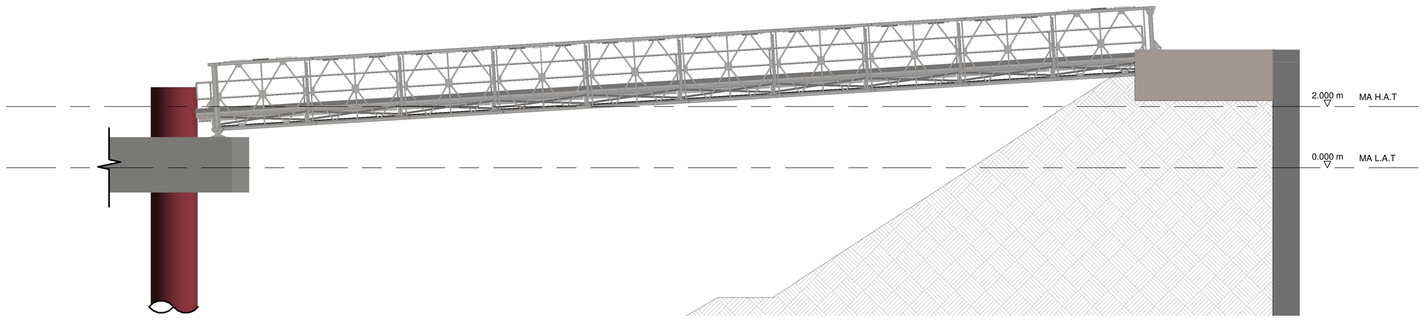
BAS2051-RHD-ZZ-ZZ-DR-C-0107



GENERAL ARRANGEMENT
1 : 1000



TYPICAL CROSS SECTION THROUGH ACCESS BRIDGE
1 : 50



ELEVATION ON ACCESS BRIDGE
1 : 100

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES RELATIVE TO CHART DATUM (mCD) UNLESS NOTED OTHERWISE.
3. ALL COORDINATES RELATIVE TO SAPPERS HILL 1943 / UTM ZONE 21S.
4. DETAILS OF PIT AND DRAINAGE LOCATIONS FOR INFORMATION ONLY AND SUBJECT TO DESIGN DEVELOPMENT.

LEGEND

M - 30m HIGH MAST LIGHTING LOCATION

SLOT DRAIN

NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	BY	CHK	APP
P04	02.12.21	PART OF PLANNING SUBMISSION PACKAGE	CH	DP	RP
P03	30.03.21	LADDER & GRAB CHAIN SPACING AMENDED	CH	DP	RP
P02	22.03.21	ADDRESSING BAM COMMENTS	CH	DP	RP
P01	18.03.21	FOR INFORMATION	CH	DP	RP

REVISIONS

CLIENT

PROJECT

NEW PORT FACILITY AT THE FALKLAND ISLANDS

TITLE

QUAY AND CAUSEWAY GENERAL ARRANGEMENT DRAWING

Marlborough House, Marlborough Crescent
Newcastle upon Tyne NE1 4EE
Tel: +44 (0)191 211 1300
Email: info@rhdhv.com
Website: www.royalhaskoningdhv.com

DRAWN	CH	CHECKED	DP	APPROVED	RCBP
DATE	15.03.21	SCALE	As indicated	RHDHV DRAWING No..	PB7829-RHD-ZZ-ZZ-DR-C-0107

BAM DRAWING No.	SUITABILITY	REVISION
BAS2051-RHD-ZZ-ZZ-DR-C-0107	S2	P04

No capital dredging is proposed as part of the proposed scheme. However, there is a requirement to remove surficial silt present underneath the footprint of the proposed new quay prior to construction commencing and limited surficial material on the southern berthing face pocket to allow vessels to access the south face / pontoon during the operational phase (described in **Section A4.2.7**).

As with the dismantling of FIPASS, it is proposed that the quay is constructed in a phased manner (detailed in **Section A4.2.15**). **Drawing PB7829-RHD-MA-BA-DR-ME-0033** shows the currently envisaged staging and phasing of the proposed construction works.

Lighting on the quay is proposed to be provided via high mast lighting to maximise operational efficiency. To meet the necessary safety standards, the quay area is to be illuminated to an average of 50 lux. Working areas on the quay are to be illuminated to an average of 20 lux to allow for safe transhipment of operation and cargo handling.

A4.2.10 Buildings to be located on the quay

During the stakeholder engagement exercise undertaken in 2020, requirements were discussed for some essential building provision, part of which could act as a 'windbreak' to provide some shelter on the quay from the prevailing westerly winds. As part of this scheme, a two-storey building (referred to as Building A) is proposed at the western end of the quay (**Drawing PB7829-RHD-ZZ-ZZ-DR-Z-0016**).

The two-storey Building A will house essential port management functions, such as:

- Ground floor:
  - Passenger processing / waiting area.
  - Multi-agency facility (customs, immigration, police, fisheries, biosecurity).
  - Related welfare, stores and plant areas.
  - Shared kitchen for staff.
  - Accessible toilets for staff and occasional visitor use.
  - Hot-desk office for the Maritime Authority and other F.I.G. visiting officers.
  - Stores for demountable barriers, foam fire apparatus and other medical and emergency equipment.
  - Cleaner's store.
  - Telecons and general plant room.
- First floor:
  - Port manager office.
  - Shared kitchen.
  - Toilet, welfare area, changing / drying room with locker space.

Building A is proposed to be a two-storey prefabricated structure and will be assembled on site.

The quay will also house a number of other buildings / structures essential for port management and will provide space for the following (refer to **Drawing PB7829-RHD-ZZ-ZZ-DR-Z-0016** for the location of each):

- Immediate action oil spill response, firefighting and medical kit (B1 and B2).
- Welfare block (B3) (with space for future welfare cabins).
- Quay substation (B4).
- Refuse area (B5).
- Seawater pump station (B6).
- Diesel generator (and space for a further substation) (located in between Building B4 and B5).
- Diesel fuel tank for pontoon fuel supply.
- Short term waste oil store.

A4.2.11 Security gatehouse

A gatehouse (referred to as Building D on **Drawing PB7829-RHD-ZZ-ZZ-DR-Z-0016**) will be provided at the root of the causeway to control access and egress to / from the quay. The building will be single storey of modular design and will house security staff from the port operator, monitoring and controlling entrance and exit to the port. The gatehouse is to be constructed on shallow pad type foundations. Parking for two cars will be provided at the gatehouse for use by staff.

A4.2.12 Substations

A substation will be provided at the base of the causeway by PWD under permitted development rights; this will provide the tie-in for the facility to the PWD high voltage main in that location. In addition, a substation (to be constructed as part of the proposed scheme) is also proposed to be located on the quay to accommodate the 11kV supply from the grid. .

A4.2.13 Associated infrastructure requirements

Modifications to the highway network and the utility / services networks will be required to service the proposed quay.

Water and power supplies will be diverted from the existing utility network to run along the alignment of the new access road and causeway. Water supply to the port is to be derived from a valved connection to the 'low-level' main provided at the head of the causeway. The freshwater system will be separated into two distinct networks, one serving the quay for ships and washdown facilities, and the other serving the port buildings and the wholesome supplies. Backflow prevention will be installed prior to the quay to prevent contamination of the local supply and consumable water for the port buildings.

Package sewage treatment plants will be used within Building A, Building B3 and the gatehouse building (Building D). These treatment plants will treat the foul water prior to discharging into Stanley Harbour via the surface water drainage system.

In addition to the above, works will be required within the SSL site to accommodate the new fuel pipe work to be installed as part of the proposed scheme. It is understood that such work within the SSL compound would likely comprise pump rooms, pipe work modifications and system control modifications. These works will be undertaken in accordance with SSL's safe systems of work to control the risk of pollution incidents.

A4.2.14 Construction programme and phasing

A summary of the main phases of construction activities and the current envisaged durations are set out in **Table 4.1**. **Drawing PB7829-RHD-MA-BA-DR-ME-0033** shows the proposed construction sequencing. The phased sequencing of construction works will result in the provision of adequate berthing face at all times (either at FIPASS or at the proposed new quay).

The construction programme is subject to final agreement with F.I.G, however it is currently envisaged that construction would commence in 2023, with final handover and commissioning of the quay in 2025.

Table 4.1 Proposed construction schedule

Activity	Indicative duration
Site set-up (including preliminary works)	1 month
Dismantling / decommissioning of FIPASS	22 months

Activity	Indicative duration
Access road construction	4 months
Surficial silt removal	20 months
Causeway construction	14 months
Quay construction	Phase 1 (earthworks, bund and all other works): 13 months
	Phase 2 (earthworks, bund and all other works): 13 months

To ensure a smooth transition and to provide continued berthing capacity during the construction phase, operations on FIPASS would gradually migrate to the proposed new quay over the two phases of construction. Although the project is to be constructed in a phased manner, the first section of quay will be tested, commissioned and handed over to the operator at the end of Phase 1. The quay is proposed to be constructed in full and handed over to the operators in 2025.

Construction works will typically be undertaken six days per week (Monday to Saturday); however, depending on the progression and sequencing of works, there may be a requirement for works to be undertaken on Sundays. Working hours will typically be from 7am – 7pm. However, certain critical path construction phase activities (namely the construction of the causeway and all of the backfilling operations) would need to be double-shifted, working across an extended window from 7am to 11pm. Liaison will be undertaken with the operators of FIPASS during these extended working windows to ensure the ongoing 24 hour operations at FIPASS would not be adversely affected as a result.

A4.2.15 Personnel

It is envisaged that the construction phase would require a peak workforce of no more than 70 personnel. It is proposed that construction personnel would travel to the Falkland Islands and live in the temporary accommodation facilities to be constructed as part of the proposed scheme.

A4.2.16 Management of construction waste

Waste will be eliminated where possible through design and construction methods. As an example, excess packaging will be removed prior to shipping materials and plant to the Falkland Islands.

All scrap steel generated during construction (including that from the dismantling of the FIPASS barges) is to be removed from the Falkland Islands for recycling at an appropriately licensed facility. Any waste timber will be offered to F.I.G. for use as a dry incinerator feed stock.

Food waste / non-recyclable rubbish generated from the construction area, site compounds, accommodation facilities etc. will be appropriately segregated and removed from site for incineration.

It is proposed that the sludge from the FIPASS ballast tanks to be removed as part of the FIPASS dismantling process will be disposed of into a suitable waste management facility on the Falkland Islands.

Waste generated as a result of the soft strip process (i.e. removal of infrastructure on top of FIPASS, including fixtures and fittings) is to be disposed of within the Falkland Islands through a combination of incineration at the proposed new incinerator and deposition into existing landfill sites (unless it can be re-used on the Islands in a beneficial manner).

The proposed scheme has been designed to minimise environmental impact as far as practicable. The following sections detail the mitigation which has been 'embedded' into the proposed scheme; the impact assessment presented in **Section A7** to **A23** has taken these measures into account when assessing potential impacts.

A4.2.17 Embedded mitigation

The proposed scheme has been designed to minimise environmental impact as far as practicable. The following sections detail the mitigation which has been 'embedded' into the proposed scheme; the impact assessment presented in **Section A7** to **A23** has taken these measures into account when assessing potential impacts.

A4.2.17.1 Measures to manage the risk from accidental spillages of oils, fuels and chemicals during construction

During the various construction activities, there is the potential for pollution from spills or leaks of fuel and oil. The risk of this arising can be minimised by following standard good practice with regard to pollution prevention guidance.

The construction works (including the dismantling of the FIPASS barges) will be undertaken in accordance with the UK Environment Agency's Pollution Prevention Guidelines (PPG) No. 5 on works in, near and liable to affect watercourses (Environment Agency, 2007). Whilst it is noted that guidance from the Environment Agency is not applicable in the Falkland Islands, and PPG No.5 has been withdrawn in England, it still provides good reference material for protection of water courses when working in and around water.

The works will also be undertaken in accordance with Construction Industry Research and Information Association (CIRIA) *Coastal and marine environmental site guide* (2nd edition) (C744) (CIRIA, 2015a) and CIRIA Guidance note C741 *Environmental Good Practice on Site Guide* (4th Edition) (CIRIA, 2015b).

All vessels would adhere to the requirements of the MARPOL Convention Regulations, in particular the requirement that all ships over 400 gross tonnage (GT) should carry an approved Shipboard Oil Pollution Emergency Plan (SOPEP).

In the unlikely event of a spill, appropriate spill kits will be available and all construction personnel will be trained to use them. In addition, suitable bunding and storage facilities will be employed to minimise the risk of release of fuel oils, lubricating fluids associated with the plant and equipment into the marine environment.

Pollution control kits and spill kits will be fitted to every machine, bowser and tank and at strategic locations around the work site. In addition, regular drills (six monthly) will be held to ensure employees are fully aware of what to do in the event of a spill.

In light of the above, any risks to the marine environment will be reduced as far as possible. Such best practice measures would be detailed within a Construction Environmental Management Plan (CEMP) to be produced in advance of construction commencing.

A4.2.17.2 Measures to manage the risk of light spill to Stanley

The lighting on the quay is proposed to be designed to be focussed in a predominantly seaward direction (with some lighting being emitted in a southerly and sideways direction to adequately light up the back and sides of the quay). Lighting on the quay (apart from Aids to Navigation which are required for safety purposes) would be turned off when a vessel is not loading / unloading, as currently occurs on FIPASS.

The following measures have been incorporated into the scheme for permanent lighting:

- Adopt the lowest safe lighting levels possible for the task being undertaken.

- Ensure the luminaire is mounted at zero degrees to the horizontal and avoid any tilt where possible.
- Direct luminaires into the area to be lit (light from the boundary inwards).
- Place lighting equipment so it makes use of the natural topography, buildings and bunds to minimise its visibility to sensitive receptors.
- Use a luminaire with good optical control.
- Minimise the mounting height of the luminaire.
- Limit the hours of lighting operation where possible.
- Make use of manufactures supplied louvres/shields.
- Provide local control for the lighting so it may be switched off when not required.

A4.2.17.3 Measures to minimise impacts to Stanley Growers from the proposed access road

The proposed access road will impact the agricultural land at Stanley Growers. Discussions are ongoing between FIG and Stanley Growers in relation to this, with FIG's intention being to ensure that any loss of land (either temporarily during the construction stage or long term when the new port becomes operational) can be offset by the offer of provision of alternative land at a suitable nearby location, and assist with re-siting or re-provision of polytunnels. In addition, it is proposed to offer to enhance agricultural areas on the remaining Stanley Growers land through the relocation of peat and topsoil generated from excavations to construct the access road. While acknowledging that there will inevitably be disruption and an impact on local business Stanley Growers, it is FIG's intention to offset this disruption by the provision of alternative land at a nearby location and support in re-provision of polytunnels as required.

A4.2.17.4 Biosecurity risk management

A number of vessels will be used to transport plant, machinery and equipment to the Falkland Islands for the construction phase of the proposed scheme. During this process, there is a risk of the introduction of terrestrial and marine invasive non-native species (INNS), and the potential for the introduction INNS was raised as a concern during the stakeholder engagement exercise.

Terrestrial INNS may be found within the intended cargo, within the associated packaging or within inadvertently adhered materiel (e.g. mud from the site of origin on the bottom of a container). Marine INNS can be transported to the Falkland Islands via ballast water and /or biofouling on the surfaces of vessels.

There are many examples of terrestrial INNS in the Falkland Islands. Of particular concern are species originating from areas that have similar environmental conditions to the Falkland Islands because they have a greater likelihood of flourishing. The habitat of the Falklands is similar with that of the UK and species that may be transported from the UK are very likely to survive and potentially become established. In terms of marine species, it is clear that several invasive species are already established within Stanley Harbour and Mare Harbour, such as the tunicate (*Ciona intestinalis*) and the parchment tubeworm (*Chaetopterus variopedatus*) both of which have the potential to out-compete and smother native species.

INNS can impact on native species through predation, competition and habitat loss, potentially affecting the biodiversity of the Islands. In 2015, a review of the Falklands Biodiversity Framework upgraded invasive species and biosecurity from a medium to high priority threat (FIG, 2015b). In recent years, there has been a concerted effort by F.I.G. to reduce the risk of materials arriving on the Islands unintentionally introducing INNS species and consequently, biosecurity procedures have become more stringent.

If INNS were introduced during the construction phase, the impact on the ecology of the Islands through parasites, disease, competitors or predators may not be immediately evident but may have long-term implications. Initially the impact would be felt locally; however, INNS may spread 'naturally' or with anthropogenic assistance to other parts of the Falklands archipelago.

If found, potentially invasive species can be removed and disposed of before becoming established. However, detecting microscopic or small mobile organisms (such as invertebrates) is very difficult once onshore.

Robust biosecurity measures will form part of the contractor's CEMP that will be developed for the proposed scheme. However, the following represent key measures that will be implemented with respect to managing biosecurity risk:

- All deliveries of plant, machinery and equipment will be shipped using agents familiar with deliveries to the Falkland Islands.
- A biosecure logistics hub will be established in the UK to support with transport of plant, machinery and equipment; all items to be shipped to the Falklands will be subject to a biosecurity check and cleaning (if necessary) prior to shipping.
- The holds of vessels to be used to transport plant, machinery and equipment will be appropriately cleaned prior to loading operations commencing. Deliveries will be quarantined, checked and re-cleaned if necessary at Mare Harbour or FIPASS as the main two possible points of entry.
- It is understood that there is an established biosecurity checkpoint in the SAAS yard in the vicinity of FIPASS; all construction deliveries will be subject to confirmation screening in the biosecurity checkpoint where applicable. No containers are opened on the existing port and all containers are transferred to the SAAS yard to be distributed and/or inspected as needed. The Biosecurity Officer at F.I.G. receives a manifest from SAAS with all of the containers and cargo being imported; the containers are then 'separated' into those carrying goods of biosecurity concern and most of them are released with the instruction of 'inspection at destination', meaning SAAS will take it unopened to the importers yard or warehouse where an inspection will be carried out. In the event of imported vehicles, caravans or machinery, the instruction is to 'Hold for Inspection' and once the SAAS yard is ready the Biosecurity Officer witnesses the opening of the cargo and carries out the inspection.

A4.2.17.5 Measures to minimise disturbance to traffic and transport

The following measures are embedded into the scheme design in order to minimise disruption to the local community as a result of traffic movements on the road network:

- Maintaining a stockpile of aggregate on-site or close to the site. The stockpiling approach will allow construction of programme-sensitive activities to continue irrespective of quarry maintenance regimes, haul operations or unplanned events.
- Any works proposed to be undertaken outside of core working hours will be discussed and agreed with F.I.G.
- Concrete deliveries to site and pour times will be planned to coincide with periods of low traffic where possible.
- Deliveries to site will be consolidated to minimise the number of shipments to Mare Harbour.
- Maximising self-containment of work and accommodation compounds to minimise movement of personnel, plant and equipment.
- Consolidating deliveries to minimise shipment via Mare Harbour.
- No construction vehicles (HGVs or plant) will be permitted in Stanley town centre; rather, they will utilise Stanley Bypass and Airport Road.
- Site traffic will not be permitted to routinely use Boxer Bridge Road.
- The employee accommodation facilities are to be located in close proximity to the main works area in order to minimise the need for movement of construction workers to travel on the local road network.

In addition to the above, a Construction Traffic Management Plan (CTMP) is to be produced as good practice in order to manage construction traffic. This is within the PEP.

A4.2.17.6 Measures to avoid disturbance to breeding birds and terrestrial ecology

At the time of construction of the proposed scheme, there is the potential for breeding birds to be present, particularly on FIPASS. Breeding birds are protected under the Conservation of Wildlife and Nature Ordinance 1999 and, therefore, measures are required to avoid disturbing birds during the breeding season.

The scale and duration of the construction works are such that it may not be possible to schedule construction activities to avoid the breeding bird season (the peak of the breeding season is in November/December). If it is possible to do so, the removal of structures that have the potential to support breeding birds, clearance of any vegetated areas at any locations to be used as construction site compounds and works at the two potential FIPASS dismantling areas will be undertaken outside of the breeding season. This is the preferred means of mitigation. However, because the timing of works is dependent on timing of receipt of planning permission and other factors within the programme, this cannot be guaranteed.

If it is clear that the construction phasing would require works to be undertaken in areas or on structures that can potentially support breeding birds, advance measures would be carried out to deter breeding within areas that would be affected by construction works during the next breeding season. These measures could include advance clearance of vegetation and surfacing of working areas, blocking access to nest sites (e.g. by use of netting) and using visual and/or auditory deterrents.

In advance of any works, a pre-construction survey will be undertaken to ensure that there is no potential for disturbance to breeding birds. In addition, the recommendations made within the Countryside Code (F.I.G., undated), specifically in relation to keeping a 6m buffer between the proposed works and sensitive ecological receptors, will be followed.

In addition to the above, it is understood that the proposed remediation area (area 7 shown on **Figure 4.1**) supports a protected plant, namely the pale maiden. It is understood from liaison with PWD that this plant is relatively widespread in this area. For the purposes of this EIS, mitigation measures to address the presence of the pale maiden will be addressed through an Environmental Management Plan, the detail of which will be agreed with F.I.G (and may require translocation of the plants outside of the working areas).

A4.2.17.7 Measures to minimise the impact of wave overtopping during operation

Wave overtopping analysis (**Ref. 19**) during the operational phase indicated a significant wave height of 1.0m in the operational case (1 in 1 year return period), and 1.8m in the extreme case (1 in 100 year event). The waves within the harbour are wind generated and so there is a correlation between windspeed and wave height. The critical 1 in 1 year return period wind is 24.4m/s from the north, which leads to a wave height of 1m. The critical 1 in 100 year return period wind is 35.7m/s form the north, which leads to a wave height of 1.8m. FIPASS currently stops operations at a windspeed of 15.4m/s. It can be concluded that operations on the port will have stopped due to the windspeed long before overtopping of the quay becomes a problem.

The design of the quay includes features to make it resistant to damage from overtopping, including moving equipment away from the quay edge where possible, having services in covered pits and raising the ground floor level of buildings above the level of the surrounding quay.

A4.3 Operational phase

A4.3.1 Vessels and marine access

During the operational phase, the proposed quay is anticipated to be used by a range of vessels, including tankers, cruise vessels, fishing vessels, cargo vessels, tugs, research / survey vessels and yachts. The general arrangement of the quay during the operational phase is shown on **Drawing PB7829-RHD-ZZ-ZZ-DR-Z-0016**.

It is envisaged that the quay will provide and support the following features:

- 300m of berthing on the seaward face of the quay, end on berthing on the eastern face.
- 70m rear side berthing for some of the smaller fishing vessels, launches, the Concordia Bay and smaller vessels. A berth that depending on draft could be used for layover.
- A clear open main quay area allowing flexibility for operational use and further storage or welfare facilities if the need arises in the future.
- Dedicated space for storage of oil spill kits on the port near the potential point of need.
- Pontoon on the landward side of the quay, east of the proposed causeway for resupply activities for vessels at anchor in the harbour, use by tourism launches and tours, pilot vessels, etc.
- The western end of the front face of the quay will generally be used for cruise vessels / expedition ships / tanker / container cargo vessels during the peak season, with the remaining berths on the seaward face used for general cargo and fish transhipment. If required, cruise vessels may also berth on the rest of the main quay. Fishing vessels can also use the western end as required and berthing scheduling will be managed by F.I.G's contracted Port Operator.
- Limited car parking areas and temporary coach parking (including provision for electric vehicle charging for port utility vehicles).
- Turning circle for coaches, HGV's and cargo handling plant and equipment.
- Demountable security fence / barrier to define a safe zone for cruise vessel passengers and crew and to form a separation from the main operational area on the quay.
- Surface water runoff drains and RCC surface suitable for transhipment operations.
- Foul water will be collected from the buildings, treated in package treatment plants and clean water discharged into the harbour.
- High lighting masts on the quay and (extended bracket) street lit causeway, with conventional street lighting on the access road designed to minimise light spill.
- Grab chains, ladders and fenders.
- Various buildings and containerised units.
- The new port will provide a safe area behind each berth to arrange containers for fish transhipment and with the addition of new container handling equipment will lead to improved turnaround times for the fishing fleet.
- The increase in overall berthing length for the fishing fleet will support the F.I.G. fishing catch licencing policy of encouraging transhipment at the new port rather than transhipment into reefer vessels at sea.

The proposed quay has been designed to accommodate the existing cargo handling operations on FIPASS (side loaders and ships gear), as well as the use of a future mobile harbour crane and straddle carrier for container loading and movement.

The pontoon will serve as a base for the resupply vessels that carry out crew, resupply cargo to vessels at anchor and passenger transfer operations, and other smaller vessels. A telehandler is proposed to be used on the pontoon to support re-supply operations. Refuelling facilities will be provided by SSL.

The general arrangement of the proposed quay will segregate cruise passengers from other cargo handling activities using portable fencing as is the current practice. The western berth will have priority for use by cruise, tanker and container vessels.

A Demand Study (**Ref. 2**) has been undertaken to present a justified forecast of the future volumes of throughput during the operational phase. The Demand Study presents a breakdown of predicted throughputs (and consequently vessel numbers) at the proposed new quay every 10 years from 2020 to 2050, for a range of future growth scenarios, ranging from pessimistic to optimistic.

The assessment presented in this EIS has utilised the predicted throughput assuming optimistic growth. The number of vessels predicted to use the proposed quay assuming an optimistic growth scenario are detailed in **Table 4.2**.

Table 4.2 Predicted numbers of vessels using the proposed new quay assuming an optimistic scenario

Vessel type	Year			
	2020	2030	2040	2050
Fishing	144	563	652	692
Fishing patrol	45	45	45	45
Survey	10	12	15	18
General cargo	33	33	33	33
Tanker	10	12	13	13
Cruise	29	74	103	125
Yachts	17	21	25	31
Other	10	12	15	18
Total	**298**	**772**	**901**	**975**

The proposed scheme is predicted to be operational during 2025; for the purposes of this EIA, the operational phase has, therefore, assessed the impacts predicted to arise during 2025. The first year of operation (assuming optimistic growth for all cargo types) is considered to be a reasonably foreseeable conservative scenario for the operational phase impact assessment. It was not considered practical to assess impacts that could occur during 2050 given that those predictions assume continuous optimistic growth across all sectors up to 2050.

The predicted vessel numbers at the port have been interpolated from the data in **Table 4.1**. Assuming an equal annual increase between 2020 and 2030, the number of vessels predicted to arrive during 2025 is 488, with the following split of vessels:

- Fishing – 311.
- Fishing patrol – 45.
- Survey – 11.
- General cargo – 33.
- Tanker – 11.
- Cruise – 47.
- Yachts – 19.
- Other – 11.

This is a predicted increase of approximately 200 vessels per year compared to the average number of vessels which berthed at FIPASS on an annual basis from 1999 to 2019 (which was approximately 300 vessels per year) (see **Section A18** for further detail). It should be noted that the predicted operational phase vessel numbers reported above do not include any allowance for vessels associated with project Sealion.

For the purposes of this EIS, it has been assumed that there could be a cruise vessel, a tanker and two fishing vessels simultaneously berthed at the quay during the operational phase. This is considered to be the worst-case scenario from an environmental impact perspective based on high / high growth scenario over the 50 year design lifespan.

A4.3.2 Vehicular and pedestrian access

Vehicular and pedestrian access onto and off the quay will be provided via the causeway. Pedestrian access will be provided via marked walkways. Access onto the quay will be managed via a security gatehouse to be located at the landward end of the causeway.

A permanent diversion of the existing coastal footpath will be required during the operational phase; the proposed diversion route is shown on **Drawing PB7829-RHD-ZZ-ZZ-DR-Z-0016**.

A4.3.3 Surface water drainage and sewage disposal

Surface water drainage from the quay is proposed to fall towards the rear of the quay into a longitudinal slot drain which will discharge into Stanley Harbour via an oil interceptor.

The proposed route of the access road is around the southern side of the existing irrigation pond on the Stanley Growers site. Surface water runoff from the access road will flow into a series of swales to be excavated along the northern side of the access road. The swales will convey surface water runoff along the length of the access road and will pass through an impermeable aggregate chamber to remove silts and oils, prior to discharging into Stanley Harbour. Where swales are not possible due to the lack of space (e.g. adjacent to the irrigation pond), buried pipes will be used to transport surface water runoff.

Package sewage treatment plants will be used within Building A, the welfare block on the eastern part of the quay (Building B3) and gatehouse building (Building D). These treatment plants will treat the foul water to surface water standards prior to discharging into Stanley Harbour via the surface water drainage system. It should be noted that the existing system on FIPASS is direct discharge into the sea and therefore treatment of foul sewage prior to discharging is a significant improvement.

A4.3.4 Lighting

Permanent lighting will be provided to operational areas (i.e. the quay and causeway) and pedestrian access routes. The proposed access route to the causeway and the causeway itself will be lit using standard street lights. The causeway is to be illuminated to an average of 20 lux.

Lighting on the quay is proposed to be provided via high masts. These will be designed to be stable taking account of the wind speeds in the Falkland Islands and will be easily demountable for maintenance. To meet the necessary safety standards, the quay area is to be illuminated to an average of 50 lux, whilst working areas on the quay are to be illuminated to an average of 20 lux. An illustration of the proposed lighting to be used on the quay is provided in **Plate 4.2**.

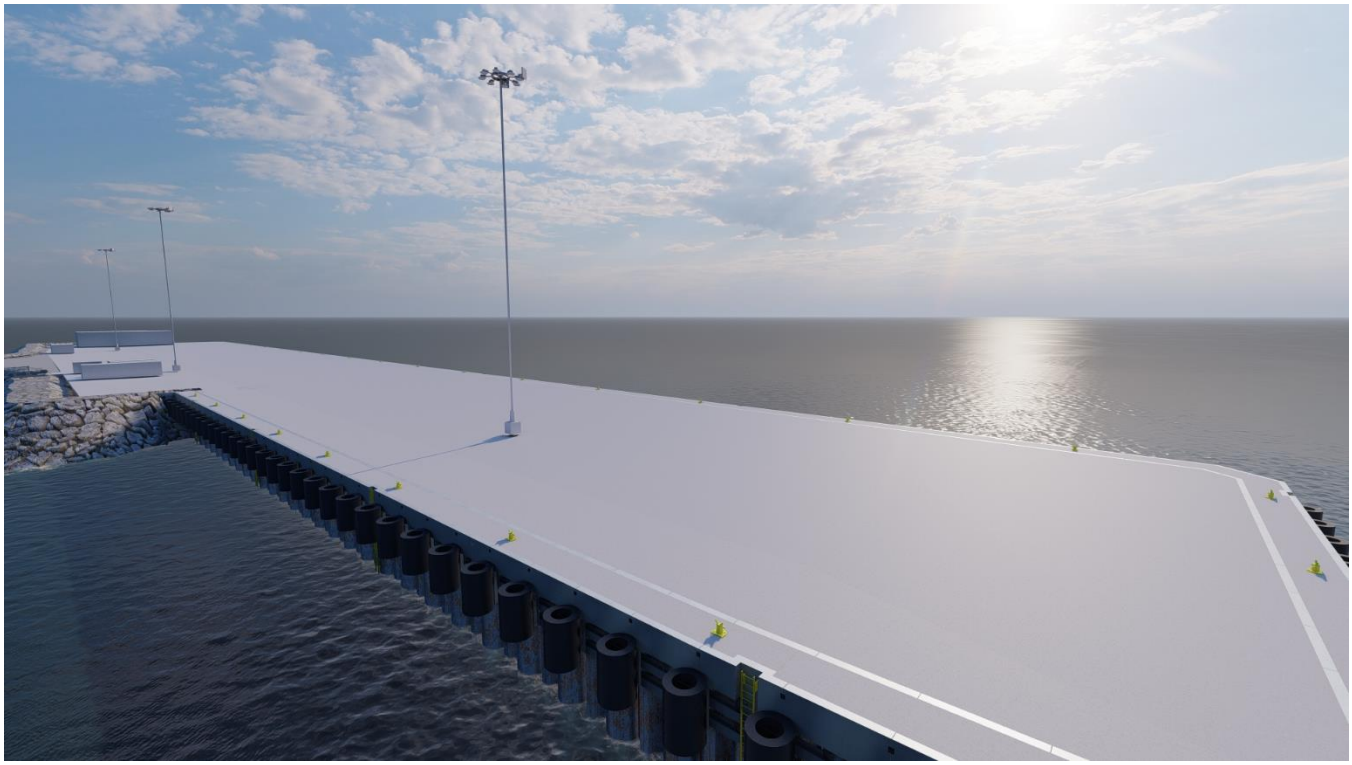


Plate 4.2 Example illustration of lighting to be used on the quay

During the operational phase, the system for Aids to Navigation will not change to those currently used on FIPASS; new lights will be provided at either end of the proposed new quay structure in a like for like replacement to that currently present on FIPASS.

A4.3.5 Operational hours

The proposed scheme will be utilised on a 24 hour, seven days per week basis, as per the current FIPASS facility. No change in operational phase employee numbers (compared to that at FIPASS) is envisaged.

A4.4 Future end-of-life decommissioning of the proposed scheme

The design life for the main port structure is 50 years. While it is recognised that there is a requirement to have a plan in place to detail how the proposed scheme might be decommissioned in the future (e.g. to demonstrate that it is possible to safely do so), the application for planning permission does not seek permission for end-of-life decommissioning of the proposed scheme. Consequently, the potential environmental impacts associated with future decommissioning the proposed scheme are not considered in this EIS (i.e. they have been excluded from the EIA process), and it is likely that further environmental assessment would be necessary as part of any consents and permissions that may be needed in order to decommission the proposed scheme.

Dismantling of the existing infrastructure (i.e. FIPASS) is, however, within the scope of this EIS.

A4.5 Consideration of alternatives

A4.5.1 Alternative locations

As part of the design development process for the proposed scheme, a screening assessment (with scoring) of several alternative locations for the proposed scheme was undertaken. The screening assessment included consideration of a range of criteria, including environmental considerations, presence of supporting infrastructure, physical characteristics (e.g. topography, geology), navigational access and development cost. The alternative locations considered comprised:

- Stanley (FIPASS area).
- Mare Harbour (East Cove West Jetty area).
- Port William, Navy Point.
- Port Harriet (Mullet Creek area).
- Berkeley Sound – Uranie Bay.

A summary of the assessment undertaken for each location, taking into account the potential environmental impacts, is presented below.

A4.5.1.1 Stanley (FIPASS area)

Stanley Harbour currently contains the FIPASS and the TDF. There is significant infrastructure in place, including a surfaced container yard with reefer plug in points, warehousing, laydown areas and fuel storage. There are a range of services already in place and available for use, including water, electricity, communication, fuel distribution as well as the existing highway network. The presence of this existing infrastructure is highly beneficial from an environmental, technical and financial perspective, as disruption to the local community and environmental receptors in the area associated with installation of such services would be avoided (as the majority of services infrastructure required for the proposed scheme is already in place).

The proximity of this location to Stanley is also advantageous from a socio-economic perspective. Commuting time for employees to the facility for those living in Stanley would be minimal, and the economic benefits arising from the proposed scheme would enhance opportunities for local investment and local businesses.

The Stanley (FIPASS) area is also located within 'Zone 6 – Heavy Industrial' as detailed within the Local Plan for Stanley (referred to as the Town Plan) (see **Section A5**). The Town Plan states that this area currently provides the main location for industrial activities in Stanley and is sufficiently far from Stanley to be used for container parks and larger scale industrial uses and warehousing and storage without detriment to the residential areas of Stanley. Consequently, the development of the proposed scheme in the FIPASS area would represent a development that aligns with the policy for this zone.

A4.5.1.2 Mare Harbour

Mare Harbour is an established deep water port in a sheltered location. There are existing services in place, as well as a small laydown area and warehousing. However, the site is a military facility and would require significant co-ordination with the MOD to construct and operate a commercial port in this location.

In addition, Mare Harbour is located approximately 60km from Stanley. As a result, there would be an increased volume of traffic (both HGVs and private vehicles) during the operational phase on roads between Stanley and Mare Harbour, resulting in traffic, noise and air quality implications. In addition, although there is some infrastructure already present at Mare Harbour, this is limited in extent and additional infrastructure would be required to support

the proposed scheme. Such extensive construction works on land would, therefore, result in a range of environmental impacts to receptors in the area.

From a socio-economic perspective, stakeholder consultation has identified that cruise and expedition vessels would prefer to come alongside Stanley, rather than alternative locations (such as Mare Harbour). The potential loss of tourism related economic activity and berthing fees from such vessels should the scheme be located at a location other than Stanley has potential to result in adverse socio-economic impacts to the area.

A4.5.1.3 Port William, Navy Point

Water depths at Port William are greater than the alternative locations; however, the area is subject to easterly winds as it does not benefit from natural shelter. As a result, a breakwater would likely be required to provide sheltered berthing during the operational phase. Creation of a breakwater has potential to result in a range of adverse environmental impacts, including changes to hydrodynamic and sedimentary processes, water quality reductions, generation of underwater noise and changes to the landscape and visual amenity value.

In addition, there is no existing highway network or service provision at Port William. Very substantial investment would be required to create the required infrastructure, including a new access road capable of carrying HGVs and construction of a new fuel distribution network. Onshore support facilities currently adjacent to FIPASS would need to be relocated to or re-constructed at Port William, including fuel tanks, warehouses and yards associated with the fishing and wool industries and container handling facilities. In addition, the topography of the site is sloping and therefore significant earthworks would be required to develop a flat area suitable for development.

The environmental impacts associated with such works in a currently undeveloped area are likely to be significant. Adverse environmental impacts would be expected to ecological receptors (including but not limited to loss of existing habitat, noise and air quality reductions, water quality reductions) and human receptors (alterations to the existing landscape and visual amenity value, increased light pollution, noise and air quality reductions).

The assessment presented above for the Port William, Navy Point area is also applicable to the Port Harriet (Mullet Creek area) and Berkeley Sound – Uranie Bay area (however the Berkeley Sound – Uranie Bay area has limited deep water).

Port Stanley (FIPASS area) achieved the highest averaged score of all locations and, therefore, this location was selected by F.I.G. for the proposed scheme.

A4.5.2 Alternative structural forms and construction techniques

In addition to the consideration of alternative locations, the early stages in the design process considered alternative structural forms and construction methods for the quay structure. Structural forms that were considered comprised the following:

- Pre-fabricated frame.
- Suspended deck on piles.
- Mass fill structure supported by a retaining structure.

The pre-fabricated frame option comprises structural steel frames which are assembled on the quayside then lowered into position and fixed to a driven sheet pile anchor wall. Once the frame has been levelled and secured on the bedrock, a sheet pile cladding panel is installed to retain the fill behind the quay wall. This option is adaptable to unknown ground conditions and bed levels, however comes with a cost and programme premium. Construction of the pre-fabricated frame would be a very time consuming process, influencing the timescales for delivery of the proposed new quay.

The suspended deck on piles option would require the use of marine plant to assist with the construction; this has potential to generate navigational risk to existing users of the harbour. The suspended deck option would also require the installation of a greater number of piles than a mass fill structure, which has potential to generate noise disturbance (both airborne and underwater) to sensitive receptors. Whilst it is recognised that these environmental impacts would not necessarily mean that the suspended deck option would be non-viable, it was considered that the mass fill structure (discussed below) was preferable from an environmental and technical perspective.

The mass fill structure supported by a retaining structure, described in **Section A4.2.10**, is considered to be a low risk solution from a technical perspective. The solution provides greater flexibility to F.I.G. compared to the other two options considered through the ability to future-proof the design; if a heavy lift area was required in the future, piles could be installed through the fill relatively easily.

The mass fill structure would utilise locally sourced construction materials (i.e. rock from Pony's Pass quarry), minimising the requirement for transport of construction materials to the Falklands. The mass fill structure could also be constructed predominantly using land-based plant, minimising the risk of conflict with ongoing navigation within the harbour. Overall, the mass fill structure is considered to be the preferred solution from a technical, programme, cost and environmental perspective.

A4.5.3 Alternative options for management of surficial silts underneath FIPASS

As noted in **Section A4.2.6.8**, the proposed scheme requires the removal of a relatively small volume (approximately 50,000m^3) of surficial silt which is assumed to be biologically contaminated (historic sewage) within the footprint of the proposed quay.

A number of options were considered to remove the surficial material, including displacement (using a plough) and removal using a dredging barge or vessel (with different forms of dredging also considered). A number of options were also considered for disposal of the material, including disposal at sea (offshore and nearshore) and disposal to land (various options were considered). A summary of the options appraisal work undertaken to determine the preferred solution (presented in **Section A4.2.6.8**) is detailed below.

A4.5.3.1 Removal: Backhoe / grab dredging

From a dredging perspective, backhoe / grab dredging is generally considered to be the most environmentally acceptable form of dredging as material tends to be removed in large clumps. However, given the fluid nature of the surficial silts, it is unlikely that a backhoe / grab would be a feasible solution to dredge such deposits and this option was therefore not considered further.

A4.5.3.2 Removal: Displacement using plough

Given the unconsolidated nature of the surficial silts, a high proportion of the material once ploughed may migrate back into the working area, thus requiring re-dredging. This would result in repeated reductions in water quality and consequently multiple indirect potential impacts on water quality, fish and the benthic community. In addition, the need for repeated ploughing would also result in the release of comparatively larger amounts of greenhouse gases compared to a single removal option. In addition to the environmental considerations, the feasibility assessment scored this option relatively low in terms of structural integrity of the proposed new port facility, duration of the dredging activity, health and safety and buildability. It is understood that the process described above (i.e. migration of material back into the area following ploughing requiring re-ploughing) was realised during the plough dredging undertaken for the TDF project. As a result, this option was not considered further.

A4.5.3.3 Removal: Submersible pump, cutter suction dredger and trailing suction hopper dredger

The potential environmental impacts associated with the submersible pump, cutter suction dredger (CSD) and trailing suction hopper dredger (TSHD) are broadly the same. All techniques would result in the release of sediment during dredging, with the CSD technique probably releasing more sediment into the water column than the other techniques.

As noted in **Section A4.2.7**, this option will adopt the 'just in time' approach whereby surficial silt would be removed just ahead of construction, as required. The removal would be undertaken in a controlled and progressive manner as the construction of the quay progresses, minimising the risk of repeated removals being required (associated with migration of surficial silt back into the construction area). Given the lack of dredging plant available in the Falkland Islands, the option of a pump mounted on a vessel was considered the most appropriate solution to remove the surficial silts (from an economic and practical perspective) and has therefore been assessed within this EIS.

A4.5.3.4 Disposal: Deposition into landfill (without drying out)

In November 2020, F.I.G.'s Environmental Officer and Policy Advisor advised that there is unlikely to be capacity for disposal of large amounts of dredged sediment within existing landfill sites. PWD confirmed this position in December 2020. Consequently, direct disposal into landfill was not considered further within the feasibility assessment.

A4.5.3.5 Disposal: Pumping into geotubes on land

Pumping surficial silts into geotubes on land will result in the permanent removal of material from Stanley Harbour which is assumed to be heavily biologically contaminated due to the historic sewage. Once dried and suitably treated, the surficial silt could be beneficially used as a fertiliser, if confirmed by testing that the material is suitable for such re-use. The water draining from the geotubes into the harbour would be that which originated from the harbour; as a result, significant environmental impacts associated with return of such water to the harbour are not envisaged. It should be noted that the surficial silt would remain in the bag until the material is due to be disposed of or re-used as fertiliser (if analysis of the material shows it is suitable for re-use). Any invasive species present within the surficial silt would be expected to die as the material dries (and there would therefore be very limited risk of spreading invasive species as a result of this option).

The proposed remediation area where the geotubes would be located (shown on **Figure 4.1**) has been deliberately selected to take account of the prevailing westerly winds. As a result, any limited gases not contained in the bag will blow away from the residential areas of Stanley, minimising impacts on the local community, albeit that recreational and tourism areas (e.g. Surf Bay and Cape Pembroke) would be downwind of the proposed remediation area.

Pumping surficial silt into geotubes was clearly the most preferable option in the feasibility assessment scoring, particularly from a cost, time, technical certainty, environmental risk health and safety, buildability and navigational impact perspective.

This option has been assessed within this EIS.

A4.5.3.6 Disposal: Offshore disposal beyond the 200m depth contour

Consultation with F.I.G.'s Environmental Officer and Policy Advisor in 2020 suggested that disposal of dredged sediment beyond the 200m depth contour would minimise the risk of spreading invasive non-native species (INNS) to coastal areas. However, the 200m depth contour is a significant distance from the proposed scheme footprint; disposal in such deep water would require a number of very long transit times between the dredge footprint and the disposal site, which would result in the release of relatively large amounts of greenhouse gases compared to more local disposal options.

In addition, the surficial silt is highly likely to disperse widely on disposal rather than descend directly to the seabed. Dispersed sediment would ultimately settle on the seabed in an area assumed to be uncontaminated. Although the chemical contamination of the sediment is such that it would likely be suitable for offshore disposal if assessed under the UK regulatory regime, there is a risk of a reduction in sediment quality at the receptor site, although the wide dispersion of sediment is unlikely to result in a detectable accumulation of sediment on the seabed.

The disposal activity would also result in temporary reductions in water quality (primarily an increase in suspended sediments and impacts associated with the presence of biological contaminants) as the disposed material disperses. Water quality offshore is assumed to be good and, therefore, disposal of dredged material could lead to a significant change from baseline conditions, but this effect would be localised and short-term due to rapid dispersion.

As a result of the information presented above, disposal of surficial silt offshore beyond the 200m depth contour was not considered further.

A4.5.3.7 Disposal: Inshore disposal (within the 200m depth contour – outside of Stanley Harbour)

As noted in **Section A4.6.3.6**, the dredged material is likely to disperse widely on disposal rather than descend directly to the seabed, although some direct deposition could occur should disposal occur in shallow water or in areas with relatively low current speed. Any dispersed sediment would ultimately settle on the seabed in an area assumed to be uncontaminated.

From a water quality perspective, there is potential for changes to the baseline environment (principally due to the release of biologically contaminated sediment); however, this would be dependent on the nature of the receiving environment. There is also potential for localised smothering of subtidal benthic communities with dredged material as a result of this option, particularly should disposal occur in area of relatively low current speeds or shallow water (as well as the potential for spread of INNS to other coastal areas).

As a result, although the predicted impacts associated with disposal offshore within the 200m depth contour are not necessarily likely to make this approach non-viable, this option has not been assessed further within this EIS as a series of extensive surveys would be required.

A4.5.3.8 Summary

Taking the above into account, and other considerations including cost, it was determined that the most appropriate solution from an environmental perspective is to remove the surficial silts using suction techniques (using vessel) and pump into geotubes to be located on land where the material would be allowed to de-water prior to being subject to bioremediation. The surficial silt could then be used beneficially on land as a fertiliser should there be demand for such as use and the surficial silt is adequately remediated so that it is chemically suitable for such use. This solution is more controlled than the other options considered and would have a lesser effect on water quality and potential subsequent impacts on ecological receptors.

Backhoe and grab dredging techniques were dismissed on technical grounds (due to the fluid nature of the surficial silts) and the use of plough dredging would likely require repeated dredging because a high proportion of the material may migrate back into the working area, with repeated effects on water quality as a consequence.

A4.5.4Alternative options for management of FIPASS barges

A4.5.4.1 Dismantling on the shore

As noted in **Section A4.1.6.5**, it is proposed that the FIPASS barges are dismantled on the shore (shown on **Figure 4.1**). The barges are known to contain sludge and water which are contaminated (detailed further in **Section A16**).

It is proposed that the barges are appropriately decontaminated *in situ* prior to winching / towing onto the foreshore for dismantling. An alternative option considered was to winch/tow the barges onto the shore, with removal of contaminants inside the tanks undertaken on the beach. Given the degrading condition of the barges, it was considered that cleaning *in situ* and transfer of water and sludge from inside the tanks to a holding area on land comprised a preferable solution from an environmental perspective. The proposed approach minimises the risk of contaminated water and sludge inside the barges being accidentally released into Stanley Harbour as the barges are transported to land for dismantling.

A4.5.4.2 Scuttling at sea

An alternative solution to dismantling the barges on the shore is to scuttle the barges at sea. This option would involve the barges being cleaned out *in situ* (as detailed in **Section A4.1.6.2**), made fit for towing and then towed out to sea where they would be disposed of.

This option would remove the requirement for construction of the slipway to support with dismantling, as well as the need to actually dismantle the barges themselves. The scuttling of barges could also result in the creation of artificial habitat on the seabed.

Although scuttling of barges at sea is not the proposed solution at present (and has not, therefore, been assessed within this EIS), this option has not been ruled out and may become the preferred solution at a later date. Should this be the case, it is recognised that the submission of further supplementary environmental assessment to F.I.G. assessing the potential environmental impacts associated with scuttling, as well as an application for a Maritime Authority licence for offshore disposal, would be required.