



Vattenfall

# HT1 Hydrogen Demonstrator Project

EPS Risk Assessment Appendices

80925

NOVEMBER 2021

**RSK**

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## APPENDICES

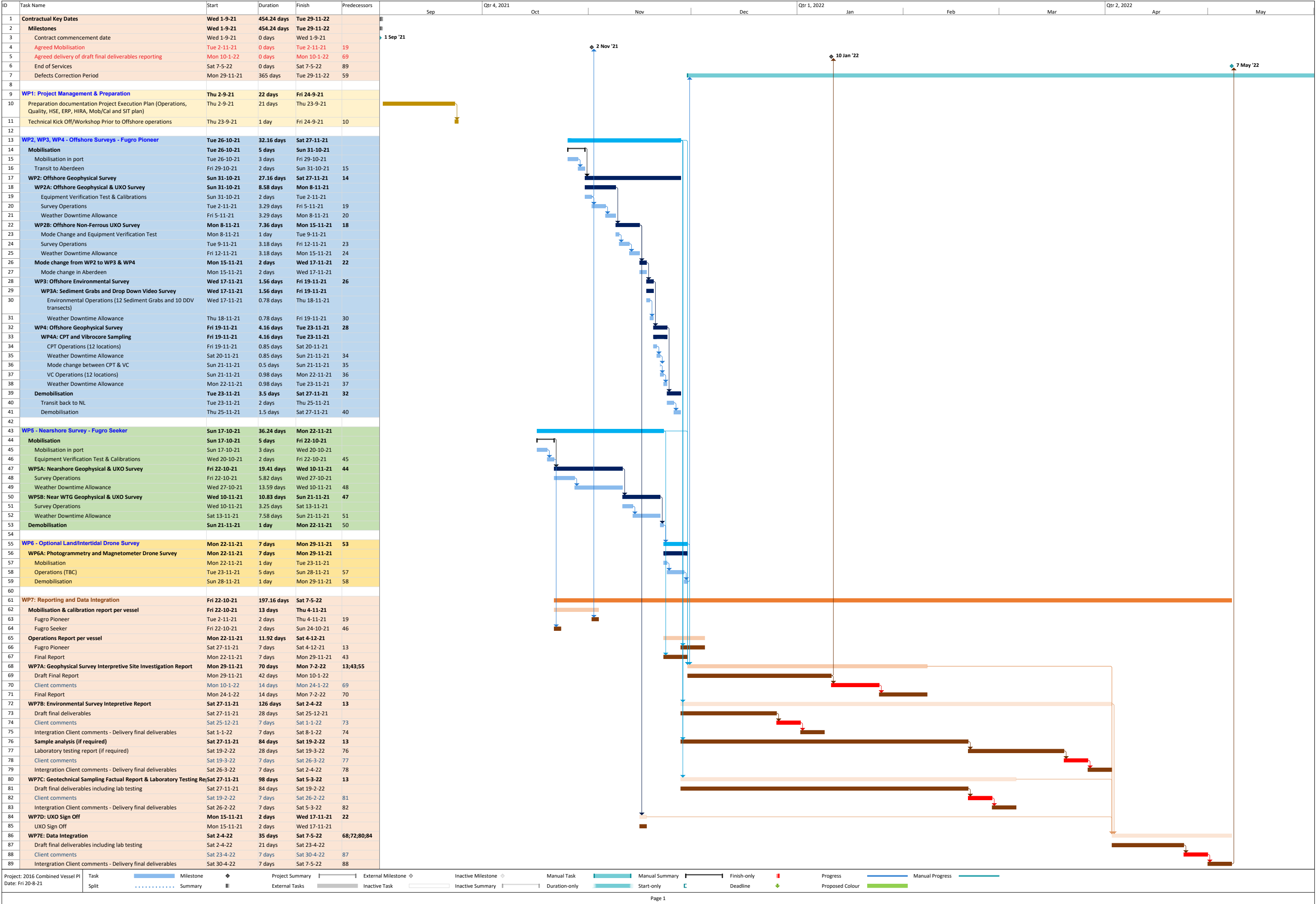
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# **APPENDIX 1**

## **PROPOSED SURVEY SCHEDULE**

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The same programme is proposed, with the start date shifted to 15th December 2021



## **APPENDIX 2**

# **VESSEL AND SURVEY EQUIPMENT SPECIFICATIONS**

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# FUGRO

## M.V. FUGRO PIONEER

M.V. Fugro Pioneer has been built to the highest standards demanded of a modern internationally operating multi-purpose survey vessel.

The diesel electric propulsion, specially designed hull, resilient engine mounts and rudder propellers maximise station keeping and navigational control while ensuring acoustically quiet running at survey speeds.

Designed with consideration for safety and environment, Fugro Pioneer is a compact flexible platform supporting a wide range of offshore services with a typical operational profile of geophysical, geotechnical survey operations up to 500 m WD.

Its limited 3 m draft adds to its capabilities to operate in shallow water nearshore. The vessel can easily be configured to support light ROV and environmental operations. The 53 metre-long vessel is prepared for dynamic positioning and equipped with state-of-the-art survey equipment.



*State of the Art Kongsberg Dual Head Dual Ping Multibeam in retractable moonpool system*



*Limited draft makes it specifically suitable for survey nearshore*

# M.V. FUGRO PIONEER

## Technical Specifications

### General

Names	Fugro Pioneer
Classifications society	BV
Flag state/ port	Bahamas Maritime Authority / Nassau
Build(er)	September 2014 – Damen Shipyards Galati
IMO/Cal sign	9701645 / C6BH3
Official number	7000674

### Dimensions

LOA	53.7 m
Beam	12.5 m
Draft (summer) max.	3.1 m + 0.26 m blister
Net tonnage	1,322 T
Deck area aft	250 m <sup>2</sup>
Deck strength	5 T / m <sup>2</sup>
Deck load	81,6 T

### Machinery

Propulsion	2 x Azimuth thrusters (electric)
Bowthrusters	1 x Tunnel thrusters (electric)
Cruising speed	10 kn
Survey speed	Variable as required
Maximum speed	11.2 kn

### Electric power

Diesel generator sets	4 x 372 kW
UPS supply survey	1 x 30 kVA, 220 vac

### Capacities

Fuel capacity	305 m <sup>3</sup>
Fuel consumption (FOC t/day)	Survey 3 T / Stationary (DP) 4.2 T / Transit 6 T
Potablewater capacity	115 m <sup>3</sup>
Watermaking	6 m <sup>3</sup> / d

### Accommodation

Cabins	30+4 bunks / 10 x single cabins, 11 double cabins
Crew (typical)	13 x marine crew, 18 x survey crew
Recreational	1 x dayroom, 1 x gym
Work offices	2 x survey, 1 x meeting room

### Control and navigation

DP system	Imtech DP-0
Radar	Sperry Marine Visionmaster FT CAT 1 / 2 S-band and X-band
Electronic chart	ECDIS Transas (double)
DGPS	1 x Kodan KGPZGO / 2 x Fugro Starpack
Magnetic compass	Sperry Jupiter

### Deck machinery

Deck crane aft	Palfinger PK65002 MD
Storage crane forward	Palfinger PK15000 MC
Hydraulics ring main system	300 bar / 200 ltr
T-frame aft (geophysical)	1 x 2 / 3 T SWL
A-frameside (geotechnical)	1 x 9 T SWL
CTD winch / davit	1 x 200 kg / 1000 m (environmental sampling)
Tugger winch aft deck	4 x 3 T SWL
Moonpool	Rectangular 1630 x 883 mm (freespace)
Geophysical tow winch	2 x EMCE (3.5 Te / 1000 m / Rochester)
Geotechnical hoisting winch	1 x EMCE (9 Te / 1500 m / 19 mm)

### Communications

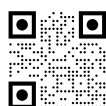
GMDSS	Motorola- 3 x VHF handheld
Vsat	2 x Seatel 5009 Ku-band
Iridium	Iridium Openport (Fall back)
UHF/ VHF radios (operational coms)	Motorola- 2 x VHF handheld / 3 x UHF mobile / 9 x UHF portable
CCTV camera system	Orlaco
TVRO	Intellian t40W

### Safety

MOB boat	RIB
Liferafts	6 x 20 persons
Survival suits & life jackets	44 pcs
Lifeline Pulley System	Yes
Personal Locator Beacons (PLB)	Ocean M100

### Survey equipment

DGPS positioning	Fugro Starfix Starpacks
Navigation package	Fugro Starfix Suite
Acoustic positioning	Kongsberg HiPap 501 incl Cymbal
Motion Reference Unit	Hydrins + Octans
Echosounder	Simrad EA400
Draft monitoring	2 x Rosemount Pressure Sensors
Multibeam echosounder	Kongsberg Maritime EM 2040 (Dual head/ Dual ping)
Side Scan Sonar	Edgetech 4200FS Dual frequency (different permutations of dual frequency subject to requirements)
Sub Bottom Profiler	Innomar Medium / Massa array 4 x 4 c.w. SES transceiver
Magnetometer	Geometrics G-882 / EIVA 3D Scanfish Katria / Fugro Geowing
Seismic compressor	Hamworthy 185E MK2 / 2 x Wärtsilä Water Systems Ltd
2D & 3D UHR Seismic	as required
Geotechnical sampling	Vibro coring CPT sampling
Environmental sampling	as required







# FUGRO SEEKER

The Fugro Seeker is purpose-built to carry out hydrographic and geophysical surveys safely in water as shallow as 2 m and wave heights up to 0.7 m. Designed for nearshore operations, this 12 m vessel easily accesses small harbours and marinas, and can be configured to sit on the seabed at low tide.

Quickly and easily configured to meet client requirements, with a top speed of 18 knots and the ability to operate up to 60 nm from port, the Fugro Seeker's versatility enables it to be deployed at short notice across north-western Europe by sea or by road.

Facilities including a spacious working deck, communal and wet weather areas, toilet and galley enable the vessel to operate for up to 12 hours. The minimum crew is three, but the Fugro Seeker can comfortably accommodate crews of up to seven.

The Fugro Seeker is permanently mobilised with high-specification hydrographic and geophysical survey equipment as standard. The vessel has a large deck area with low open-stern freeboard, three winch beds with a 500 kg SWL A-frame, rigid survey arms and dedicated survey generators. Additional seismic, unexploded ordnance (UXO), remotely operated vehicle (ROV) and environmental payloads can be accommodated with ease.



*Fugro Seeker*



*Fugro Seeker bridge*



# FUGRO SEEKER

## Technical Specifications

### Vessel Particulars

Type	Catapult 396
Length overall	12.00 m
Beam	4.88 m
Maximum draught	1.07 m
Licence	MCA CAT 2
Gross tonnage	17 t
Year built	2012

### Safety

Maximum safe carrying capacity	12 persons
Operational pattern	12 hrs
All equipment certified to Maritime and Coastguard Agency (MCA) SCV2 standard	

### Navigation Equipment

Simrad NSS12 evo3 plotters	3
Simrad AP70 autopilot	1
Simrad broadband 4G radar	1
DSC VHF ship-to-shore radios	3
Class A AIS NAVTEX	1

### Deck Equipment

A-frame 500 kg SWL 2.4 m clear height	1
Winch beds	3

### Survey Equipment

Fugro Starpack GNSS – G2+, G2, XP2
Teledyne RESON SeaBat® 7125-SV2 multibeam echosounder
EdgeTech 4125,4200 or 4205 tri-frequency side scan sonar
Innomar SES-2000 parametric, Standard, Medium or Quattro sub-bottom profiler
Sonardyne Ranger 2 or Applied Acoustics Easytrak Nexus ultra short baseline
Applanix POS MV OceanMaster v5
G882 magnetometer soft or armoured tow
Fugro Miniwing fixed gradiometer with up to four magnetometers
UHR seismic/boomer/mini-airgun sources, up to 100 m streamer
Observation class ROV (Saab Seaeeye Falcon or Tiger)
Various environmental camera and sampling options

### Propulsion

Iveco NEF 450 main engines	2
Twin disk gear boxes	2
Westerbeke marine 5.7 kVA generators	2
Service speed 15 kn to 18 kn	

### Working Conditions

Deck space 5.9 m × 4.8 m
Spacious and clear working deck
Large comfortable communal area

### Accommodation

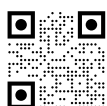
Galley
100 L freshwater
Wet weather area
Toilet



Falcon Seaeeye ROV deployment



Fugro Miniwing deployment

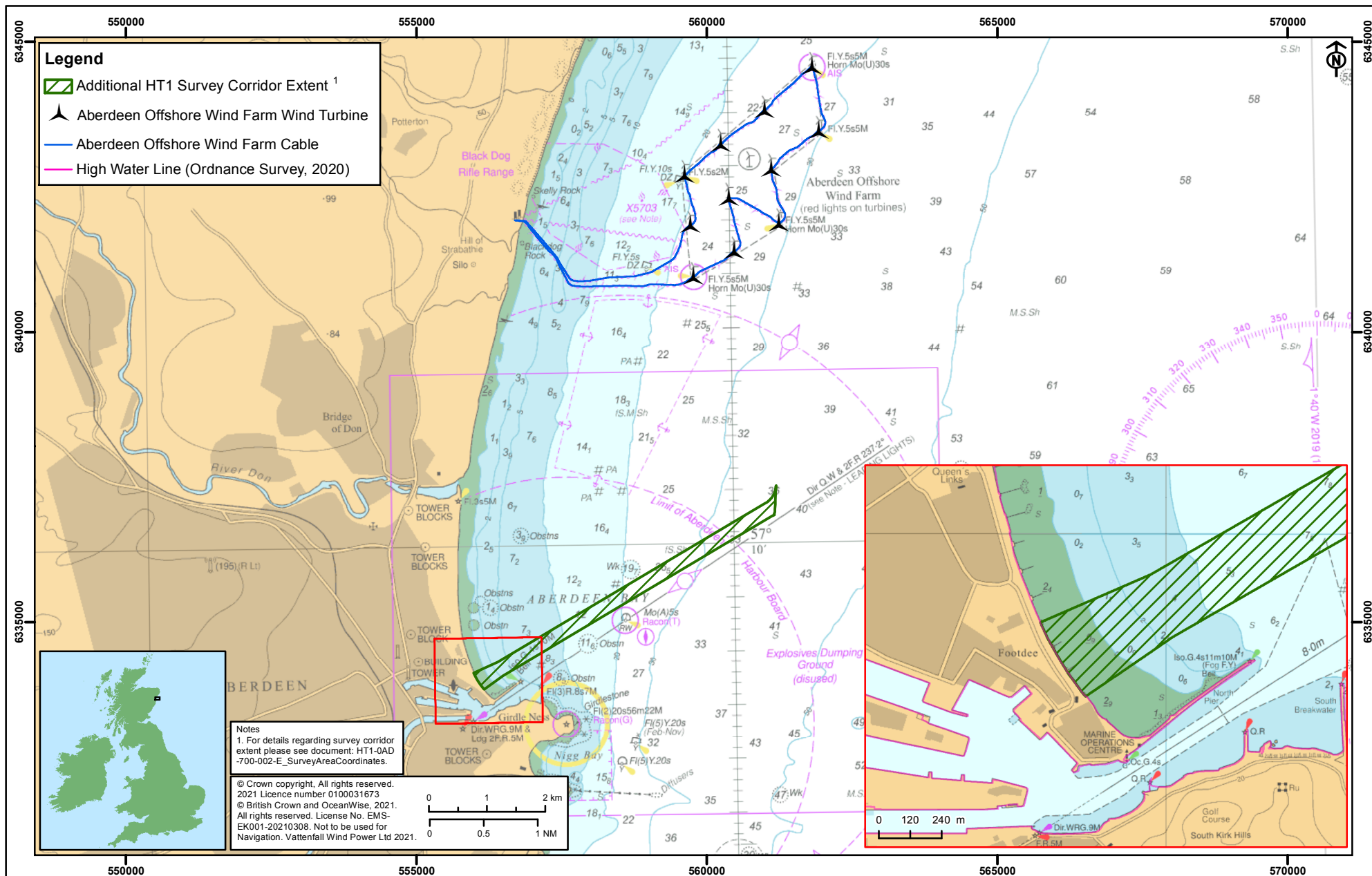


**FUGRO.COM/CONTACTS**

## **APPENDIX 3**

### **SURVEY AREA**

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This drawing/map has been produced to the latest known information at the time of issue. Please consult with the Vattenfall GIS team to ensure the content is still current before using the information contained on this map.					Datum	ETRS 1989	<b>Project HT1</b> <b>Seabed Survey Area</b>	Confidentiality Class	C1 - Public
B	04/11/21	lico	jjaw	Survey corridor updated	Projection	ETRS 1989 UTM Zone 30N		Drg No	HT1-OAG-700-003
A	25/08/21	lico	rasm	First issue	Plot	A4		Rev	B
Rev	Date	Drawn By	Checked By	Comment	Scale	1:90,000		Layout	n/a