PO Box 2305 Churchlands
WA 6018 Australia
Tel: +61 8 6163 4900
www.bmt.org

Technical Note

Project:	Learmonth Benthic Habitat Survey
From:	BMT
To:	MBS Environmental
Date:	25 February 2020
Doc Ref:	R-1557_00-1
Subject:	Verification of Benthic Habitat in the Exmouth Gulf

1 Introduction

Subsea 7 (Australia) Contracting Pty Ltd (Subsea 7) is investigating the option to build a new Pipeline Bundle fabrication site in Western Australia to further support growth within the Asia Pacific region. The proposed Learmonth Pipeline Fabrication Facility is to be located adjacent to the western shoreline of Exmouth Gulf, approximately 35 km south of the Exmouth townsite and 2.5 km south east of the Royal Australian Air Force Learmonth base (Figure 1.1).

Benthic communities and habitat (BCH) occurring near the proposed pipeline bundle tow route have previously been mapped by MBS Environmental and 360 Environmental to support Subsea 7's application to the Environmental Protection Authority (EPA; MBS Environmental 2018, 360 Environmental 2017). These surveys verified BCH with video ground truthing along the proposed bundle tow route, which was divided into three areas: the 'Off Bottom Tow'[1] area, the 'Parking Area'[2] and the 'Surface Tow'[3] area (MBS Environmental 2018).

Following the completion of previous mapping, the Marine Ecosystems Branch of EPA requested further verification of a subset of ground truthed sites occurring in and around the Off Bottom Tow area, during the expected period of maximum seagrass biomass (nominally, November to February) (Figure 1.1). MBS Environmental contracted BMT Pty Ltd (BMT) to assist in completing additional field ground truthing of the Off Bottom Tow area and surrounds in February 2020, and prepare a memorandum describing BCH observed along towed video transects.

[1] Section of the bundle tow route where the pipeline bundle is towed above the seafloor with chains in contact with the seabed
[2] Section of the bundle tow route between the Off Bottom Tow area and the Surface Tow area where tow reconfiguration of the pipeline bundle may take place before continuing offshore
[3] Section of the bundle tow route where the pipeline bundle is towed at the water's surface

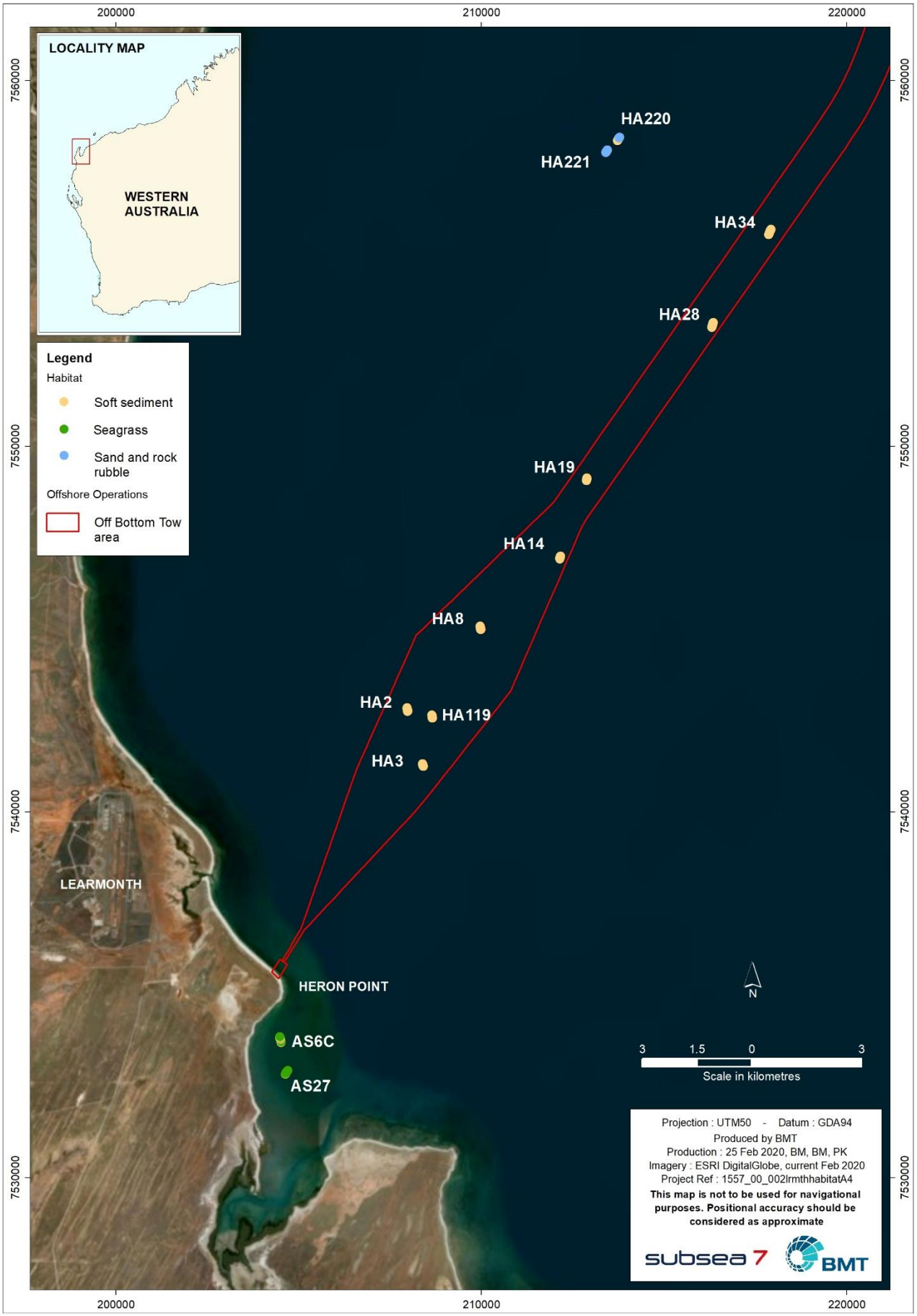


Figure 1.1 Ground truth video transects in the Exmouth Gulf, February 2020

2 Methods

2.1 Ground truth survey

Ground truth data was collected on 6 February 2020 using a high definition, waterproof camera with a wide-angle lens. Twelve transects were surveyed, including: two sites south of Heron Point, eight sites within the Off Bottom Tow area and two sites to the north of Off Bottom Tow area (Figure 1.1). Site coordinates were provided by MBS Environmental, and correspond to the location of previous ground truthed sites (MBS Environmental 2018, 360 Environmental 2017), although the transect route at each location may have varied from the original video tows. Transects ranged in length from 80 m to 168 m and spanned ~1.4 km in total. The camera was attached to a towed video apparatus, which provided a live feed from the camera to the survey vessel and allowed the operator to adjust the height of the apparatus depending on visibility and topography. A GPS track was recorded concurrently to the video tows, documenting position at 15 second intervals.

2.2 Video analysis and habitat classification

Video footage was classified by a marine scientist using TransectMeasure (SeaGIS 2013). The software allows a single benthic habitat type to be assigned to each frame of video footage. Benthic habitat was classified by identifying the dominant substrate and presence or absence of biota in each frame of the video. The results were quality assured and controlled by a second marine scientist who reviewed and confirmed the classification of 30% (i.e. 4 of 12 transects) of the data. Habitat data were synchronised to positional data from the GPS using the time signal and overlaid on aerial imagery to produce maps of the ground truthed transects classified by habitat (Figure 1.1, Figure 3.1).

2.3 Benthic habitat types

Three benthic habitat categories were developed to classify the range of habitats observed during the video tows. These included soft sediment, sand and rock rubble, and seagrass. Full descriptions of each habitat type and example images are provided in Table 2.1.

Table 2.1 Benthic habitat classifications with example images from towed video

Category	Description	
Soft sediment	Mud and sand dominated habitat with bioturbation and rare occurrences of macroalgae and filter feeders	  

Category	Description	
Sand and rock rubble	Coarse sand with rock rubble, turf algae and/or macroalgae and occasional filter feeders	   
Seagrass	Mud and sand dominated habitat with sparse *Halodule uninervis* and *Halophila ovalis* and rare occurrence of filter feeders.	 

3 Results

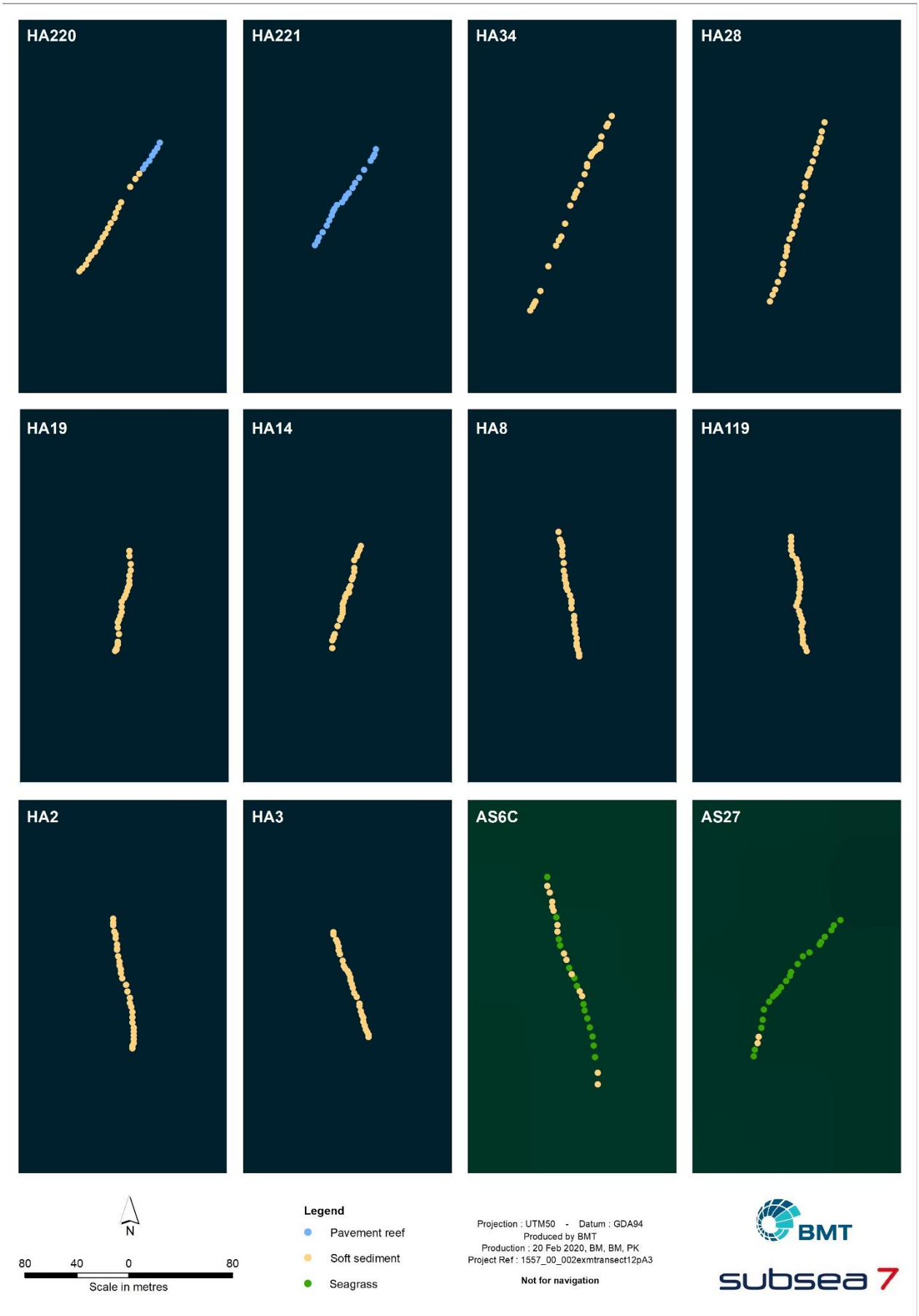
Benthic habitat classifications and descriptions for each transect are displayed in Table 3.1 and Figure 3.1. Transects located to the north of the Off Bottom Tow area were predominately coarse sand substrate with rock rubble and turf algae (HA220 and HA221). Macroalgae and occasional filter feeders (marine sponges, feather stars) were also observed growing on the rock rubble at these sites. Transects surveyed within the Off Bottom Tow area were all observed to be soft sediment (HA34, HA19, HA14, HA8, HA119 and HA2), with the rare occurrence of filter feeders (e.g. marine sponges) and macroalgae at HA28. Transects surveyed to the south of Heron Point were largely characterised by a sparse cover of ephemeral seagrass growing on soft sediment, with rare occurrences of filter feeders (e.g. marine sponges and feather stars; AS6C and AS27).

Habitats classified by BMT from ground truthing completed in February 2020 largely align with those previously identified by MBS Environmental (HA220, HA221, HA34, HA28, HA19, HA14, HA8, HA119, HA2 and HA3; 2018) and 360 Environmental (AS6C and AS27; 2017). However, habitat at sites HA220 and HA221 were classified as sand and rock rubble, rather than reef, given the sparsity of filter feeders and low relief substrate resembling coarse grained sediment rather than pavement reef habitat. Though, the variation in classification results could be due to differences in the transect route between the two ground truthing surveys and has little consequence to the identification of significant BCH.

Table 3.1 Benthic habitat descriptions for ground truthed transects

Transect	Depth	Transect length	Habitat types identified	Description
HA220	11.6 m	117 m	Soft sediment, sand and rock rubble	Mud and sand with turf algae transitioned into coarse sand and rock rubble with turf algae, macroalgae and rare occurrences of filter feeders
HA221	11.1 m	89 m	Sand and rock rubble	Sand and rock rubble with turf algae, macroalgae and occasional filter feeders
HA34	16.4 m	165 m	Soft sediment	Bioturbated mud and sand
HA28	16.1 m	145 m	Soft sediment	Bioturbated mud and sand with occasional macroalgae and filter feeders
HA19	14.1 m	80 m	Soft sediment	Bioturbated mud and sand
HA14	14.1 m	84 m	Soft sediment	Bioturbated mud and sand
HA8	13.1 m	98 m	Soft sediment	Bioturbated mud and sand
HA119	13.2 m	92 m	Soft sediment	Bioturbated mud and sand
HA2	12.8 m	103 m	Soft sediment	Bioturbated mud and sand
HA3	12.0 m	87 m	Soft sediment	Bioturbated mud and sand
AS6C	3.7 m	168 m	Seagrass, soft sediment	Sparse seagrass (*H. ovalis* and *H. uninervis*) interspersed with mud and sand and occasional filter feeders
AS27	3.2 m	129 m	Seagrass, soft sediment	Sparse seagrass (*H. ovalis* and *H. uninervis*) interspersed with mud and sand and occasional filter feeders

Note:
1. See Figure 1.1 for location of transects



Note:
1. See Figure 1.1 for location of transects

Figure 3.1 Classification of habitats along towed video transects

4 References

MBS Environmental (2018) Exmouth Gulf Benthic Communities and Habitat Survey Report. Prepared for Subsea 7 by MBS Environmental, Perth, Western Australia, November 2018

SeaGIS (2013) TransectMeasure – single camera biological analysis tool. SeaGIS Pty Ltd, Melbourne, Victoria. Available at <http://www.seagis.com.au/transect.html>

360 Environmental Pty Ltd (2017) Learmonth Habitat Surveys. Prepared for Subsea 7 by 360 Environmental Pty Ltd, Report No. 2003AF, Perth, Western Australia, August 2017