

MEMORANDUM

ATTN:	Neil Carroll	CC:	
ORGANISATION:	City of Mandurah	FROM:	Melissa Capill
PROJECT NO:	1568	DATE:	15 October 2018
SUBJECT:	Novara boat ramp and Dawesville boat ramp pre-maintenance dredging disposal area environmental surveys		

1. Introduction

The Novara boat ramp and Dawesville boat ramp are managed by the City of Mandurah and provide access to the Peel-Harvey Estuary, located ~80 km south of the Perth, Western Australia. Each boat ramp's entrance channel requires maintenance dredging on an ad-hoc basis to maintain navigability and the next maintenance dredging campaign is scheduled for October 2018. This memorandum provides a description of a pre-maintenance dredging survey undertaken by BMT Western Australia Pty Ltd (BMT) within the proposed disposal areas for each boat ramp's dredge material. The purpose of the pre-maintenance dredging survey was to obtain a general environmental description of the disposal areas prior to the commencement of the maintenance dredging campaign and a post-dredge survey following campaign completion will also be undertaken.

2. Methods

Pre-maintenance dredging environmental surveys of the Novara and Dawesville boat ramp disposal areas were undertaken on 5 October 2018 and involved:

- collection of high definition towed-video footage traversing the length of each disposal area to identify types of benthic habitats and marine fauna present (Figure 2.1, Figure 2.2 and Table 2.1)
- photographs of 0.5 m² quadrats collected by a snorkel diver at five randomly distributed sites within each disposal area for semi-qualitative observations of benthic habitats and marine macrofauna (Figure 2.1, Figure 2.2 and Table 2.1)
- collection of sediment cores (~0–20 cm) by a snorkel diver at the same five randomly distributed sites within each disposal area for general surficial sediment descriptions including: colour, texture, sorting, presence of sulphuric odour, organic matter, debris and/or macrofauna (captured by sieving sample through a 1 mm mesh screen; Figure 2.1, Figure 2.2 and Table 2.1).



Figure 2.1 Survey sites and towed-video transect at Novara boat ramp disposal area, October 2018

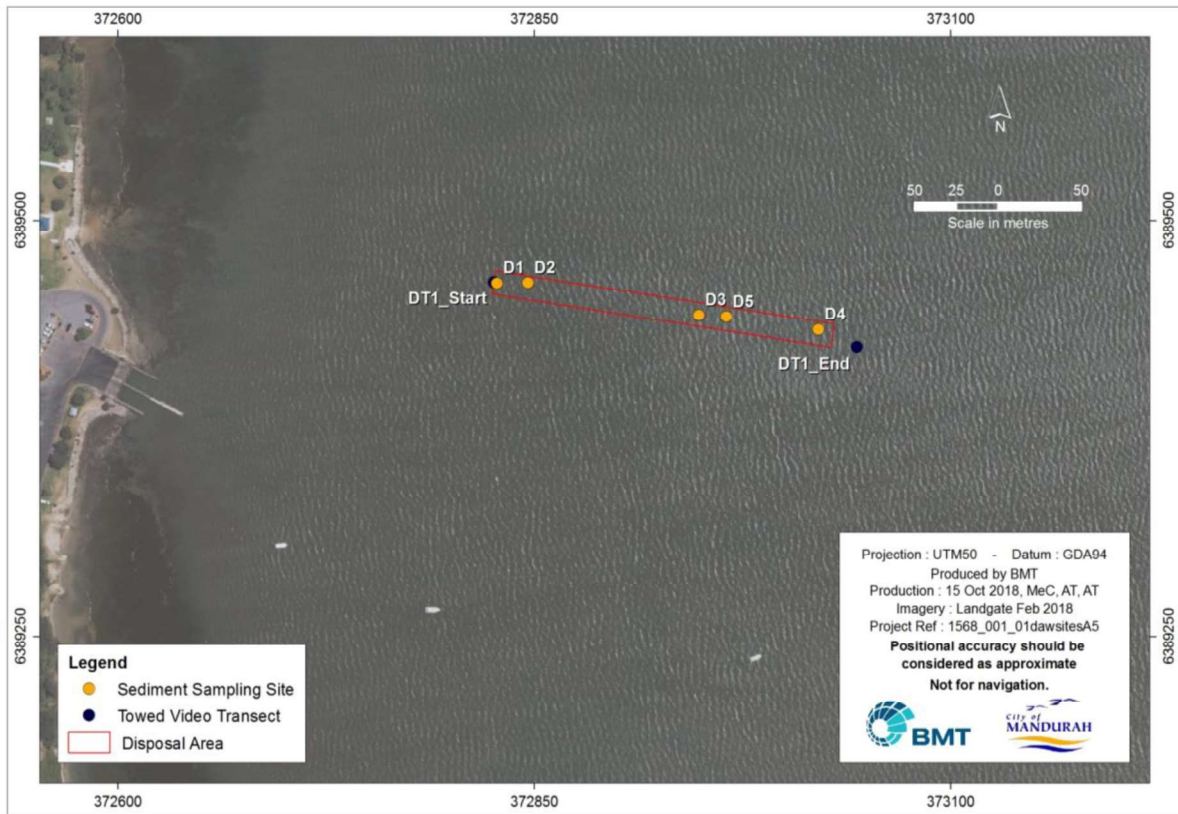


Figure 2.2 Survey sites and towed-video transect at Dawesville boat ramp disposal area, October 2018

Table 2.1 Coordinates of survey sites and towed-video transect at Novara and Dawesville boat ramp disposal areas

Area	Site	Coordinates (UTM50 GDA94)	
		Easting	Northing
Novara boat ramp disposal area	NT1_Start ¹	375758	6394933
	NT1_End ¹	375694	6395234
	N1	375718	6395132
	N2	375728	6395104
	N3	375733	6395091
	N4	375747	6395021
	N5	375753	6394971
Dawesville boat ramp disposal area	DT1_Start ^{1,2}	372825	6389463
	DT1_End ¹	373044	6389424
	D1	372827	6389463
	D2	372846	6389463
	D3	372949	6389443
	D4	373020	6389434
	D5	372965	6389442

Notes:

1. Towed video was collected in a general liner direction from the 'start' site to the 'end' site.
2. An actual waypoint for site DT1_Start was not collected during the field survey, therefore the coordinates for the proposed site have been included.

3. Results


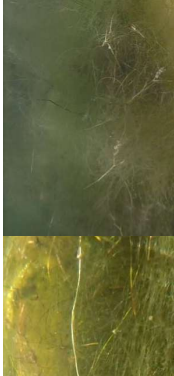







3.1 Towed video transects



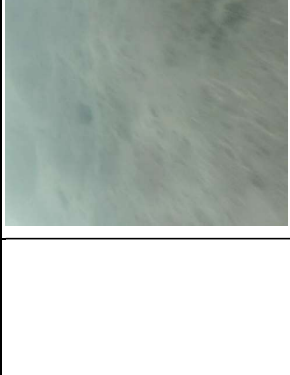


Benthic habitats observed during analysis of the towed video footage collected at the Novara and Dawesville boat ramp disposal areas are presented in Table 3.1.

Bare sediment was the most prevalent habitat within the Novara boat ramp disposal area and the substrate often appeared bioturbated with frequent sightings of the blue swimmer crab, *Portunus armatus*. Closer to shore, there was increased cover of dense macroalgal mats dominated by *Chaetomorpha linum* and isolated patches of seagrass (*Ruppia* sp.) often covered by *C. linum*.

The Dawesville boat ramp disposal area was relatively uniform and characterised by bare bioturbated sediments with infrequent sightings of isolated patches of macroalgae and/or seagrass. No benthic marine fauna was observed.

Table 3.1 Novara boat ramp disposal area and Dawesville boat ramp disposal area pre-maintenance dredging benthic habitat categories and example images, October 2018

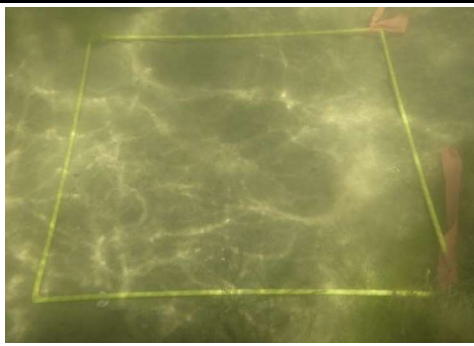
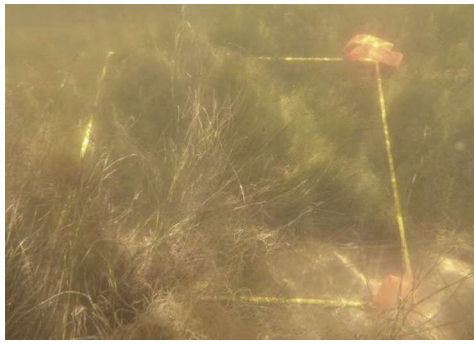
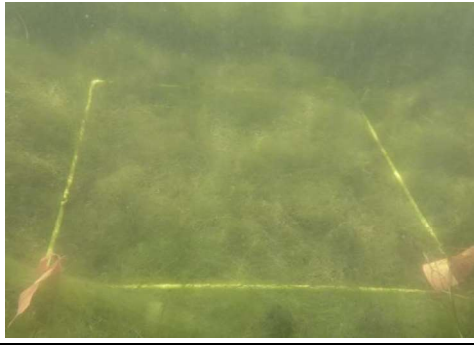
Benthic habitat types	Example images		
Novara boat ramp disposal area			
Seagrass (<i>Ruppia</i> sp.) partially covered by macroalgae (<i>C. linum</i>)			
Macroalgae (<i>C. linum</i>)			
Bare sediment			
Bare sediment with benthic marine invertebrates – blue swimmer crab, <i>P. armatus</i>			

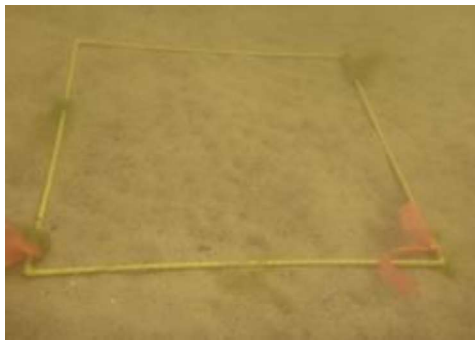
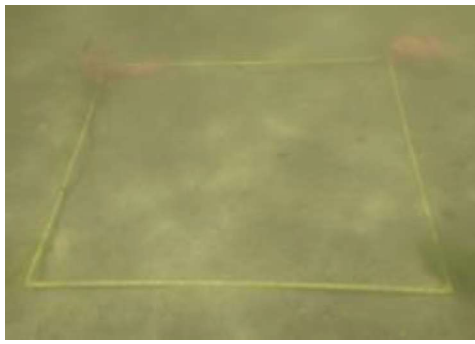
Benthic habitat types	Example images			
Dawesville boat ramp disposal area				
Bare sediment				
Bare sediment with small scattered patches of unidentified macroalgae and/or seagrass				

3.2 Photo quadrat survey

Semi-quantitative descriptions of benthic habitat and marine macrofauna observed at sites sampled within the Novara and Dawesville boat ramp disposal areas are presented in Table 3.2. At the Novara boat ramp disposal area, benthic habitats were variable among sites (Table 3.2) with quadrats at sites N1, N4 and N5 predominately comprising bare sediment. The quadrat at site N3 was dominated by macroalgae (*C. linum*) and site N2 contained a blend of seagrass and macroalgae (*Ruppia* sp. and *C. linum*; Table 3.2). At the Dawesville boat ramp disposal area, all quadrats comprised bare sediment (Table 3.2). There was no macrofauna present within quadrats at any of the sites (Table 3.2).

Table 3.2 Results of the pre-maintenance dredging quadrat survey at Novara boat ramp disposal area and Dawesville boat ramp disposal area, October 2018

Site	Benthic habitat description	Macrofauna present	Photograph ^{1,2}
Novara boat ramp disposal area			
N1	Bare sediment (~95%) with macroalgae (<i>C. linum</i> ; ~5%)	No	
N2	Bare sediment (~10%) with seagrass (<i>Ruppia</i> sp.; ~40%) and macroalgae (<i>C. linum</i> ; ~50%)	No	
N3	Macroalgae (<i>C. linum</i> ; 100%)	No	

Site	Benthic habitat description	Macrofauna present	Photograph ^{1,2}
Novara boat ramp disposal area			
N4	Bare sediment (100%)	No	
N5	Bare sediment (100%)	No	
Dawesville boat ramp disposal area			
D1	Bare sediment (100%)	No	No photographs available. Refer to Table 3.1 for example site images.
D2	Bare sediment (100%)	No	
D3	Bare sediment (100%)	No	
D4	Bare sediment (100%)	No	
D5	Bare sediment (100%)	No	

Notes:






1. Photographs of quadrats sampled within the Novara boat ramp disposal area were captured from an angled viewpoint due to shallow (<1 m) water depths.
2. Photographs of quadrats sampled within the Dawesville boat ramp disposal area were low quality due to poor water clarity and therefore have not been included in this memorandum.






3.3 Sediment sampling and analysis

Sediments at within the Novara boat ramp disposal area were predominately medium to coarse sands with some fines (Table 3.3). Sediments were grey-brown coloured and moderately-well sorted with a small proportion (<1%) of shell fragments present (Table 3.3). All sediment samples contained minor traces of seagrass and/or macroalgae fragments and terrestrial wood fragments (Table 3.3). At sites N3, N4 and N5 macrofauna including polychaetes and amphipods and/or evidence of macrofauna including polychaete tubes were observed (Table 3.3). No sediment samples exhibited sulphuric odour (Table 3.3).

Within the Dawesville boat ramp disposal area, sediments were predominately characterised by grey-brown coloured, very well sorted silt/clay (Table 3.3). All sediment samples contained a small proportion of shell fragments (<1%), with no sulphuric odour and limited to no organic matter (Table 3.3). This was with exception to site D5 where some seagrass stems were observed within the sediment sample (Table 3.3). The only macrofauna observed was at site D2 which contained polychaetes (Table 3.3).

Table 3.3 Sediment sample log from Novara boat ramp disposal area and Dawesville boat ramp disposal area, October 2018

Site	Munsell colour	Texture	Sorting	Sulphuric odour	Organic matter	Debris	Macrofauna	Photograph
Novara boat ramp disposal area								
N1	2.5Y 4/2	Medium to coarse sand with some fines	Well sorted	No	Macroalgae and/or seagrass fragments and terrestrial wood fragments	Small shell fragments (<1%)	No	
N2	2.5Y 4/2	Medium to coarse sand with some fines	Moderately sorted	No	Macroalgae and/or seagrass fragments and terrestrial wood fragments (<1%)	Small shell fragments (<1%)	No	
N3	2.5Y 4/2	Medium to coarse sand with some fines	Well sorted	No	Macroalgae and/or seagrass fragments and terrestrial wood fragments (<1%)	Small shell fragments (<1%)	Polychaete tubes and amphipods	
N4	2.5Y 4/2	Medium to coarse sand with some fines	Well sorted	No	Macroalgae and/or seagrass fragments and terrestrial wood fragments (<1%)	Small shell fragments (<1%)	Polychaetes	
N5	2.5Y 4/2	Medium to coarse sand with some fines	Moderately sorted	No	Macroalgae and/or seagrass fragments and terrestrial wood fragments (<1%)	Small shell fragments (<1%)	Polychaete tubes	

Site	Munsell colour	Texture	Sorting	Sulphuric odour	Organic matter	Debris	Macrofauna	Photograph
Dawesville boat ramp disposal area								
D1	3N	Silt/clay	Very well sorted	No	No	Small shell fragments (<1%)	No	
D2	3N	Silt/clay	Very well sorted	No	No	Small shell fragments (<1%)	Polychaetes	
D3	3N	Silt/clay	Very well sorted	No	No	Small shell fragments (<1%)	No	
D4	2.5/10GY	Silt/clay	Very well sorted	No	No	Small shell fragments (<1%)	No	
D5	2.5/10GY	Silt/clay	Very well sorted	No	Seagrass stems	Small shell fragments (<1%)	No	

Notes:

- The colours presented in the table above are intended to provide visual comparison between composite samples and are not intended to take the place of a Munsell Soil Colour Chart (i.e. the name, hue, value/chroma of the sediment). Colours were determined using BabelColor.

4. Summary

This memorandum provides a general baseline description of the benthic habitats and sediments at the Novara and Dawesville boat ramp disposal areas prior to maintenance dredging. Benthic habitats observed during the pre-maintenance dredging environmental surveys at the Novara and Dawesville boat ramp disposal areas were representative of known local estuarine habitats and no new marine fauna or macrofauna was identified (BMT 2018, Forbes and Kilminster 2014, Oceanica 2007, Valesini et al. 2018).

5. References

BMT (2018) Point Grey Channel – Dredging Environmental Impact Assessment. Prepared for Department of Transport by BMT, Report No. 1349_005/2_Rev4, Perth, Western Australia, January 2018

Forbes V, Kilminster K (2014) Monitoring Seagrass Extent and Distribution in the Swan-Canning Estuary, Water Science Technical Series, Report No. 70, Department of Water, Perth, Western Australia, January 2014

Oceanica (2007) Port Mandurah Maintenance Dredging – Dredging Environmental Impact Assessment. Prepared for City of Mandurah by Oceanica Consulting Pty Ltd, Report No. 522/1, Perth, Western Australia, August 2007

Valesini F, Cronin-O'Reilly S, Krumholz O, Harvey M (2018) Benthic Habitat Characteristics at the Dredge Disposal Site for the Point Grey Boating Channel, Peel-Harvey Estuary – Interim Report for 'Pre-dredge' Characteristics. Prepared for BMT Oceanica Pty Ltd by Murdoch University, Perth, Western Australia, July 2018