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SUBJECT: **BCI Minerals – Mardie Salt Project. Snapshot Survey of the Benthic Habitats and Communities at the Proposed Bitterns Pipeline and Outfall Infrastructure Options, March 2018.**

1. Introduction

The BCI Minerals Limited (BCI) Mardie Salt Project (the Project) is located in the north of Western Australia, within the Pilbara region, approximately 70 km southwest of the Port of Cape Preston East, between the towns of Onslow and Dampier. The Project area covers up to 26,005 ha, with approximately 25% of this area potentially utilised for solar salt production. The Project is estimated to produce 3 to 3.5 million tonnes per annum of sodium chloride salt from seawater via a series of evaporation ponds and crystallisers. The ponds predominantly overlie the intertidal salt flats and mudflats within the Project area. In addition, installation of a permanent pipeline will be required for discharge of waste bitterns diluted with seawater from the facility to the marine environment at one of three potential locations (Zone A, B and C) shown in Figure 1.

During feasibility assessment for the Project, BCI identified that the waste bitterns outfall posed a potential risk to subtidal benthic communities and habitat (BCH) in the immediate vicinity of the outfall location and within the associated pipeline footprint. To better understand these potential impacts, BCI commissioned a subtidal BCH snapshot survey to determine the environmental significance of the subtidal BCH within the vicinity of potential waste bitterns outfall locations and identify if these options represent a ‘fatal flaw’ for the Project. Instructions from BCI was to prioritise assessment of Zone A and Zone B, with option Zone C to be assessed if it was determined other options were not considered suitable.

At the end of the survey, O2 Marine was to communicate the results of the snapshot survey with BCI to assist determination of the preferred location for the outfall. A Water Quality Monitoring Station (WQMS) was then to be deployed at this location for collection of baseline water quality data prior to the discharge of waste bitterns to support an environmental impact assessment. During planning for the survey, BCI also identified that it would be beneficial to opportunistically collect preliminary bathymetry information whilst in the field for the BCH snapshot survey to guide early project engineering design, particularly for investigation of a possible transhipment route shown in Figure 1.

The specific objectives for the BCH snapshot survey were to:

1. Broadly characterise the subtidal BCH at the discharge locations and associated pipeline footprints with low intensity sampling to determine the significance of BCH which occur in the Project area;
2. Confirm if any of the options represent a ‘fatal flaw’ to the Project and identify alternatives;

3. Identify the preferred discharge location option, which offers the lowest level of potential environmental impact on subtidal BCH;
4. Deploy a WQMS near the BCI designated preferred outfall location;
5. Collect depth information along the slope between Zone A and Zone B to investigate unsurveyed areas where -3.0 m LAT is closest to shore, and
6. Assess depths along the proposed transhipment route to understand if it would be possible for a 4.85 m loaded draft vessel to travel above mean sea level.

This technical memorandum details the findings of the BCH snapshot survey and preliminary bathymetry investigations.

2. Methods

2.1. Subtidal BCH

The BCH snapshot survey was undertaken at Zone A and Zone B via drop video camera between 8th and 14th March 2018¹. Video transects of approximately 100 m length were recorded at 250 m intervals along the Zone A and Zone B pipeline routes extending from the shore out to the proposed discharge location. O2 Marine understood BCI intended for the outfall to be located in depths of approximately -3.0 m LAT and therefore sampling continued along the proposed pipeline route until this depth was attained. This resulted in a total of 15 and 26 transects undertaken at Zone A and B, respectively.

The drop camera used was a Spot X Underwater Vision Pro Squid, which utilises a GoPro Hero 4 camera, recording high resolution (1080p 50fp) High Definition footage streamed to the surface via an on-board monitor. To maintain an appropriate speed for capture of good quality video, a sea anchor was deployed to slow the drift rate of the vessel.

The following information was recorded during each transect: GPS coordinates (start and finish), depth, time, relief, substrate, bedforms, the cover of benthic flora and fauna and the dominant and sub-dominant taxa. The BCH was classified in accordance with the Collaborative and Automated Tools for Analysis of Marine Imagery (CATAMI) standard classification scheme for scoring marine biota and physical characteristics from underwater imagery. A table showing the habitat classification scheme is provided in **Appendix A**.

Communication with BCI on the preliminary findings of the BCH from Zone A and Zone B during the survey determined further analysis should be conducted on Zone A in preference to undertaking a BCH survey at Zone C. An additional 11 transects (approximately 100 m in length) were subsequently undertaken within the vicinity of the potential discharge location in Zone A.

The BCH scoring results were grouped into similar depths and BCH to represent various benthic biotic associations along the pipeline with depth.

¹ The BCH snapshot survey was combined with a separate scope to assess the ecological value of the mangrove communities in the Project area. The results of this work will be provided in a separate report.



Figure 1 Benthic Habitat Assessment Zones A, B and C, water quality instrument position and proposed transhipment route.

2.2. WQMS Deployment

The WQMS components include a weighted subsea frame, anchor, surface buoy with hazard navigation lights, water quality instruments to record water temperature, pH, dissolved oxygen, conductivity and salinity and cables, data transponder, batteries and antennae for remote automated communication via telemetry. An image of the water quality instruments mounted on the subsea frame (without weights) is provided in Figure 4a.

2.3. Depth Sounding

Depth information was collected using the vessel's onboard GPS positioning system and depth sounder, a Humminbird Colour 798Si. Depth soundings were recorded in 500 m intervals on two transects between Zone A and B undertaken near the -3.0 m LAT slope (Transects 1 and 2) and additional zigzag transects were undertaken within uncharted areas further offshore at 500 m intervals (Transects 3 to 7). The depths soundings for the proposed transhipment route (Transect 8) were recorded in 100 m intervals.

The depths for all positions (BCH and depth sounding transects) were converted to Lowest Astronomical Tide (LAT) or Chart Datum (CD) and Mean Sea Level (MSL). The date, time, observed depth (m), corresponding waypoint number, coordinates and sounder depth (in feet) was recorded for each position. The depth in feet was converted to metres by dividing the result by 3.2808399. The Lowest Astronomical Tide (LAT) or Chart Datum (CD) was then calculated by subtracting the tide above CD from the result. The tide prediction data used came from the Willyweather website at the North Sandy Island location (<https://tides.willyweather.com.au/wa/pilbara/north-sandy-island-offshore.html>). The tide data assumes the tide level remains constant until the next available reading was available from the website which occurs in approximately 15-minute intervals. The Mean Sea Level (MSL) was then calculated by adding 1.57 m to the CD results. This was the height above CD used by AZTEC Analysis for the design of the Harbour Approach Channel for a recent project O2 Marine supported in Onslow to calculate the MSL.

Conditional formatting was then undertaken on the data to identify depths below -3.0 m LAT along Transects 1 to 7 and depths below -4.85 m MSL along the transhipment route (Transect 8) which were highlighted in red/bold.

3. Results

3.1. Subtidal BCH

3.1.1. Zone A

Zone A extends from the shoreline in a north-south direction and is the northern most survey area of the three zones (Figure 1). This survey area ranged from a near-shore depth of 0.43 m LAT to -3.59 m LAT approximately 4 km offshore. Drop camera video results indicate the survey zone can be classified into 5 BCH groupings (BCH-A to BCH-E) (Figure 2 and Table 1). The raw subtidal BCH data are provided in **Appendix B**.

The near-shore area of Zone A (BCH A and B) is largely flat mud and fine sands. These areas are predominantly devoid of biotic cover except for the occasional macroalgae and crab burrows. The exception is the shallowest transect which recorded moderate to high (10-75%) cover of macroalgae typically found on the lower intertidal zone. The mid-section of Zone A (BCH-C and D) recorded fine/course sands with a mixture of sand covering limestone pavement and rubble. The biotic cover ranged from bare to Low (<1% - 10%) primarily comprised of macroalgae and soft corals. A notable increase in depth was recorded between transect A13 (-0.8 m LAT) and A14 (-2.87 m LAT), this slope recorded the highest level of BCH, with a sparse to high cover (3% - 75%) of soft corals, and occasional macroalgae and sponges.

Transects A19 to A25 (BCH-E) were all located in waters of -3.0 m LAT or deeper. Results for this area showed a mostly flat substrate comprised of fine to coarse sand with sparse to low covering (1% - 10%) of soft corals and occasional macroalgae and sponges.

Zone A

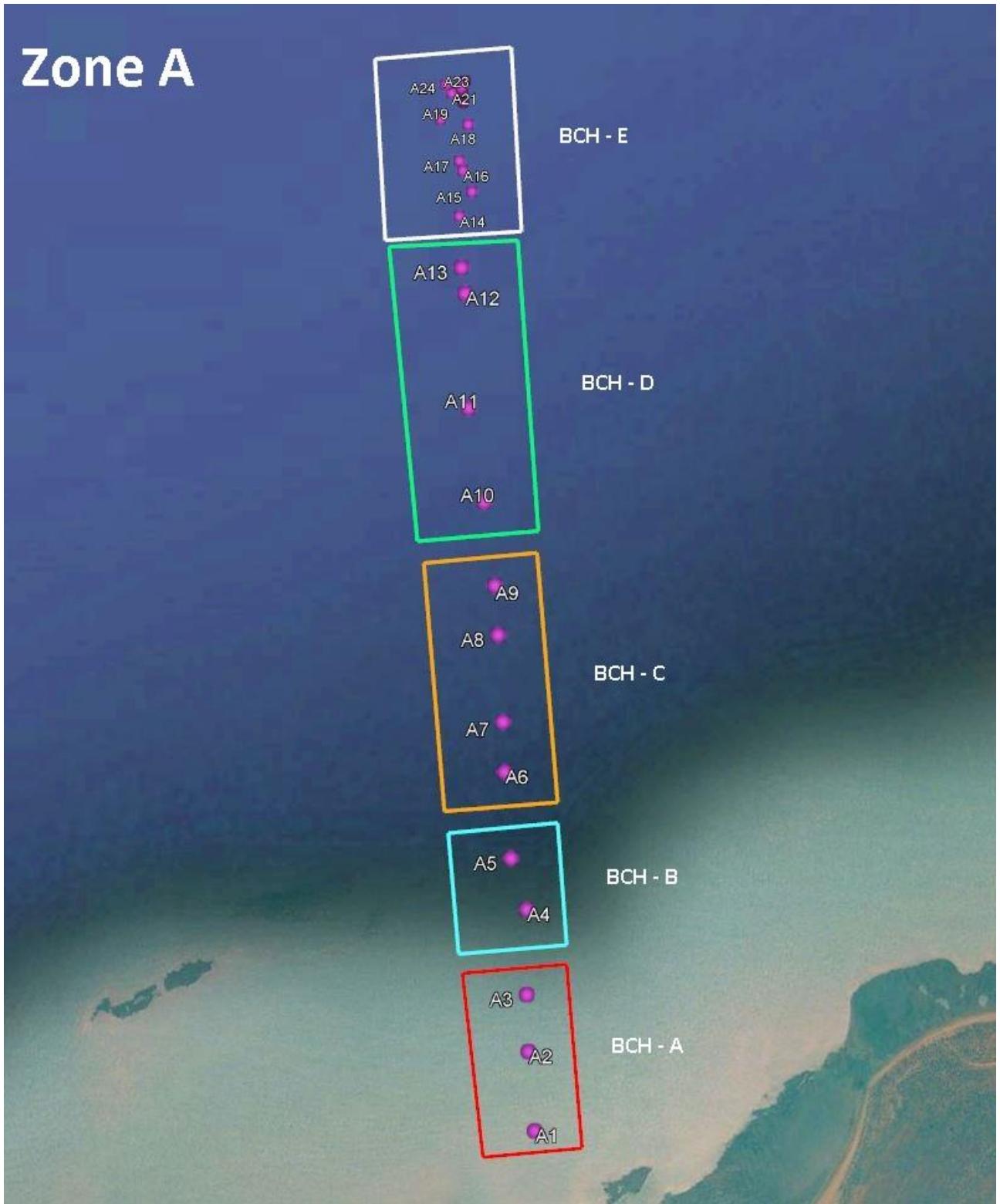


Figure 2 Zone A – Video Transect locations with associated BCH Groupings.

Table 1. BCH characteristics of Zone A.

Grouping	Transect	Depth m (onsite)	Depth (LAT)	BCH Description	Example Images
BCH-A	A1	0.6	0.9	Depth range 0.43 m to 0.96 m LAT. Flat substrate comprised of fine sand with 2D ripples some bioturbation (e.g. burrows). Moderate to High cover (25-75%) macroalgae at A1. A2/A3 predominantly bare substrate with irregular sponges, macroalgae or seagrass.	 <i>Transect A1</i>
	A2	0.9	0.7		 <i>Transect A2</i>
	A3	1.2	0.4		

Grouping	Transect	Depth m (onsite)	Depth (LAT)	BCH Description	Example Images
BCH-B	A4	2.1	-0.3	Depth range-0.38m to -0.68m LAT., Flat substrate comprised of mud/fine sand with regular bioturbation (e.g. burrows, mounds, tracks). Bare substrate with infrequent macroalgae.	 <i>Transect A4</i>
	A5	2.3	-0.6		 <i>Transect A5</i>

Grouping	Transect	Depth m (onsite)	Depth (LAT)	BCH Description	Example Images
BCH-C	A6	2.4	-0.7	Depth range -0.34 m to -0.57 m LAT. Flat substrate of fine to coarse sand. Bare to low (<1% - 10%) cover comprising occasional soft corals & infrequent macroalgae, sponges & hard corals.	
	A7	2.4	-0.6		
	A8	2.3	-0.3		
	A9	2.3	-0.1		

Grouping	Transect	Depth m (onsite)	Depth (LAT)	BCH Description	Example Images
BCH-D	A10	2.1	-0.1	Depth ranging 2.1m – 3 m. Flat substrate of sand over limestone pavement/rubble & coarse sand. Sparse to low (1-10%) biotic cover predominantly comprising macroalgae & soft corals, with macroalgae, hard coral, sponges & bryozoans sub-dominant.	 <i>Transect A11</i>
	A11	2.1	-0.1		
	A12	2.6	-0.4		 <i>Transect A12</i>
	A13	3	-0.4		

Grouping	Transect	Depth m (onsite)	Depth (LAT)	BCH Description	Example Images
BCH-E	A14	5.3	-2.4	Depths ranging -2.45 m LAT to -3.46 m LAT. Flat substrate comprising fine/course sand, with some bioturbation. Biotic cover predominantly sparse to low (1% to 3%), with sparse to high (1% to 75%) cover recorded on the steepest part of the slope. Cover dominated by soft corals with occasional macroalgae & sponges.	
	A15	4.7	-2.6		
	A16	5	-3.0		
	A17	5.1	-2.8		
	A18	5.3	-3.0		
	A19	6.2	-3.6		
	A20	5.4	-3.1		
	A21	5.8	-3.4		
	A22	5.6	-3.2		
	A23	6	-3.4		
	A24	5.8	-3.2		
	A25	5.7	-3.4		

3.1.2. Zone B

Zone B is located approximately 5 km to the south-west of Zone A, extending from the shoreline in an east-west direction (Figure 1). Water depth within this zone ranges from +2.45 m LAT at the shoreline to -3.61 m LAT to the west. Drop camera video results identified that the BCH for this zone can be grouped into seven (7) categories (BCH-A to BCH-G) (Figure 3 and Table 2). The raw subtidal BCH data are provided in **Appendix B**.

The first three transects adjacent to the shoreline (BCH-A) comprises flat fine sand with shell. No biotic cover was recorded in this zone which is likely a sand bank exposed on low tide. BCH-B is flat fine to course grained sand with low to moderate cover (3% - 25%) of seagrass (*Halophila* and *Syringodium* species). BCH-C comprised of fine to coarse grained sand with bare to sparse cover (<1% - 3%) of macroalgae and occasional seagrass.

The biotic cover of BCH-D to BCH-G is dominated by two species of hydrozoans on fine sands closer to shore changing to coarse sands in deeper waters. The cover at BCH-D is from bare to sparse (<1% - 3%) with occasional macroalgae. The cover in BCH-E is variable ranging from bare to high (<1% to 75%) with occasional macroalgae and sponges. Seagrass (*Halophila* spp) was recorded as co-dominant taxa with the hydrozoans at BCH-F at bare to low (<1% - 10%) total biotic cover immediately before the slope. The two hydrozoans species were again dominant at sparse to moderate (1%-25%) cover with occasional sponges on the slope to depth below -3.0 m LAT.

Zone B

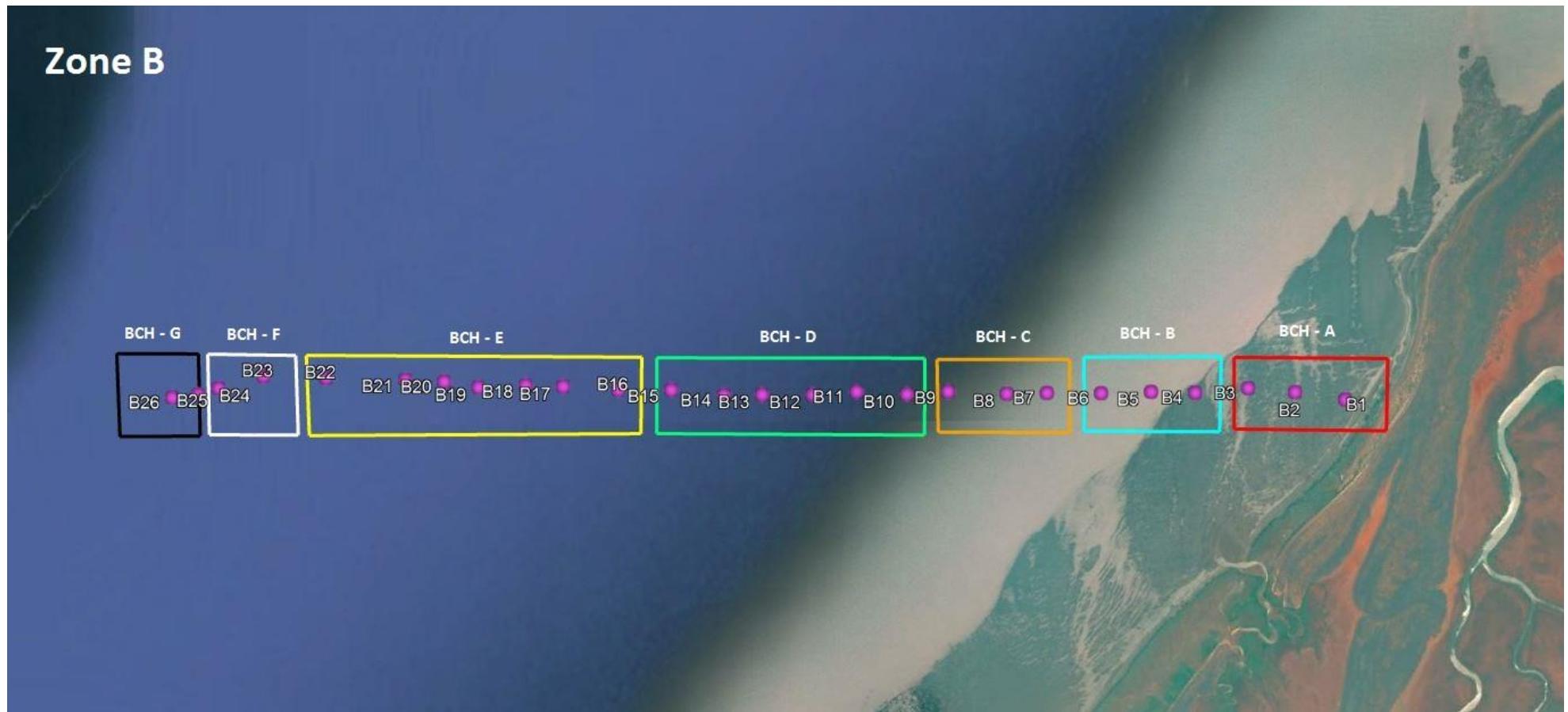


Figure 3 Zone B – Video Transect locations with associated BCH Groupings.

Table 2. BCH characteristics of Zone B

Groupings	Transect	Depth m (onsite)	Depth (LAT)	BCH Description	Example Images
BCH-A	B1	0.50	2.5	Depth range 0.5 m to 1.1 m., Flat substrate of fine sands/silt with shells. No biotic cover recorded.	 <i>Transect B3</i>
	B2	0.90	2.0		
	B3	1.10	1.8		 <i>Transect B3</i>

Groupings	Transect	Depth m (onsite)	Depth (LAT)	BCH Description	Example Images
BCH-B	B4	1.50	1.7		 <p>Transect B4</p>
	B5	1.80	1.5	Depth range 1.5 m to 2.1 m. Flat substrate with fine to coarse grained sand. Sparse to moderate cover (1-25%) of seagrass	 <p>Transect B5</p>
	B6	2.10	1.4		

Groupings	Transect	Depth m (onsite)	Depth (LAT)	BCH Description	Example Images
BCH-C	B7	2.30	1.2		 <p>Transect B7</p>
	B8	2.40	1.3	Depth range 2.3 m to 2.8 m. Flat fine to coarse sand. Bare to sparse (<1% - 3%) green macroalgae with infrequent seagrass.	 <p>Transect B8</p>
	B9	2.80	0.7		

Groupings	Transect	Depth m (onsite)	Depth (LAT)	BCH Description	Example Images
BCH-D	B10	3.00	0.7	Depth range 3 m to 3.7 m. Flat fine to coarse sand. Bare to sparse (<1% - 3%) biotic cover dominated by hydrozoans & occasional macroalgae.	 <i>Transect B10</i>
	B11	3.30	0.5		
	B12	3.50	0.3		 <i>Transect B12</i>
	B13	3.30	0.5		
	B14	3.30	0.6		
	B15	3.70	0.2		

Groupings	Transect	Depth m (onsite)	Depth (LAT)	BCH Description	Example Images
BCH-E	B16	4.10	-0.1	Depth range 2.7 m to 4.5 m. Flat coarse sands. Variable biotic cover from bare to high (<1% - 75%) comprised almost exclusively of two species of hydroids & occasional sponges.	
	B17	4.50	-0.5		
	B18	4.20	-0.4		 Transect B18
	B19	3.50	0.1		
	B20	3.10	0.1		
	B21	3.00	0.3		
	B22	2.70	0.6		

Groupings	Transect	Depth m (onsite)	Depth (LAT)	BCH Description	Example Images
BCH-F	B23	2.60	0.7	Depth range 2.6 m to 3 m. Flat substrate of coarse sands. Biotic cover from bare to low (<1% - 10%) comprised of seagrass and hydrozoans.	 <p><i>Transect B24</i></p>
	B24	3.00	0.4		 <p><i>Transect B24</i></p>

Groupings	Transect	Depth m (onsite)	Depth (LAT)	BCH Description	Example Images
BCH-G	B25	7.10	-1.4	Depth range 5.0 m to 7.1 m. Flat to moderate slope (0-3 m) of coarse sands. Biotic cover sparse to moderate (1 – 25%) dominated by two species of hydrozoan & occasional sponges.	 <p>Transect B25</p>
	B26	5.00	-3.6		 <p>Transect B26</p>

3.2. WQMS Deployment

Following communication with BCI and confirmation that Zone A is the preferred outfall location, the WQMS was deployed in Zone A at a depth of approximately -3.4 m LAT (4.5 m MSL) on 14 March 2018. The recorded position of the WQMS was: Latitude 21°2'13.75" S, Longitude 115°55'31.46" E. An image of the surface buoy following deployment is provided in Figure 4b.



Figure 4a Water quality instruments mounted on the subsea frame from the WQMS.



Figure 4b Surface buoy, navigation light and communication cables from the WQMS following deployment.

3.3. Depth Sounding

The results from converting all depth sounding positions recorded during the BCH snap shot survey to LAT and MSL are provided in **Appendix C**. It should be noted that the methods used resulted in negative LAT values for depths above the LAT and positive values for depths below the LAT. Therefore, these signs would need to be converted for actual heights above and below LAT or MSL.

Sounding operations undertaken during the field assessment found the bathymetry within Zone A more appropriate for bittern discharge infrastructure. A depth of at least -3.0 m LAT was identified approximately 4 km from the shoreline, while this depth was not reached for approximately 6 km within Zone B (BCH transects). The depths along the slope transects indicate a depth of -3.0 m LAT may occur closest to the shore approximately 2.5 km west of Zone A. The zigzag transects within the unchartered area typically indicate shallower areas to the west of the transhipment route, particularly closer to the chain of islands on the way out to the Deep Water Current Meter (DWCM).

Sounding data identified four 'high spots' shallower than -4.85 MSL along the proposed transhipment route from the WQMS to the DWCM. High spot one occurs approximately 1 km past the WQMS position and extends approximately 1.8 km ranging in depths between -4.3 and -4.8 m MSL. High spot two is a single record of -4.8 m MSL 800 m past high spot one. High spot 3 occurs approximately 3.7 km along the

transhipment route extending approximately 300 m ranging in depth from -3.2 m to -4.5 m MSL. High spot four is a single record 100 m south of the DWCM location at a depth of -4.7 m MSL.

4. Conclusion

The BCH snapshot survey undertaken between the 8th and 14th March 2018 found strong associations in depth related subtidal BCH at both Zone A and Zone B. The subtidal BCH and groups recorded across the pipeline and discharge areas of both zones are quite distinct, although in both zones the highest biotic cover was recorded immediately shoreward of, or on the slope, where depths increase rapidly from <1 m to -3.0 m LAT. The BCH present, comprised of filter feeders (soft corals, hydrozoans) and tropical seagrass, proliferate in the transition between nearshore turbid waters and offshore clearer waters (evident when sampling) where stronger tidal currents and subsequent mixing of waters increases. The discharge areas at -3.0 m LAT comprise similar communities but in typically low cover.

Zone A near the slope identified sand covered hard substrate composed of low to moderate cover (3% - 25%) soft corals, sponges and macroalgae, although cover decreases to <3% at -3.0 m LAT. Bare to low biotic cover was also recorded in shallower areas of Zone A with occasional macroalgae and filter feeders (i.e. sponges, soft corals). Macroalgae increases on the lower part of the intertidal zone which is typical of the community expected to be found near a rocky beach. The substrate changes from fine sand in shallow areas to coarse sand, sand covered rock and rubble at depths below 1 m LAT. Many turtles were also observed in the shallows at Zone A.

Zone B identified two hydrozoan species that dominate the biotic cover at variable but occasionally relatively high cover near the slope (<1% - 75%). Small areas of sparse to moderately covered (1-3%) seagrass was also identified on the slope and in the shallows at Zone B which can be considered an important source of food for protected species such as dugong and turtles. However, no seagrass was observed in depths of -3.0 m LAT. Except for these areas of biotic cover, Zone B was typically comprised bare to sparsely covered benthic biota. Zone B remained very shallow (above LAT) out to the slope, which was located approximately 2 km further offshore than Zone A and typically comprised of both fine and coarse sands.

The subtidal BCH recorded from both zones is not considered to be of regional significance or of high ecological value as these communities are likely to be found throughout turbid nearshore areas of the Pilbara and are therefore widely distributed. The potential environmental risk associated with the pipeline installation and waste bitterns outfall which requires disturbance of a small area of these communities is unlikely to represent a 'fatal flaw' to the Project for either option. There was therefore no clear option that provided a reduced level of environmental impact. Depth sounding undertaken also indicated that shallower areas occur west of the proposed transhipment route closer to the chain of islands that occur from Zona B towards the DWCM location. In the absence of environmental fatal flaws identified and the preliminary bathymetry information gathered during the snapshot survey, BCI identified that Zone A offers the most practical design option for the reduced length of the pipeline, with -3.0 m LAT closer to shore and improved operational depths and distance for a proposed transhipment route. Therefore, the WQMS was deployed in Zone A at a depth of approximately -3.4 m LAT (4.5 m MSL) on 14 March 2018.

Depth sounding along the slope between Zone A and Zone B identified an area approximately 2.5 km west of Zone A where depths may be further investigated for where -3.0 m LAT may occur closer to shore than at Zone A. Four high spots were also identified along the transhipment route which will require further investigation where MSL is shallower than -4.85 m and likely to restrict a 4.85 m loaded draft vessel to travel daily during high tides. It should be noted that depths were recorded using non-professional survey equipment and were intended for use a preliminary bathymetry information that will require further investigation with appropriate equipment.

Appendix A Habitat Classification Scheme

Relief		Substrate Type		Bedforms		Total Cover		BCH		Taxa	
F	Flat	M	Mud/Silt	N	None	B	Bare (<1%)	Ma	Macroalgae	Sa	<i>Sargassum</i>
L	Low (<1m)	FS	Fine Sand	B	Bioturbated	S	Sparse (1-3%)			Pa	<i>Padina</i>
M	Moderate (1-3m)	CS	Course Sands (shell)	2DR	Ripples (<10cm parallel)	L	Low (3-10%)			Ca	<i>Caulerpa</i>
H	High (>3m)	G	Gravel	2DW	Waves (>10cm parallel)	M	Medium (10%-25%)			As	<i>Asparagopsis</i>
W	Wall	R	Rubble	3DR	Ripples (>10cm uneven)	H	High (25%-75%)			En	<i>Encrusting coralline</i>
		P	Pebble	3DW	Waves (>10cm uneven)	D	Dense (>75%)			Rh	<i>Mixed Rhodophyta (red algae)</i>
		B	Boulders							Ch	<i>Mixed Chlorophyta (green algae)</i>
		LP	Limestone Pavement							Ph	<i>Mixed Phaeophyceae (brown algae)</i>
		LPS	Limestone Pavement w sand veneer							TA	<i>Unidentified Turf Algae</i>
		R-LP	Rock - Low Profile							U	<i>Unidentified Macroalgae</i>
	R-HP	Rock - High Profile						S	Seagrass	Ho	<i>Halophila ovalis</i>
										Hd	<i>Halophila decipiens</i>
										Hs	<i>Halophila spinulosa</i>
										Ha	<i>Halodule</i>
										S	<i>Syringodium</i>
										C	<i>Cymodocea</i>
								Mo	Motile benthic invertebrates	U	<i>Unidentified Seagrass</i>
										A	<i>Asterioidea (Sea stars)</i>
										H	<i>Holothuroidea (Cucumbers)</i>
										O	<i>Ophiuroidea (Brittle Stars)</i>
										E	<i>Echinoidea (Urchins, Crinoids)</i>
										W	<i>Worms</i>
										C	<i>Crustacea (crabs, shrimps, lobsters)</i>
										M	<i>Molluscs (shells)</i>
										F	<i>Fishes</i>
										U	<i>Unidentified Motile Benthic Invertebrates</i>
								C	Coral - Hard & Soft	A	<i>Hard Coral Acroporidae</i>
										F	<i>Hard Coral Faviidae</i>
										Por	<i>Hard Coral Poritidae</i>
										Poc	<i>Hard Coral Pocilloporidae</i>
										D	<i>Hard Coral Dendrophylliidae</i>
										M	<i>Hard Coral Mussidae</i>
										O	<i>Hard Coral Other</i>
										SC	<i>Black & Octocorals (soft corals)</i>
								Nc	Non-coral sessile benthic invertebrates	SCr	<i>Sponges: Crusts</i>
										SC	<i>Sponges: Cup</i>
										SE	<i>Sponges: Erect</i>
										SM	<i>Sponges: Massive</i>
										O	<i>Anemones, Hydrocorals, Hydroids</i>
										B	<i>Bryozoa</i>
										A	<i>Ascidians</i>
								Un	Unvegetated	T	<i>Tunicata</i>

Appendix B Subtidal BCH Raw Data

Zone A

Site ID	Transect No:	Depth Onsite	Depth (LAT)	Relief	Substrate	Bedform	Total Cover	Dominant BCH	Taxa	Cover			Sub Dominant Taxa		
										1	2	3	1	2	3
TP3	1	0.6	0.96	Flat	Vaneer/fine sand	None	Moderate - High	Macroalgae	Phaeophyceae	Moderate	Macroalgae - Phaeophyceae	Macroalgae - Sargassum	Macroalgae - Chlorophyta		
TP4	2	0.9	0.73	Flat	Fine Sand	Ripples (<10cm parallel)	Bare	Non Coral Invertebrates	Sponge	Bare	Macroalgae - Phaeophyceae	Non Coral Invertebrates - Hydroids			
TP5	3	1.2	0.43	Flat	Fine Sand	Ripples (<10cm parallel)/Bioturbated	Bare	Macroalgae	Rhodophyta	Bare	Seagrass - Halophila decipiens	Macroalgae - Phaeophyceae			
TP6	4	2.1	-0.38	Flat	Mud/Fine Sand	Ripples (<10cm parallel)/Bioturbated	Bare	Unvegetated							
TP7	5	2.3	-0.58	Flat	Mud/Fine Sand	None/Bioturbated	Bare	Unvegetated							
TP8	6	2.4	-0.68	Flat	Fine Sand	None/Bioturbated	Bare	Macroalgae	Phaeophyceae	Bare					
TP9	7	2.4	-0.57	Flat	Fine Sand	None/Bioturbated	Bare	Non Coral Invertebrates	Hydroids	Bare	Macroalgae - Phaeophyceae	Sponge - erect			
TP10	8	2.3	-0.47	Flat	Fine/Course Sand	None	Sparse	Non Coral Invertebrates	Hydroids	Bare	Sponge - erect	Macroalgae - Phaeophyceae			
TP11	9	2.3	-0.34	Flat	Fine/Course Sand	None	Low	Non Coral Invertebrates	Hydroids	Sparse	Coral - Hard	Sponge - erect			
TP12	10	2.1	0.01	Flat	Veneer/Rubble	None	Low	Macroalgae	Chlorophyta	Low	Coral - Hard	Coral - Mussidae	Macroalgae - Rhodophyta		
TP13	11	2.1	0.01	Flat	Veneer/Rubble	None	Low	Macroalgae	Chlorophyta	Low	Macroalgae - Phaeophyceae	Cora - Soft Coral	Non Coral Invertebrates - Bryozoa		
TP14	12	2.6	-0.33	Flat	Course Sand/Rubble	None	Sparse - Low	Coral	Soft Corals	Sparse	Macroalgae - Rhodophyta	Coral - Dendrophylliidae	Sponge - erect		
WQ11	13	3	-0.8	Flat	Course Sand	None	Sparse - Moderate	Coral	Soft Corals	Moderate	Sponge - erect	Sponge - cup			
TP15	14	5.3	-2.87	Moderate	Course Sand/Limestone Pavement	None/Bioturbated	Sparse - High	Coral	Soft Corals	Sparse - High	Sponge - erect	Sponge - massive	Coral - hard		
WQ10	15	4.7	-2.45	Flat	Fine/Course Sand	Bioturbated	Bare	Coral	Soft Corals	Bare					
WQ9	16	5	-2.75	Flat	Fine/Course Sand	None	Sparse - Low	Coral	Soft Corals	Sparse	Macroalgae - Phaeophyceae	Sponge			
WQ8	17	5.1	-2.79	Flat	Fine/Course Sand	None	Sparse	Coral	Soft Corals	Sparse	Macroalgae - Phaeophyceae	Sponge			
WQ7	18	5.3	-2.92	Flat	Fine/Course Sand	None	Sparse	Coral	Soft Corals	Sparse	Macroalgae - Phaeophyceae	Sponge			
TP16	19	6.2	-3.59	Moderate	Course Sand	None/Bioturbated	Sparse	Coral	Soft Corals	Sparse	Sponge - erect	Sponge - massive	Macroalgae - Phaeophyceae		
WQ6	20	5.4	-3.02	Flat	Fine/Course Sand	None	Sparse	Coral	Soft Corals	Sparse	Macroalgae - Phaeophyceae	Sponge			
WQ4	21	5.8	-3.34	Flat	Fine/Course Sand	None	Sparse	Coral	Soft Corals	Sparse	Macroalgae - Phaeophyceae	Sponge			
WQ5	22	5.6	-3.22	Flat	Fine/Course Sand	None	Sparse - Low	Coral	Soft Corals	Sparse	Macroalgae - Phaeophyceae	Sponge	Bryozoa		
WQ1	23	6	-3.46	Flat	Fine/Course Sand	None	Sparse	Coral	Soft Corals	Bare	Sponge - erect				
WQ3	24	5.8	-3.34	Flat	Fine/Course Sand	None	Sparse - Low	Coral	Soft Corals	Sparse	Macroalgae - Phaeophyceae	Sponge - erect			
WQ2	25	5.7	-3.16	Flat	Fine/Course Sand	None	Sparse	Coral	Soft Corals	Bare	Macroalgae - Phaeophyceae				

Zone B

Site ID	Transect No:	Depth Onsite	Depth (LAT)	Relief	Substrate	Bedform	Cover	Dominant BCH	Taxa	Cover	Sub Dominant Taxa		
											1	2	3
NP2	B 1	0.50	2.45	Flat	Fine Sand - Shell	Slight Ripples	Bare	Unvegetated					
NP3	B 2	0.90	2.05	Flat	Fine Sand - Shell	Slight Ripples	Bare	Unvegetated					
NP4	B 3	1.10	1.80	Flat	Fine Sand - Shell	Ripples (<10cm parallel)	Bare	Unvegetated					
NP5	B 4	1.50	1.68	Flat	Course Sands	Ripples (<10cm parallel)	Low	Seagrass	Halophila ovalis	Low	Seagrass (syringodium)		
NP6	B 5	1.80	1.51	Flat	Fine Sand - Shell	Ripples (<10cm parallel)	Sparse	Seagrass	Halophila ovalis	Sparse	Seagrass (syringodium)		
NP7	B 6	2.10	1.36	Flat	Course Sands	Ripples (<10cm parallel)	Moderate	Seagrass	Halophila ovalis	Sparse	Seagrass (syringodium)		
NP8	B 7	2.30	1.15	Flat	Fine/Course Sand	Ripples (<10cm parallel)	Bare	Macroalgae	Chlorophyta	Bare	Seagrass (Halophila ovalis)	Seagrass (syringodium)	
NP9	B 8	2.40	1.25	Flat	Fine/Course Sand	Ripples (<10cm parallel)	Sparse	Macroalgae	Chlorophyta	Sparse	Seagrass (Halophila ovalis)	Motile Benthic Invertebrates (Echinoidea)	
NP10	B 9	2.80	0.68	Flat	Course Sands	Ripples (<10cm parallel)	Bare	Macroalgae	Chlorophyta	Bare	Macroalgae (Asparagopsis)	Macroalgae (Phaeophyceae)	Non Coral Invertebrates (Hydroids)
NP11	B 10	3.00	0.72	Flat	Fine/Course Sand	Ripples (<10cm parallel)	Bare	Non Coral Invertebrates	Hydroids	Bare			
NP12	B 11	3.30	0.53	Flat	Fine/Course Sand	Ripples (<10cm parallel)	Bare	Non Coral Invertebrates	Hydroids	Bare			
NP13	B 12	3.50	0.33	Flat	Fine/Course Sand	Ripples (<10cm uneven)	Bare	Non Coral Invertebrates	Hydroids	Bare	Macroalgae (Phaeophyceae)		
NP14	B 13	3.30	0.53	Flat	Course Sands	Ripples (<10cm uneven)	Sparse	Non Coral Invertebrates	Hydroids	Bare	Macroalgae (Phaeophyceae)		
NP15	B 14	3.30	0.61	Flat	Course Sands	Ripples (<10cm uneven)	Bare	Non Coral Invertebrates	Hydroids	Bare	Macroalgae (Rhodophyta)	Macroalgae (Phaeophyceae)	Non Coral Invertebrates (sponge - erect)
NP16	B 15	3.70	0.21	Flat	Fine/Course Sand	Ripples (<10cm uneven)	Bare	Non Coral Invertebrates	Hydroids	Bare			
NP17	B 16	4.10	-0.14	Flat	Course Sands	Ripples (<10cm uneven)	High	Non Coral Invertebrates	Hydroids	High	Non Coral Invertebrates (Hydroids)	Macroalgae (Phaeophyceae)	
A1	B 17	4.50	-0.52	Flat	Course Sands	None	Low - High	Non Coral Invertebrates	Hydroids	Low - High	Non Coral Invertebrates (Hydroids)	Non Coral Invertebrates (sponge - erect)	
A2	B 18	4.20	-0.37	Flat	Course Sands	None	Sparse - High	Non Coral Invertebrates	Hydroids	Moderate - High	Non Coral Invertebrates (sponge - erect)	Non Coral Invertebrates (Hydroids)	
A3	B 19	3.50	0.08	Flat	Course Sands	Ripples (<10cm parallel)	Bare - Low	Non Coral Invertebrates	Hydroids	Bare - Low	Non Coral Invertebrates (sponge - erect)	Non Coral Invertebrates (Hydroids)	
A4	B 20	3.10	0.14	Flat	Course Sands	Ripples (<10cm parallel)	Bare	Non Coral Invertebrates	Hydroids	Bare	Non Coral Invertebrates (Hydroids)	Non Coral Invertebrates (sponge - erect)	Non Coral Invertebrates (sponge - erect)
NP18	B 21	3.00	0.25	Flat	Course Sands	Ripples (<10cm parallel)	Sparse - Low	Non Coral Invertebrates	Hydroids	Sparse	Non Coral Invertebrates (Hydroids)	Motile Benthic invertebrates (Asteroidea)	Macroalgae (Phaeophyceae)
NP19	B 22	2.70	0.55	Flat	Course Sands	Ripples (<10cm parallel)	Bare - Sparse	Non Coral Invertebrates	Hydroids	Bare - Sparse	Non Coral Invertebrates (Hydroids)		
NP20	B 23	2.60	0.65	Flat	Course Sands	Ripples (<10cm parallel)	Bare	Non Coral Invertebrates	Hydroids	Bare	Seagrass (Halophila ovalis)		
NP21	B 24	3.00	0.38	Flat	Course Sands	Ripples (<10cm parallel)	Low	Seagrass	Halophila ovalis	Bare	Non Coral Invertebrates (Hydroids)	Non Coral Invertebrates (Hydroids)	
NP23	B 25	5.00	-1.42	Flat/Moderate	Course Sands	Ripples (<10cm parallel)	Sparse - Moderate	Non Coral Invertebrates	Hydroids	Sparse - Moderate	Non Coral Invertebrates (Hydroids)		
NP22	B 26	7.10	-3.61	Flat	Course Sands	None	Sparse - Moderate	Non Coral Invertebrates	Hydroids	Sparse - Moderate	Non Coral Invertebrates (Hydroids)	Non Coral Invertebrates (sponge - erect)	

Appendix C Depth Soundings

Zone A

Transect	Start										Finish												
	Waypoint	Longitude	Latitude	Depth (ft)	Depth (m)	Depth Onsite	Depth (LAT)	Mean Sea Level (+1.57 CD)	Date	Time	Waypoint	Longitude	Latitude	Depth (ft)	Depth (m)	Depth Onsite	Depth (LAT)	Mean Sea Level (+1.57 CD)	Date	Time	Tide		
1	347	S21°03.232'	E115°55.849'	5.25	1.600199998	1.7	0.19	1.76	9/03/2018	9:10	Transect cancelled										1.51		
2	348	S21°03.235'	E115°55.820'	5.48	1.670303997	1.6	0.08	1.65	9/03/2018	9:14	349	S21°03.257'	E115°55.763'	5.18	1.578864	1.6	0.08			1.65	9/03/2018	9:25	1.52
3	350	S21°04.262'	E115°55.663'	2.2	0.670559999	0.6	-0.96	0.61	9/03/2018	9:59	351	S21°04.284'	E115°55.678'	8.1	2.46888	0.6	-0.96			0.61	9/03/2018	10:02	1.56
4	352	S21°04.099'	E115°55.672'	2.92	0.890015999	0.9	-0.73	0.84	9/03/2018	10:08	353	S21°04.143'	E115°55.700'	2.56	0.780288	0.9	-0.73			0.84	9/03/2018	10:13	1.63
5	354	S21°03.976'	E115°55.683'	4.13	1.258823998	1.2	-0.43	1.14	9/03/2018	10:16	355	S21°04.026'	E115°55.707'	3.51	1.069848	1.2	-0.43			1.14	9/03/2018	10:20	1.63
6	356	S21°03.817'	E115°55.669'	6.73	2.051303997	2.1	0.38	1.95	9/03/2018	10:24	357	S21°03.859'	E115°55.699'	6.23	1.898904	2.1	0.38			1.95	9/03/2018	10:28	1.72
7	358	S21°03.707'	E115°55.626'	7.48	2.279903997	2.3	0.58	2.15	9/03/2018	10:30	359	S21°03.750'	E115°55.661'	7.48	2.279904	2.3	0.58			2.15	9/03/2018	10:34	1.72
8	360	S21°03.552'	E115°55.624'	7.94	2.420111996	2.4	0.68	2.25	9/03/2018	10:37	361	S21°03.587'	E115°55.653'	7.97	2.429256	2.4	0.68			2.25	9/03/2018	10:40	1.72
9	362	S21°03.441'	E115°55.631'	7.97	2.429255996	2.4	0.57	2.14	9/03/2018	10:43	363	S21°03.478'	E115°55.674'	7.97	2.429256	2.4	0.57			2.14	9/03/2018	10:46	1.83
10	364	S21°03.283'	E115°55.606'	7.12	2.170175997	2.3	0.47	2.04	9/03/2018	10:49	365	S21°03.334'	E115°55.644'	7.74	2.359152	2.3	0.47			2.04	9/03/2018	10:54	1.83
11	366	S21°03.171'	E115°55.597'	6.86	2.090927997	2.3	0.34	1.91	9/03/2018	10:57	367	S21°03.231'	E115°55.639'	7.35	2.24028	2.3	0.34			1.91	9/03/2018	11:02	1.96
12	368	S21°03.012'	E115°55.574'	7.25	2.209799997	2.1	-0.01	1.56	9/03/2018	11:18	369	S21°03.093'	E115°55.616'	6.73	2.051304	2.1	-0.01			1.56	9/03/2018	11:25	2.11
13	370	S21°02.829'	E115°55.544'	7.35	2.240279997	2.1	-0.01	1.56	9/03/2018	11:29	371	S21°02.921'	E115°55.579'	7.35	2.24028	2.1	-0.01			1.56	9/03/2018	11:36	2.11
14	372	S21°02.600'	E115°55.524'	8.92	2.718815996	2.6	0.33	1.9	9/03/2018	11:46	373	S21°02.698'	E115°55.591'	7.97	2.429256	2.6	0.33			1.9	9/03/2018	11:53	2.27
15	374	S21°02.460'	E115°55.524'	15.98	4.870703993	5.3	2.87	4.44	9/03/2018	12:02	375	S21°02.521'	E115°55.560'	12.86	3.919728	3.8	1.37			2.94	9/03/2018	12:06	2.43
16	376	S21°02.236'	E115°55.480'	20.21	6.160007991	6.2	3.59	5.16	9/03/2018	12:13	377	S21°02.350'	E115°55.533'	18.6	5.66928	5.7	3.09			4.66	9/03/2018	12:19	2.61
17	488	S21°02.230'	E115°55.527'	19.36	5.900927991	6	3.46	5.03	14/03/2018	13:41	489	S21°02.223'	E115°55.575'	18.21	5.550408	6	3.46			5.03	14/03/2018	13:44	2.54
18	490	S21°02.217'	E115°55.531'	19.39	5.910071991	5.7	3.16	4.73	14/03/2018	13:48	491	S21°02.212'	E115°55.576'	18.34	5.590032	5.7	3.16			4.73	14/03/2018	13:50	2.54
19	492	S21°02.226'	E115°55.488'	19.36	5.900927991	5.8	3.34	4.91	14/03/2018	13:55	493	S21°02.219'	E115°55.540'	18.9	5.76072	5.8	3.34			4.91	14/03/2018	13:58	2.46
20	494	S21°02.241'	E115°55.507'	18.41	5.611367991	5.8	3.34	4.91	14/03/2018	14:01	495	S21°02.236'	E115°55.548'	17.72	5.401056	5.8	3.34			4.91	14/03/2018	14:04	2.46
21	499	S21°02.237'	E115°55.519'	0	0	5.6	3.22	4.79	14/03/2018	14:14	498	S21°02.228'	E115°55.582'	0	0	5.6	3.22			4.79	14/03/2018	14:12	2.38
22	500	S21°02.262'	E115°55.521'	18.04	5.498591992	5.4	3.02	4.59	14/03/2018	14:18	501	S21°02.253'	E115°55.580'	17.59	5.361432	5.4	3.02			4.59	14/03/2018	14:21	2.38
23	502	S21°02.303'	E115°55.529'	17.52	5.340095992	5.3	2.92	4.49	14/03/2018	14:26	503	S21°02.294'	E115°55.590'	17.52	5.340096	5.3	2.92			4.49	14/03/2018	14:29	2.38
24	504	S21°02.381'	E115°55.505'	16.86	5.138927992	5.1	2.79	4.36	14/03/2018	14:33	505	S21°02.359'	E115°55.580'	16.86	5.138928	5.1	2.79			4.36	14/03/2018	14:37	2.31
25	508	S21°02.399'	E115°55.514'	17.09	5.209031992	5	2.75	4.32	14/03/2018	14:44	507	S21°02.379'	E115°55.584'	16.9	5.15112	5	2.75			4.32	14/03/2018	14:48	2.25
26	508	S21°02.437'	E115°55.536'	15.98	4.870703993	4.7	2.45	4.02	14/03/2018	14:55	509	S21°02.422'	E115°55.595'	15.35	4.67868	4.7	2.45			4.02	14/03/2018	14:58	2.25
27	510	S21°02.560'	E115°55.497'	8.5	2.590799996	3	0.8	2.37	14/03/2018	15:03	511	S21°02.523'	E115°55.597'	11.91	3.630168	3.4	1.2			2.77	14/03/2018	15:09	2.2

Zone B

Transect	Start										Finish										Tide
	Waypoint	Longitude	Latitude	Depth (ft)	Depth (m)	Depth Onsite	Depth (LAT)	Mean Sea Level (+1.57 CD)	Date	Time	Waypoint	Longitude	Latitude	Depth (ft)	Depth (m)	Depth Onsite	Depth (LAT)	Mean Sea Level (+1.57 CD)	Date	Time	
1	308	S21°05'.564'	E115°54.340'	1.87	0.569975999	0.5	-2.450024	-0.880024001	8/03/2018	12:22	309	S21°05'.593'	E115°54.327'	1.8	0.54864	0.5	-2.47136	-0.901360001	8/03/2018	12:26	3.02
2	310	S21°05'.534'	E115°54.174'	3.18	0.969263999	0.9	-2.050736	-0.480736001	8/03/2018	12:32	311	S21°05'.568'	E115°54.185'	2.92	0.890016	0.9	-2.129984	-0.559984001	8/03/2018	12:33	3.02
3	312	S21°05'.527'	E115°54.041'	4	1.219199998	1.1	-1.8008	-0.230800002	8/03/2018	12:38	313	S21°05'.571'	E115°54.052'	3.94	1.200912	1.1	-1.819088	-0.249088002	8/03/2018	12:40	3.02
4	314	S21°05'.513'	E115°53.860'	5.05	1.539239998	1.5	-1.68076	-0.110760002	8/03/2018	12:46	315	S21°05'.581'	E115°53.857'	4.49	1.368552	1.5	-1.851448	-0.281448002	8/03/2018	12:49	3.22
5	316	S21°05'.537'	E115°53.758'	5.61	1.709927997	1.8	-1.510072	0.059927997	8/03/2018	12:54	317	S21°05'.599'	E115°53.752'	5.41	1.648968	1.8	-1.571032	-0.001032003	8/03/2018	12:57	3.22
6	318	S21°05'.515'	E115°53.584'	6.73	2.051303997	2.1	-1.358696	0.211303997	8/03/2018	13:03	319	S21°05'.589'	E115°53.577'	6.69	2.039112	2.1	-1.370888	0.199111997	8/03/2018	13:06	3.41
7	320	S21°05'.531'	E115°53.437'	7.41	2.258567997	2.3	-1.151432	0.418567997	8/03/2018	13:12	Missed entering waypoint										3.41
8	321	S21°05'.522'	E115°53.322'	7.61	2.319527996	2.4	-1.250472	0.319527996	8/03/2018	13:20	322	S21°05'.595'	E115°53.312'	0.69	0.210312	2.4	-3.359688	-1.789688	8/03/2018	13:23	3.57
9	323	S21°05'.526'	E115°53.148'	9.48	2.889503996	2.8	-0.680496	0.889503996	8/03/2018	13:29	324	S21°05'.583'	E115°53.135'	7.68	2.340864	2.8	-1.229136	0.340863996	8/03/2018	13:32	3.57
10	325	S21°05'.520'	E115°53.002'	0	0	3	-0.72	0.85	8/03/2018	13:38	326	S21°05'.590'	E115°52.991'	9.88	3.011424	3	-0.708576	0.861423995	8/03/2018	13:42	3.72
11	327	S21°05'.527'	E115°52.873'	10.79	3.288791995	3.3	-0.53	1.04	8/03/2018	13:52	328	S21°05'.587'	E115°52.864'	10.37	3.160776	3.3	-0.669224	0.900775995	8/03/2018	13:56	3.83
12	329	S21°05'.532'	E115°52.711'	10.99	3.349751995	3.5	-0.33	1.24	8/03/2018	14:00	330	S21°05'.595'	E115°52.703'	10.86	3.310128	3.5	-0.519872	1.050127995	8/03/2018	14:02	3.83
13	331	S21°05'.529'	E115°52.591'	10.93	3.331463995	3.3	-0.53	1.04	8/03/2018	14:07	332	S21°05'.601'	E115°52.576'	11.06	3.371088	3.3	-0.458912	1.111087995	8/03/2018	14:10	3.83
14	333	S21°05'.514'	E115°52.471'	11.35	3.459479995	3.3	-0.61	0.96	8/03/2018	14:14	334	S21°05'.601'	E115°52.443'	11.22	3.419856	3.3	-0.490144	1.079855995	8/03/2018	14:18	3.91
15	335	S21°05'.512'	E115°52.321'	13.02	3.968495994	3.7	-0.21	1.36	8/03/2018	14:24	336	S21°05'.594'	E115°52.295'	1.61	0.490728	3.7	-3.419272	-1.849272001	8/03/2018	14:27	3.91
16	337	S21°05'.490'	E115°52.144'	12.6	3.840479994	4.1	0.14	1.71	8/03/2018	14:33	338	S21°05'.584'	E115°52.104'	12.4	3.77952	4.1	-0.18048	1.389519994	8/03/2018	14:37	3.96
17	339	S21°05'.295'	E115°52.022'	15.22	4.639055993	4.5	0.52	2.09	8/03/2018	15:03	340	S21°05'.766'	E115°51.888'	0	0	3.3	-0.68	0.89	8/03/2018	15:41	3.98
18	341	S21°05'.354'	E115°51.897'	14.34	4.370831993	4.2	0.37	1.94	8/03/2018	15:43	342	S21°05'.666'	E115°51.850'	10.73	3.270504	3.5	-0.559496	1.010503995	8/03/2018	16:05	3.83
19	343	S21°05'.360'	E115°51.753'	11.84	3.608831995	3.5	-0.08	1.49	8/03/2018	16:21	344	S21°05'.695'	E115°51.698'	10.24	3.121152	3.5	-0.458848	1.111151995	8/03/2018	16:47	3.58
20	345	S21°05'.360'	E115°51.635'	10.5	3.200399995	3.1	-0.14	1.43	8/03/2018	16:58	346	S21°05'.594'	E115°51.627'	9.12	2.779776	3.1	-0.460224	1.109775996	8/03/2018	17:22	3.24
21	394	S21°05'.454'	E115°51.468'	0	0	3	-0.25	1.32	9/03/2018	13:23	395	S21°05'.542'	E115°51.541'	0	0	2.2	-1.05	0.52	9/03/2018	13:23	3.25
22	396	S21°05'.467'	E115°51.241'	8.73	2.660903996	2.7	-0.55	1.02	9/03/2018	13:27	397	S21°05'.544'	E115°51.288'	8.99	2.740152	2.7	-0.509848	1.060151996	9/03/2018	13:32	3.25
23	398	S21°05'.471'	E115°51.061'	8.3	2.529839996	2.6	-0.65	0.92	9/03/2018	13:35	399	S21°05'.532'	E115°51.113'	7.74	2.359152	2.6	-0.890848	0.679151996	9/03/2018	13:40	3.25
24	400	S21°05'.492'	E115°50.924'	10.24	3.121151995	3	-0.38	1.19	9/03/2018	13:44	401	S21°05'.560'	E115°50.970'	9.91	3.020568	3	-0.359432	1.210567995	9/03/2018	13:49	3.38
25	402	S21°05'.490'	E115°50.786'	23.39	7.129271989	7.1	3.61	5.18	9/03/2018	13:52	403	S21°05'.655'	E115°50.859'	18.41	5.611368	5.5	2.12136799	3.691367991	9/03/2018	14:03	3.49
26	404	S21°05'.528'	E115°50.881'	16.8	5.120639992	5	1.42	2.99	9/03/2018	14:11	405	S21°05'.565'	E115°50.896'	13.16	4.011168	4	0.43116799	2.001167994	9/03/2018	14:13	3.58

Transects 1 to 2

Transect	Date	Time	Depth Onsite	Waypoint	Longitude	Latitude	Depth (ft)	Depth (m)	Depth LAT	Mean Sea Level (+1.57 CD)	Tide
1	9/03/2018	12:46	3.2	379	S21°03.212'	E115°55.447'	10.24	3.121152	0.181151995	1.751151995	2.94
1	9/03/2018	12:47	3.6	380	S21°03.356'	E115°55.200'	12.04	3.669792	0.729791994	2.299791994	2.94
1	9/03/2018	12:49	4.3	381	S21°03.502'	E115°54.950'	14.47	4.410456	1.470455993	3.040455993	2.94
1	9/03/2018	12:50	4.8	382	S21°03.629'	E115°54.707'	16.11	4.910328	1.970327993	3.540327993	2.94
1	9/03/2018	12:51	4.8	383	S21°03.803'	E115°54.480'	15.85	4.83108	1.891079993	3.461079993	2.94
1	9/03/2018	12:52	4.8	384	S21°03.931'	E115°54.227'	15.78	4.809744	1.869743993	3.439743993	2.94
1	9/03/2018	12:52	4.6	385	S21°04.092'	E115°53.996'	14.93	4.550664	1.610663993	3.180663993	2.94
1	9/03/2018	12:53	4.1	386	S21°04.248'	E115°53.763'	13.22	4.029456	1.089455994	2.659455994	2.94
1	9/03/2018	12:54	2.7	387	S21°04.370'	E115°53.500'	8.73	2.660904	-0.279096004	1.290903996	2.94
1	9/03/2018	12:55	3.7	388	S21°04.522'	E115°53.261'	11.91	3.630168	0.690167994	2.260167994	2.94
1	9/03/2018	12:56	4	389	S21°04.674'	E115°53.024'	12.86	3.919728	0.979727994	2.549727994	2.94
1	9/03/2018	12:57	3.6	390	S21°04.837'	E115°52.793'	11.48	3.499104	0.559103995	2.129103995	2.94
1	9/03/2018	12:58	3.2	391	S21°04.983'	E115°52.553'	10.66	3.249168	0.309167995	1.879167995	2.94
1	9/03/2018	12:59	3.4	392	S21°05.147'	E115°52.309'	11.48	3.499104	0.559103995	2.129103995	2.94
1	9/03/2018	13:01	3.6	A2	S21°05.267'	E115°52.067'	0.56	0.170688	-3.239312	-1.669312	3.41
2	9/03/2018	14:40	2.9	406	S21°05.405'	E115°51.050'	10.04	3.060192	-0.589808005	0.980191995	3.65
2	9/03/2018	14:41	3.1	407	S21°05.289'	E115°51.313'	10.5	3.2004	-0.449600005	1.120399995	3.65
2	9/03/2018	14:42	3.2	408	S21°05.121'	E115°51.542'	10.3	3.13944	-0.510560005	1.059439995	3.65
2	9/03/2018	14:43	4.1	409	S21°04.979'	E115°51.789'	13.48	4.108704	0.458703994	2.028703994	3.65
2	9/03/2018	14:44	4.5	410	S21°04.811'	E115°52.022'	15.22	4.639056	0.989055993	2.559055993	3.65
2	9/03/2018	14:45	5	411	S21°04.645'	E115°52.253'	16.4	4.99872	1.348719992	2.918719992	3.65
2	9/03/2018	14:46	5.2	412	S21°04.500'	E115°52.488'	16.27	4.959096	1.309095992	2.879095992	3.65
2	9/03/2018	14:47	5.3	413	S21°04.354'	E115°52.736'	17.29	5.269992	1.619991992	3.189991992	3.65
2	9/03/2018	14:48	5.6	414	S21°04.189'	E115°52.980'	18.9	5.76072	2.110719991	3.680719991	3.65
2	9/03/2018	14:49	6.3	415	S21°04.040'	E115°53.194'	20.28	6.181344	2.531343991	4.101343991	3.65
2	9/03/2018	14:50	6.2	416	S21°03.876'	E115°53.426'	20.05	6.11124	2.461239991	4.031239991	3.65
2	9/03/2018	14:51	6.2	417	S21°03.729'	E115°53.667'	19.98	6.089904	2.439903991	4.009903991	3.65
2	9/03/2018	14:52	5.9	418	S21°03.529'	E115°53.889'	18.9	5.76072	2.110719991	3.680719991	3.65
2	9/03/2018	14:53	5.2	419	S21°03.382'	E115°54.110'	17.98	5.480304	1.830303992	3.400303992	3.65
2	9/03/2018	14:54	5.2	420	S21°03.245'	E115°54.356'	16.54	5.041392	1.391391992	2.961391992	3.65
2	9/03/2018	14:55	4.6	421	S21°03.114'	E115°54.620'	15.35	4.67868	1.028679993	2.598679993	3.65
2	9/03/2018	14:56	4.7	422	S21°02.952'	E115°54.854'	15.29	4.660392	1.010391993	2.580391993	3.65
2	9/03/2018	14:56	5	423	S21°02.774'	E115°55.063'	15.58	4.748784	1.098783993	2.668783993	3.65
2	9/03/2018	14:57	4.5	424	S21°02.629'	E115°55.304'	14.6	4.45008	0.800079993	2.370079993	3.65

Transects 3 to 7

Transect	Date	Time	Depth Onsite	Waypoint	Longitude	Latitude	Depth (ft)	Depth (m)	Depth LAT	Mean Sea Level (+1.57 CD)	Tide
3	9/03/2018	15:05	7.3	426	S21°02.498'	E115°54.898'	23.52	7.168896	3.478895989	5.048895989	3.69
3	9/03/2018	15:07	7.2	427	S21°02.517'	E115°54.596'	23.33	7.110984	3.420983989	4.990983989	3.69
3	9/03/2018	15:08	7.5	428	S21°02.530'	E115°54.318'	24.77	7.549896	3.859895989	5.429895989	3.69
3	9/03/2018	15:09	6.4	429	S21°02.538'	E115°54.024'	21.33	6.501384	2.81138399	4.38138399	3.69
3	9/03/2018	15:10	6	430	S21°02.534'	E115°53.733'	19.72	6.010656	2.320655991	3.890655991	3.69
3	9/03/2018	15:11	4.5	431	S21°02.541'	E115°53.440'	14.86	4.529328	0.839327993	2.409327993	3.69
3	9/03/2018	15:12	5	432	S21°02.552'	E115°53.153'	16.21	4.940808	1.250807992	2.820807992	3.69
3	9/03/2018	15:13	5.2	433	S21°02.564'	E115°52.863'	16.86	5.138928	1.448927992	3.018927992	3.69
3	9/03/2018	15:14	5	425	S21°02.574'	E115°52.579'	0	0	1.31	2.88	3.69
4	9/03/2018	15:21	5	435	S21°02.445'	E115°52.842'	15.85	4.83108	1.131079993	2.701079993	3.7
4	9/03/2018	15:22	6.3	436	S21°02.325'	E115°53.103'	20.08	6.120384	2.420383991	3.990383991	3.7
4	9/03/2018	15:23	7	437	S21°02.238'	E115°53.379'	22.97	7.001256	3.301255989	4.871255989	3.7
4	9/03/2018	15:24	7.2	438	S21°02.092'	E115°53.692'	22.7	6.91896	3.218959989	4.788959989	3.7
4	9/03/2018	15:25	7.1	439	S21°02.000'	E115°53.900'	23.72	7.229856	3.529855989	5.099855989	3.7
4	9/03/2018	15:26	7.6	440	S21°01.873'	E115°54.140'	23.88	7.278624	3.578623989	5.148623989	3.7
4	9/03/2018	15:27	7.9	441	S21°01.743'	E115°54.428'	25.39	7.738872	4.038871988	5.608871988	3.7
4	9/03/2018	15:28	7	442	S21°01.652'	E115°54.673'	23.52	7.168896	3.468895989	5.038895989	3.7
4	9/03/2018	15:29	7.1	443	S21°01.519'	E115°54.935'	23.03	7.019544	3.319543989	4.889543989	3.7
4	9/03/2018	15:30	6.8	444	S21°01.393'	E115°55.176'	22.41	6.830568	3.13056799	4.70056799	3.7
4	9/03/2018	15:31	7.2	445	S21°01.281'	E115°55.440'	24.15	7.360692	3.660919989	5.230919989	3.7
4	9/03/2018	15:32	6.8	434	S21°01.152'	E115°55.689'	0	0	3.1	4.67	3.7
5	9/03/2018	15:36	6.7	447	S21°01.045'	E115°55.468'	21.72	6.620256	2.92025599	4.49025599	3.7
5	9/03/2018	15:38	6.9	448	S21°00.884'	E115°55.229'	22.77	6.940296	3.240295989	4.810295989	3.7
5	9/03/2018	15:39	7.6	449	S21°00.733'	E115°54.961'	24.41	7.440168	3.740167989	5.310167989	3.7
5	9/03/2018	15:41	7.6	450	S21°00.643'	E115°54.714'	24.7	7.52856	3.838559989	5.408559989	3.69
5	9/03/2018	15:42	7.2	451	S21°00.517'	E115°54.457'	23.39	7.129272	3.439271989	5.009271989	3.69
5	9/03/2018	15:44	7.4	452	S21°00.373'	E115°54.217'	23.72	7.229856	3.539855989	5.109855989	3.69
5	9/03/2018	15:45	7.2	453	S21°00.244'	E115°53.962'	23.52	7.168896	3.478895989	5.048895989	3.69
5	9/03/2018	15:47	7	446	S21°00.103'	E115°53.718'	0	0	3.31	4.88	3.69
6	9/03/2018	15:50	7	455	S20°59.926'	E115°53.919'	24.57	7.488936	3.798935989	5.368935989	3.69
6	9/03/2018	15:51	7.2	456	S20°59.792'	E115°54.178'	23.95	7.29996	3.609959989	5.179959989	3.69
6	9/03/2018	15:52	8.2	457	S20°59.640'	E115°54.416'	26.28	8.010144	4.320143988	5.890143988	3.69
6	9/03/2018	15:53	9.1	458	S20°59.477'	E115°54.642'	29.76	9.070848	5.380847986	6.950847986	3.69
6	9/03/2018	15:54	9.6	459	S20°59.348'	E115°54.903'	31.63	9.640824	5.950823985	7.520823985	3.69
6	9/03/2018	15:55	9.5	460	S20°59.219'	E115°55.149'	31.4	9.57072	5.880719985	7.450719985	3.69
6	9/03/2018	15:56	9.5	461	S20°59.075'	E115°55.397'	32.25	9.8298	6.139799985	7.709799985	3.69
6	9/03/2018	15:57	10	462	S20°58.928'	E115°55.668'	31.82	9.698736	6.008735985	7.578735985	3.69
6	9/03/2018	15:58	9.9	463	S20°58.775'	E115°55.877'	31.5	9.6012	5.911199985	7.481199985	3.69
6	9/03/2018	15:59	9.9	464	S20°58.634'	E115°56.132'	32.38	9.869424	6.179423985	7.749423985	3.69
6	9/03/2018	16:00	9.7	465	S20°58.472'	E115°56.352'	31.07	9.470136	5.820135986	7.390135986	3.65
6	9/03/2018	16:01	10.2	454	S20°58.330'	E115°56.590'	0	0	6.55	8.12	3.65
7	9/03/2018	16:05	10.6	466	S20°58.605'	E115°56.585'	34.51	10.51865	6.868647984	8.438647984	3.65
7	9/03/2018	16:06	9.9	467	S20°58.933'	E115°56.490'	32.25	9.8298	6.179799985	7.749799985	3.65
7	9/03/2018	16:07	8.1	468	S20°59.125'	E115°56.436'	26.15	7.97052	4.320519988	5.890519988	3.65
7	9/03/2018	16:08	7.7	469	S20°59.405'	E115°56.359'	25.46	7.760208	4.110207988	5.680207988	3.65
7	9/03/2018	16:09	6.9	470	S20°59.647'	E115°56.265'	22.41	6.830568	3.18056799	4.75056799	3.65
7	9/03/2018	16:10	8.1	471	S20°59.893'	E115°56.155'	26.64	8.119872	4.469871988	6.039871988	3.65
7	9/03/2018	16:11	8.5	472	S21°00.202'	E115°56.104'	27.66	8.430768	4.780767987	6.350767987	3.65
7	9/03/2018	16:12	7.5	473	S21°00.420'	E115°56.023'	24.97	7.610856	3.960855988	5.530855988	3.65
7	9/03/2018	16:13	6.4	474	S21°00.684'	E115°55.928'	21.03	6.409944	2.75994399	4.32994399	3.65
7	9/03/2018	16:14	6.8	475	S21°01.004'	E115°55.819'	22.77	6.940296	3.290295989	4.860295989	3.65
7	9/03/2018	16:15	7	476	S21°01.252'	E115°55.792'	21.78	6.638544	2.98854399	4.55854399	3.65
7	9/03/2018	16:16	6.5	477	S21°01.482'	E115°55.742'	21.46	6.541008	2.89100799	4.46100799	3.65
7	9/03/2018	16:17	7.1	478	S21°01.719'	E115°55.634'	23.16	7.059168	3.409167989	4.979167989	3.65
7	9/03/2018	16:18	7.7	479	S21°01.982'	E115°55.560'	25.89	7.891272	4.241271988	5.811271988	3.65
7	9/03/2018	16:18	6.8	480	S21°15.186'	E115°46.321'			3.15	4.72	3.65

Transect 8

Transect	Date	Time	Depth Onsite	Waypoint	Longitude	Latitude	Depth (ft)	Depth (m)	Depth LAT	Mean Sea Level (+1.57 CD)	Tide
8	14/03/2018	15:32	5.7	512	S21°02.176'	E115°55.534'	18.9	5.76072	3.600719991	5.170719991	2.16
8	14/03/2018	15:33	6.1	513	S21°02.144'	E115°55.539'	19.23	5.861304	3.701303991	5.271303991	2.16
8	14/03/2018	15:34	6.2	514	S21°02.093'	E115°55.539'	19.91	6.068568	3.908567991	5.478567991	2.16
8	14/03/2018	15:35	6.2	515	S21°02.038'	E115°55.545'	20.77	6.330696	4.17069599	5.74069599	2.16
8	14/03/2018	15:36	6.2	516	S21°01.985'	E115°55.544'	20.34	6.199632	4.039631991	5.609631991	2.16
8	14/03/2018	15:36	6	517	S21°01.931'	E115°55.548'	19.98	6.089904	3.929903991	5.499903991	2.16
8	14/03/2018	15:37	5.9	518	S21°01.877'	E115°55.541'	19.46	5.931408	3.771407991	5.341407991	2.16
8	14/03/2018	15:38	5.8	519	S21°01.821'	E115°55.549'	18.83	5.739384	3.579383991	5.149383991	2.16
8	14/03/2018	15:39	5.5	520	S21°01.767'	E115°55.541'	17.65	5.37972	3.249719992	4.819719992	2.13
8	14/03/2018	15:39	5.4	521	S21°01.712'	E115°55.528'	17.65	5.37972	3.249719992	4.819719992	2.13
8	14/03/2018	15:40	5.2	522	S21°01.661'	E115°55.520'	17.16	5.230368	3.100367992	4.670367992	2.13
8	14/03/2018	15:42	5.2	523	S21°01.549'	E115°55.504'	16.86	5.138928	3.008927992	4.578927992	2.13
8	14/03/2018	15:42	5	524	S21°01.476'	E115°55.525'	16.34	4.980432	2.850431992	4.420431992	2.13
8	14/03/2018	15:43	4.8	525	S21°01.420'	E115°55.532'	15.78	4.809744	2.679743993	4.249743993	2.13
8	14/03/2018	15:43	5	526	S21°01.366'	E115°55.522'	16.27	4.959096	2.829095992	4.399095992	2.13
8	14/03/2018	15:44	5.2	527	S21°01.313'	E115°55.511'	16.96	5.169408	3.039407992	4.609407992	2.13
8	14/03/2018	15:44	5.2	528	S21°01.257'	E115°55.507'	17.42	5.309616	3.179615992	4.749615992	2.13
8	14/03/2018	15:44	5	529	S21°01.203'	E115°55.511'	16.17	4.928616	2.798615993	4.368615993	2.13
8	14/03/2018	15:45	5.3	530	S21°01.148'	E115°55.516'	16.96	5.169408	3.039407992	4.609407992	2.13
8	14/03/2018	15:45	5.3	531	S21°01.095'	E115°55.514'	17.29	5.269992	3.139991992	4.709991992	2.13
8	14/03/2018	15:45	5	532	S21°01.035'	E115°55.502'	16.54	5.041392	2.911391992	4.481391992	2.13
8	14/03/2018	15:45	5.2	533	S21°00.986'	E115°55.508'	16.9	5.15112	3.021119992	4.591119992	2.13
8	14/03/2018	15:46	5	534	S21°00.935'	E115°55.508'	16.27	4.959096	2.829095992	4.399095992	2.13
8	14/03/2018	15:46	5.1	535	S21°00.878'	E115°55.504'	16.67	5.081016	2.951015992	4.521015992	2.13
8	14/03/2018	15:47	5.2	536	S21°00.821'	E115°55.495'	16.9	5.15112	3.021119992	4.591119992	2.13
8	14/03/2018	15:47	5.2	537	S21°00.772'	E115°55.480'	16.96	5.169408	3.039407992	4.609407992	2.13
8	14/03/2018	15:47	5.6	538	S21°00.719'	E115°55.475'	18.67	5.690616	3.560615991	5.130615991	2.13
8	14/03/2018	15:47	5.8	539	S21°00.667'	E115°55.474'	18.73	5.708904	3.578903991	5.148903991	2.13
8	14/03/2018	15:48	5.7	540	S21°00.610'	E115°55.478'	18.67	5.690616	3.560615991	5.130615991	2.13
8	14/03/2018	15:48	6	541	S21°00.557'	E115°55.481'	19.52	5.949696	3.819695991	5.389695991	2.13
8	14/03/2018	15:48	6.1	542	S21°00.502'	E115°55.480'	20.05	6.11124	3.981239991	5.551239991	2.13
8	14/03/2018	15:48	6.1	543	S21°00.448'	E115°55.488'	20.05	6.11124	3.981239991	5.551239991	2.13
8	14/03/2018	15:49	5.8	544	S21°00.392'	E115°55.483'	19.03	5.800344	3.670343991	5.240343991	2.13
8	14/03/2018	15:49	5.4	545	S21°00.341'	E115°55.478'	17.49	5.330952	3.200951992	4.770951992	2.13
8	14/03/2018	15:49	5.7	546	S21°00.286'	E115°55.479'	18.77	5.721096	3.591095991	5.161095991	2.13
8	14/03/2018	15:50	6.2	547	S21°00.232'	E115°55.473'	20.54	6.260592	4.13059199	5.70059199	2.13
8	14/03/2018	15:50	6.8	548	S21°00.176'	E115°55.472'	21.95	6.69036	4.56035999	6.13035999	2.13
8	14/03/2018	15:51	6.8	549	S21°00.119'	E115°55.467'	22.64	6.900672	4.770671799	6.340671799	2.13
8	14/03/2018	15:51	6.4	550	S21°00.066'	E115°55.465'	20.96	6.388608	4.25860799	5.82860799	2.13
8	14/03/2018	15:51	6.3	551	S21°00.016'	E115°55.465'	20.54	6.260592	4.13059199	5.70059199	2.13
8	14/03/2018	15:51	6	552	S20°59.964'	E115°55.464'	19.78	6.028944	3.898943991	5.468943991	2.13
8	14/03/2018	15:52	6	553	S20°59.909'	E115°55.460'	19.59	5.971032	3.841031991	5.411031991	2.13
8	14/03/2018	15:52	5.9	554	S20°59.855'	E115°55.459'	19.46	5.931408	3.801407991	5.371407991	2.13
8	14/03/2018	15:52	5.8	555	S20°59.801'	E115°55.463'	18.9	5.76072	3.630719991	5.200719991	2.13
8	14/03/2018	15:53	5.6	556	S20°59.746'	E115°55.461'	18.47	5.629656	3.499655991	5.069655991	2.13
8	14/03/2018	15:53	5.4	557	S20°59.692'	E115°55.447'	18.04	5.498592	3.368591992	4.938591992	2.13
8	14/03/2018	15:53	3.8	558	S20°59.640'	E115°55.440'	12.47	3.800856	1.670855994	3.240855994	2.13
8	14/03/2018	15:54	4.3	559	S20°59.583'	E115°55.429'	13.98	4.261104	2.131103994	3.701103994	2.13
8	14/03/2018	15:54	5.2	560	S20°59.528'	E115°55.415'	16.67	5.081016	2.951015992	4.521015992	2.13
8	14/03/2018	15:54	5.8	561	S20°59.476'	E115°55.414'	18.96	5.779008	3.649007991	5.219007991	2.13
8	14/03/2018	15:55	6.2	562	S20°59.423'	E115°55.425'	20.9	6.37032	4.24031999	5.81031999	2.13
8	14/03/2018	15:55	6.6	563	S20°59.369'	E115°55.439'	21.46	6.541008	4.41100799	5.98100799	2.13
8	14/03/2018	15:55	6.2	564	S20°59.312'	E115°55.445'	20.08	6.120384	3.990383991	5.560383991	2.13

Transect	Date	Time	Depth Onsite	Waypoint	Longitude	Latitude	Depth (ft)	Depth (m)	Depth LAT	Mean Sea Level (+1.57 CD)	Tide
8	14/03/2018	15:56	6.4	565	S20°59.260'	E115°55.440'	20.67	6.300216	4.19021599	5.76021599	2.11
8	14/03/2018	15:56	6.5	566	S20°59.207'	E115°55.436'	21.78	6.638544	4.52854399	6.09854399	2.11
8	14/03/2018	15:56	7.5	567	S20°59.154'	E115°55.436'	24.77	7.549896	5.439895989	7.009895989	2.11
8	14/03/2018	15:57	7.7	568	S20°59.100'	E115°55.434'	25.1	7.65048	5.540479988	7.110479988	2.11
8	14/03/2018	15:57	7.8	569	S20°59.046'	E115°55.431'	25.46	7.760208	5.650207988	7.220207988	2.11
8	14/03/2018	15:57	7.4	570	S20°58.989'	E115°55.428'	24.41	7.440168	5.330167989	6.900167989	2.11
8	14/03/2018	15:57	6.9	571	S20°58.937'	E115°55.424'	22.7	6.91896	4.808959989	6.378959989	2.11
8	14/03/2018	15:58	6.9	572	S20°58.883'	E115°55.424'	22.34	6.809232	4.69923199	6.26923199	2.11
8	14/03/2018	15:58	7.2	573	S20°58.842'	E115°55.416'	23.52	7.168896	5.058895989	6.628895989	2.11
8	14/03/2018	15:59	7.7	574	S20°58.776'	E115°55.403'	25.26	7.699248	5.589247988	7.159247988	2.11
8	14/03/2018	15:59	7.7	575	S20°58.716'	E115°55.392'	25.39	7.738872	5.628871988	7.198871988	2.11
8	14/03/2018	15:59	7.3	576	S20°58.666'	E115°55.385'	24.08	7.339584	5.229583989	6.799583989	2.11
8	14/03/2018	15:59	6.8	577	S20°58.615'	E115°55.380'	22.47	6.848856	4.73885599	6.30885599	2.11
8	14/03/2018	16:00	6.5	578	S20°58.563'	E115°55.380'	21.59	6.580632	4.47063199	6.04063199	2.11
8	14/03/2018	16:00	6.2	579	S20°58.505'	E115°55.383'	20.6	6.27888	4.16887999	5.73887999	2.11
8	14/03/2018	16:00	6.5	580	S20°58.450'	E115°55.393'	21.39	6.519672	4.40967199	5.97967199	2.11
8	14/03/2018	16:01	7.2	581	S20°58.398'	E115°55.407'	23.39	7.129272	5.019271989	6.589271989	2.11
8	14/03/2018	16:01	7.5	582	S20°58.342'	E115°55.412'	24.64	7.510272	5.400271989	6.970271989	2.11
8	14/03/2018	16:01	6.9	583	S20°58.289'	E115°55.414'	22.7	6.91896	4.808959989	6.378959989	2.11
8	14/03/2018	16:02	6.7	584	S20°58.233'	E115°55.407'	21.78	6.638544	4.52854399	6.09854399	2.11
8	14/03/2018	16:02	7	585	S20°58.181'	E115°55.399'	22.47	6.848856	4.73885599	6.30885599	2.11
8	14/03/2018	16:02	7.3	586	S20°58.128'	E115°55.387'	24.21	7.379208	5.269207989	6.839207989	2.11
8	14/03/2018	16:03	7.8	587	S20°58.077'	E115°55.357'	25.66	7.821168	5.711167988	7.281167988	2.11
8	14/03/2018	16:03	7.6	588	S20°58.014'	E115°55.337'	25.13	7.659624	5.549623988	7.119623988	2.11
8	14/03/2018	16:03	8.2	589	S20°57.966'	E115°55.340'	26.57	8.098536	5.988535988	7.558535988	2.11
8	14/03/2018	16:04	8.8	590	S20°57.909'	E115°55.344'	28.84	8.790432	6.680431987	8.250431987	2.11
8	14/03/2018	16:04	8.8	592	S20°57.860'	E115°55.340'	29.4	8.96112	6.851119986	8.421119986	2.11
8	14/03/2018	16:04	8.8	593	S20°57.858'	E115°55.339'	28.77	8.769096	6.659095987	8.229095987	2.11
8	14/03/2018	16:05	9.6	594	S20°57.802'	E115°55.327'	28.94	8.820912	6.710911987	8.280911987	2.11
8	14/03/2018	16:05	9.7	595	S20°57.756'	E115°55.317'	31.4	9.57072	7.460719985	9.030719985	2.11
8	14/03/2018	16:05	9.5	596	S20°57.699'	E115°55.330'	31.63	9.640824	7.530823985	9.100823985	2.11
8	14/03/2018	16:06	9.6	597	S20°57.644'	E115°55.335'	31.63	9.640824	7.530823985	9.100823985	2.11
8	14/03/2018	16:06	9.7	598	S20°57.591'	E115°55.331'	31.2	9.50976	7.399759986	8.969759986	2.11
8	14/03/2018	16:06	9.9	599	S20°57.534'	E115°55.328'	32.38	9.869424	7.759423985	9.329423985	2.11
8	14/03/2018	16:07	10	600	S20°57.474'	E115°55.328'	32.12	9.790176	7.680175985	9.250175985	2.11
8	14/03/2018	16:07	10.1	601	S20°57.426'	E115°55.332'	32.64	9.948672	7.838671985	9.408671985	2.11
8	14/03/2018	16:07	9.9	602	S20°57.374'	E115°55.330'	32.81	10.00049	7.890487985	9.460487985	2.11
8	14/03/2018	16:08	9.9	603	S20°57.322'	E115°55.322'	32.51	9.909048	7.799047985	9.369047985	2.11
8	14/03/2018	16:08	10	604	S20°57.267'	E115°55.314'	32.58	9.930384	7.820383985	9.390383985	2.11
8	14/03/2018	16:08	9.9	605	S20°57.212'	E115°55.320'	32.64	9.948672	7.838671985	9.408671985	2.11
8	14/03/2018	16:08	10	606	S20°57.159'	E115°55.329'	32.38	9.869424	7.759423985	9.329423985	2.11
8	14/03/2018	16:09	10.1	607	S20°57.103'	E115°55.337'	32.71	9.970008	7.860007985	9.430007985	2.11
8	14/03/2018	16:09	10	608	S20°57.050'	E115°55.327'	32.81	10.00049	7.890487985	9.460487985	2.11
8	14/03/2018	16:09	9.9	609	S20°56.996'	E115°55.318'	33.01	10.06145	7.951447985	9.521447985	2.11
8	14/03/2018	16:10	10	610	S20°56.941'	E115°55.312'	32.71	9.970008	7.860007985	9.430007985	2.11
8	14/03/2018	16:10	9.5	611	S20°56.887'	E115°55.304'	32.32	9.851136	7.741135985	9.311135985	2.11
8	14/03/2018	16:10	9.2	612	S20°56.836'	E115°55.294'	31.46	9.589008	7.479007985	9.049007985	2.11
8	14/03/2018	16:11	9.1	613	S20°56.779'	E115°55.288'	30.22	9.211056	7.101055986	8.671055986	2.11
8	14/03/2018	16:11	9	614	S20°56.725'	E115°55.290'	29.76	9.070848	6.960847986	8.530847986	2.11
8	14/03/2018	16:11	8.8	615	S20°56.672'	E115°55.306'	29.69	9.049512	6.939511986	8.509511986	2.11
8	14/03/2018	16:11	8.7	616	S20°56.615'	E115°55.314'	28.84	8.790432	6.680431987	8.250431987	2.11
8	14/03/2018	16:12	8.7	617	S20°56.562'	E115°55.320'	28.51	8.689848	6.579847987	8.149847987	2.11
8	14/03/2018	16:12	7.4	618	S20°56.508'	E115°55.317'	28.64	8.729472	6.619471987	8.189471987	2.11
8	14/03/2018	16:12	6.4	619	S20°56.460'	E115°55.300'	24.7	7.52856	5.418559989	6.988559989	2.11
8	14/03/2018	16:13	6	620	S20°56.402'	E115°55.274'	20.9	6.37032	4.26031999	5.83031999	2.11
8	14/03/2018	16:13	5.8	621	S20°56.347'	E115°55.269'	19.59	5.971032	3.861031991	5.431031991	2.11
8	14/03/2018	16:13	5.3	622	S20°56.292'	E115°55.280'	18.9	5.76072	3.650719991	5.220719991	2.11
8	14/03/2018	16:13	5.5	623	S20°56.240'	E115°55.279'	17.22	5.248656	3.138655992	4.708655992	2.11
8	14/03/2018	16:14	5.5	624	S20°56.186'	E115°55.275'	17.98	5.480304	3.380303992	4.950303992	2.1