

Report Date: 30/05/2020 **Week:** 22-2020
Number: 001 **Period:** 23/05/2020 **to** 29/05/2020

Project	: Dredging, Land Reclamation and Revetment Works at Gulhifalhu	Document number	: 462.10062-WQR-1
Contract number	: AGR(471)-PIDS2/PRIV/2019/194	Contractor	: Boskalis Westminster Contracting Ltd
Project number [MIAS]	: 462.10042	Client	: Ministry of National Planning and Infrastructure
		Attention	: shaana.farooq@planning.gov.mv

NTU - TSS Relationship	Correlation coefficient (NTU:TSS)	Monitoring equipment	TSS limit (mg/L)	Converted limit NTU	Limit applicability
	1.92	Eureka Manta	10	5.2	Maintain a threshold level for turbidity at all reefs within the atoll lagoon in proximity to the dredging site, measured as Total Suspended Solids (TSS) to a maximum of 10 mg/L not exceeding 20% of the measurements. Exceptions shall be made where background rates exceeded the threshold level and in reefs where extensive reclamation work has been undertaken (including e.g. Thilafushi, Gulhifalhu, Villigili, Maïé, Huthumalé). Considerations also shall be made to account for naturally elevated levels of turbidity which may occur during storm events or bad weather.

Activities and other observations	
Activities	<p>Insitu water quality measurements performed. No unexpected values or exceedances. Plume monitoring. Coral surveys performed by CDE. Preparing work method statement silt screens. Finalizing Environmental Management Plan.</p>

Corrective actions taken if necessary			
Mitigation	<p>Based on a visual observation of the turbidity pattern during works this week, the following vessels were stopped</p> <table border="0"> <tr> <td style="padding-right: 40px;">BHD Colbart</td> <td>320 min</td> </tr> </table> <p>Bund construction itself is a mitigating measure, to contain reclamation sediment.</p>	BHD Colbart	320 min
BHD Colbart	320 min		

Measurements	
Measurements	<p>Measurements are taken using a Eureka Manta Multiparameter probe. The EIA requires measurements and water sample at the surface, at approximately 1 meter depth. For completeness, two additional depths are measured; 'bottom' and 'mid-water'. The 'bottom' measurement is taken at either: The maximum depth the probe will go to on a 30m cable (dependent on currents), or 90% of the water column if water depth is < 30m The 'mid-water' measurement is taken at approximately 0.5 * the 'bottom' depth Eureka Manta Turbidity sensor has an accuracy of 2% of reading or 0.2 (https://www.waterprobes.com/water-quality-sensor-specifications). Therefore, negative readings of up until -0.2 NTU indicate no turbidity.</p>

Calibration													
Calibration	<table border="0"> <tr> <td>Eureka Manta Multiparameter probe</td> <td></td> <td>Calibration Date: 10/05/2020</td> <td>Status: Used for measurements</td> </tr> <tr> <td> S/N: MT12183556</td> <td></td> <td>Calibration Date: N/A</td> <td>Status: Spare</td> </tr> <tr> <td> S/N: MT12183554</td> <td></td> <td></td> <td></td> </tr> </table>	Eureka Manta Multiparameter probe		Calibration Date: 10/05/2020	Status: Used for measurements	S/N: MT12183556		Calibration Date: N/A	Status: Spare	S/N: MT12183554			
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S/N: MT12183554													

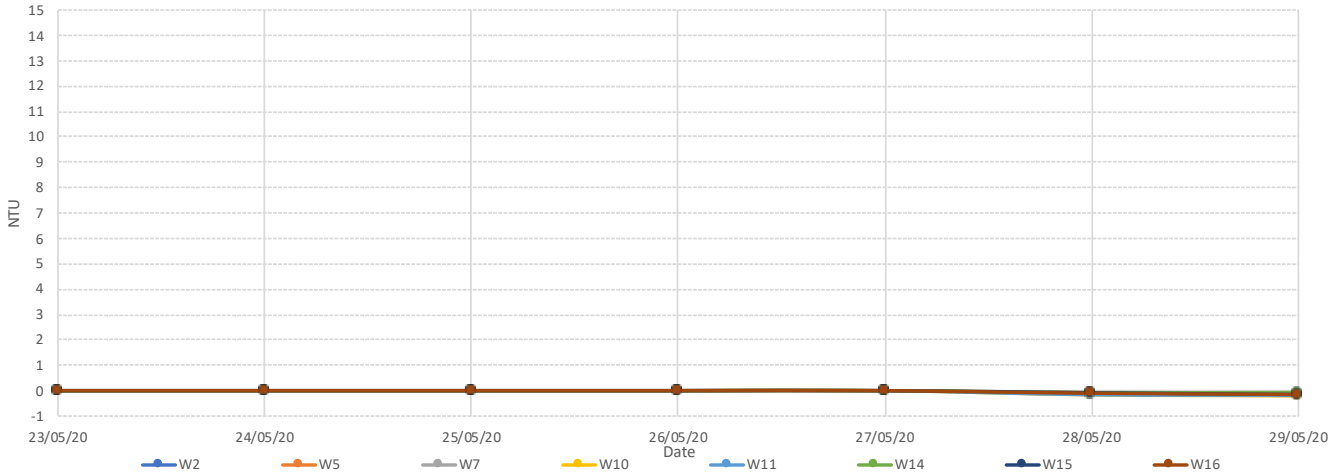
Location ID	Description
W2	Reclamation
W5	
W7	
W10	
W11	
W14	Villigili
W15	
W16	Reclamation
W19	Background
W20	Borrow area
W25	
W26	
W27	Background
W36	Borrow area
W45	
W46	
W47	
W51	

Signed by Contractor	Signed by Client
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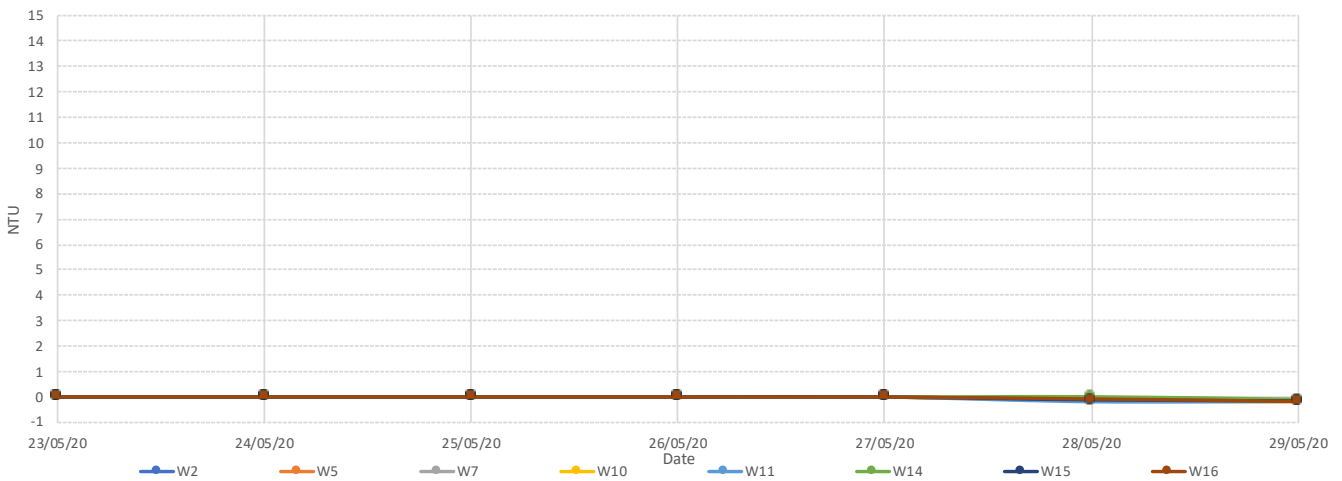
Report Date: 30/05/2020 Week: 22-2020 Period: 23/05/2020 to 29/05/2020

Project	: Dredging, Land Reclamation and Revetment Works at Gulhifalhu	Document number	: 462.10062-WQR-1.2
Contract number	: AGR(471)-PIDS2/PRIV/2019/194	Contractor	: Boskalis Westminster Contracting Ltd
Project number [MIAS]	: 462.10042	Client	: Ministry of National Planning and Infrastructure
		Attention	: shaana.farooq@planning.gov.mv

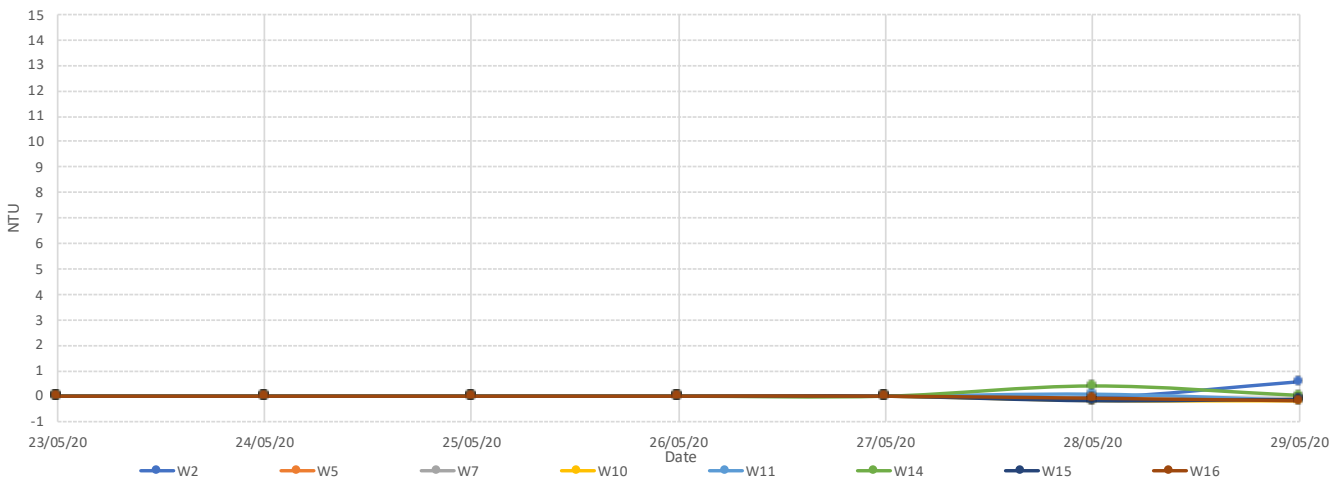
Surface Turbidity Measurements at the Reclamation Area



Mid Water Turbidity Measurements at the Reclamation Area



Bottom Turbidity Measurements at the Reclamation Area



Date: 28/05/2020

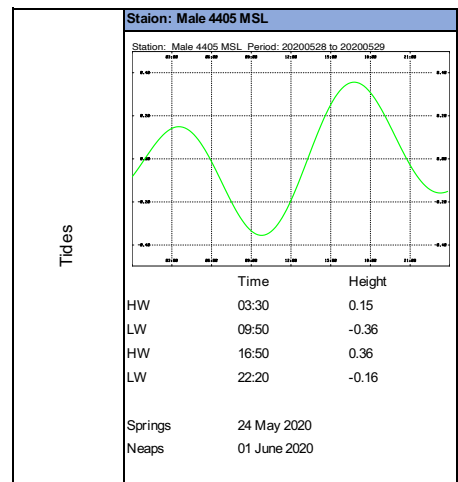
Time: 11:36-15:54

Project : Dredging, Land Reclamation and Revetment Works at Gulhifalhu
 Contract number : AGR(471)-PIDS2/PRIV/2019/194
 Project number [MIAS] : 462.10042

Document number : 462.10062-WQR-1.3
 Contractor : Boskalis Westminster Contracting Ltd
 Client : Ministry of National Planning and Infrastructure
 Attention : shaana.farooq@planning.gov.mv

Location	Section	Depth (m)	Temperature		pH	Conductivity (uS/cm)	Turbidity (NTU)
			Surface	Bottom			
W2	Surface	1	29.3	7.7	52406	-0.11	
	Mid-water	9	29.3	7.8	52407	-0.11	
	Bottom	22	29.3	7.8	52401	-0.06	
W5	Surface	1	29.2	8.0	51952	-0.08	
	Mid-water	10	29.3	8.1	52185	-0.11	
	Bottom	21	29.3	8.1	52230	-0.12	
W7	Surface	2	29.4	7.9	52315	-0.13	
	Mid-water	9	29.4	7.9	52324	-0.14	
	Bottom	22	29.4	7.9	52319	-0.15	
W10	Surface	1	29.4	7.6	52433	-0.16	
	Mid-water	10	29.4	7.5	52386	-0.15	
	Bottom	23	29.3	7.2	52388	-0.17	
W11	Surface	1	29.4	7.7	52401	-0.16	
	Mid-water	9	29.4	7.6	52377	-0.18	
	Bottom	16	29.4	7.7	52405	0.08	
W14	Surface	1	29.4	8.0	52353	-0.07	
	Mid-water	9	29.4	7.9	52340	0.01	
	Bottom	18	29.3	8.0	52349	0.40	
W15	Surface	1	29.2	7.8	52199	-0.08	
	Mid-water	9	29.2	7.8	52253	-0.11	
	Bottom	19	29.2	8.0	52210	-0.18	
W16	Surface	1	29.3	7.8	52371	-0.10	
	Mid-water	9	29.3	7.8	52353	-0.08	
	Bottom	22	29.3	7.8	52370	-0.08	

Stoppages	Vessel	Stop	Start
	BHD Colbart	16:05	16:55



Remarks

As per Client request, started daily in-situ water quality monitoring already at 'Reclamation' locations defined by the EIA on 28/05/2020.
 10 mg/l TSS limit not applicable at the 'Reclamation' locations as per the EIA.

Time	WX	Winds							Waves						Vis (nm)	Clouds (ft)	Temp Air (degC)	
		10m			50m		Wind Wave		Swell			Wave						
		Dir	Spd (kts)	Gust (kts)	Risk (kts)	Spd (kts)	Gust (kts)	Hgt (m)	Per (sec)	Dir	Hgt (m)	Per (sec)	Hsig (m)	Max (m)				Risk (m)
Thursday, 28 May 2020 - Maldives Project 04°11'N 073°28'E																		
03	TS	WSW	14	29	28	15	30	0.6	3	SW	0.8	8	1.0	1.7	-	3-5	3500	28
06	TS	WSW	15	30	28	16	31	0.7	4	SSW	0.8	9	1.1	1.8	-	3-5	3500	28
09	TS	WSW	14	29	28	15	30	0.7	4	SW	0.8	8	1.1	1.8	-	3-5	3500	28
12	TS	W	15	30	28	16	31	0.7	4	SSW	0.8	8	1.1	1.8	-	3-5	2000	27
15	TS	WSW	15	31	29	17	33	0.8	4	SSW	0.7	9	1.1	1.8	-	3-5	3500	28
18	TS	WSW	14	29	28	15	30	0.7	4	SW	0.8	8	1.1	1.8	-	3-5	3500	28
21	TS	WSW	16	32	29	17	33	0.9	4	SW	0.8	8	1.2	2.0	-	3-5	3500	28



WATER QUALITY REPORT

Dredging, Land Reclamation and Revetment Works at Gulhifalhu

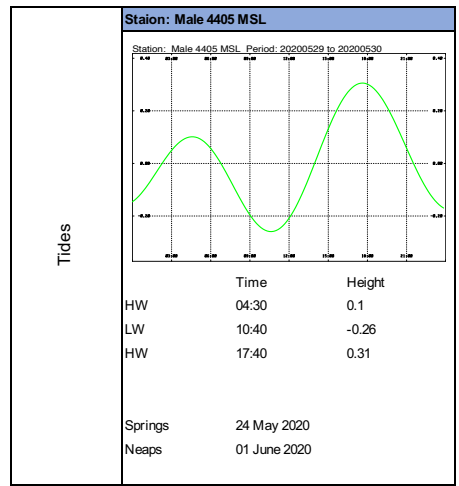


Date: 29/05/2020 Time: 08:08-10:11

Project : Dredging, Land Reclamation and Revetment Works at Gulhifalhu	Document number : 462.10062-WQR-1.4
Contract number : AGR(471)-PIDS2/PRIV/2019/194	Contractor : Boskalis Westminster Contracting Ltd
Project number [MIAS] : 462.10042	Client : Ministry of National Planning and Infrastructure
	Attention : shaana.farooq@planning.gov.mv

Location	Section	Depth (m)	Temperature	pH	Conductivity (uS/cm)	Turbidity (NTU)
W2	Surface	2	29.3	7.9	52303	-0.08
	Mid-water	8	29.3	8.0	52251	-0.10
	Bottom	20	29.3	8.0	52232	0.57
W5	Surface	1	29.2	8.1	52421	-0.15
	Mid-water	6	29.2	8.1	52345	-0.16
	Bottom	14	29.2	8.1	52376	-0.13
W7	Surface	1	29.3	7.8	52367	-0.20
	Mid-water	10	29.3	7.5	52381	-0.18
	Bottom	22	29.3	7.7	52366	-0.15
W10	Surface	1	29.3	7.8	52369	-0.20
	Mid-water	10	29.3	7.8	52337	-0.18
	Bottom	23	29.3	7.7	52280	-0.18
W11	Surface	2	29.3	7.9	52350	-0.18
	Mid-water	8	29.3	7.9	52339	-0.17
	Bottom	20	29.3	7.9	52321	-0.16
W14	Surface	1	29.2	8.1	52210	-0.07
	Mid-water	9	29.2	8.0	52240	-0.09
	Bottom	16	29.2	8.0	52255	0.03
W15	Surface	2	29.2	8.1	52297	-0.15
	Mid-water	6	29.2	8.1	52305	-0.15
	Bottom	14	29.2	8.1	52291	-0.12
W16	Surface	2	29.3	7.9	52345	-0.15
	Mid-water	9	29.3	8.0	52321	-0.17
	Bottom	20	29.2	8.0	52327	-0.18

Stoppages	Vessel	Stop	Start
	BHD Colbart	12:35	17:05



Remarks

As per Client request, started daily in-situ water quality monitoring already at 'Reclamation' locations defined by the EIA on 28/05/2020.
10 mg/l TSS limit not applicable at the 'Reclamation' locations as per the EIA.

Time	WX	Winds								Waves						Vis	Clouds	Temp			
		10m				50m				Wind Wave			Swell						10m	Lowest	Air
		Dir	Spd (kts)	Gust (kts)	Risk (kts)	Spd (kts)	Gust (kts)	Hgt (m)	Per (sec)	Dir	Hgt (m)	Per (sec)	Hsig (m)	Max (m)	Risk (m)						
Friday, 29 May 2020 - Maldives Project 04°11'N 073°28'E																					
03	TS	WSW	14	29	29	16	30	0.9	4	SSW	0.8	8	1.2	2.0	-	3-5	3500	28			
06	TS	WSW	16	32	29	18	34	0.8	4	SW	0.8	8	1.1	1.9	-	3-5	3500	28			
09	TS	WSW	18	35	30	20	37	0.9	4	SSW	0.8	8	1.2	2.0	-	3-5	3500	28			
12	TS	WSW	16	32	29	17	33	0.8	4	SW	0.9	8	1.2	2.0	-	3-5	2000	27			
15	TS	WSW	17	33	29	18	35	0.9	4	SSW	0.8	8	1.2	2.0	-	3-5	1000	27			
18	TS	WSW	17	34	30	19	37	0.9	4	SW	0.9	8	1.3	2.1	-	3-5	1000	27			
21	TS	WSW	16	29	27	17	31	0.8	4	SW	0.9	8	1.2	2.0	-	3-5	1000	27			