

Dredging, Land Reclamation and Revetment Works at Gulhifalhu



Report Date: 17-10-2020 Week: 42-2020

Number: 021 Period: 10-10-2020 to 16-10-2020

Project : Dredging, Land Reclamation and Revetment Works at Gulhifalhu □ Document number : 462.10062-WQR-21

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

did	Correlation coefficient (NTU:TSS	Monitoring equipment	TSS limit (mg/L)	Converted limit NTU	Limit applicability
NTU - TSS Relations	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, Malé, Hulhumalé). 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

Daily in situ seawater quality measurements and sampling performed.

No unexpected values or exceedances.

Revetment installation works ongoing.

Corrective actions taken if necessary

Mitigation

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.

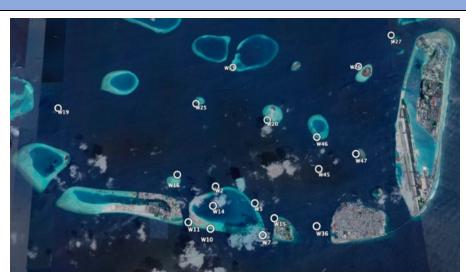
Eureka Manta Multiparameter probe
S/N: M
S/N: M

Location ID Descrip

S/N: MT12183556 Calibration Date: 19/09/2020 Status: Used for measurements

S/N: MT12183554 Calibration Date: N/A Status: Spare

W2	
W5	
W7 Reclamatio	n
W10	"
W11	
W14	
W15 Villigili	
प्ट W16 Reclamatio	n
W16 Reclamatio W19 Background W20	d
W20	
W25 Borrow are	а
W26	
W27 Background	d
W36	
W45	
W46 Borrow are	а
W47	
W51	



Signed by Contractor Signed by Client

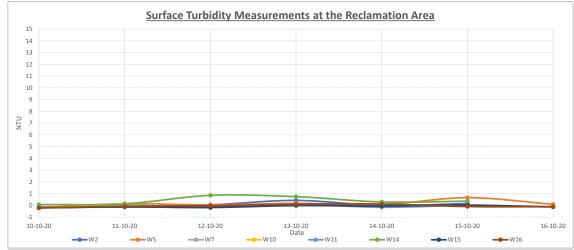


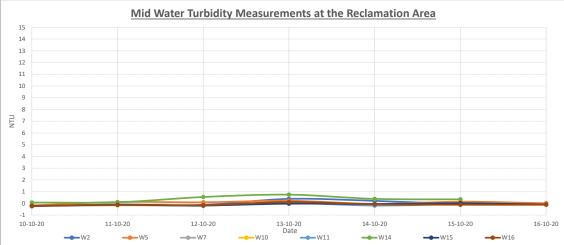
Dredging, Land Reclamation and Revetment Works at Gulhifalhu

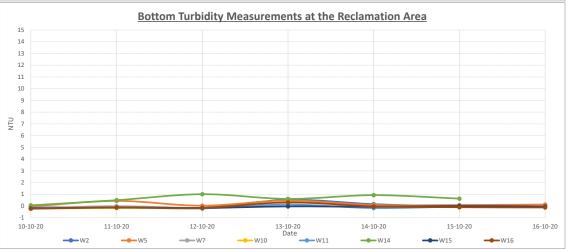




Attention









Dredging, Land Reclamation and Revetment Works at Gulhifalhu



Date: 10-10-2020 Time: 7:20 to 10:40

Project : Dredging, Land Reclamation and Revetment Works at Gulhifalhu □

Contract number : AGR(471)-PIDS2/PRIV/2019/194

Project number [MIAS] : 462.10042

Document number Contractor Client

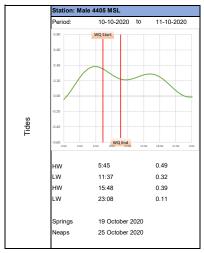
Attention

: 462.10062-WQR-21.4

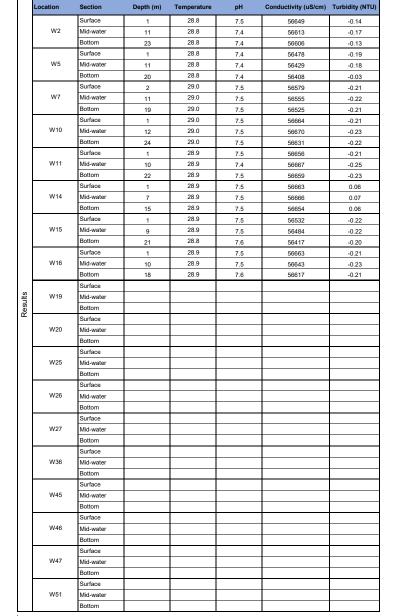
: Boskalis Westminster Contracting Ltd : Ministry of National Planning and Infrastructure

shaana.farooq@planning.gov.mv

	Vessel	Stop	Start
8			
Stoppages			
Sto			



Fairway completed the dredging phase of the works on the 20th of August, therefore as of the 25th only the Reclamation area locations are measured









Dredging, Land Reclamation and Revetment Works at Gulhifalhu



Date: 11-10-2020 Time: 8:20 to 10:40

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

Project number [MIAS] : 462.10042

Document number Contractor Client

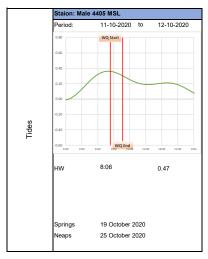
Attention

: 462.10062-WQR-21.5

: Boskalis Westminster Contracting Ltd : Ministry of National Planning and Infrastructure

shaana.farooq@planning.gov.mv

	Vessel	Stop	Start
es			
Stoppages			
Stop			



Fairway completed the dredging phase of the works on the 20th of August, therefore as of the 25th only the Reclamation area locations are measured

Water samples taken from all reclamation sites for TSS testing

Location	Section	Depth (m)	Temperature	pН	Conductivity (uS/cm)	Turbidity (NTU)
	Surface	1	29.0	7.9	56447	-0.14
W2	Mid-water	12	28.9	7.9	56476	-0.11
	Bottom	24	28.9	7.5	56440	-0.09
	Surface	2	28.8	8.1	56475	0.13
W5	Mid-water	11	28.8	8.4	56402	0.11
	Bottom	21	28.7	8.0	56376	0.44
	Surface	1	29.1	7.7	56477	0.00
W7	Mid-water	11	29.1	7.7	56477	-0.13
	Bottom	21	29.1	7.7	56463	-0.01
	Surface	1	29.1	7.7	56485	-0.06
W10	Mid-water	11	29.1	7.6	56482	-0.17
	Bottom	23	29.1	7.6	56466	-0.17
	Surface	1	29.0	7.7	56516	-0.13
W11	Mid-water	12	29.0	7.6	56483	-0.15
	Bottom	25	28.9	7.5	56455	-0.13
	Surface	1	29.1	8.0	56495	0.13
W14	Mid-water	8	29.0	8.0	56480	0.09
	Bottom	17	29.0	8.2	56460	0.50
	Surface	1	28.7	7.4	56357	-0.13
W15	Mid-water	12	28.7	7.1	56420	-0.13
	Bottom	24	28.7	7.2	56388	-0.12
	Surface	1	28.9	7.7	56504	-0.08
W16	Mid-water	11	28.9	7.5	56482	-0.11
	Bottom	22	28.9	7.6	56466	-0.12
	Surface					
W19	Mid-water					
	Bottom					
	Surface					
W20	Mid-water					
	Bottom					
	Surface					
W25	Mid-water					
	Bottom					
	Surface					
W26	Mid-water					
	Bottom					
	Surface					
W27	Mid-water					
	Bottom					
	Surface					
W36	Mid-water					
	Bottom					
	Surface					
W45	Mid-water					
	Bottom					
	Surface					
W46	Mid-water					
	Bottom					
	Surface					
W47	Mid-water					
	Bottom					
	Surface					
W51	Mid-water					
	Bottom					







W5

W7

W11

W14

W15

W16

W19

W20

W26

W27

W36

W45

W47

Results

#### WATER QUALITY REPORT

Dredging, Land Reclamation and Revetment Works at Gulhifalhu



Date: 12-10-2020 Time: 7:50 to 10:35

Project : Dredging, Land Reclamation and Revetment Works at Gulhifalhu □

Contract number : AGR(471)-PIDS2/PRIV/2019/194

Temperature

28.9

28.9

28.9

28.8

28.8

28.7

28.9

29.0

29.0

29.0

29.0

29.0

29.0

29.0

29.0

28.8

28.8

28.8

28.8

28.8

28.9

28.9

7.3

7.2

7.2

6.9

6.8

6.8

7.2

7.0

7.1

7.3

7.2

72

7.3

7.3

7.3

7.6

7.4

7.3

6.8

6.6

6.6

7.4

7.3

7.3

Depth (m)

11

23

1

10

16

11

22

11

21

2

10

18

8

17

2

12

24

12

23

Project number [MIAS] : 462.10042

Mid-water

Bottom

Surface

Bottom

Surface

Bottom

Surface

Mid-water

Bottom

Surface

Mid-water Bottom Surface

Mid-water

Bottom Surface Mid-water

Bottom Surface

Mid-water Bottom Surface

Mid-water Bottom Surface

Mid-water Bottom Surface

Mid-water
Bottom
Surface
Mid-water
Bottom
Surface

Mid-wate Bottom

Mid-water

Document number Contractor Client

-0.13

-0.15

0.04

0.09

0.03

-0.20

-0.23

-0.22

-0.17

-0.20

-0.19

-0.17

-0.19

-0.20

0.85

0.54

1.01

-0.18

-0.18

-0.16

-0.03

-0.16

-0.16

Attention

Conductivity (uS/cm) Turbidity (NTU)

56578

56575

56525

56532

56497

56476

56610

56578

56521

55658

56591

56601

56584

56589

56582

56631

56589

56577

56480

56451

56448

56558

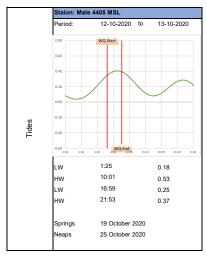
56564

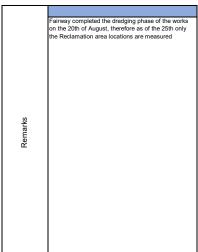
56572

: 462.10062-WQR-21.6

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	Vessel	Stop	Start
ώ			
Stoppages			
Stop			











W5

#### WATER QUALITY REPORT

Dredging, Land Reclamation and Revetment Works at Gulhifalhu



Date: 13-10-2020 Time: 14:45 to 16:45

Project : Dredging, Land Reclamation and Revetment Works at Gulhifalhu □

Contract number : AGR(471)-PIDS2/PRIV/2019/194

Temperature

28.9

28.9

28.9

28.9

28.9

7.4

7.2

7.3

6.7

6.7

Depth (m)

12

24

1

12

Project number [MIAS] : 462.10042

Mid-water

Bottom

Surface

Mid-water

Document number Contractor Client

0.38

0.53

0.17

0.22

Attention

Conductivity (uS/cm) Turbidity (NTU)

56255

56221

56181

56126

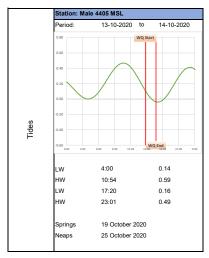
56110

: 462.10062-WQR-21.7

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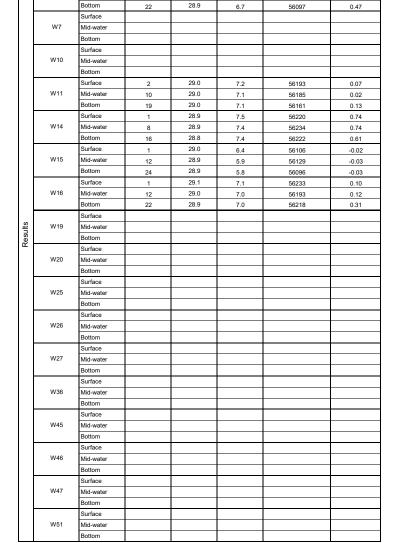
shaana.farooq@planning.gov.mv

	Vessel	Stop	Start
S			
Stoppages			
Sto			



Fairway completed the dredging phase of the works on the 20th of August, therefore as of the 25th only the Reclamation areal locations are measured

W07 & W10 were not surveyed today as these sites were not safely accessible due to severe weather conditions.









Dredging, Land Reclamation and Revetment Works at Gulhifalhu



Date: 14-10-2020 Time: 14:15 to 16:10

Project : Dredging, Land Reclamation and Revetment Works at Gulhifalhu 

Contract number : AGR(471)-PIDS2/PRIV/2019/194

Project number [MIAS] : 462.10042

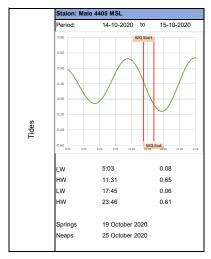
Document number Contractor Client

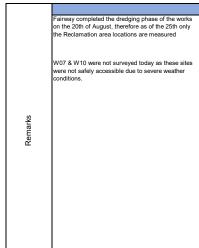
Attention

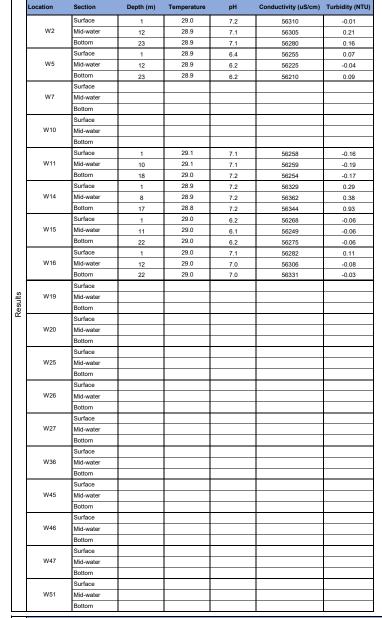
: 462.10062-WQR-21.8

: Boskalis Westminster Contracting Ltd : Ministry of National Planning and Infrastructure

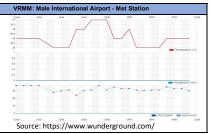
	Vessel	Stop	Start
es			
pag			
Stoppages			













W5

W7

W11

W14

#### **WATER QUALITY REPORT**

Dredging, Land Reclamation and Revetment Works at Gulhifalhu



Date: 15-10-2020 Time: 11:52 to 13:22

: Dredging, Land Reclamation and Revetment Works at Gulhifalhu  $\hfill\Box$ Project : AGR(471)-PIDS2/PRIV/2019/194 Contract number

Temperature

28.9

28.8

28.8

29.0

28.9

28.9

29.0

29.0

28.9

28.9

28.7

29.0

7.0

6.9

6.9

6.7

6.5

6.5

6.8

6.7

6.7

7.1

7.0

7.0

Depth (m)

11

19

1

11

22

12

20

10

18

Project number [MIAS] : 462.10042

Mid-water

Bottom

Surface

Mid-water

Bottom

Surface

Mid-water Bottom

Surface

Mid-water Bottom Surface

Mid-water

Bottom

Surface

Bottom

Surface

Document number Contractor Client

0.16

-0.08

-0.03

0.65

0.14

0.09

0.02

-0.06

-0.04

0.36

0.34

0.63

Attention

Conductivity (uS/cm) Turbidity (NTU)

56309

56273

56273

56200

56183

56178

56334

56271

56257

56188

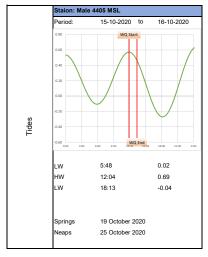
56269

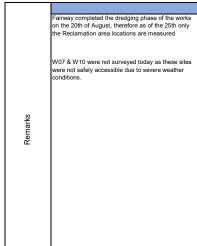
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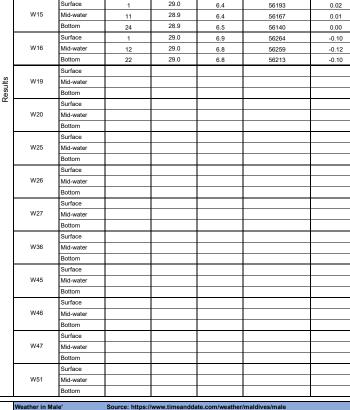
: 462.10062-WQR-21.9

: Boskalis Westminster Contracting Ltd : Ministry of National Planning and Infrastructure

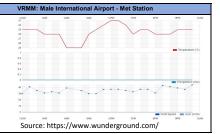
	Vessel	Stop	Start
S			
Stoppages			
Sto			













W5

W7

W11

W14

W15

W16

W19

W20

W26

W27

W36

W45

Results

#### **WATER QUALITY REPORT**

Dredging, Land Reclamation and Revetment Works at Gulhifalhu



Date: 16-10-2020 Time: 16:00 to 17:10

56098

56109

56131

56029

56061

56063

56135

56127

56104

Project : Dredging, Land Reclamation and Revetment Works at Gulhifalhu 

Contract number : AGR(471)-PIDS2/PRIV/2019/194

Temperature

28.7

28.7

28.7

28.9

28.8

28.7

28.7

28.7

28.7

6.9

6.8

6.8

6.8

6.9

7.1

6.9

7.0

Depth (m)

12

22

12

24

12

21

Project number [MIAS] : 462.10042

Mid-water Bottom Surface

Mid-water

Bottom

Surface

Mid-water Bottom

Surface

Mid-water Bottom Surface

Mid-water Bottom Surface

Bottom Surface

Mid-water

Bottom

Surface

Mid-water

Bottom

Surface

Mid-water Bottom Surface

Mid-water

Bottom Surface Mid-water

Bottom Surface

Mid-water Bottom

Surface

Mid-water Bottom Surface

Mid-water Bottom Surface

Mid-water
Bottom
Surface
Mid-water
Bottom

Document number Contractor Client

0.09

0.01

0.13

-0.14

-0.10

-0.04

-0.12

-0.12

-0.12

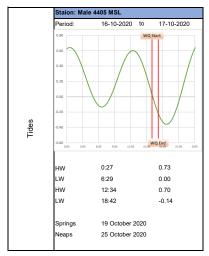
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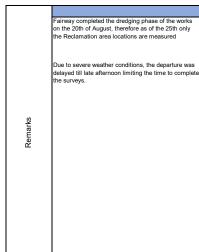
Conductivity (uS/cm) Turbidity (NTU)

: 462.10062-WQR-21.10

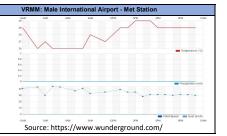
: Boskalis Westminster Contracting Ltd : Ministry of National Planning and Infrastructure

	Vessel	Stop	Start
es			
Stoppages			
Stop			









## Male' Water & Sewerage Company Pvt Ltd Water Quality Assurance Laboratory

Quality Assurance Building, 1st Floor, Male' Hingun, Vilimale', Male' City, Maldives Tel: +9603323209, Fax: +9603324306, Email: wqa@mwsc.com.mv



#### WATER QUALITY TEST REPORT Report No: 500185201

Customer Information: CDE Pvt Ltd H.Orchidmaage, 4th Floor Ameeru Ahmed Magu Male K Report date: 12/10/2020
Test Requisition Form No: 900190515
Sample(s) Recieved Date: 11/10/2020
Date of Analysis: 11/10/2020 - 11/10/2020

Sample Description ~	GF_REC-W15	GF_REC-W05	GF_REC-W07	
Sample Type ~	Sea Water	Sea Water	Sea Water	
Sample No	83214073	83214074	83214075	
Sampled Date ~	11/10/2020 08:27	11/10/2020 08:27	11/10/2020 08:27	TEST METHOD
PARAMETER		ANALYSIS RESULT		
Physical Appearance	Clear with particles	Clear with particles	Clear with particles	
Total Suspended Solids	<5 (LoQ 5 mg/L )	<5 (LoQ 5 mg/L )	<5 (LoQ 5 mg/L )	HACH Method 8006

Keys: mg/L : Milligram Per Liter

Checked by

Aminath Sofa Laboratory Executive Approved by

Mohamed Eyman Manager, Quality

**Notes: Sampling Authority:** Sampling was not done by MWSC Laboratory This report shall not be reproduced except in full, without written approval of MWSC This test report is ONLY FOR THE SAMPLES TESTED.

~ Information provided by the customer

Page 1 of 3 MWSC-A5-F-92 Rev 00

### Male' Water & Sewerage Company Pvt Ltd

Water Quality Assurance Laboratory
Quality Assurance Building, 1st Floor, Male' Hingun, Vilimale', Male' City, Maldives
Tel: +9603323209, Fax: +9603324306, Email: wqa@mwsc.com.mv



## WATER QUALITY TEST REPORT Report No: 500185201

**Customer Information:** CDE Pvt Ltd H.Orchidmaage, 4th Floor Ameeru Ahmed Magu Male K

Report date: 12/10/2020 Test Requisition Form No: 900190515 Sample(s) Recieved Date: 11/10/2020 Date of Analysis: 11/10/2020 - 11/10/2020

Sample Description ~	GF_REC-W10	GF_REC-W11	GF_REC-W16
Sample Type ~	Sea Water	Sea Water	Sea Water
Sample No	83214076	83214077	83214078
Sampled Date ~	11/10/2020 08:27	11/10/2020 08:27	11/10/2020 08:27
PARAMETER		ANALYSIS RESULT	
Physical Appearance	Clear with particles	Clear with particles	Clear with particles
Total Suspended Solids	<5 (LoQ 5 mg/L )	<5 (LoQ 5 mg/L )	<5 (LoQ 5 mg/L )

Keys: mg/L : Milligram Per Liter

Checked by

Aminath Sofa Laboratory Executive Approved by

Mohamed Eyman Manager, Quality

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Page 2 of 3 MWSC-A5-F-92 Rev 00

# Male' Water & Sewerage Company Pvt Ltd Water Quality Assurance Laboratory

Quality Assurance Building, 1st Floor, Male' Hingun, Vilimale', Male' City, Maldives Tel: +9603323209, Fax: +9603324306, Email: wqa@mwsc.com.mv



#### WATER QUALITY TEST REPORT Report No: 500185201

Customer Information: CDE Pvt Ltd

H.Orchidmaage, 4th Floor Ameeru Ahmed Magu

Male K

Report date: 12/10/2020 Test Requisition Form No: 900190515 Sample(s) Recieved Date: 11/10/2020 Date of Analysis: 11/10/2020 - 11/10/2020

Sample Description ~	GF_REC-W02	GF_REC-W14		
Sample Type ~	Sea Water	Sea Water		
Sample No	83214079	83214080		
Sampled Date ~	11/10/2020 08:27	11/10/2020 08:27	TEST METHOD	
PARAMETER	ANALYSIS RESULT			
Physical Appearance	Clear with particles	Clear with particles		
Total Suspended Solids	<5 (LoQ 5 mg/L )	<5 (LoQ 5 mg/L )	HACH Method 8006	

Keys: mg/L : Milligram Per Liter

Checked by

Org.

Aminath Sofa Laboratory Executive Approved by

Mohamed Eyman Manager, Quality

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~ Information provided by the customer

Page 3 of 3 MWSC-A5-F-92 Rev 00