MONA OFFSHORE WIND PROJECT

Annex 3.7 to the Applicant's response to Relevant Representation at the Procedural Deadline

NRW Sediment sample analysis proforma in response to NRW RR-11.170

Sediment sample results 2021(B)

Deadline: Procedural Deadline

Application Reference: EN01037

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25 June 2024

F01

Image of an offshore wind farm

www.morganandmona.com/en

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
F01	Examination – Procedural Deadline	RPS	Mona Offshore Wind Ltd	Mona Offshore Wind Ltd	June 2024

Prepared by:

RPS

Prepared for:

Mona Offshore Wind Ltd.

Applicant Information

Instructions:

1. All applicants and laboratories should refer to the most recent guidance on sediment analysis in support of marine licence applications on the Marine Licensing pages of the NRW website
2. Full information must be provided under each relevant sheet of the workbook. Grey highlighted cells indicate where information can be entered.
3. Where information cannot be provided, the applicant should consult with NRW PS prior to submission.
4. Worksheets are protected to prevent accidental amendments to calculated values. If amendments are required please consult with NRW PS.
5. Sample IDs used through the data output worksheets should correspond to Sample IDs provided on this worksheet.

Marine licence applicant information:

Applicant:	Mona Offshore Wind Project Ltd
NRW Sample plan reference number:	
Application title:	Mona Offshore Wind Project
Date sampled:	08/08/2021 to 20/09/2021
Sampling location:	South Irish Sea

Dredge area tonnages:

Dredge Area	Dredging tonnages	% total dredged material	Total dredged material
Area i		N/A	0
Area ii		N/A	
Area iii		N/A	
Area iv		N/A	
Area v		N/A	
Area vi		N/A	

NRW PS use only

Sample numbers and locations

Sample ID	Excluded sample (NRW PS use)	Sample location (decimal degrees, WGS84)		Location name (as per sampling plan)	Sampling depth (m)	Dredge area
		Position latitude	Position longitude			
ENV64		-4.067823	53.924947		45	
ENV65		-4.033986	53.889722		48	
ENV66		-4.014427	53.773582		44	
ENV67		-3.758952	53.670327		46	
ENV68		-3.713514	53.629662		43	
ENV69		-3.832019	53.656686		42	
ENV70		-3.866500	53.626579		42	
ENV71		-4.013369	53.837957		44	
ENV82		-3.718129	53.654008		37	
ENV83		-3.808467	53.658991		39	
ENV84		-3.778008	53.678799		42	
ENV86		-3.981626	53.802842		42	
ENV88		-3.968226	53.711219		47	
ENV89		-3.915869	53.625827		48	
ENV90		-4.079865	54.016767		43	
ENV95		-3.739047	53.671888		48	
ENV96		-3.870387	53.621202		42	
ENV97		-3.987697	53.653950		42	

Physical characteristics data

Instructions:

1. Record the laboratory/contractor responsible for analysis
2. Record the date the samples were analysed.
3. Enter full dataset for each sample in the analysis results table
4. Where copying and pasting entries please use paste values only
5. Where entering multiple Sample IDs please use the pop-up form
   IDs should be separated by a comma

Analysis information:

Laboratory/contractor:	Kenneth Pye Associates Ltd. and Ocean Ecology
Date of analysis:	

Physical characteristics analysis outputs:

Laboratory sample number	Dredge Area	Sample ID(s)	Visual appearance*	Exempt from chemical analysis▫
ENV64		ENV64	Sandy gravel/gravelly sand with shell fragments	y
ENV65		ENV65	velly sand with shell fragments. Occasional boulders and cobbles	
ENV66		ENV66	and with shell fragments. Areas of plain sand. Occasiona	y
ENV67		ENV67	Sand with shell fragments	y
ENV68		ENV68	Gravelly sand	y
ENV69		ENV69	slope. Areas of shell fragments and gravel at bottom of	y
ENV70		ENV70	ith shell fragments. Occasional sand waves/ripples and	y
ENV71		ENV71	Gravelly sand with shell fragments. Occasional cobbles	
ENV82		ENV82	avelly sand. Occasional boulders. Areas of shell fragme	y
ENV83		ENV83	Gravelly sand with shell fragments	y
ENV84		ENV84	Coarse sand with gravel and shell fragments	y
ENV86		ENV86	Occasional boulders and cobbles. Large boulders at east	y
ENV88		ENV88	hell fragments. Occasional boulders. Areas of boulders a	y
ENV89		ENV89	d with gravel and shell fragments. Occasional faunal bur	y
ENV90		ENV90	velly sand with shell fragments. Some areas of rippled s	y
ENV95		ENV95	avelly sand with shell fragments. Occasional cobbles an	y
ENV96		ENV96	Coarse sand with shell fragments and faunal burrows.	y
ENV97		ENV97	lly sand wth shell fragments. Occasional cobbles and bo	y

* **Visual appearance**: Incude a description of what the material looks like and what it contains, e.g. sandy material containing brick fragments, or black silt, or foreign man made matter caught in the sample.

▫ **Exempt from chemical analysis:** enter 'y' where sediment samples contain glacial material or are too coarse and thus exempt from chemical analysis.

Total Solids (% total sediments)	Organic matter (total organic carbon)	-5.5	-5.0	-4.5	-4.0	-3.5	-3.0	-2.5	-2.0	-1.5	-1.0
		45mm	31.5mm	22.4mm	16mm	11.2mm	8mm	5.6mm	4mm	2.8mm	2mm
		0.00	0.00	0.00	0.00	2.10	9.60	6.50	4.60	6.10	5.40
	0.1400	0.00	0.00	0.00	0.30	1.90	6.40	2.60	3.70	5.70	4.60
		0.00	0.00	0.00	0.00	0.70	0.50	0.40	0.40	1.30	2.30
		0.00	0.00	0.00	0.20	0.20	0.30	0.70	0.50	1.00	1.20
		0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.30	0.70	0.70
		0.00	0.00	0.00	1.50	1.60	3.20	3.90	6.40	6.10	4.10
		0.00	0.00	0.00	0.00	0.00	0.40	1.40	1.70	3.10	5.00
	0.1500	0.00	0.00	0.00	0.00	3.10	5.60	2.70	2.80	3.50	3.30
		0.00	1.40	0.00	0.00	3.80	4.30	3.60	4.80	5.20	4.20
		0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.30	0.70	1.60
		0.00	0.00	0.00	0.00	4.30	3.10	3.20	3.20	2.40	2.40
		0.00	0.00	0.00	0.00	0.60	8.20	2.50	5.00	5.60	5.70
		0.00	0.00	0.00	0.20	4.20	11.30	3.50	4.70	6.60	4.60
		0.00	0.00	0.00	0.00	0.10	1.20	1.50	2.90	5.30	7.90
		0.00	0.00	0.00	0.30	1.70	3.50	3.90	4.90	5.10	3.40
		0.00	0.00	0.00	0.00	0.00	0.20	0.20	0.80	1.10	1.30
		0.00	0.00	0.00	0.00	0.00	3.30	2.60	2.10	3.60	3.90
		0.00	0.00	0.00	0.00	0.30	4.80	2.60	4.10	5.20	5.10

Particle size distribution (% at 0.5 phi inter

-0.5	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
1.4mm	1mm	707µm	500µm	353.6µm	250µm	176.8µm	125µm	88.39µm	63µm	44.2µm	31.3µm
5.20	3.00	6.90	5.70	7.70	12.00	10.60	3.50	0.80	0.50	0.50	0.60
4.50	3.00	6.70	5.90	9.70	16.80	13.10	3.90	1.10	0.60	0.40	0.60
5.60	11.70	44.00	25.40	5.30	1.10	0.50	0.10	0.10	0.00	0.00	0.10
2.20	3.70	30.60	32.20	16.70	7.50	2.40	0.20	0.10	1.00	0.00	0.00
1.20	1.10	9.20	11.50	19.60	31.50	13.60	2.20	1.10	0.50	0.40	0.40
3.50	2.70	15.50	20.50	10.90	4.10	1.90	0.30	0.50	0.50	0.60	0.90
7.60	8.00	26.90	20.60	11.70	7.70	2.30	0.40	0.30	0.20	0.20	0.20
3.20	2.30	7.10	10.80	16.60	17.20	9.30	2.60	1.30	0.70	0.40	0.50
3.50	2.10	13.80	18.60	12.80	5.70	2.30	0.80	0.70	0.60	0.50	0.80
3.50	6.90	25.90	27.20	18.30	8.70	2.50	0.50	0.30	0.20	0.20	0.20
2.50	3.10	16.40	20.20	14.80	5.90	2.30	0.80	0.60	0.60	0.60	0.90
5.10	3.20	6.10	7.10	14.30	15.70	6.60	1.60	1.10	0.70	0.50	0.60
4.30	2.90	8.90	10.10	12.10	10.60	4.00	0.90	0.50	0.50	0.40	0.50
12.00	12.10	25.80	17.60	7.90	3.30	0.90	0.20	0.10	0.10	0.10	0.10
2.80	2.80	11.60	16.60	16.90	9.50	3.00	1.50	0.90	0.50	0.50	0.50
2.10	2.60	17.50	17.80	14.60	15.70	8.90	1.30	0.60	0.70	0.70	0.90
4.70	4.40	18.80	18.80	14.00	11.50	4.50	1.10	0.50	0.30	0.30	0.30
4.20	4.50	20.40	15.70	9.20	7.10	3.70	1.30	0.80	0.60	0.50	0.50

vals)

5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0
22.1µm	15.6µm	11µm	7.8µm	5.5µm	3.9µm	2.75µm	1.95µm	1.38µm	0.98µm	0.69µm	0.49µm
0.70	0.80	1.10	1.20	1.20	1.00	0.70	0.50	0.30	0.20	0.90	
0.60	0.80	1.10	1.30	1.20	1.00	0.70	0.50	0.30	0.20	0.90	
0.10	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
0.50	0.60	0.80	0.90	0.80	0.70	0.50	0.30	0.20	0.20	0.60	
1.00	1.20	1.50	1.60	1.50	1.20	0.80	0.50	0.40	0.30	1.10	
0.20	0.30	0.30	0.30	0.30	0.20	0.10	0.10	0.10	0.10	0.30	
0.50	0.60	0.90	1.00	0.90	0.80	0.60	0.40	0.30	0.20	0.80	
0.90	1.10	1.40	1.50	1.40	1.20	0.80	0.50	0.30	0.20	1.00	
0.20	0.20	0.40	0.40	0.40	0.40	0.20	0.20	0.10	0.10	0.30	
1.00	1.30	1.70	1.90	1.80	1.50	1.00	0.70	0.40	0.30	1.30	
0.70	0.80	1.20	1.40	1.30	1.10	0.90	0.60	0.40	0.30	1.10	
0.60	0.80	1.10	1.30	1.30	1.10	0.80	0.50	0.30	0.30	1.10	
0.10	0.10	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00	0.20	
0.70	0.90	1.30	1.50	1.40	1.20	0.80	0.50	0.30	0.30	1.10	
1.00	1.10	1.40	1.60	1.60	1.40	1.10	0.80	0.60	0.50	1.90	
0.40	0.50	0.70	0.70	0.70	0.60	0.40	0.20	0.20	0.20	0.60	
0.60	0.80	1.10	1.20	1.30	1.10	0.80	0.60	0.40	0.30	1.10	

11.5	12.0	12.5	13.0	13.5	14.0	14.5	>14.5
0.34µm	0.24µm	0.17µm	0.12µm	0.09µm	0.06µm	0.04µm	<0.04µm

Trace metal data

Instructions:

1. Record the laboratory/contractor responsible for trace metal analysis
2. Record the date the samples were analysed.
3. Enter full dataset for each sample in the analysis results table
4. Trace metal analysis results should be reported in mg/kg (ppm) dry weight
5. Enter methdological limit of detection for each trace metal prior to inputting raw data
6. Where analysis outputs are less than the limits of detection please enter text "<LOD"
7. Where copying and pasting entries please use paste values only
8. Where entering multiple Sample IDs please use the pop-up form
   IDs should be separated by a comma

Analysis information:

Laboratory/contractor:	Kenneth Pye Associates Ltd. and Ocean Ecology
Date of analysis:	

Determinand analysis outputs:

Laboratory sample number	Dredge Area	Sample ID(s)	Metals as mg/kg dry weight							
			Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Mercury (Hg)	Nickel (Ni)	Lead (Pb)	Zinc (Zn)
ENV65		ENV65	20.2	0.08	11.4	5.6	0.05	10.3	10.6	31.4
ENV71		ENV71	9	0.04	10.1	5.4	0.05	8.8	8.4	21.9
Limits of detection (mg/kg dry weight):			1	0.04	0.5	2	0.01	0.5	2	3

Organotin data

Instructions:

1. Record the laboratory/contractor responsible for organotin analysis
2. Record the date the samples were analysed.
3. Enter full dataset for each sample in the analysis results table
4. Organotin analysis results should be reported in mg/kg (ppm) dry weight
5. Enter methdological limit of detection for each organotin prior to inputting raw data
6. Where analysis outputs are less than the limits of detection please enter text "<LOD"
7. Where copying and pasting entries please use paste values only
8. Where entering multiple Sample IDs please use the pop-up form
   IDs should be separated by a comma

Analysis information:

Laboratory/contractor:	N/A
Date of analysis:	N/A

Determinand analysis outputs:

Laboratory sample number	Dredge Area	Sample ID(s)	Organotins as mg/kg dry weight	
			Dibutyltine (DBT)	Tributyltin (TBT)
Limits of detection (mg/kg dry weight):				

Polyaromatic hydrocarbon data

Instructions:

1. Record the laboratory/contractor responsible for PAH analysis
2. Record the date the samples were analysed.
3. Enter full dataset for each sample in the analysis results table
4. Analysis results for individual PAHs should be reported in µg/kg (ppb) dry weight.
   THC should be reported as mg/kg (ppm)
5. Enter methdological limit of detection for each PAH prior to inputting raw data
6. Where analysis outputs are less than the limits of detection please enter text "<LOD"
7. Where copying and pasting entries please use paste values only
8. Where entering multiple Sample IDs please use the pop-up form
   IDs should be separated by a comma

Analysis information:

Laboratory/contractor:	Kenneth Pye Associates Ltd. and Ocean Ecology
Date of analysis:	

Determinand analysis outputs:

Laboratory sample number	Dredge Area	Sample ID(s)	Acenapthene	Acenapthylene
ENV65		ENV65	<LOD	<LOD
ENV71		ENV71	<LOD	<LOD
Limits of detection (µg/kg dry weight):			1	1

Anthracene	Benz[a]anthracene	Benzo[a]pyrene	Benzo[b]fluoranthene	Benzo[g,h,i]perylene	Benzo[e]pyrene	Benzo[k]fluoranthene	C1-Napthalenes
<LOD	2.18	2.57	5.87	4.44	4.23	2.52	6.19
<LOD	1.85	2.01	4.47	3.86	3.68	2.39	4.5
1	1	1	1	1	1	1	1

PAHs as dry weight (µg/kg dry weight)

C1-Phenanthrenes	C2-Napthalenes	C3-Napthalenes	Chrysene	Dibenz[a,h]anthracene	Fluoranthene	Fluorene	Indeno[123-c,d]pyrene
5.87	5.46	4.87	2.82	<LOD	3.7	<LOD	4.85
5.1	4.38	3.57	2.8	<LOD	3.41	<LOD	4.14
1	1	1	1	1	1	1	1

Napthalene	Perylene	Phenanthrene	Pyrene	**Total hydrocarbon content (mg/kg)**
2.21	<LOD	4.01	3.26	65.05
1.76	<LOD	3.37	3.02	54.31
1	1	1	1	1

Polychlorinated biphenyl data

Instructions:

1. Record the laboratory/contractor responsible for PCB analysis
2. Record the date the samples were analysed.
3. Enter full dataset for each sample in the analysis results table
4. Analysis results should be reported in mg/kg (ppm) dry weight.
5. Enter methdological limit of detection for each PCB prior to inputting raw data
6. Where analysis outputs are less than the limits of detection please enter text "<LOD"
7. ICES 7 PCBs are highlighted in bold
8. Where copying and pasting entries please use paste values only
9. Where entering multiple Sample IDs please use the pop-up form
   IDs should be separated by a comma

Analysis information:

Laboratory/contractor:	Kenneth Pye Associates Ltd. and Ocean Ecology
Date of analysis:	

Determinand analysis outputs:

Laboratory sample number	Dredge Area	Sample ID(s)	2,2',4,5,5'-Pentachlorobiphenyl CB101	2,3,3',4,4'-Pentachlorobiphenyl CB105
ENV65		ENV65	<LOD	<LOD
ENV71		ENV71	<LOD	<LOD
Limits of detection (mg/kg dry weight):			0.00008	0.00008

2,3,3',4',6-Pentachlorobiphenyl CB110	2,3',4,4',5-Pentachlorobiphenyl CB118	2,2',3,3',4,4'-Hexachlorobiphenyl CB128	2,2',3,4,4',5'-Hexachlorobiphenyl CB138	2,2',3,4,5,5'-Hexachlorobiphenyl CB141	2,2',3,4',5',6-Hexachlorobiphenyl CB149	2,2',3,5,5',6-Hexachlorobiphenyl CB151	2,2',4,4',5,5'-Hexachlorobiphenyl CB153
<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008

PCBs as mg/kg dry weight

2,3,3',4,4',5-Hexachlorobiphenyl CB156	2,3,3',4,4',6-Hexachlorobiphenyl CB158	2,2',3,3',4,4',5-Heptachlorobiphenyl CB170	2,2',5- Trichlorobiphenyl CB18	2,2',3,4,4',5,5'-Heptachlorobiphenyl CB180	2,2',3,4,4',5',6-Heptachlorobiphenyl CB183	2,2',3,4',5,5',6-Heptachlorobiphenyl CB187	2,2',3,3',4,4',5,5'-Octachlorobiphenyl CB194
<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008

2,4,4'-Trichlorobiphenyl CB28	2,4',5-Trichlorobiphenyl CB31	2,2',3,5'-Tetrachlorobiphenyl CB44	2,2',4,4'-Tetrachlorobiphenyl CB47	2,2',4,5'-Tetrachlorobiphenyl CB49	2,2',5,5'-Tetrachlorobiphenyl CB52	2,3',4,4'-Tetrachlorobiphenyl CB66
<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008

Organochlorine data

Instructions:

1. Record the laboratory/contractor responsible for analysis
2. Record the date the samples were analysed.
3. Enter full dataset for each sample in the analysis results table
4. Analysis results should be reported in mg/kg (ppm) dry weight.
5. Enter methdological limit of detection for each Organochlorine prior to inputting raw data
6. Where analysis outputs are less than the limits of detection please enter text "<LOD"
7. Where copying and pasting entries please use paste values only
8. Where entering multiple Sample IDs please use the pop-up form
   IDs should be separated by a comma

Analysis information:

Laboratory/contractor:	Kenneth Pye Associates Ltd. and Ocean Ecology
Date of analysis:	

Determinand analysis outputs:

Laboratory sample number	Dredge Area	Sample ID(s)	Organochlorine pesticides as mg/kg dry weight							
			alpha-hexachlorocyclohexane (AHCH)	beta-hexachlorocyclohexane (BHCH)	gamma-hexachlorocyclohexane (GHCH)	Dieldrin	Hexachlorobenzene (HCB)	1,1-Dichloro-2,2-bis(p-chlorophenyl) ethylene (PPDDE)	Dichlorodiphenyltrichloro ethane (PPDDT)	1,1-dichloro-2,2-bis(p-chlorophenyl)ethane (PPTDE)
ENV65		ENV65	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
ENV71		ENV71	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Limits of detection (mg/kg dry weight):			0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Brominated flame retardant data

Instructions:

1. Record the laboratory/contractor responsible for analysis
2. Record the date the samples were analysed.

3. Enter full dataset for each sample in the analysis results table

4. Analysis results should be reported in mg/kg (ppm) dry weight.
5. Enter methdological limit of detection for each BDE prior to inputting raw data
6. Where analysis outputs are less than the limits of detection please enter text "<LOD"
7. Where copying and pasting entries please use paste values only
8. Where entering multiple Sample IDs please use the pop-up form
   IDs should be separated by a comma

Analysis information:

Laboratory/contractor:	N/A
Date of analysis:	N/A

Determinand analysis outputs:

Laboratory sample number	Dredge Area	Sample ID(s)	Brominated flame retardants as mg/kg dry weight											
			2,2′,4,4′,6-penta-bromodiphenyl ether (BDE100)	Hexabromodiphenyl ether (BDE138)	2,2′,4,4′,5,5′-hexa-bromodiphenyl ether (BDE153)	2,2′,4,4′,5,6′-hexa-bromodiphenyl ether (BDE154)	2,2′,4-tri-bromodiphenylether (BDE17)	2,2′,3,4,4′,5′,6-heptabromodiphenyl ether (BDE183)	2,2',3,3',4,4',5,5',6,6'-decabrominated diphenyl ether (BDE 209)	2,4,4'-tribromodiphenyl ether (BDE28)	2,2′,4,4′-Tetrabromodiphenyl ether (BDE47)	2,3',4,4'-Tetrabromodiphenyl ether (BDE66)	2,2',3,4,4'-Pentabromodiphenyl ether (BDE85)	2,2',4,4',5-pentabromodiphenyl ether (BDE99)
Limits of detection (mg/kg dry weight):														