

TECHNICAL NOTE



blueOASIS
ADFMA
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Subject:	INESC TEC HT-S	Date:	April 22, 2026
To:		Doc:	INESC_TEC_HT-S_REV00
CC:		Phone:	
From:	Giacomo Dieci	Email:	gdieci@blueoasis.pt
Job No.:			

1. INTRODUCTION

blueOASIS was requested to provide materials, mooring design, and installation support to INESC TEC for the deployment of a Hydrotwin-S device offshore the port of Matosinhos.

2. OBJECTIVES

Develop a mooring layout design for a Hydrotwin-S device offshore the port of Matosinhos, including the definition of quantities and specifications for each component, and assess representative environmental conditions to simulate realistic operational scenarios.

2. INPUTS

The following input data were provided by the client:

- **Location:** 41°27'55.0" N, 8°50'08.0" W
- **Water depth:** 43 m

3. RESULTS

A single-point mooring system (see drawings at the end of the document) was designed for the Hydrotwin-S device to ensure reliable station-keeping while minimizing loads and maintaining a controlled line profile along the water column.

Based on the layout and corresponding item numbering, Table 1 summarizes the main line components and their lengths, while Table 2 presents the weights and volumes of discrete elements used in the overall system definition.

At the end of the document, the static OrcaFlex configuration under a 2-knot current is presented, together with the corresponding tension distribution along the full mooring line as a function of arc length.

For the SMART BUOY, the following beaconing system details are provided:

- **Type:** High-visibility marine warning light
- **Flash Pattern:** 0.5-second flash every 2.5 seconds (user configurable)
- **Visibility Range:** Minimum 1 NM under normal atmospheric conditions

The distance between the SMART BUOY and the SURFACE BUOY is governed by the length of the first SMART CABLE. In the present layout, this distance ranges between 9 and 10 m.

Table 1: Mooring lines specifications

Item	Line	Material	Diameter (mm)	Length (m)	Mass per unit length (kg/m)	MBL (kN)	Axial stiffness (kN)
4	BUOY LINE	Nylon	18	1	0.2	68	23.128
6	SMART CABLE	Flexible polymer cover	14.5	10	0.194	–	–
7	SMART CABLE	Flexible polymer cover	14.5	20	0.194	–	700000
9	CONNECTION LINE	Dyneema	10	1.5	0.035	35	800
11	MOORING LINE	Nylon	18	23	0.2	68	23.128
14	MOORING LINE	Nylon	18	21	0.2	68	23.128

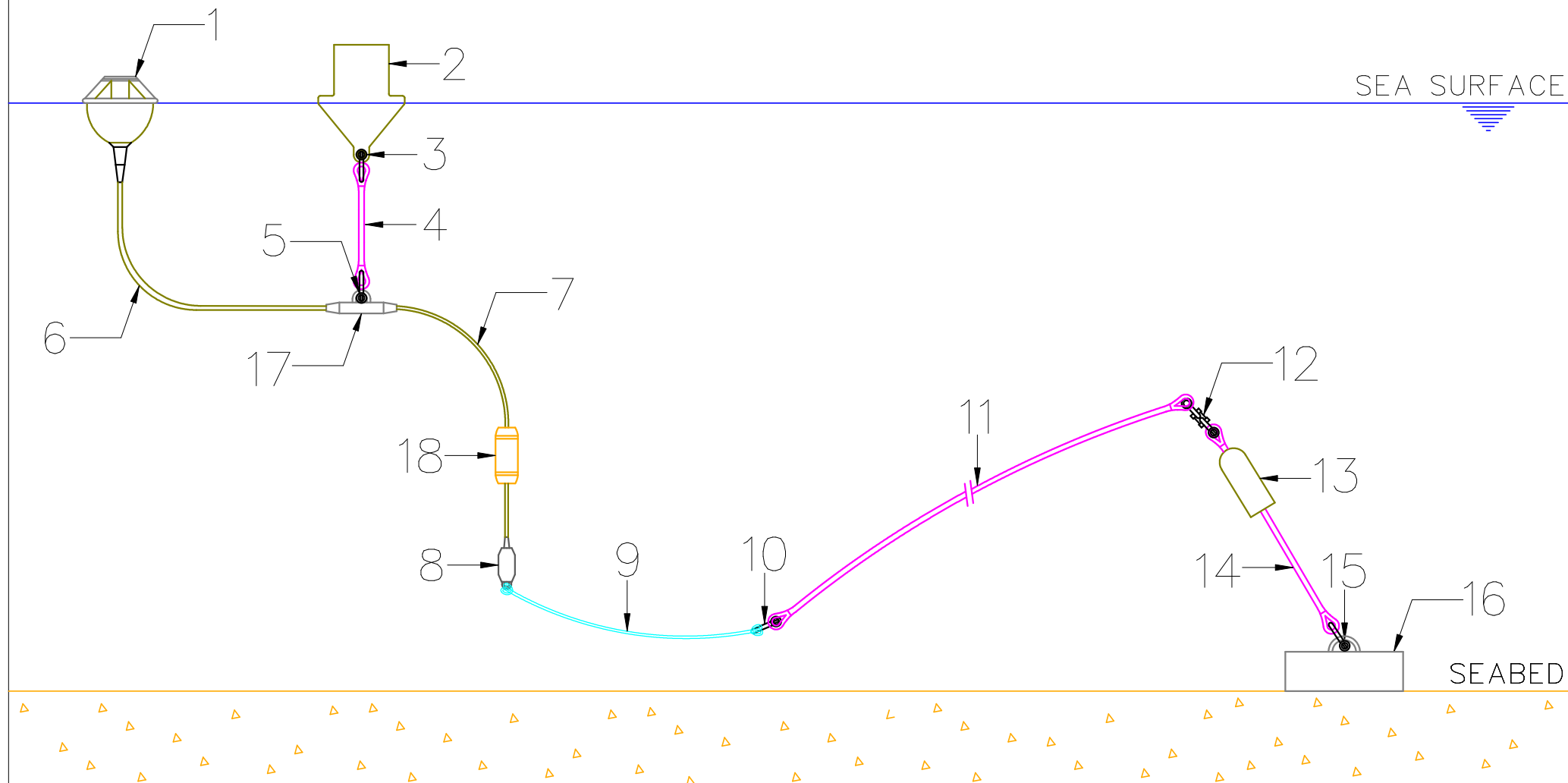
Table 2: Attachments specifications

Item	Object	Material	Width (m)	Total height (m)	Height above water (m)	Weight (kg)	Volume (m ³)
2	SMART BUOY	UV-stabilized rigid polymer	0.42	0.31	0.16	7.45	0.03
2	SURFACE BUOY	Virgin polyethylene	0.6	0.8	0.3	6	0.1
8	HYDROPHONE	–	–	–	–	10.12	0.00353
14	SUBMERGED FLOATER	UV-stabilized rigid polymer	0.26	0.26	–	–	0.0085
16	ANCHOR BLOCK	Concrete	0.53	0.34	–	180	–
17	SMART NODE	Inox steel	–	–	–	2.51	0.0005
18	IN-LINE FLOATER	UV-stabilized rigid polymer	–	–	–	3.37	0.007

EQUIPMENT LISTING

ITEM NO.	ITEM DESCRIPTION	ITEM NO.	ITEM DESCRIPTION	ITEM NO.	ITEM DESCRIPTION	ITEM NO.	ITEM DESCRIPTION
1	SMART BUOY	6	SMART CABLE	11	MOORING LINE	16	ANCHOR BLOCK
2	SURFACE BUOY	7	SMART CABLE	12	SWIVEL SHACKLE	17	SMART NODE
3	SHACKLE	8	HYDROPHONE	13	SUBMERGED FLOATER	18	IN-LINE FLOATER
4	BUOY LINE	9	CONNECTION LINE	14	MOORING LINE		
5	SHACKLE	10	SHACKLE	15	SHACKLE		

General notes



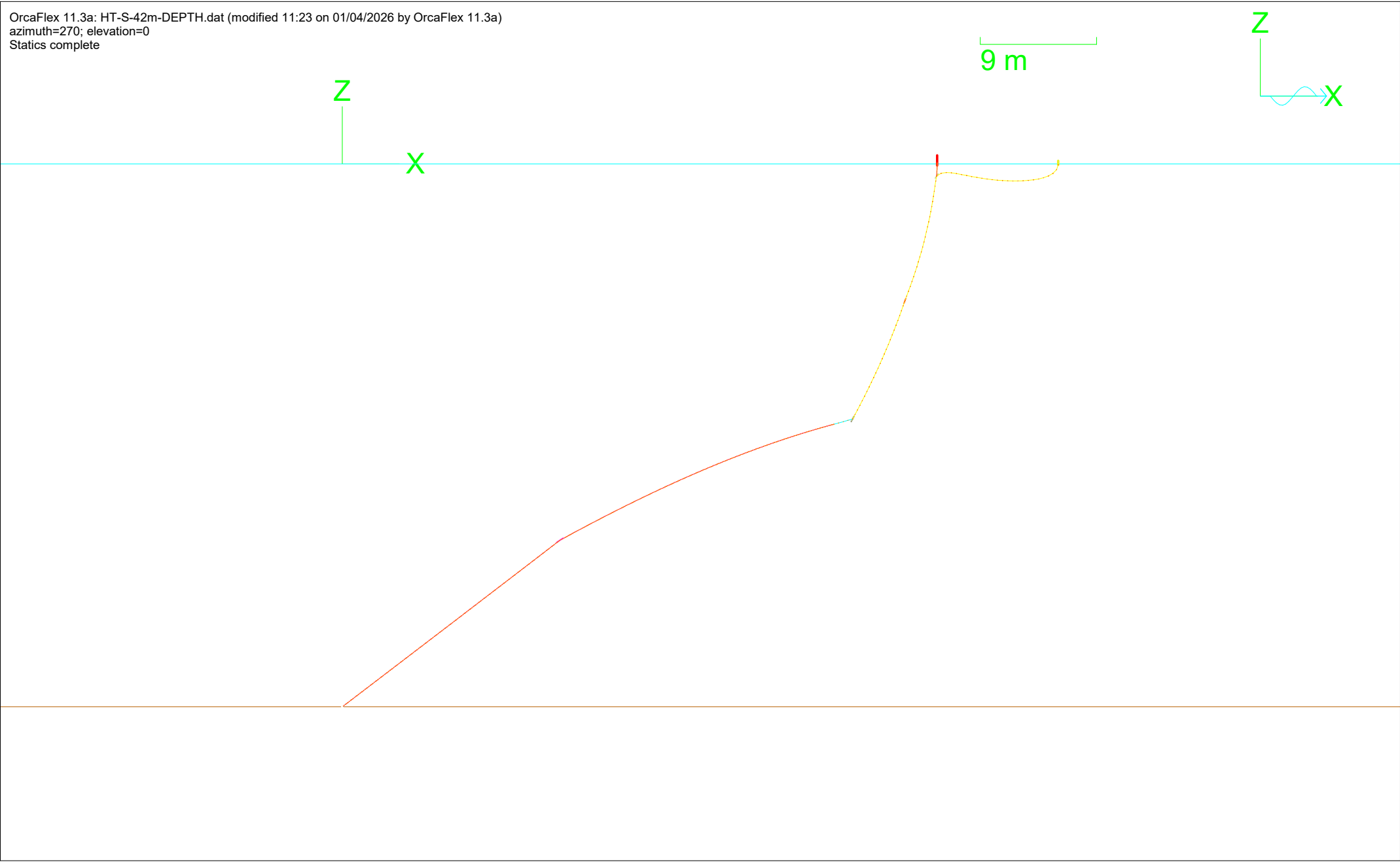
Design phase

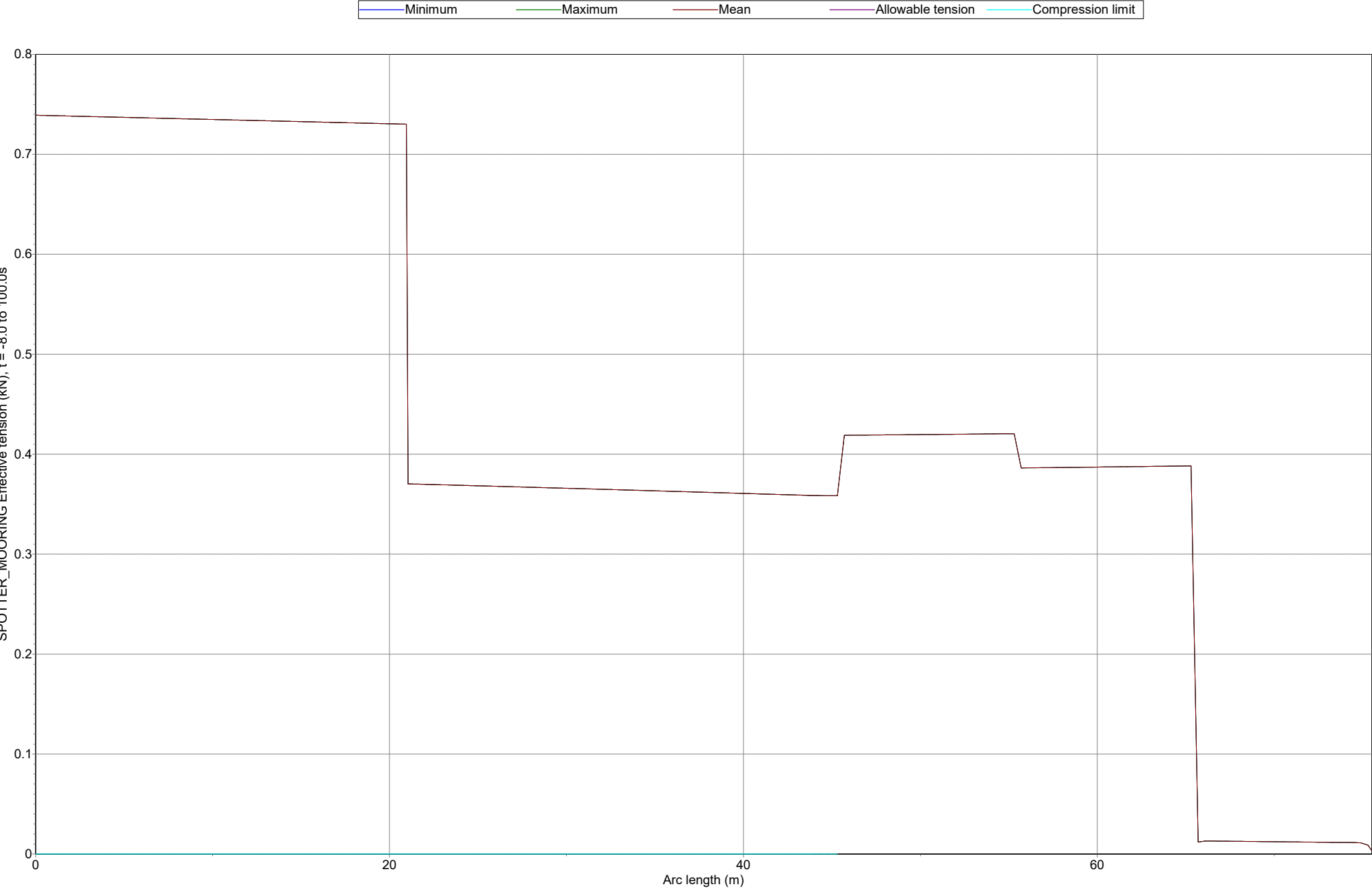
Drawing title

HYDROTWIN-S MOORING DIAGRAM
INESC-TEC

REV	DATE	BY	CHK'D	PM	DESCR

OrcaFlex 11.3a: HT-S-42m-DEPTH.dat (modified 11:23 on 01/04/2026 by OrcaFlex 11.3a)
azimuth=270; elevation=0
Statics complete





TECHNICAL NOTE



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Subject:	INESC TEC CURRENT ME-TER	Date:	April 22, 2026
To:		Doc:	INESC_TEC_CURR_REV00
CC:		Phone:	
From:	Giacomo Dieci	Email:	gdieci@blueoasis.pt
Job No.:			

1. INTRODUCTION

blueOASIS was requested to provide materials, mooring design, and installation support to INESC TEC for the deployment of a current meter device offshore the port of Matosinhos.

2. OBJECTIVES

Develop a mooring layout design for a current meter device offshore the port of Matosinhos, including the definition of quantities and specifications for each component, and assess representative environmental conditions to simulate realistic operational scenarios.

2. INPUTS

The following input data were provided by the client:

- **Location:** 41°27'55.0" N, 8°51'24.0" W
- **Water depth:** 55 m

3. RESULTS

A single-point mooring system (see drawings at the end of the document) was designed for the current meter device to ensure reliable station-keeping while minimizing loads and maintaining a controlled line profile along the water column.

Based on the layout and corresponding item numbering, Table 1 summarizes the main line components and their lengths, while Table 2 presents the weights and volumes of discrete elements used in the overall system definition.

At the end of the document, the static OrcaFlex configuration under a 2-knot current is presented, together with the corresponding tension distribution along the full mooring line as a function of arc length.

For the SMART BUOY, the following beaconing system details are provided:

- **Type:** High-visibility marine warning light
- **Flash Pattern:** 0.5-second flash every 2.5 seconds (user configurable)
- **Visibility Range:** Minimum 1 NM under normal atmospheric conditions

The distance between the SMART BUOY and the SURFACE BUOY is governed by the length of the first SMART CABLE. In the present layout, this distance ranges between 9 and 10 m.

Table 1: Mooring lines specifications

Item	Line	Material	Diameter (mm)	Length (m)	Mass per unit length (kg/m)	MBL (kN)	Axial stiffness (kN)
4	BUOY LINE	Nylon	18	1	0.2	68	23.128
6	SMART CABLE	Flexible polymer cover	14.5	10	0.194	–	–
7	SMART CABLE	Flexible polymer cover	14.5	20	0.194	–	700000
9	CONNECTION LINE	Dyneema	10	1.5	0.035	35	800
11	MOORING LINE	Nylon	18	30	0.2	68	23.128
14	MOORING LINE	Nylon	18	28	0.2	68	23.128

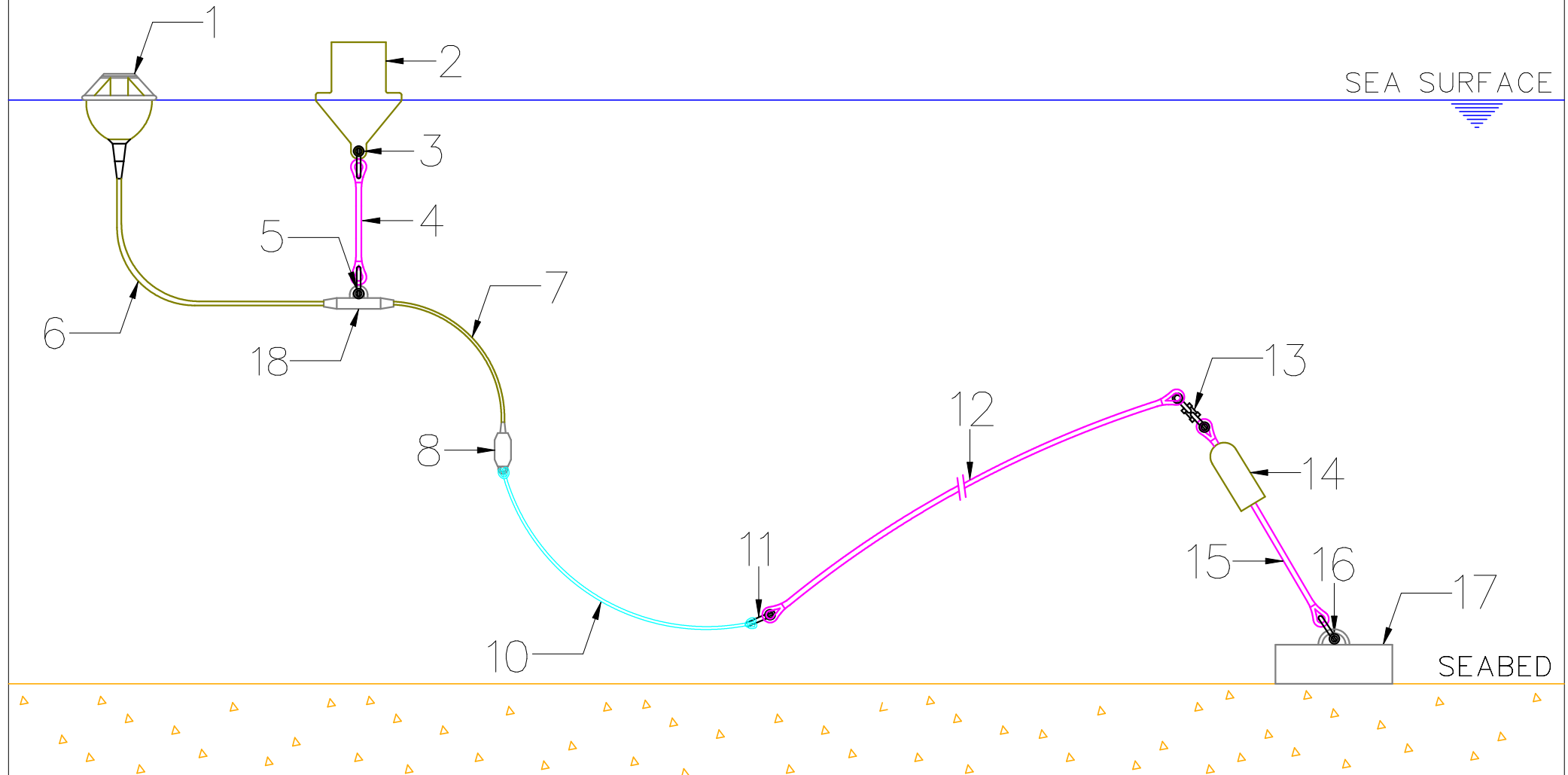
Table 2: Attachments specifications

Item	Object	Material	Width (m)	Total height (m)	Height above water (m)	Weight (kg)	Volume (m ³)
2	SMART BUOY	UV-stabilized rigid polymer	0.42	0.31	0.16	7.45	0.03
2	SURFACE BUOY	Virgin polyethylene	0.6	0.8	0.3	6	0.1
8	CURRENT METER	–	–	–	–	12.02	0.00353
14	SUBMERGED FLOATER	UV-stabilized rigid polymer	0.26	0.26	–	–	0.0085
16	ANCHOR BLOCK	Concrete	0.53	0.34	–	180	–
17	SMART NODE	Inox steel	–	–	–	2.51	0.0005
18	IN-LINE FLOATER	UV-stabilized rigid polymer	–	–	–	3.37	0.007

EQUIPMENT LISTING

ITEM NO.	ITEM DESCRIPTION	ITEM NO.	ITEM DESCRIPTION	ITEM NO.	ITEM DESCRIPTION	ITEM NO.	ITEM DESCRIPTION
1	SMART BUOY	6	SMART NODE	11	SHACKLE	16	SHACKLE
2	SURFACE BUOY	7	SMART CABLE	12	MOORING LINE	17	ANCHOR BLOCK
3	SHACKLE	8	CURRENT METER	13	SWIVEL SHACKLE	18	SMART NODE
4	BUOY LINE	9	SWIVEL SHACKLE	14	SUBMERGED FLOATER		
5	SHACKLE	10	CONNECTION LINE	15	MOORING LINE		

General notes

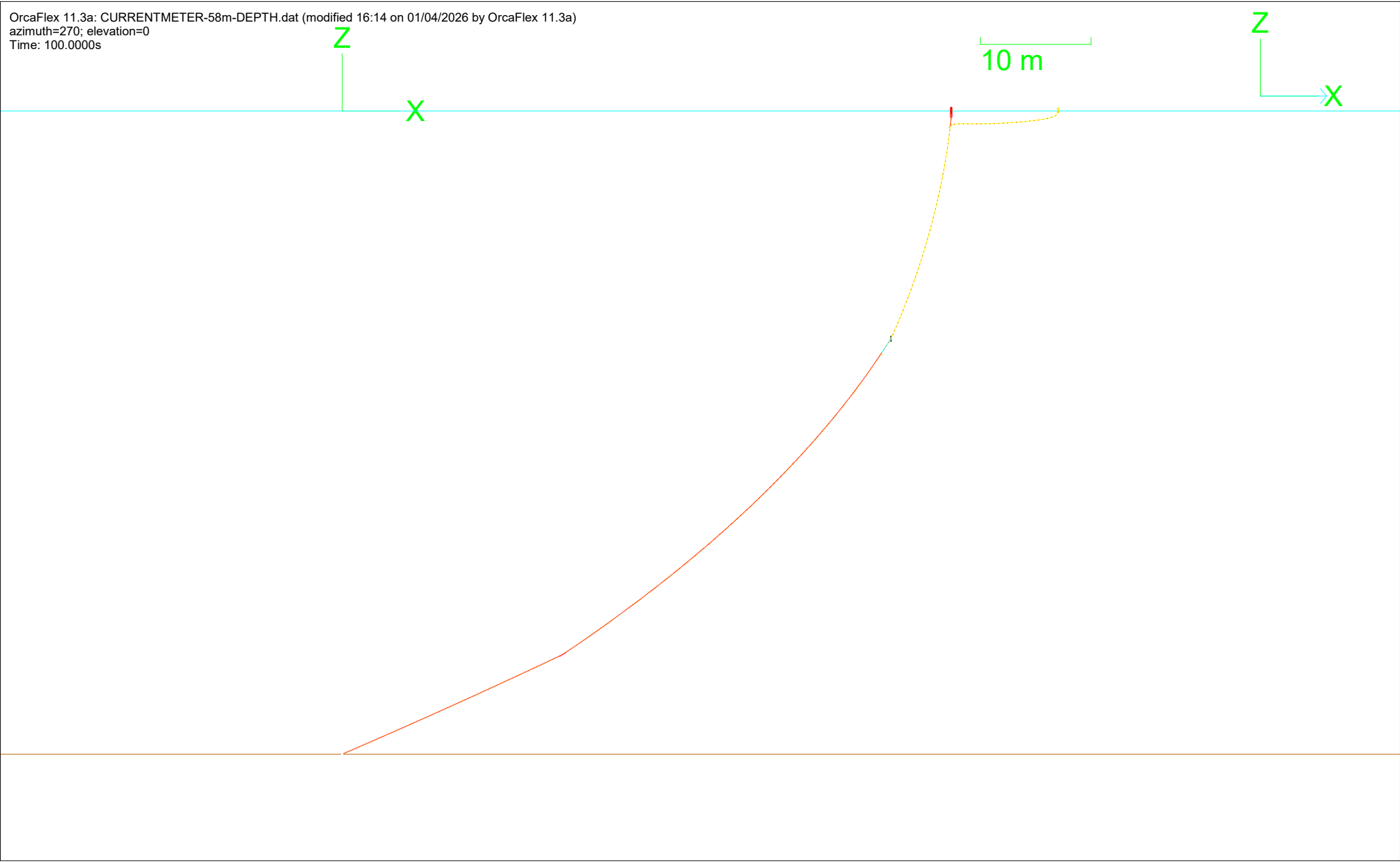


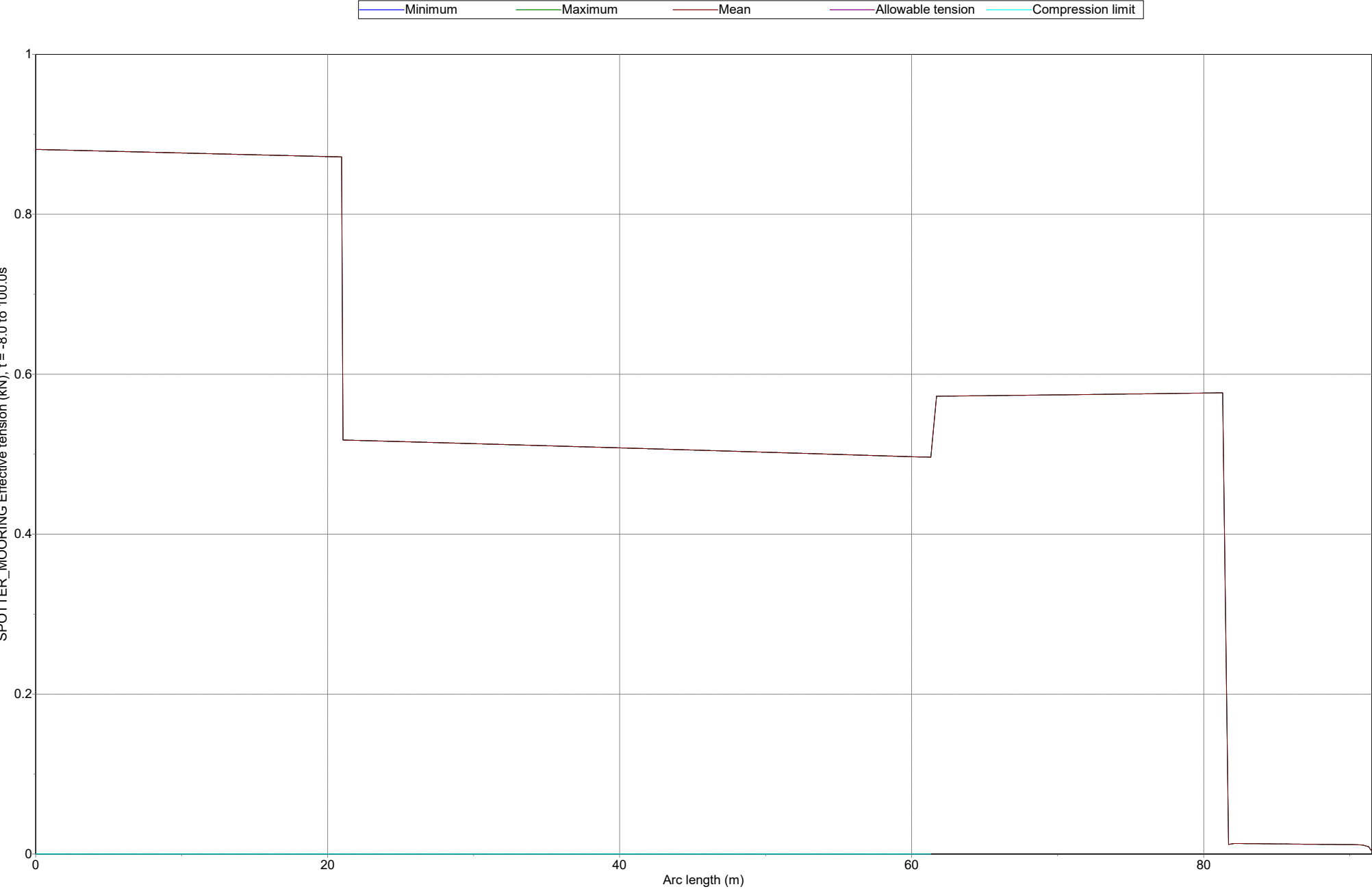
Design phase

Drawing title
CURRENT METER MOORING DIAGRAM
INESC-TEC

REV	DATE	BY	CHK'D	PM	DESCR

OrcaFlex 11.3a: CURRENTMETER-58m-DEPTH.dat (modified 16:14 on 01/04/2026 by OrcaFlex 11.3a)
azimuth=270; elevation=0
Time: 100.0000s





TECHNICAL NOTE



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Subject:	INESC TEC WAVE BUOY	Date:	April 23, 2026
To:		Doc:	INESC_TEC_WAVE_REV00
CC:		Phone:	
From:	Giacomo Dieci	Email:	gdieci@blueoasis.pt
Job No.:			

1. INTRODUCTION

blueOASIS was requested to provide materials, mooring design, and installation support to INESC TEC for the deployment of a wave buoy device offshore the port of Matosinhos.

2. OBJECTIVES

Develop a mooring layout design for a wave buoy device offshore the port of Matosinhos, including the definition of quantities and specifications for each component, and assess representative environmental conditions to simulate realistic operational scenarios.

2. INPUTS

The following input data were provided by the client:

- **Location:** 41°27'14.0" N, 8°51'18.0" W
- **Water depth:** 50 m

3. RESULTS

A single-point mooring system (see drawings at the end of the document) was designed for the wave buoy device to ensure reliable station-keeping while minimizing loads and maintaining a controlled line profile along the water column.

Based on the layout and corresponding item numbering, Table 1 summarizes the main line components and their lengths, while Table 2 presents the weights and volumes of discrete elements used in the overall system definition.

At the end of the document, the static OrcaFlex configuration under a 2-knot current is presented, together with the corresponding tension distribution along the full mooring line as a function of arc length.

For the SMART BUOY, the following beaconing system details are provided:

- **Type:** High-visibility marine warning light
- **Flash Pattern:** 0.5-second flash every 2.5 seconds (user configurable)
- **Visibility Range:** Minimum 1 NM under normal atmospheric conditions

The distance between the SMART BUOY and the SURFACE BUOY is governed by the length of the first MOORING LINE and CHAIN. Thus, in the present layout, this distance ranges between 9 and 10 m.

Table 1: Mooring lines specifications

Item	Line	Material	Diameter (mm)	Length (m)	Mass per unit length (kg/m)	MBL (kN)	Axial stiffness (kN)
4	BUOY LINE	Nylon	18	1	0.2	68	23.128
5	CHAIN	Galvanised chain	10	3	2.3	50	8540
6	MOORING LINE	Nylon	18	7	0.2	68	23.128
10	MOORING LINE	Nylon	18	22	0.2	68	23.128
12	MOORING LINE	Nylon	18	27	0.2	68	23.128
15	MOORING LINE	Nylon	18	25	0.2	68	23.128

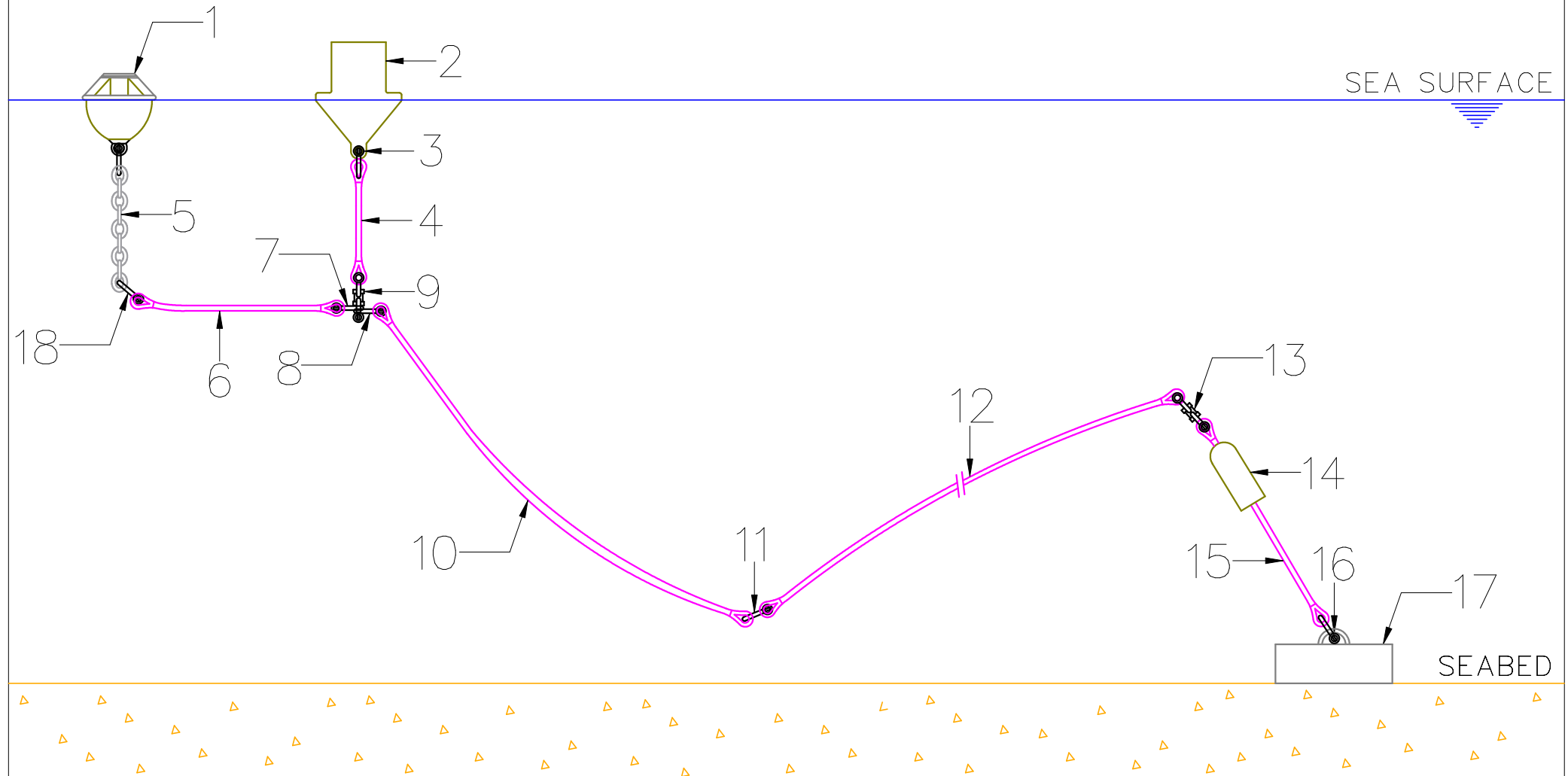
Table 2: Attachments specifications

Item	Object	Material	Width (m)	Total height (m)	Height above water (m)	Weight (kg)	Volume (m ³)
2	SMART BUOY	UV-stabilized rigid polymer	0.42	0.31	0.16	7.45	0.03
2	SURFACE BUOY	Virgin polyethylene	0.6	0.8	0.3	6	0.1
14	SUBMERGED FLOATER	UV-stabilized rigid polymer	0.26	0.26	–	–	0.0085
16	ANCHOR BLOCK	Concrete	0.53	0.34	–	180	–

EQUIPMENT LISTING

ITEM NO.	ITEM DESCRIPTION	ITEM NO.	ITEM DESCRIPTION	ITEM NO.	ITEM DESCRIPTION	ITEM NO.	ITEM DESCRIPTION
1	SMART BUOY	6	MOORING LINE	11	SHACKLE	16	SHACKLE
2	SURFACE BUOY	7	SHACKLE	12	MOORING LINE	17	ANCHOR BLOCK
3	SHACKLE	8	SHACKLE	13	SWIVEL SHACKLE	18	SHACKLE
4	BUOY LINE	9	SWIVEL SHACKLE	14	SUBMERGED FLOATER		
5	CHAIN	10	MOORING LINE	15	MOORING LINE		

General notes



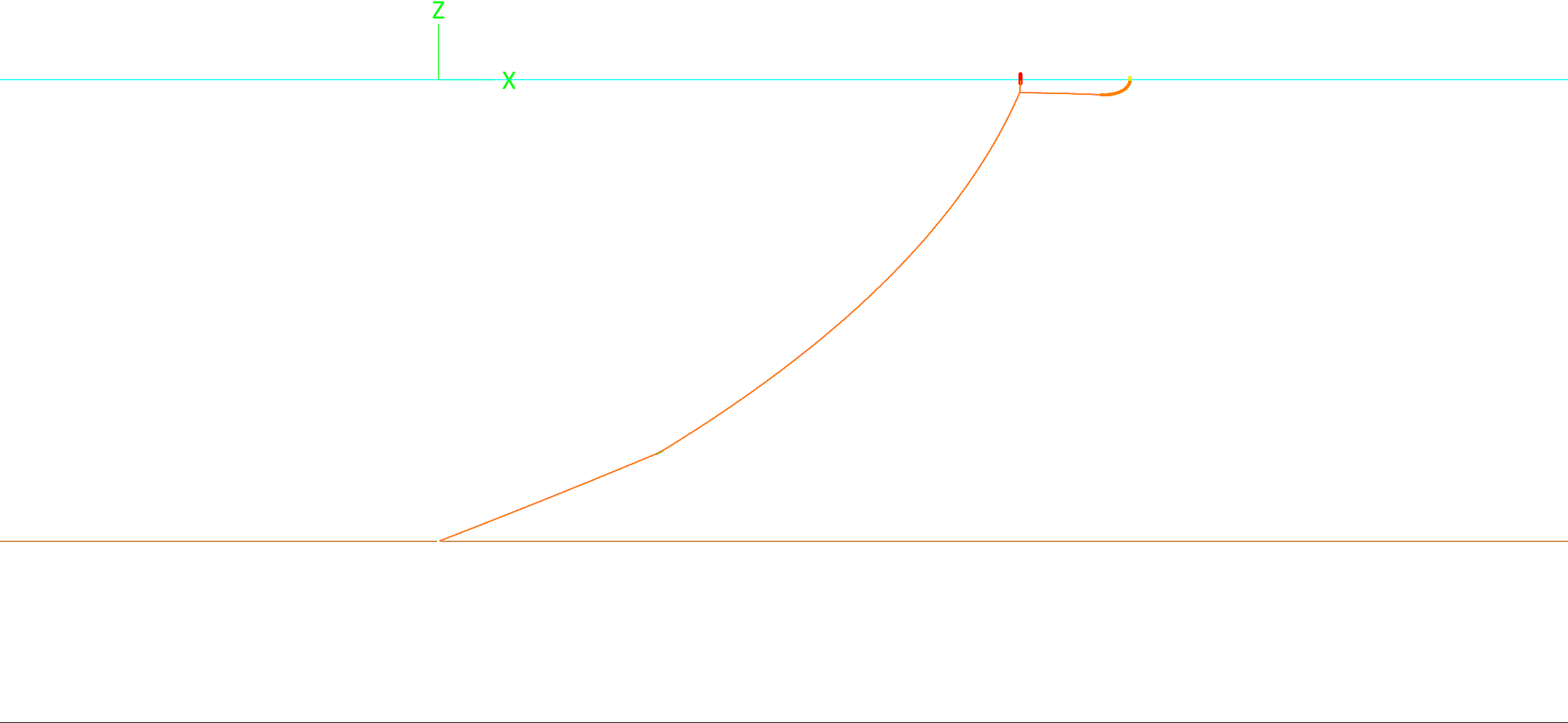
Design phase

Drawing title

WAVE-BUOY MOORING DIAGRAM
INESC-TEC

REV	DATE	BY	CHK'D	PM	DESCR

OrcaFlex 11.6c: WAVEBUOY-40m-DEPTH.dat (modified 13:57 on 02/04/2026 by OrcaFlex 11.6c)
wire frame; azimuth=270; elevation=0
Statics complete



OrcaFlex 11.6c: WAVEBUOY-40m-DEPTH.sim (modified 13:59 on 02/04/2026 by OrcaFlex 11.6c)

Range graph: SPOTTER_MOORING Effective tension, over Whole simulation

