	<b>NORM</b>	ENSEADA No. <b>N-EIN-TUP-001</b>
	PROGRAM: <b>ENSEADA - PRIVATE USE TERMINAL (TUP)</b>	LEAF: <b>1 of 24</b>
	AREA: <b>QUALITY MANAGEMENT SYSTEM</b>	
	TITLE: <b>STANDARDS FOR NAVIGATION, MOORING AND ANCHORING OF VESSELS IN THE PORT OF ENSEADA SHIPYARD</b>	

**INDEX OF REVISIONS**

REV.	DESCRIPTION AND/OR STRICKEN LEAVES
<b>0</b>	<b>Original Issue</b>
<b>1</b>	<b>Addition of the comments of the analysis of the Union of Pilots - State of Bahia</b>
<b>2</b>	<b>Addition of comments from the Brazilian Navy - Ports of Bahia (CPBA)</b>
<b>3</b>	<b>Tug Table Review</b>
<b>4</b>	<b>Tug Table Review</b>
<b>5</b>	<b>Review items 4.2.2 / 5.3.1 / 5.3.2 / 5.4.1 / 5.4.2 / 5.4.4 / 6.0</b>
<b>6</b>	<b>Review items 5.2 / 5.3.2 / 5.4.1 / 5.4.2 / 5.4.3 / 5.4.4</b>
<b>[ELECTRONICALLY TRANSLATED]</b>	

REVISION	REV. 0	REV. 01	REV. 02	REV. 03	REV. 04	REV. 05	REV. 06
DATE	01/01/2020	03/03/2020	20/03/2020	08/10/2020	23/03/2021	05/08/2021	07/12/2021
EXECUTION	RSS	RSS	RSS	RSS	RSS	RSS	RSS
VERIFICATION	RSS	RSS	RSS	RSS	RSS	RSS	RSS
APPROVAL	MM	MM	MM	MM	MM	MM	MM

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ELECTRONICALLY TRANSLATED

*MM*

## Summary

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	TITLE: <b>NAVIGATION, MOORING AND ANCHORING STANDARDS OF VESSELS IN THE PORT OF ENSEADA SHIPYARD</b>		


## 1. GOAL

The purpose of this document is to standardize any and all boat navigation operations for entry into the access and permanence channel at the port of Enseada Shipyard, called Enseada private use terminal (**TUP Enseada**).

Informing the characteristics and restrictions of waterways, berths, maneuvering basin, ensuring safety in water transport.

The Captain of Brazilian Navy - Ports of Bahia (CPBA), Agent of the Maritime Authority, approved this standard, through the Ordinance No \_\_\_\_\_ / \_\_\_\_\_. Any amendment in this document that impacts the safety of navigation, safeguarding human life at sea and preventing water pollution without the agreement of the CPBA is blocked.

New requirements, not provided for in this Standard, may be determined by the Maritime Authority agent in view of the need to ensure the safeguarding of human life, safety of navigation and the prevention of environmental pollution by vessels.

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## 2. REFERENCES

### 2.1. Projects

- PSG-B-C-0000-PCP-LD-0001, "Document List" - Technical Specification Shipyard Enseada do Paraguaçu.
- ET-0000-NAV-EEP-0100, "Types of Vessels Moored Alongside EEP Quays" - Technical Specification - Shipyard Enseada do Paraguaçu.
- PSG-B-B-0500-DGG-ET-0001, "Dredging Project" - Technical Specification - Shipyard Enseada do Paraguaçu.
- PSG-C-B-0500-DGG-DE-5001, "Executive Dredging Project - General Plant - Excavation Area" - Design- Shipyard Enseada do Paraguaçu.
- PSG-B-A-0900-CCI-MD-000, Descriptive Memorial of the Maneuvering and Mooring Basin.
- RT-0218.048.02-10B-001B, Technical Report - Maneuverability Simulations and Nautical Access - Access to TUP Enseada (Technomar Oceanic Engineering)


### 2.2. Codes and Standards

- ABNT - Brazilian Association of Technical Standards
- PIANC - Permanent International Association of Navigation Congresses
- ROM Program - Recommendations for Maritimas Works (puerto.es)
- NORMAM - Standards of the Maritime Authority (Brazilian Navy)
- NORTEC - Nautical Signaling Technical Standards (Brazilian Navy)
- IALA - International Association of Marine Aids to Navigation and Lighthouse Authorities
- National Council for the Environment - Ministry of the Environment
- NPCP-BA (2015) - Rules and Procedures of the Brazilian Navy - Ports of Bahia

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### 2.3. Technical Literature

- Nautical Chart No. 1107 - Baía de Todos os Santos, West Part - CHM/DHN, warning 2020-71.
- Nautical Chart No. 1108 - Baía de Todos os Santos, Porto de São Roque and Nearby - CHM/DHN, issue September 17, 2018.
- Nautical Chart No. 1110 - Baía de Todos os Santos - CHM/DHN, notice 2022-204.
- East Coast Route - From Cape Heel to Cabo Frio - CHM/DHN, 2011.
- List of Headlights - CHM/DHN, 2013.
- SPM (1984) - Shore Protection Manual, Volumes 1 and 2.
- Dantas (1998) - Visual Nautical Signaling. Directorate of Hydrography and Navigation (DHN), 2nd Ed., Niterói, RJ, 1998.
- CEM (2002) - Coastal Engineering Manual," U.S. Army Corps of Engineers.

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### 3. LOCATION OF TUP ENSEADA

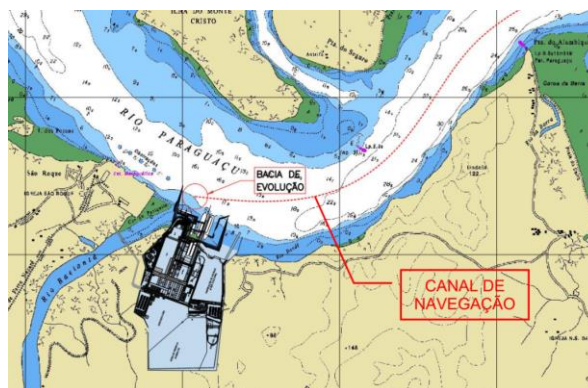
Figure 1 shows the location of TUP Enseada in reference to the map of Brazil and the State of Bahia. The basemap used in the figure is Nautical Chart No. 1110 - *Baía de Todos os Santos* - CHM/DHN, 07/02/19, where it is possible to view the Bay of All Saints and the Paraguaçu River, characterizing nautical access to the shipyard.



**Figure 1:** Extract from the location plant of TUP Enseada.

The TUP of enseada shipyard is located near the city of São Roque, located on the right bank, approximately 3.4 nautical miles from the mouth of the Paraguaçu River, at the mouth of the Baetantã River, practically facing the Island of Monte Cristo.

According to **Figure 2**, it is located in the so-called Ponta do Corujão, having as neighbor the Terminal of São Roque belongs to PETROBRAS S/A, and destined for the movement and repair of maritime platforms, probe ships, boring and other similar metal structures.



**Figure 2:** Nautical Chart clipping with addition of the Enseada Shipyard Terminal Arrangement and Navigation Channel.



**Photo 01:** Indication area of the Terminals of São Roque (Petrobrás) and TUP Enseada, and the Baetantã and Paraguaçu Rivers.

The vessels that demand the region of São Roque, since the entrance of the Bay of All Saints, follow the navigation recommendations of the nautical accesses existing in the nautical charts listed in **Table 01**.

Nautical Chart No.	Name
1107	All Saints Bay - West
1108	<i>Baía de Todos os Santos - Porto de São Roque</i> and Nearby
1110	All Saints Bay
1101	Near by The Port of Salvador

**Table 01** - Recommended Nautical Charts for Nautical Access to TUP ENSEADA

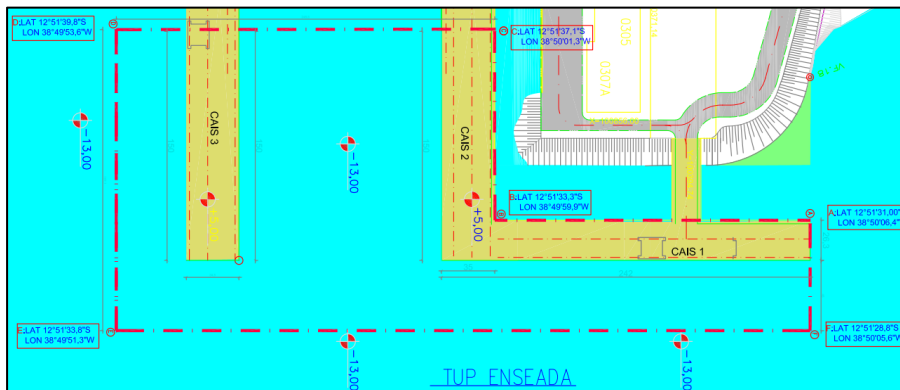
**3.1. Address**

<b>Terminal Address:</b> Rua A, Fazenda Boa Vista do Gurjão and Dendê		<b>Number:</b> S/N
<b>Complement:</b> Annex 2		<b>Neighborhood:</b> Enseada do Paraguaçu
<b>Municipality:</b> Maragogipe		<b>State:</b> BA
<b>ZIP Code:</b> 44420-000		

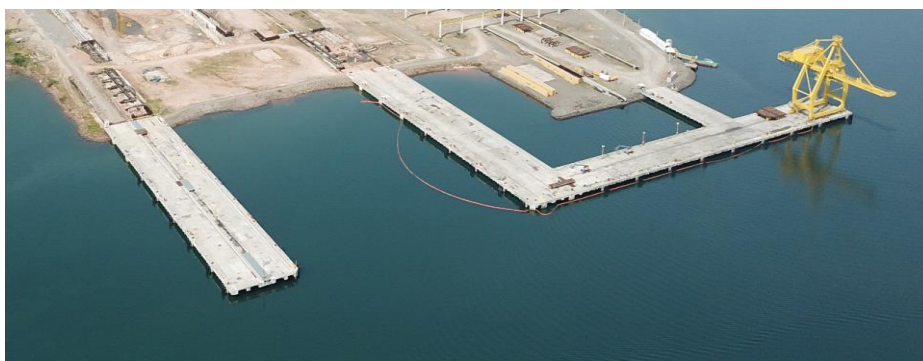
### 3.2. Geographic Location

Considering the Datum **SIRGAS 2000**, the Polygonal terminal of Enseada shipyard is located in the following coordinates:

	<i>Geographic Coordinates</i>	
<i>Point</i>	Latitude	Longitude
<i>The</i>	12°51'31.00"S	38°50'06.4"W
<i>B</i>	12°51'33.3"S	38°49'59.9"W
<i>C</i>	12°51'37.1"S	38°50'01.3"W
<i>D</i>	12°51'39.8"S	38°49'53.6"W
<i>And</i>	12°51'33.8"S	38°49'51.3"W
<i>F</i>	12°51'28.8"S	38°50'05.6"W



**Figure 3:** TUP Enseada, geographic coordinates.



**Photo 02:** TUP Enseada.

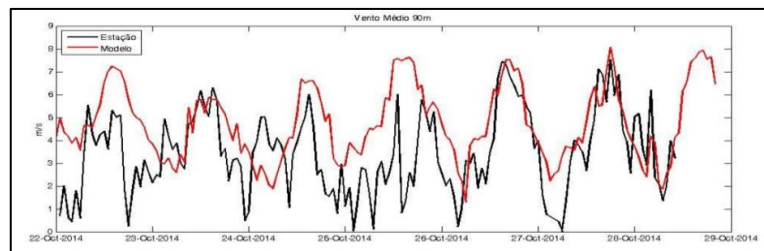
## 4. CHARACTERISTICS OF TUP ENSEADA

### 4.1. Environmental Conditions

This section presents a summary of the environmental analysis carried out to survey wind and current conditions in the shipyard region.

#### 4.1.1. Wind

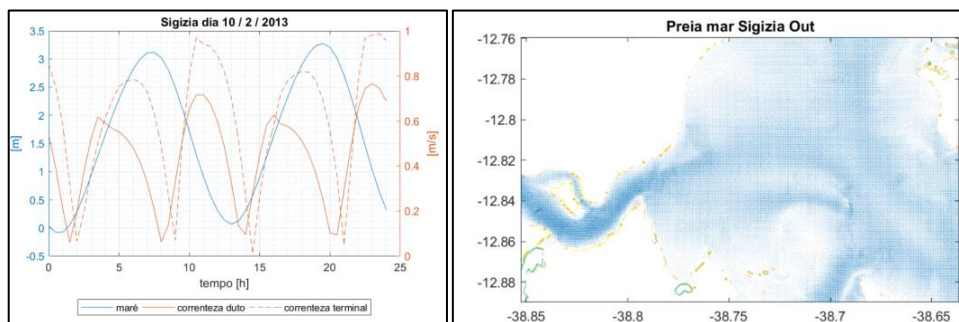
**Figure 4** is possible to observe the history of wind intensity raised between October 22 and 29, 2014. Based on this graph it was defined that a wind intensity of 15 knots. And, according to the data measured in the field, the predominant wind directions are E, ESE and SE.



**Figure 4:** Graph generated from data collected in the field by Tetrattech.

#### 4.1.2. Current

To characterize the current in the locality, a study with numerical modeling was used by the company I4Sea. The spring and neap currents used in the simulation are shown in **Figure 5** and **Figure 6**, respectively.



**Figure 5 :** Current of spring tide for the month of October (dry period)

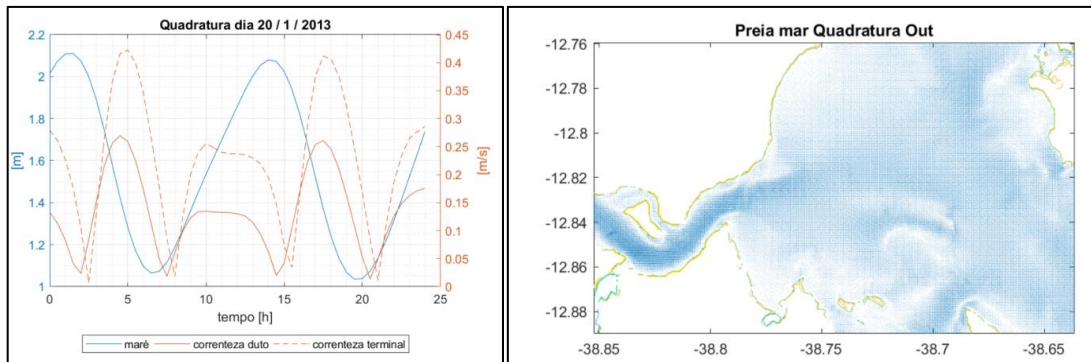


Figure 6: Current of neap tide for the month of October (dry period)

## 4.2. Access Channel

### 4.2.1. Location and Features

The access channel of the Enseada Shipyard Terminal is demanded from the nearby southern end of Frade Island, taking as reference the Paraguaçu Lighthouse, in Ponta do Alambique, in the Bay of All Saints.

The depths along the nautical access vary from 9.6 m to 27 m, values referred to the level of reduction of Nautical Chart No. 1107 "Baía de Todos os Santos, Porto de São Roque e Proximidades" - CHM/DHN, 17/09/2018.

Figure 7 shows the main nautical signs existing in Nautical Chart No. 1107 along the existing nautical access used by TUP Enseada.



Figure 7: Section of Nautical Chart No. 1107 with the marking of nautical signs and approximate location of TUP Enseada.

It follows description of nautical signs and possible dangers for navigation.


#### 4.2.2. Existing Nautical Signs.

Name (Order No.)	Position	Beacon	Luminous and Geographical Ranges	Description and height	Observations
- Provisional Buoy No. 1 <sup>1</sup> (---)	12° 48,85' 38° 43,97'	Lp. E	5 M.N.	Incarnate	Radar reflector
- Provisional Buoy No. 2 <sup>1</sup> (---)	12° 48,94' 38° 44,06'	Lp. V	5 M.N.	Green	Radar reflector
- Buoy no.1 <sup>1</sup> (Old 1708)	12° 48,85' 38° 44,32'	Lp. E	5 M.N.	Incarnate	Radar reflector
- Buoy No. 2 (1712)	12 49,68 38 45,65	Lp. V	8 M.N.	Green	Radar reflector
- Farolete Pedra do Itaipabo (1716)	12 49,38 38 47,13	Lp. E	8 M.N. 8 M.N.	Metal tube 4 M.N.	Tope Brand
- Farolete Paraguaçu (1720)	12 50,36 38 47,63	Lp. B	14 M.N. 10 M.N.	Metal truss 7 M.N.	-
- Buoy No. 3 (1724)	12 51,03 38 48,82	Lp. E	5 M.N.	Incarnate	Radar reflector
- Lighthouse Head of Black (1728)	12 49,65 38 51,35	Lp. E	5 M.N. 9 M.N.	Metal tube 6 M.N.	-

<sup>1</sup> according to nautical signaling project - Paraguaçu River - Baía of all saints - BA (MAR -MD - 2021- 05-031).

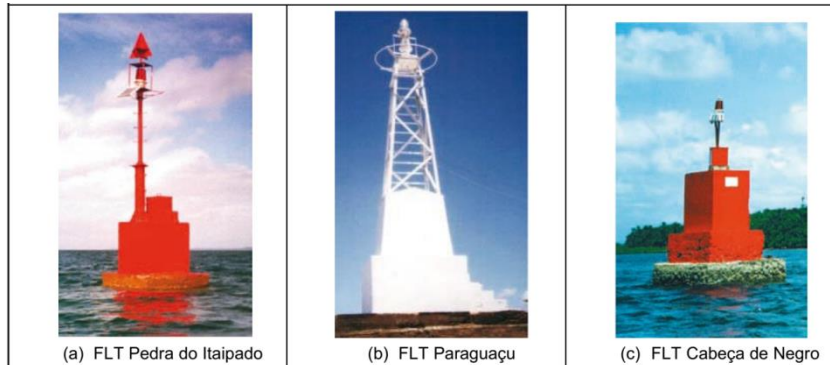


**Photo 3:** Photo of buoy no. 03 on the Paraguaçu River

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- Farolete Cabeça de Negro (no. 1728)

Farolete Cabeça de Negro is located at coordinates 12°49,65'S / 38°51,35'W. It consists of metal tube on quadrangular base of masonry, red, with 6 m high and light of red flash at the altitude of 7 m with a range of 5 nautical miles, next to the slab Cabeça de Negro.



**Photo 4:** Lighthouses (FLT) existing along the nautical access to TUP Enseda.

In demand of the Itaparica channel and the Paraguaçu River, vessels must observe existing hazards in the area with depths above 5m;

#### 4.2.3. Dangers for Navigation

##### -Stones

At the entrance of the Itaparica channel, with three heads at depths of 1.4 m, 1.5 m and 1.6 m. The 1.5 m head is at the 336° mark and distance of 1.4 nautical miles from the remarkable antenna of the tip of Itaparica. They are marked by the light buoy of boreste Itaparica no. 1 (1748).

##### - Coroa do Meriti

With a lower depth of 1.8 m at the 046° mark and distance of 0.86 nautical miles from the remarkable antenna of the tip of Itaparica. 0.35 nautical miles to NW from this crown tip the lighthouse Itaparica no. 2 (1752).

##### - Coroa das Pedras

With a lower depth of 1.4 m at the 347° marking and distance of 3.0 nautical miles from the remarkable antenna of the tip of Itaparica. It is marked by the light buoy of port Coroa das Pedras (1744).

- Coroa Nova

With a lower depth of 0.9 m at the 325° mark and distance of 4.18 nautical miles from the remarkable antenna of the tip of Itaparica. It is marked by the light buoy of port Coroa Nova (1740).

- Obstructions at The Terminal of St. Roque

Despite having no influence on Enseada's maneuvering area, it is notelike the existence in the vicinity of the port of São Roque, obstructions in the distance of 0.1 nautical miles with the presence of mooring buoys.

- Black Head Slab

At a depth of 4.8 m, position 12°49.65'S / 38°51,35'W. It is marked by the Lighthouse Slab Head of Black.

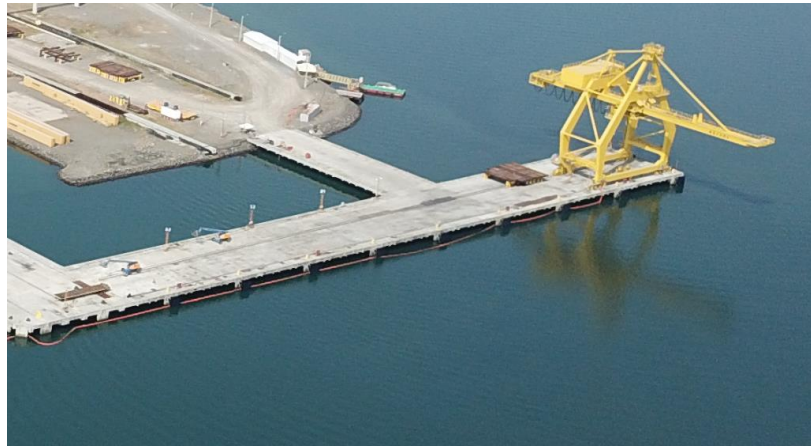
**4.3. Mooring Quay (Berths)**

The port facilities in TUP Enseada are: Quay 01 (Berth 01), Quay 02 (Berth 02), Quay 03 (Berth 03 and Berth 04).

4.3.1. Quay 01 (Berth 01)

	Quantity	Dimensions	Unit
Length	-	242	m
Width	-	26,3	m
Depth at Quay front	-	13	m
Fenders (Reaction forces 1149 kn and absorption 633 kN.m)	02	3x4.5	m
Fenders (Reaction forces 1149 kn and absorption 633 kN.m)	09	3x3	m
Bollards	10	150	Ton
Bollards	03	300	Ton

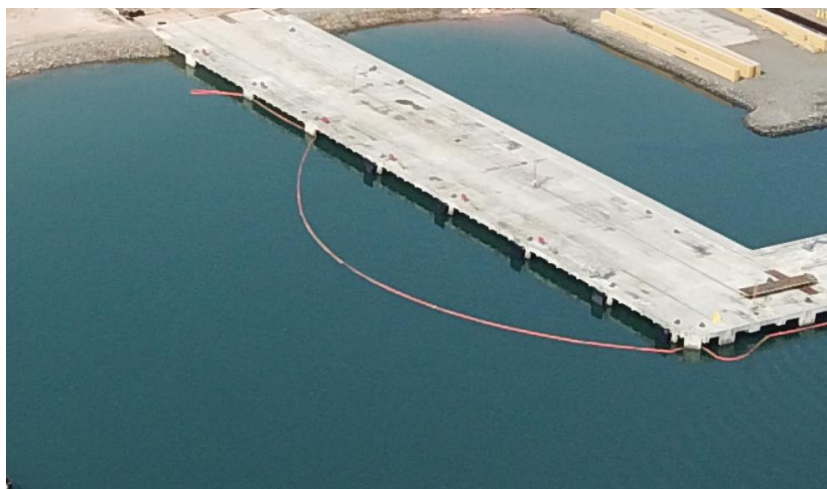




**Photo 5:** Quay 01 (Folding crane boom, 90°).

4.3.2. Quay 02 (Berth 02)

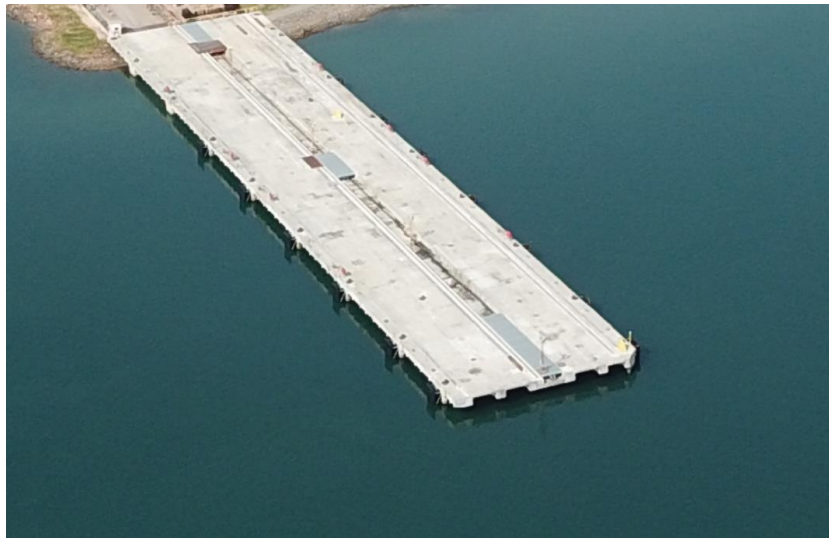
	Quantity	Dimensions	Unit
Length	-	150	m
Width	-	35	m
Depth at Quay front	-	13	m
Fenders (Reaction forces 1149 kn and absorption 633 kN.m)	03	3x4.5	m
Fenders (Reaction forces 1149 kn and absorption 633 kN.m)	05	3x3	m
Bollards	09	200	Ton
Bollards	02	300	Ton



**Photo 6:** Quay 02

**4.3.3. Quay 03 (Berth 03 and Berth 04)**

	Quantity	Dimensions	Unit
Length	-	150	m
Width	-	35	m
Depth at Beira do Cais	-	13	m
Fenders (Reaction forces 1149 kn and absorption 633 kN.m)	06	3x4.5	m
Fenders (Reaction forces 1149 kn and absorption 633 kN.m)	10	3x3	m
Bollards	17	200	Ton

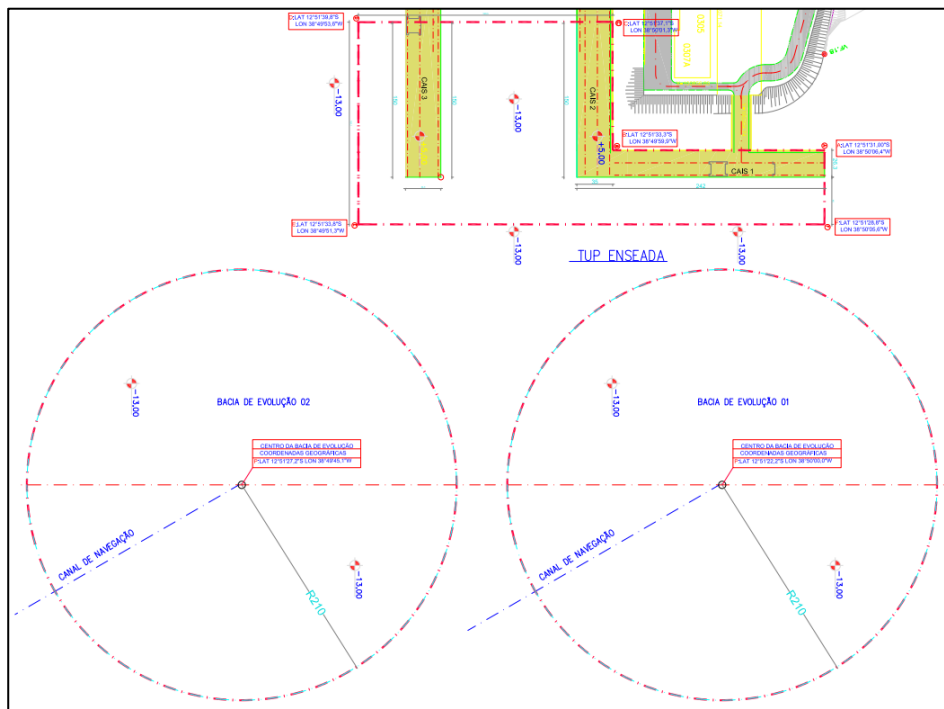


**Photo 7: Quay 03 (Berth 03 and 04)**

**4.4. Evolution Basin**

Basin 01 (Berth 1)	Dimensions	Unit
Radius	210	m
Area	138.000	m <sup>2</sup>
Minimum Depth (minimum tide)	13	m
Geographic Coordinates Center of B. Evolution	LAT: 12°51'22.2" S	LON: 38°50'00.0" W

Basin 02 (Berth 2,3,4)	Dimensions	Unit
Radius	210	m
Area	138.000	m <sup>2</sup>
Minimum Depth (minimum tide)	13	m
Geographic Coordinates Center of B. Evolution	LAT: 12°51'27.2" S	LON: 38°49'45.1" W



**Figure 8 : Evolution Basin Project**

**5. OPERATIONAL CHARACTERISTICS TUP ENSEADA (ACCESS, DIMENSIONS AND RESTRICTIONS)**

**5.1. Maximum Speeds**

Pipelines and Sandbank Region	<6.0 (six) knots
-------------------------------	------------------

### 5.2. Recommended Maximum Draught (CRM) calculation

$CMR = (P + M) - [(P + M) \times FS]$ <p>Onde:</p> <p>CMR = calado máximo recomendado</p> <p>P = profundidade do local reduzida ao nível de redução</p> <p>M = altura da maré no momento, obtida da tábua de marés</p> <p>F.S. = percentual de fator de segurança (natureza do fundo)</p>
---

Source: NPCP-CPBA

For the purpose of calculating the CRM, adopt the value of 9.8% as a safety factor (F.S). In the event of adverse sea conditions, preceded by "Severe Weather Warnings" released by the Navy Hydrography Center (CHM), 13% should then be considered as a safety factor.

### 5.3. Access Channel

#### 5.3.1. Dimensions

Length	7790 meters
Width	171 <sup>1</sup> meters
Minimum Depth (minimum tide)	9.6 meters

<sup>1</sup> according to nautical signaling project - Paraguaçu River - Bay of all saints - BA (MAR -MD - 2021- 05- 031).

#### 5.3.2. Maximum dimensions for Vessels

	Vessels	
	Merchant Ships	SS Drilling
LOA (m)	260,00	97,00
Mouth (m)	43,00	70,00
Draught (m)	8.56 - 11.64*	
Gross Weight - DWT (ton)	120.000	15.000

\*See item 5.2 for CRM determination. For these draught values, the historical minimum tide value of (-) 0.1 m and maximum (+)3.3 m was adopted.

**5.4. Berths, maximum dimensions for vessels**

**5.4.1. Berth 01 (Quay 01)**

Dimensions	Vessels	
	Merchant Ships	SS Drilling
LOA (m)	260,00	97,00
Mouth (m)	43,00	70,00
Draught (m)	8,56 – 11,64*	
Gross Weight - DWT (ton)	120.000	15.000

\*See item 5.2 for CRM determination. For these draught values, the historical minimum tide value of (-) 0.1 m and maximum (+)3.3 m was adopted.

Quay 01 features a load handling equipment, *unloading crane*, even having its boom folding, being free without vertical interference, pay close to vessels that have lateral appendages, which come to protrude up the quay, when moored.

**5.4.2. Berth 02 (Quay 02).**

Dimensions	Vessels
LOA (m)	97,00
Mouth (m)	97,00
Draught (m)	8,56 – 11,64*
Gross Weight - DWT (ton.)	15.000

\*See item 5.2 for CRM determination. For these draught values, the historical minimum tide value of (-) 0.1 m and maximum (+)3.3 m was adopted.



5.4.3. Berth 03 (Quay 03)

Dimensions	Vessels
LOA (m)	97,00
Mouth (m)	97,00
Draught (m)	8,56 – 11,64*
Gross Weight - <i>DWT</i> (ton.)	15.000

\*See item 5.2 for CRM determination. For these draught values, the historical minimum tide value of (-) 0.1 m and maximum (+)3.3 m was adopted.

5.4.4. Berth 04 (Quay 03)

Dimensions	Vessels
LOA (m)	97,00
Mouth (m)	97,00
Draught (m)	8,56 – 11,64*
Gross Weight - <i>DWT</i> (ton.)	15.000

\*See item 5.2 for CRM determination. For these draught values, the historical minimum tide value of (-) 0.1 m and maximum (+)3.3 m was adopted.

**6. PILOT AND TUGS**


The use of practical and tugboats in the maneuvers of ships in the TUP Enseada is mandatory according to the Maritime Authority Standard (NORMAM 12) and Rules and Procedures of the Brazilian Navy - Ports of Bahia (NPCP-BA) and it will be up to customers and users of the Terminal to hire them.

For typical vessels, during mooring maneuvers use the tower numbers according to the table, below:

Type Ships	Quantity (Mooring)	Quantity (Undocking)	Static Traction ( <i>bollard pull</i> )	Unit
<b>Merchant Ships (Dwt ≤120,000)</b>	2	2	60	Ton
<b>Merchant Ships (Dwt ≤80,000)</b>	2	2	50	Ton
<b>Merchant Ships (Dwt ≤70,000)</b>	2	2	4th5th	Ton
<b>Merchant Ships (Dwt ≤50,000)</b>	2	2	40	Ton
<b>Semissubmersible platform</b>	4	4	50	Ton

**Table 02:** Tug Sizing


Vessels smaller than typical vessels, should present configuration analyses of tugs for approval of this Port Authority.

	<b>NORM</b>		ENSEADA Nº	<b>N-EIN-TUP-001</b>	RE V.	<b>6</b>
	AREA:	<b>QUALITY MANAGEMENT SYSTEM</b>			LEAF:	<b>22 of 24</b>
	TITLE:	<b>NAVIGATION, MOORING AND ANCHORING STANDARDS OF VESSELS IN THE PORT OF ENSEADA SHIPYARD</b>				

**7. INDOOR AREA FOR ANCHORING**

The Evolution Basin may be used as an internal anchor in emergency situations or for the safeguarding of human life at sea with the authorization of the TUP Administration and/or the Maritime Authority.

*M. Mauer*

	<b>NORM</b>	ENSEADA Nº <b>N-EIN-TUP-001</b>	RE V. <b>6</b>
	AREA: <b>QUALITY MANAGEMENT SYSTEM</b>	LEAF: <b>23 of 24</b>	
	TITLE: <b>NAVIGATION, MOORING AND ANCHORING STANDARDS OF VESSELS IN THE PORT OF ENSEADA SHIPYARD</b>		

## 8. DISTRIBUTION

Its publication and any and all changes should always be distributed, according to the list of entities below:

- Brazilian Navy - Ports of Bahia (CPBA).
- Union of Practitioners of the State of Bahia (SINDIPRAT).
- Bahia Pilots.
- Salvador Pilots.
- National Union of Maritime Navigation Companies (Syndarma).
- Union of Navigation Agencies in the State of Bahia (Sindinave).



NORM

ENSEADA Nº

N-EIN-TUP-001

RE  
V.

6

AREA: **QUALITY MANAGEMENT SYSTEM**

LEAF: **24 of 24**

TITLE: **NAVIGATION, MOORING AND ANCHORING STANDARDS OF VESSELS IN THE PORT OF ENSEADA SHIPYARD**

**9. TERM OF THE STANDARD**

This standard shall is valid from \_\_\_\_\_ of \_\_\_\_\_ of 20\_\_\_\_\_.

Director of Enseada Private Use Terminal

Mario Arthur of Assis Borges Moura