
Section C - Engineering

1. Introduction

This section presents preliminary engineering studies on **STS08** lease area located in the Alamoia region, in the Port of Santos' right bank. The terminal is used for the handling, storage and distribution of liquid and gaseous bulk, especially petroleum byproducts.

2. Description of The Operational Structure

The **STS08** lease area will be focused on cabotage and long-haul operations, mostly on boarding petroleum products.

The terminal's total surface area is **168.324 m²** with pipeline connection to Presidente Bernardes refinery and to Cubatão Terminal; the pipeline connects to the existing refineries in the State of São Paulo. **STS08** also has a pipeline connection to Alamoia's public pier.

Currently, the project is classified as brownfield. Therefore, the enterprise will operate on a land with existing infrastructure.

The **STS08** lease area has Port Authority structures and structures of the current lessee that are reversible to the Port Authority, as well as equipment of the current lessee that are not reversible.

Considering that one of the assumptions of the study is that the terminal may not incur in operational discontinuity, non-reversible assets to the Port Authority shall be indemnified by the future lessee of **STS08A** that will temporarily exploit the terminal during the first two contractual years and will subsequently comprise the list of assets that will be made available upon the lease of **STS08**.

It was also considered an assumption of the study, for the purposes of economic and financial analysis, that all investments foreseen in Capex (Annex C-2: Capex) and in the indemnification of existing assets located in the leasing area, **will be reversible** to the Port Authority at the end of the lease

All assets will be made available to the future lessee in their current condition. The lessee must make the necessary investments in order to guarantee that the terminal operates properly. The future lessee is also responsible for executing improvements. To check the list of existing assets, see Section E - Financial.

In addition, the future lessee will be expected to make the planned investments specified in this study, including operational and safety improvements to the Terminal; new equipment to expand static capacity; segregation of operations in the delimited area and installation of land reception system.

- I. Terminal Development (execution between the 1st and 2nd contractual year):
 - a. Fence and safety;
 - b. Implementation of a new Fire Fighting System;
 - c. Demolition.

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- II. Equipment for static capacity expansion and segregation of operations in the delimited area (execution between the 1st and 3rd contractual year - 1st phase):
- a. Installation of new storage tanks, with total static capacity of 67. 500 m³;
 - b. Installation of new pipeline lines;
 - c. Installation of two new set of pumps;
 - d. Installation of two truck unloading stations;
 - e. Installation of two truck loading stations;
 - f. Installation of *pipe rack - manifold* - next to STS08 to access pipeline installed outside the Organized Port.
- III. Investments in the common area of the organized port (execution between the 1st and 3rd contractual year - 1st phase):
- g. Installation of firefighting system;
 - h. Implementation of the new access - Public Gate and sentry box;
 - i. Building and parking;
 - j. Substation;
 - k. Installation of *pipe rack - Public Gate area*.
- IV. Expansion of static capacity and segregation of operations in the delimited area (execution between the 3rd and 5th contractual year - 2nd phase):
- a. Reception of CODESP's existing tanks, with a static capacity of 39,525 m³;
 - b. Installation of new storage tanks, with total static capacity of 57,220 m³;
 - c. Installation of new pipelines;
 - d. Installation of a new set of pumps;

The calculation of capacity in each operating subsystem is presented in more details in chapter "Compatibilization of Future Capacity of the Enterprise".

For more operational details, see Section D - Operational.

2.1. Waterway Loading/Unloading System

Lease areas **STS08** and **STS08A** are currently served by berths AL 01 and AL 02, located in the Alamoia Pier.

According to the list of "BERTHS OPERATIONAL DRAUGHTS", No. 219 of 07/20/2019, the information below can be seen:¹

Berth	TPB	Length (m)	Project Depth (m)	Operational Draught (m)	
				Low Tide	High Tide
1 AL	60,000	250	12,70	11,90	12,20
02 AL	60,000	250	12,70	11,50	11,80

¹ The "BERTHS OPERATIONAL DRAUGHTS" is authored by the Traffic and Mooring Management of the Port Authority.

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Table 1 - Berth Characteristics of Alamoia liquid bulk terminals
Source: Port Authority

It is important to point out that berths AL 03 and AL 04, which are also part of the Alamoia pier, are currently used for receiving and embarking chemicals products, and were not considered in this study.



Figure 1: Illustration of Alamoia fluid berths
Source: Master Plan of the Port of Santos

In addition to the pier's regular berths, there are smaller vessels moorings on the inside part of the T structure, on the west side of the pier. This location is used for Bunker oil shipment on barges that supply vessels docked at the Port Complex.

In order to meet future demand, **STS08A**'s next lessee will be responsible for building a new pier, adding two new berths - the Alamoia 05 (AL 05) and 06 (AL 06), upstream of the existing pier. The expansion's scope intends to guarantee adequate berth capacity for **STS08A**'s new lessee contractual term.

The construction of the new pier on piles for berths AL 05 and AL 06 should be sized for vessels of at least a 100,000 TPB (250 m LOA, 43 m opening and 15.1 m draught). The location of the new superstructure should be in the northwest direction, close to AL01, with a slope so as to not interfere with the two upstream channel branches (Piaçaguera Channel to the north and future TUP Alamoia to the west). Additionally, there should also be a large enough gap between existing and new pier, allowing the passage and mooring of 4,000 TPB supply barges (at least 80 meters long and 6 meters of draught) on the inner part of the existing "T" structure's west side.

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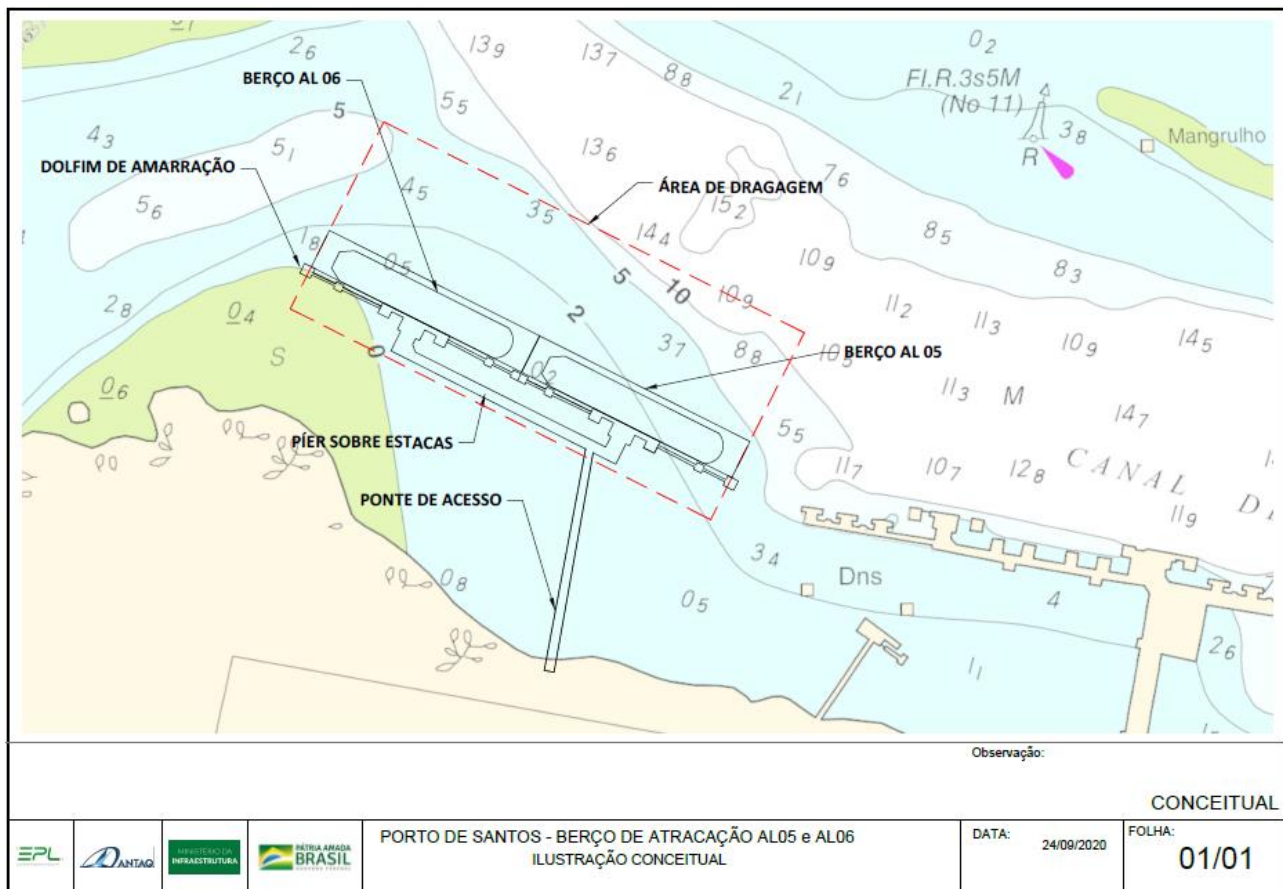


Figure 2: Illustration of the new mooring berths for Alamoia (AL05 and AL06)
Source: EPL

Dredging for new berths AL 05 and AL 06 and their respective access basins are to be carried out by the future lessee of STS08A. The study estimates that minimum dredging depth is of at least 15.0m (DHN). It is important to point out that this depth is lower than what would actually be required to fully comply with the project's ship draft, especially considering the current operational draught limitations of the access channel stretch (12.70 m in the low tide and 13.70 m during high tide).

The construction of a new Alamoia pier is the responsibility of **STS08A's** future tenant. Construction must occur between the 1st and 5th contractual year, allowing for operations to start in the new pier by the 6th contractual year.

It is important to stress that construction methodologies and values presented in this study are all estimates. Therefore, it is up to auction bidders to carry out field studies, data collection with the Port Authority and/or technical assessment necessary to support their proposals.

At this point, it is worth emphasizing the operational improvements and the expansions of the handling capacities at the Alamoia pier according to the calculation of the cargo handling capacities for the **STS08** and **STS08A**:

- Reduction of non-operating times for liquid bulk vessel services;

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- Replacement of the loading arms in berths AL 01 and AL 02 and automation of the barge pier, increasing loading/unloading system;
- Construction of a new pier in Alamoia for the operation of two new berths, corresponding to the fifth and sixth berths at the Alamoia region;
- For the purpose of collecting relevant operational statistics, the study considered only the most productive period (2014-2018) in its sample.

Based on such assumptions and as of the beginning of STS08's operation its berth productivity rate was set at 760 t/h. Berth occupancy rate considered amounted to 60%.

Currently, berths AL 01 and AL 02 show consistently high occupancy and high average mooring time. Given demand projections and the investments foreseen in the construction of a new pier in Alamoia, it is reasonable to expect considerable improvements in the level of service for the **STS08** and **STS08A** terminals.

In accordance with the project's investment timeline, **STS08** and **STS08A** will both share AL01 and AL02, until the fifth contractual year. Upon the completion of the new pier, Terminal STS08A will start handling liquid petroleum byproducts at berths AL05 and AL06. As for the LPG operation, it will continue to be carried out at AL01 and AL02. Meanwhile, **STS08** will also continue to handle its products at berths AL01 and AL02.

In order to foster a more harmonious use of pier infrastructure and provide adequate capacity for the new tenants, the study suggests giving terminal **STS08** and **STS08A** preferential status regarding berth utilization. When appropriate, this preferential mooring should also apply to more than one vessel if the other vessel is operating in the adjacent berth.²

The study expects berths AL05 and AL06 to come online up to 2026. At this time, the new pier will also become integrated to STS08A's area. Also considering the two initial phases of implementation of the terminals in the first five contractual years and the definitive phase from the sixth contractual year, the mooring priorities were considered as follows:

Period	1st and 2nd year	3rd to 5th year	6th to 25th year
STS08A	Preferential mooring at berths AL 01 and AL 02	Preferential mooring at berth AL 02	Berths AL 05 and AL 06 are part of the lease area STS08A
STS08	Not applicable	Preferential mooring at berth AL 01	Preferential mooring at Berth AL 01

Table 2 - Priority mooring of Terminals **STS08** and **STS08A**

Source: EPL

Finally in relation to berth operational performance, the following indicators were of prime concern to the study: Average Cargo per Vessel, Productivity (average handling rate) and Occupancy Rate. These indicators

² Mooring order provided by SPA DIPRE Resolution No. 150/2020, based on the Santos Port Operating Regulations -REP 2020.

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aim at monitoring the port's mooring capacity system, considered the most relevant and scarce assets in terms of infrastructure. For more information, see Section D - Operational.

2.2. Storage Capacity

A two-step transition rule is necessary given that area STS08's storage facilities are partially dependent on subsystems within **STS08** leasing area. Hence, the study saw fit to devise a transition phase when both areas will work on becoming independent of each other.

The main assumptions for the transition phase are:

- Safeguard the continuity of the then existing port operation;
- Assimilate in the study the adjacent areas with low attractiveness or low viability;
- Propose petroleum byproduct operation that is conducive of port infrastructure investments and encourage better use of potential areas for capacity expansion;

In the 1st phase of the transition, the implementation strategy has the following objectives: i) focus on existing operations in terminal **STS08A**, safeguarding continuity of operation through the addition of temporary areas and ii) start the expansion of tank capacity in currently unoccupied areas that will become part of **STS08** terminal; and in the 2nd phase of the transition: iii) conclude the capacity expansion of **STS08** in areas that were temporarily managed by **STS08A**, and iv) expansion of Alamoá's Waterway system through the construction of a new pier with two additional berths.

In the table below, the study elaborates further on its transition implementation strategy for Terminals **STS08** and **STS08A**:

Stages	Period	Description
1st Stage of Transition	1st to 3rd contractual year (3 years)	<p>STS08: will receive an initial area of 82,363 m²; executing 1st phase investments (installation of new storage tanks with total static capacity of 67,500 m³ for petroleum byproducts; installation of new pipeline (approximately 50%); installation of two new pump facilities, pipe racks, two new loading stations, two new unloading stations, investments in common area of the Organized Port; and segregation of environmental licensing, <u>all within 3 years</u>. Observation: not including port operation. In the third year, STS08 receives additional area of 69,962 m² from the Port Authority (with a static capacity for 39,525 m³). Up until the third year, STS08A will be temporarily responsible for this 69,692 m² area. With the transfer of the area, STS08 will reach its definitive size corresponding to 152,324 m² and 107,025 m³ of static capacity.</p>
		<p>STS08A: will receive an initial area of 343,926 m² of which 297,349 m² are dedicated to storing petroleum byproducts LPG with static capacity for 229,864 m³ and 83,002 m³, respectively. In addition, the terminal will also operate on 46,577 m² of temporary area with static capacity for 39,525 m³ of petroleum byproducts. As mentioned before, STS08A's temporary stewardship of this areas aims at achieving the following objectives: safeguarding operational continuity of the fuel supply chain; necessary investments in the terminal's operational security; investments in static capacity expansion (static capacity of 24,380 m³ for petroleum byproducts) and adequate segregation of operations between the sister terminals; and segregation of environmental licensing, all within a 2-year deadline; observation: STS08A will provisionally run STS08 area so as to ensure continuity of the existing port operation. At the end of the 2nd contractual year, STS08A will return this area to the Port Authority, so it can be made available to the lessee of terminal STS08. Upon transferring its provisional areas, STS08A will be left with its final lease area of 297,349 m². By the 3rd contractual year, STS08A starts to operate with a total static capacity of 254,244 m³ for petroleum byproducts and 83,002 m³ for "LPG".</p>

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2nd Stage of Transition	3rd to 5th contractual year (3 years)	STS08: During the second phase, STS08 receives its additional area, summing up to the terminal's definitive area of 152,324 m ² . On its newly acquired land, STS08 is responsible for executing the 2nd phase of investments, including the installation of new storage tanks, with static capacity of 57,220 m ³ for petroleum by-products (total terminal static capacity of 164,245 m ³); installation of new pipelines (approximately 50%); installation of a new pump facilities; observation: STS08 starts its port operations.
		STS08A: the terminal finishes construction of the new Alamoia pier, equipped with two new berths (AL05 and AL06). STS08A is also responsible for executing the dredging work of deepening the new berths and access area to the berths until the deadline in the 5th contractual year .
Definitive Situation	6th to 25th contractual year (20 years)	STS08: starts the port operation with total static capacity (164,245 m ³ for petroleum by-products).
		STS08A: beginning of operation of Alamoia's 5th and 6th berths.

Table 3 - Transition strategy for Terminals **STS08** and **STS08A**

Source: EPL

At its definitive form **STS08** will consist of 15 tanks (proposed conceptual arrangement) totaling **164,245 m³** for petroleum by-products (**148,647 tons**).

Of this of expected total amount, the future lessee would have to install a total of nine new tanks.

Four other tanks are owned by the Port Authority and two other tanks are classified as non-reversible to the Port Authority, totaling six existing tanks. These existing tanks will be provisionally assigned to **STS08A** (1st and 2nd contractual year) to safeguard the continuity of port operations. **STS08A** will also return non-reversible assets to the former lessee, so that they become part of the list of reversible assets of the future **STS08** lease, free of charge to the **STS08** future lessee. The area in which these tanks are inserted will be made available to **STS08** in the 3rd contractual year. Thus, existing tank infrastructure will be operational from the 4th contractual year onward. Furthermore, the 2nd phase of implementation of new tanks will be carried out up to the 5th contractual year.

It is worth noting that the six existing tanks will be delivered by the current lessee in full operational condition, given the current lessee's ongoing maintenance to recover inactive tanks.

It is noteworthy that during the 1st transition phase (1st to 3rd contractual year), no port operation was planned for Terminal **STS08**. Of particular relevance to this objective is the implementation of 67,500 m³ of tanking capacity.

In addition to installing the new tanks, there are also the corresponding piping and pumping systems, truck loading and unloading system, investments in common port area, administrative and utilities areas.

From the 4th contractual year onward, Terminal **STS08** will operate the 67,500 m³ implemented during the 1st transition phase; and from the 4th contractual year it will also start the operating the 39,525 m³ of capacity provisionally operated by **STS08A**. Hence, by the 4th contractual year, **STS08** will operate with 107,025 m³. This, in addition to completing the investments in the implementation of the remaining tanks in the complementary area.

All existing assets are reflected in the model under their current state of conservation, with the objective of allowing the bidder to formulate a more realistic proposal.

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To estimate existing asset value, the study decided to use the Ross-Heidecke methodology, a traditional way of calculating physical depreciation by considering the asset's age (as a percentages of useful life) and classifying it under nine different levels of conservation (new, regular, simple repairs, important repairs and no value).

Despite the widely acceptance of the above referred to methodology, the study recognizes the inherent uncertainty related to measuring an asset's remaining useful economic life. Moreover, the advance age of the assets makes the calculation even more challenging. Thus, in arriving at its own estimate, the study also considered the current lessee own assessment of its assets (Annex). The way this study approached the existing lessee's assessment is shown in the Technical Note, Section C.

In this context, in order to estimate the necessary investments so that existing operational assets may generate future cash flows, the study created a ratio of depreciated value of the asset in relation to the value of a new one, considering the state of conservation of each asset, as classified in the lessee's equity assessment report.

For conceptual layout purposes, the study tried to appropriate as many existing operational facilities as possible. Thus, from the existing capacity and available land, the study projected the additional capacity to meet growing demand. Concerning additional tank storage, the study followed sizing requirements for liquid bulk terminals, especially the following: ABNT NBR 17,505, parts 1 to 7, ABNT NBR 7,821, API 650 AND API 620 (American Petroleum Institute).

In addition to the existing tanks with 39,525 m³, the need to expand the static capacity by 124,720 m³ was evaluated. In total, the future **STS08** terminal will have a **minimum static capacity of 164,245 m³**.

Based on historical record of operations and on the expected improvement potential, it is estimated that the **STS08** terminal performs 30 annual inventory turnovers for petroleum byproducts, which corresponds to a dynamic capacity of **4,927,350 m³/year (4,459,411 t/year)** for petroleum byproducts.³

Considering that the final size of the area corresponds to **152,324 m²**, the utilization index, measured in m³/m², is 1.07.⁴

The necessary size of the terminal considered its projected demand over 25 years and the capacity of its yearly berth and storage systems. For more details on terminal sizing, see Section B - Market Studies.

In estimating the necessity of tank storage, this study considered de expected volume for liquid bulk, especially petroleum by-products. It should be noted that the layout and sizing of the tank set is the prerogative of the winning bidder, subject to contractual conditions.

³ Considering a weighted average density of 0,905 t/m³ for petroleum byproducts.

⁴ The area utilization index (utilization coefficient) is an indicator that, when applied to the liquid bulk port sector, takes volume of tanking capacity and divides it by total area in square meters.

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In estimating the unit cost of acquisition of tanks, the study used samples from national suppliers, estimates from other feasibility studies approved by the Federal Government and Antaq's Port Cost System - SICPORT.

For modeling purposes, the pricing of new tanks related to additional capacity adopted a parametric model that includes all associated works and equipment, such as:

- Foundations;
- Base of tanks;
- Drainage net;
- Valves;
- Protection system;
- Meters;
- Grounding;
- Basin containment wall;
- Containment basin;
- Floating seal; and
- Automation systems.

It is worth noting that the engineering solution presented, as well as its associated values, are used for the purpose of measuring maintenance and insurance costs, detailed in Section D- Operational.

Appendix C-2 shows the details of unit and quantitative values.

2.3. On-shore shipping/receiving systems

Currently the only way products access the terminal is through pipelines that connect terminal **STS08A** to the Presidente Bernardes refinery and the Cubatão Terminal. From Cubatão, products are also connected to other existing refineries in the State of São Paulo.

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Figure 3: Location map of terminals and pipelines - "Southeast Detail"
Source: Transpetro (Dec/2017)⁵

The detailed description of the existing road infrastructure is in official letter No 1/2021, prepared by the National Agency for Petroleum, Natural Gas and Biofuels - ANP (ANNEX).

4. From the Organized Port of Santos, in the Alamoia area, a string of pipelines leads to Cubatão's land terminal. This terminal is also connected by pipelines to the Cubatão refinery (RPBC), the Mauá refinery (RECAP) and São Caetano do Sul land terminal. All these units have other pipelines that interconnect the other terminals and refineries of the Petrobras system in the state. In the metropolitan region of São Paulo, for example, there is product delivery infrastructure for distributors (either by pipelines connected to distribution centers, or by direct roadway access with truck loading at the terminals) at the terminals of São Caetano do Sul, Barueri and Guarulhos and at RECAP. In the current configuration, land terminals and the longer pipelines are operated by PETROBRAS TRANSPORTE S.A – TRANSPETRO, while refineries and some shorter transfer pipelines are operated by PETRÓLEO BRASILEIRO S.A. (PETROBRÁS). Other short transfer pipelines are operated by the distributors themselves. (...)

Considering that the pipelines to the Cubatão Terminal are private, it will be up to the future lessee to carry out the necessary negotiations with the pipeline operator to access the infrastructure.

In this sense, according to ANP Resolution No. 35/2012 and ANP Resolution No. 716/2018, the use of transport pipelines for the handling of oil, petroleum by-products and biofuels, by interested third parties is guaranteed, given the adequate remuneration and existing capacity. The regulations also establish that the Carrier will maintain on its website important updated user information, such as ,for example, "Price for

⁵ <http://transpetro.com.br/transpetro-institucional/nossas-atividades/dutos-e-terminais.htm> (accessed 11/29/2019).

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Transporting Oil and Petroleum By-Products in Long Pipelines" (May/2019). ANP provides web links to the information of all authorized companies.⁶⁷

Thus, the information provided by Transpetro, in compliance with ANP resolutions, is available at <http://transpetro.com.br/transpetro-institucional/informacoes-legais/informacoes-em-atendimento-a-anp.htm> (accessed 11/03/2020).

The study's legal and regulatory information concerning pipeline infrastructure usage by third parties is attributed to ANP. Specifically, the agency's position on the matter is laid out in Official Letter No. 1/2021⁸ ANNEX), paragraphs 8 to 83 as follows:

11. It is worth mentioning that, in the analysis requested by the Ministry of Infrastructure, involves long and short transport pipelines, according to their length. The five pipelines connecting the Santos terminal to the Cubatão terminal, for example, are short pipelines subject to ANP Resolution No. 716/2018. In contrast, the three pipelines connecting the Cubatão terminal to the São Caetano do Sul terminal, as well as the LPG pipelines that connect Cubatão to the RECAP refinery, are long pipelines.

12. In both ANP Resolutions, the basic assumption is that the Carrier must serve, **in a non-discriminatory manner**, interested Third Parties, that is, any company or consortium of companies that formally requests to transport Products through pipeline infrastructure. The Carrier must also follow **the preferences of the owner of the infrastructure** in meeting the demand transportation services, as set forth in the laws and regulations. Additional clarifications are important in this respect.

13. In general terms, the model chosen by the Petrobras Group for managing its assets is as follows: PETROBRAS is the company that owns the transportation facilities operated by TRANSPETRO, including pipelines and terminals throughout the state of São Paulo. Thus, for all intents and purposes, PETROBRAS is the infrastructure owner, and may enforce its preferences when TRANSPETRO serves third parties.

14. The owner's preference is expressed differently between long and short lines, in accordance with the regulations for each type of pipeline.

15. For long pipelines, ANP Resolution No. 35 of 2012 initially highlights two important phases in a commercial relationship between Carrier and User.

I – The first is the execution of the contract between Carrier and User, which can take place in the fixed or Non-Fixed mode. In essence, Fixed Transportation is a " type of transportation service where the Carrier guarantees a certain capacity to the User. Hence, at volumes within the contracted capacity, the Carrier may not interrupt or reduce the User's volume" (Art. 2, XII). On

⁶ <http://transpetro.com.br/transpetro-institucional/canal-do-cliente/dutos-e-terminais/tarifas.htm> (accessed 11/29/2019).

⁷ <http://www.anp.gov.br/terminais-de-petroleo-combustiveis-liquidos/5704-livre-acesso-de-terceiros> (accessed 03/11/2020)

⁸ CRAFT No. 1/2021/SIM-CAL/SIM/ANP-Rj-e, National Agency of Petroleum, Natural Gas and Biofuels - ANP

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the other hand, Non-Fixed Transport is one "that may be interrupted or reduced by the Carrier, prior to the beginning of the user's batch of products being loaded to the infrastructure" (Art. 2, XIII);

II – The second phase is when the preparation of the monthly schedule (art. 19) takes place, beginning at least 30 days in advance, with Fixed contract users presenting their monthly transport schedules. After the allocation of these volumes and an agreement between both parties, there is also a window for allocating Non-Fixed users' orders. Next, up to 5 days before the month of the actual transport, the allocation schedule is disclosed. Requests sent after the schedule's disclosure will be dealt with on case-by-case bases, and the possible transportation of the product (or its denial) must be communicated by the Carrier to the User within 7 days.

16. Regarding the Owner's Preference, current regulation defines this benefit as a "monthly volume of Products, between Receiving and Delivery Points that is guaranteed to the Owner of the Transportation Facility when handling its own Products" (art. 2, XVIII). Therefore, during the monthly scheduling process, the owner's volume allocation enjoys the same privileges as those awarded to user's volume under a Fixed contract, as both are taken into consideration during the first phase of allocation. However, it is important to emphasize that the owner's preference does not mean an exclusive right to use the infrastructure: the Carrier must meet the requests of interested Third Parties, in a non-discriminatory manner, during both commercial phases - at any time in the contract (if there is Operational Available Capacity) and monthly in the schedule (if there is Idle Contracted Capacity, including that of Proprietary Volumes, allocated under Owner's Preference rights) (art. 3).

17. For long pipelines, there is a five-year review of the owner's preference volumes based on Carrier proposals and ANP subsequent evaluation (art. 8 to 12). In the latest owner preference review that ANP approved, the agency decided in favor of the Owner user (Petrobras), in relation to its early contracting with the Carrier (Transpetro). This resulted in the publication of ANP Order No. 170 of February 28, 2020 (annex). That decision, part of proceeding number 48610.218814/2020-07, is under administrative appeal. In any case, it is worth mentioning certain long pipelines that may be of interest to any Carrier that wishes to transport cargo between the Santos Terminal and the metropolitan region of São Paulo. For example, the OSSP pipelines that connect the Cubatão terminal to São Caetano do Sul have the following Operational Capacities and preferential volumes for the next five years (2018-2023), as shown in Table 1:

Quadro 1 - Capacidade Operacional e Preferência do Proprietário alocadas a dutos selecionados, conforme Despacho ANP nº 170, de 2020.

Código DCPD	Nome	Diâm. (Pol)	Extensão (km)	Ano Início Operação	Origem	UF	Destino	UF	Produto (s)	Capacidade Operacional (m³/mês)	Preferência do Proprietário 2018-2023 (m³/mês)
000645	OSSP-A	14	46,2	1989	TT Cubatão	SP	TT São Caetano	SP	Claros/GLP	282.744	134.461
000646	OSSP-B	10	37	1972	Cubatão	SP	TT São Caetano	SP	GLP/Claros	129.989	61.200
000647	OSSP-OC	18	37,9	1980	Cubatão	SP	TT São Caetano	SP	O.C.	288.055	172.010
000648	OSSP-C	18	38	1952	Cubatão	SP	TT São Caetano	SP	Claros	277.328	152.408

18. Therefore, it is important to note that the owner's preference in these selected pipelines varies between 47-60% of the operational capacity, with space for contracting capacity beyond the owner's own preference.

19. It is also important to note, in relation to the Carrier's capacity assumption calculations, that OSSP pipelines (SEI 0274808) have a two-way operational capability. However, the company only

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considers one flow direction. Indeed, the Carrier bases its rationale on the fact that, historically, OSSP-A, OSSP-B and OSSP-C generally operate cargo destined to São Caetano do Sul (or to RECAP, in the case of OSSP-A). The Carrier only considers an opposite flow in the case of OSSP-OC's capacity calculation. In the case of OSSP-OC, historical volumes point to refineries sending heavy oil to Cubatão. There is no doubt that changing flow direction several times in a month would impact the capacity of the pipeline in that month. For example, more inversions than planned could decrease the line's productivity, thus reducing its available capacity. On the other hand, if third party operations follow the same direction considered in the Carrier's calculation, it is expected that operational capacities will resemble the ones highlighted above.

20. For short lines, according to ANP Resolution No. 716 of 2018, the regulatory system is simpler. As in the case of long lines, the Carrier must prepare a Prior Schedule in which it must consider the Owner's Preference and Contracted Capacities (art. 7). However, ANP will not validate the owner's preferred volume - this is expressed every month with during the volume request made by the owner. Once the movement request is confirmed, the User must pay in full even for scheduled services that were not utilized (take or pay). The only obvious exceptions being when non-compliance is not the User's fault (art. 8).

21. It should be noted that, in the event of a request for Transportation by an Interested Third Party, if Operating Available Capacity is not sufficient to meet the service needs, and the Owner chooses not to make the necessary investments to expand the Operating Capacity, this Owner is obliged to accept investments made by the Interested Third Parties to implement the aforementioned expansion, both in long and short pipelines, as established, respectively, in art. 13, of ANP Resolution No. 35, of 2012, and in art. 3, § 1, of ANP Resolution No. 716, of 2018. The investment required for capacity expansion or duplication of short pipelines is generally lower than in its long counterparts. Hence, in conclusion, in the case of limited capacity and other physical restrictions of short pipelines, third party users may make the necessary investments, and the owner will have to accept them.

22. Similarly, the owner of the transportation facilities is obliged to allow the interconnection of its facilities with other facilities owned by third parties, in compliance with the safety standards and operating conditions adopted by the Carrier, both in long and short pipelines, as provided for, respectively, in Article 6, of ANP Resolution No. 35, 2012, and in Art. 4, of ANP Resolution No. 716, 2018.

23. Finally, it should be made clear that, in all cases involving the regulation of transportation by pipelines, ANP reserves the right to resolve on any doubts or disagreements, brought before the Agency by Owners, Carriers, Users or Interested Third Parties. Indeed, the agency is designated to mediate and resolve conflicts between, according to ANP Ordinance No. 254, of September 11, 2001.

According to the pipeline operator, the Alamoia Connection has pipelines with 10", 14" and 18", with a total operating capacity of **2,400,000 m³ per month**.

The future lessee will be responsible for complying with operational parameters of pipeline reception as provided for in the study.

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It is important to highlight that the future lessee will not face any obstacle in regard to the implementation of equipment and pipes of different capacities according to its safety and operation criteria, provided that the future lessee complies with the operational parameters of pipeline reception required by its requesters.

In addition to the pipeline system, the study foresaw truck loading and unloading operations, to enhance the terminal's service flexibility. Regarding road reception of petroleum by-products, the study proposed the implementation of two new unloading platforms that can service train trucks, with two unloading positions on each platform, enabling the simultaneous operation of Four trucks (one vehicle on each side). New platforms are expected to be implemented during the second phase of investments.

As for the outbound shipment of petroleum by-products, the study planned for two new loading platforms able to comply with B-trains, with two loading positions on each platform, enabling the simultaneous operation of four trucks (one vehicle on each side). The implementation of the new loading platforms was also foreseen in the second phase of the lease.

At present, roadway access is available only for the terminal's workers and for the services flow.

There is no direct rail connection to the Alamo terminals, and the study did not plan for such a connection. However, the railway network on the right bank is close to the terminal. Indeed, the railway access lies less than 500 m from the Terminal, and there are no constraints (other than new required investments) to the future lessee's option of developing a rail alternative.

Annex C-2 details values and quantitative estimates.

2.4. Other Operational Structures

To enable operations in the terminal, the study identified the following essential assets:

2.4.1. Pipelines

Additionally, the existing pipelines on the pier are also non-reversible assets owned by the current lessee. Thus, in order to safeguard the continuity of the port operation, these pipelines must be bought by the future lessee of **STS08A**. However, these assets will be the property of the Port Authority, so that they can be made available to future **STS08** and **STS08A** lessees (isolated or shared), free of charge, in accordance with the contractually defined mooring priority rules. It is worth noting that the study did not require new pipelines on the existing pier.

Pipes, Valves and Pipe Fittings, Metal Structures, Electrical Installations (wires, cables, keys, circuit breakers, small frames and panels, accessories and miscellaneous) on the pier and in the leased area corresponding to the CODESP tanks will be made available to the future lessee in their current conditions.

Besides existing assets, internal pipeline connections will be needed for new on-shore and waterway assets. Namely, the study foresees new pipeline investments connecting the new storage tanks, pump room, truck

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loading and unloading stations and the existing system. The study also foresees the need for implementing three new pipelines connecting the terminal to Petrobras's system (land access). The following table shows the estimated quantity of pipelines.

Pipeline	Total (in linear meters)
External (outside the terminal)	2,940
Internal (inside the terminal)	2,450
Total	5,390

Table 4: Sizing of the Pipeline System for **STS08**

Source: EPL

The definition of the value of the linear meter of the pipelines was based on the quotation of national suppliers, based on average values from different budgets and feasibility studies evaluated by ANTAQ.

Concerning the installation of the external pipeline connecting *the* manifold to STS08, the study understands that there will be the need to install a pipe rack measuring, approximately, 790 meters. The structure was planned to protect the pipeline right of access belonging to Transpetro. The tracing of the structure is demonstrated in this study, Section C, Annex C-1: Figure 5.

2.4.2. Pumps Room

Since Pumps Room capacity presents low variation when controlled for terminals of similar size, a reference model was adopted based on market assumptions to serve a medium-sized fuel terminal with a static capacity of 35,000m³, consisting of six pumps.

From this estimate of required pump capacity the study concluded that an additional set of **four** pump rooms will be required given **STS08** storage capacity expansion.

The study arrived at a value for the new Pumps Room based on a sample of quotes from national suppliers.

2.5. Other Non-Operational Structures

In **STS08** lease area, the existing non-operating assets will be incorporated into the future lease. For modeling purposes, only expenses with maintenance of non-operational assets were considered.

2.6. Investments in The Common Area of the Organized Port

The future **STS08** lessee will make investments in the common area of the Organized Port, in an adjacent region to the one to be occupied by STS08 and STS08A terminals.

Part of the future area destined for the STS08 lease is under possession of the Santos Port Authority, approximately 21,231 m², as indicated in Annex C-1: Figure 1 (southeast delimitation), where the area is currently being underutilized, whose vacancy has an operational nature.

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Due to its operational nature, the Port Authority realizes that such area has economic potential to be explored and, therefore, was considered as an integral part of the area to be tendered in terminal STS08.

However, in order to effectively use the entirety of the 21,231 m², there will be a need for interventions to replace structures currently used by the Port Authority, resulting in investments in the adjacent area to **STS08** terminal, as described in the following items:

- I. Installation of firefighting system;
- II. Implementation of the new access - Public Gate and sentry box;
- III. Installation of pipe rack - Public Gate Area;
- IV. Electric Substation; and
- V. Construction of New Administrative Facilities.

All investments mentioned are expected to be made during the **first phase**, corresponding to the period from 1st to 3rd contractual year.

2.6.1. Firefighting System

The planned investments include the disassembling of the current firefighting system (FFS) and its replacement according to the area indicated by the port authority, Figure 4. The new firefighting system should be modernized, automated and have a tidal water collection system. The following are the technical specifications of the system.

Figure 4

- Comply with standard requirements;
- Sized for cargo handling capacity greater than 70,000 DWT per berth;
- Two independent pipelines, one for cooling (water) and one for foam, with the possibility of using both lines for simultaneously spraying water and foam;
- Fresh water tank reserve to comply with current regulations;
- LGE storage tank;
- Independent seawater (tidal pump) capture;
- Interconnection of networks with other firefighting systems from TEGLA terminals;
- The installation of two emergency connection points in a defined location by the Port Authority;
- Replacement and resizing of the entire FFS;
- Automated system;
- At least two automated water cannons;
- Redundancy (backup) for all systems;
- General Alarm System with addressable electronic mainframe;
- Approval of the project with the Fire Department and get the AVCB from the facility.

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In aiding the system desired to fulfill the Port of Santos requirements, the study relied on SPA's own contribution reports (annex). It is worth noting that the conceptual work shown below surmises SPA's report document. Hence, the full report contains technical specifications that are aligned to concepts discussed in this section.⁹

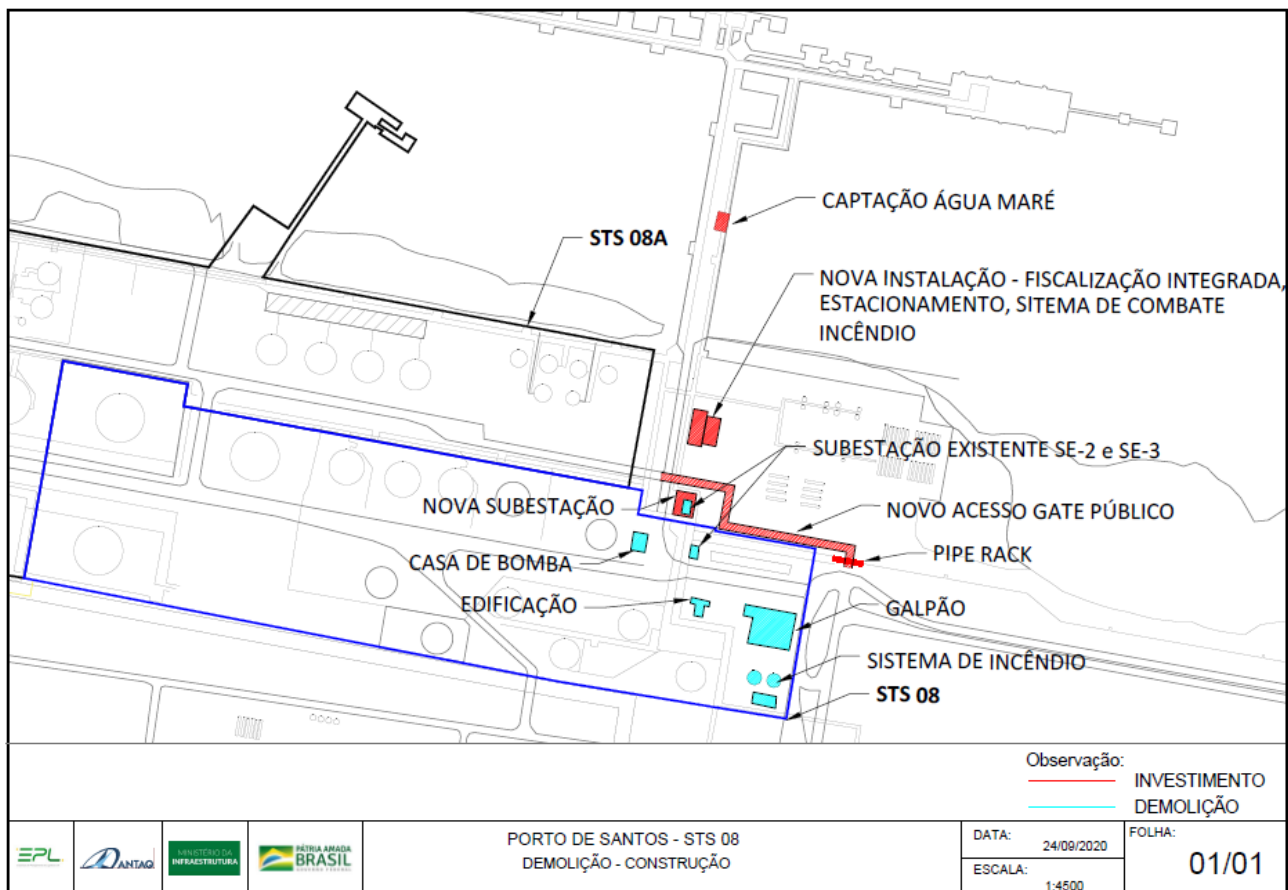


Figure 4: Necessary interventions - area added to the lease STS08 and common to the port
Source: Own elaboration

2.6.2 Public Gate - New Access

There will be the possibility of segregating the respective road accesses, providing both terminals with independent accesses, with no need for any type of remuneration or easement to be paid by the **STS08A**. Figure 5 illustrates the current access located inside the future **STS08** area, and the conceptual delimitation of the new access to the **STS08A** terminal.

⁹ Reports of Contributions SPA, STS08 and STS08A Santos-SP (17/06/2020, 17/09/2020 and 18/09/2010)

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Figure 5: Phasing - Terminal Access
Source: EPL

There will be the possibility of segregating the respective road accesses, providing both terminals with independent accesses, with no need for any type of remuneration or easement to be paid by the STS08A. Figure 5 illustrates the current access located inside the future STS08 area, and the conceptual delimitation of the new access to the STS08A terminal.

The adjustments to be made by the future lessee **STS08A** will take place in the first three years after the date of transfership, coinciding with the 1st Stage of transition. Hence, the new access would be available by the fourth contractual year, coinciding with the beginning of the 2nd Stage of transition.

It is important to emphasize that the new access will not be exclusive to **STS08A** and that it does not integrate the area that integrates the future lease.

To enable the installation of the new access, it will be necessary to build an access gate. It should be noted that such access gate will also be used as one of the accesses to the public berths that is planned for the region, as indicated in the Development and Zoning Plan of the Port of Santos.

During the first Stage of the transition, to ensure road access to terminal **STS08A**, it will be necessary to use a temporary access located inside the future **STS08** area, as shown in Figure 5.

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At the end of the 1st phase, the temporary access to the **STS08A** terminal will not be necessary anymore, and it will be returned to STS08.

To define the scope of interventions necessary to create this new access, the study considered projected roadway volume as well as SPA's own contributions regarding the area (Annex).¹⁰

2.6.3 Pipe Rack

As part of the interventions, in order to build the new access, it is necessary to elevate a small extension of the pipeline (about 30 m) that are located at ground level, blocking the future roadway access. Figure 5 illustrates this conflict. Figure 5

2.6.4 Substation

The future lessee should make investments to replace the existing energy substations. Currently, the substations are positioned as shown in Figure 4 (blue), taking into account the various facilities of the region, such as: inspection building, fire pump room (440V/220V), workshop shed, lighting system of the entire area (whether internal and/or external), Gates 2 and 3 and other electrical distribution installations in 440V and 220V powering berths 1, 2, 3 and 4.

The replacement aims to meet the demand of the facilities in the region equivalent to a minimum installed power of 862.5 KVA, through a new substation with a minimum area of 100m², which should meet the various facilities that are currently served by the SE-2 and SE-3 substations.

As per Figure 4, the one substation (red) will replace the other two. In turn, due to the replacement of existing substations, all accompanying subsystems, composed of high-voltage power lines and low voltage electric circuits for distribution lines, would need to be relocated as well.

2.6.5 Administrative Facilities

The investments planned for **new buildings** should cover 700m², of which 500m² is intended for administrative facilities and 200m² for the new public Gate entrance.

The Port Authority needs to build facilities to accommodate employees, including furniture, and comply with the Safety Labor Standards of the former Ministry of Labor. Thus, the study sized the following facilities, according to the staff size:

- Room: engineer/technician, administrative and 2 operators;
- Dining hall: 4 employees;
- Warehouse;
- Male and female toilets: 4 employees;

¹⁰ Reports of Contributions SPA, STS08 and STS08A Santos-SP (17/06/2020, 17/09/2020 and 18/09/2010)

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- Men's and women's locker rooms: 2 employees (per shift), considering lockers for 10 employees (5 shifts).

In addition, the construction of the facilities must accommodate the inspection staff in a single building, which may contain one or two floors, and must have office room, dining hall, male and female toilet and male and female changing rooms, as well as storage for cleaning materials. For sizing each environment, the study considered the following:

- Room 1: supervisor, engineer, administrative, duty (desk), operations inspector, construction inspector, safety technician and environment technician (8 workstations and monitoring station);
- Room 2: room with glass walls for surveilling the surroundings, combined with toilet and clothing for 1 Port Guard (per shift), i.e., toilet for 1 employee and locker for 5 employees (5 shifts);
- Room 3: turnstiles and technical room (ISPS-CODE);
- Dining hall: 10 employees;
- Male and female toilets: 10 employees;
- Men's and women's locker rooms: 4 employees (per shift), considering lockers for 20 employees (5 shifts).

Additionally, next to the buildings itself, the study sets the parking lot for employee and police vehicles from the Port Guard (GPORT). The lot will also have bike rack, and an area for rotating parking spaces for service vehicles with a total area of approximately 400 m².

Currently, on the study-designated area for the administrative building there is an existing structure and its location is represented in Figure 4, outside the Figure 4 **STS08's** area.

The future lessee should assess the possibility of adapting and modernizing the existing building to meet the minimum requirements listed above, as the area currently occupied by contract DP/43.2000 can be reused, since all real estate improvements are reversible to the Port Authority at end of the contractual term, which will take place in December 2020

Likewise, the layout foreseen for the Public Gate's entrance is similar to the existing one to access to Alamoá's Public Pier.

To enable the effective exploitation of the STS08 partial area (21,231 m²), the study sees the need for **demolition** of structures that are currently underutilized by the Port Authority inside the future area of lease STS08, described below.

- Inspection Building;
- Pump room;
- Tanks;
- Warehouse Shed; and
- Substations;

The total area planned for demolition was 2,953 m². The location and identification of each structure is shown in Figure 4, highlighted in blue. Figure 4

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To define the interventions necessary to meet the Port of Santos standards, the study used SPA's own contribution reports (annex).¹¹

3 Compatibilization of the Future Capacity of the Enterprise

After analyzing the individual capacities of each subsystem in this area, the Terminal's capacity is estimated, which is set by the smallest capacity in its systems: the handling capacity on the pier (boarding/unloading system) or the storage of load. The study assumes that the ability of the terminal to receive and ship product onshore is not a limiting system. Thus, taking all these assumptions in consideration, the table below shows the total annual capacity at **4,460 kt**.

MICRO-CAPACITY CALCULATION						
Lease	STS08					
			future			
	Unit	Base year	1st phase	2 nd phase	3 rd phase	notes
Beginning of the period		2018	2021-2023	2024-2025	2026-2045	
		(equivalent to final area)				
Waterway System						
Loading System						
Number of berths	#	2	0	2	2	1
Occupation of the berth	%	60%	0%	60%	60%	
Percentage of berth time allocated	%	12%	0%	27%	56%	2
General Average Handling rate	t/h	570	0	760	760	
Annual loading capacity	thousand t	720	0	2.140	4.460	
Storage System						
Liquid Bulk - Tanks						
Static capacity	m3	39.525	0	107.025	164.245	
Density	t/m3	0,91	0,00	0,91	0,91	
Static capacity	t	35.771	0,00	96.861	148.647	
Inventory turnover / year	#/year	28	0	30	30	
Total annual storage capacity	thousand t	1.000	0	2.910	4.460	
Onshore System						
Pipeline						
Pipeline operational capacity	thousand m3/month	2.400	0	2.400	2.400	3
Percentage of pipeline allocated to the terminal	%	15%	0%	30%	39%	4
Density	t/m3	0,91	0,00	0,91	0,91	
Safety factor	%	50%		50%	50%	
Pipeline reception capacity	thousand t	1.900	0	3.900	5.100	
Roadway Reception						

¹¹ Reports of Contributions SPA, STS08 and STS08A Santos-SP (17/06/2020, 17/09/2020 and 18/09/2010)

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Number of reception stations	Pcs.	0	0	2	2
Points per station in simultaneous operation	Pcs.	0	0	2	2
Hours of operation per day	hr	0	0	16	16
Unloading by truck	t	0	0	40	40
Productivity	t/h	0	0	119	119
Connection and maneuver time	Min	0	0	10	10
Truck operating time	Min	0	0	30	30
Security occupancy rate	%	0	0	60%	60%
Capacity Road Reception	thousand t	0	0	790	790

Roadway Shipping

Number of Shipping Stations	Pcs.	0	0	2	2
Points per station in simultaneous operation	Pcs.	0	0	2	2
Hours of operation per day	hr	0	0	16	16
Unloading by truck	t	0	0	40	40
Productivity	t/h	0	0	119	119
Connection and maneuver time	Min	0	0	10	10
Truck operating time	Min	0	0	30	30
Security occupancy rate	%	0	0	60%	60%

Road shipping capacity	thousand t	0	0	790	790
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Total annual capacity of the Onshore system	thousand t	1.900	0	5.480	6.680
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TERMINAL LIMITING CAPACITY	thousand t	720	0	2.140	4.460
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Obs

- 1 Alamoia 1 and Alamoia 2 berths were considered in phase 2;
- 2 The percentage of berth time allocated was scaled based on expected market demands.
- 3 Data provided by the pipeline operator between the port terminal and the Cubatão terminal.
- 4 Proportion between the static capacities of the storage systems of terminals STS08 and STS08A.

Table 5STS08 in the Port of Santos

Source: EPL

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4 Sizing Parameters

Lessee will be responsible for the implementation and development of the infrastructure and will be required to make the necessary improvements to achieve and maintain the performance parameters.

Lessee will undertake and be responsible for all technical studies, including, but not limited to, field investigations, feasibility studies, conceptual and final projects, planning documents and bidding/construction documents relating to the proposed improvements.

At its own expense and with appropriate notification to Lessee, the Port Authority reserves for itself the right to hire independent consultants in order to monitor the quality of construction.

The terminal implementation project will comply with all applicable local, state, and federal codes and regulations, as well as the design standards indicated by the organizations below (note that Brazilian standards and codes will be the main design standards/codes of the project. In the event of conflict with other international standards, the most restrictive code will be applied):

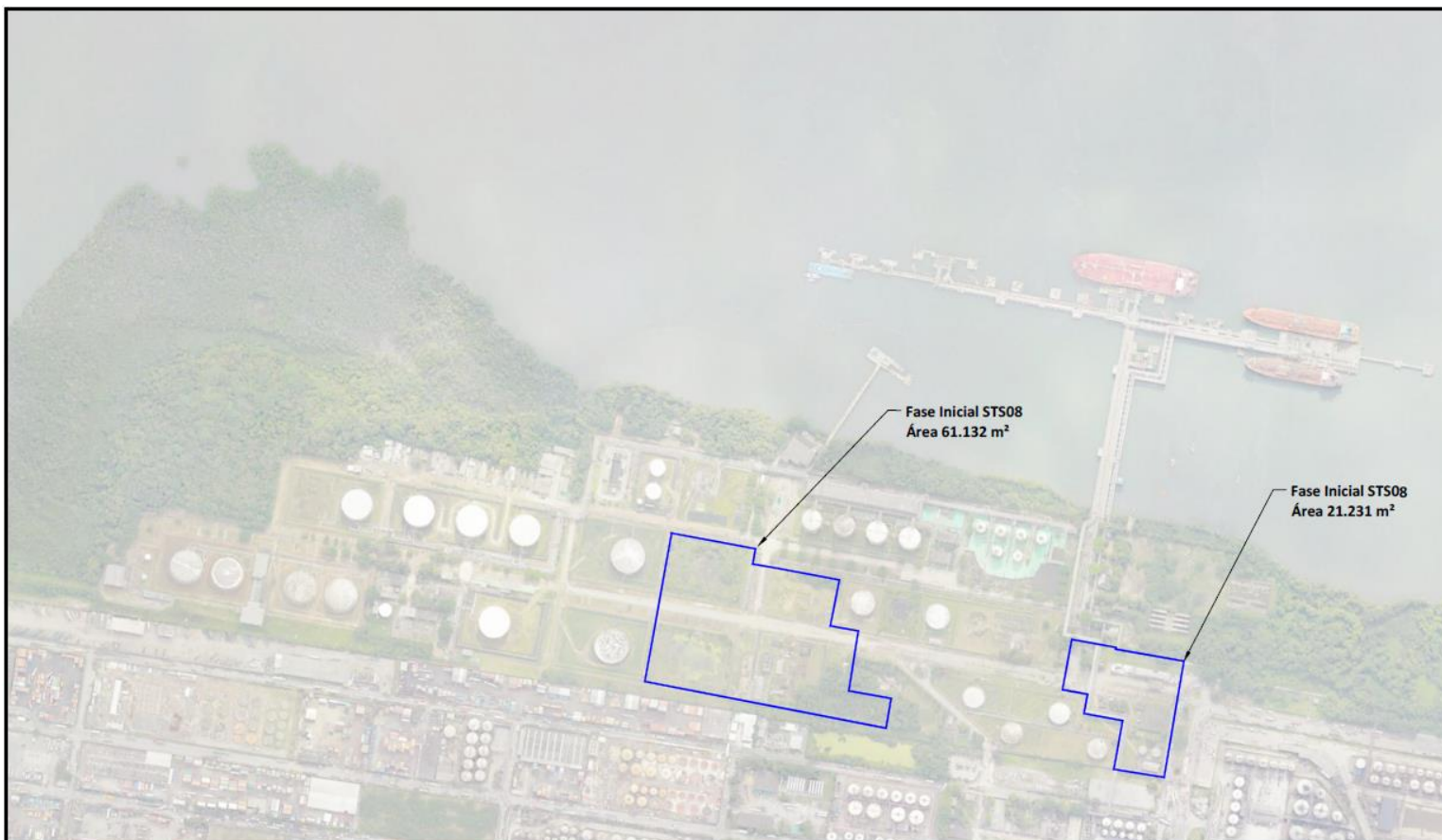
- ABNT, or where these are not available, appropriate and internationally recognized standards, including those listed above under the heading "Project Requirements";
- ISO;
- IMO;
- MARPOL, MARPOL, 2010.
- Port Authority;
- National Agency of Petroleum, Natural Gas and Biofuels - ANP;
- Local Fire Department;
- External Suppliers of Public Services, in accordance with national and international Building and Construction Codes;

In addition, the project will comply with the latest versions of all applicable design codes and standards established by the following organizations:

- *European Committee for Standardization (Eurocode);*
- *Permanent International Association of Navigation Congress (PIANC)*
- *ASTM International (American Society for Testing and Materials);*
- *Oil Companies International Marine Forum (OCIMF); and*
- *American Petroleum Institute (API).*

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Annex C-1: Figure 1



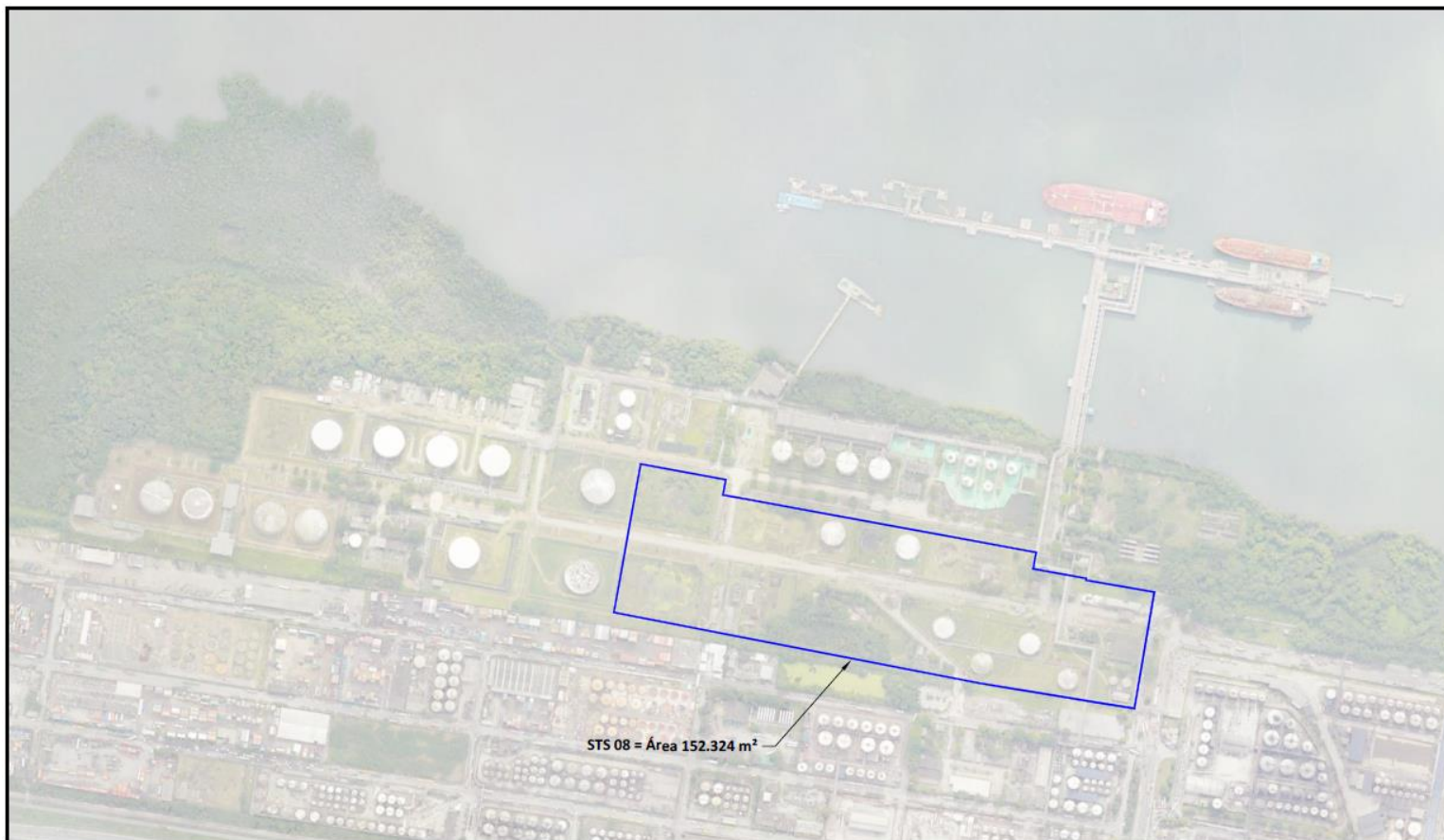
Obs: STS 08 Fase 01 = Área 82.363 m²

CONCEITUAL

	PORTO DE SANTOS - STS 08 DELIMITAÇÃO DA ÁREA - FASE 1	DATA: 06/04/2021	FOLHA: 01/05
		ESCALA: 1:7500	

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Annex C-1: Figure 2



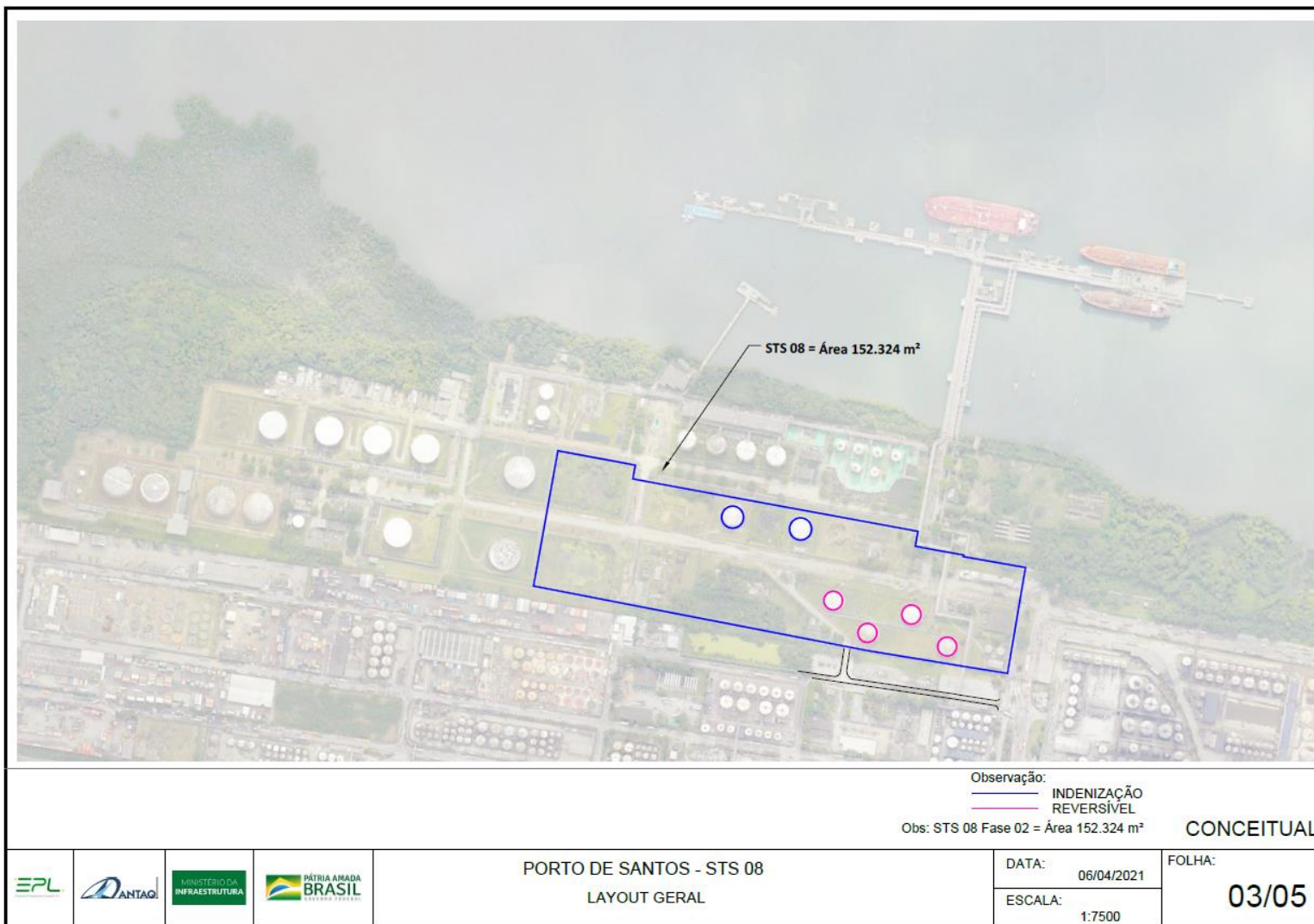
Obs: STS 08 Fase 02 = Área 152.324 m²

CONCEITUAL

	PORTO DE SANTOS - STS 08 DELIMITAÇÃO DA ÁREA FASE 2	DATA: 06/04/2021	FOLHA: 02/05
		ESCALA: 1:7500	

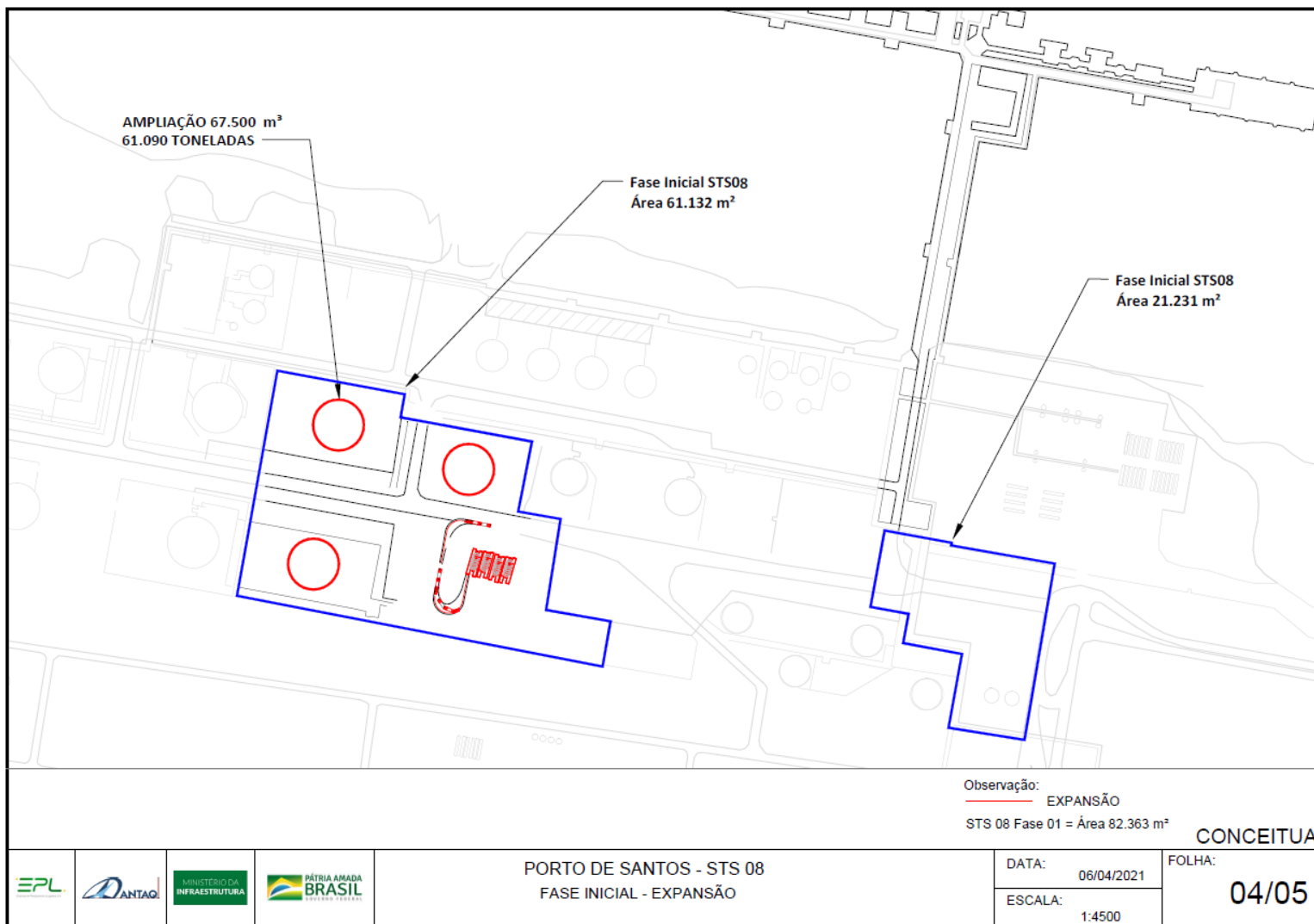
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Annex C-1: Figure 3



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Anexo C-1: Figure 4



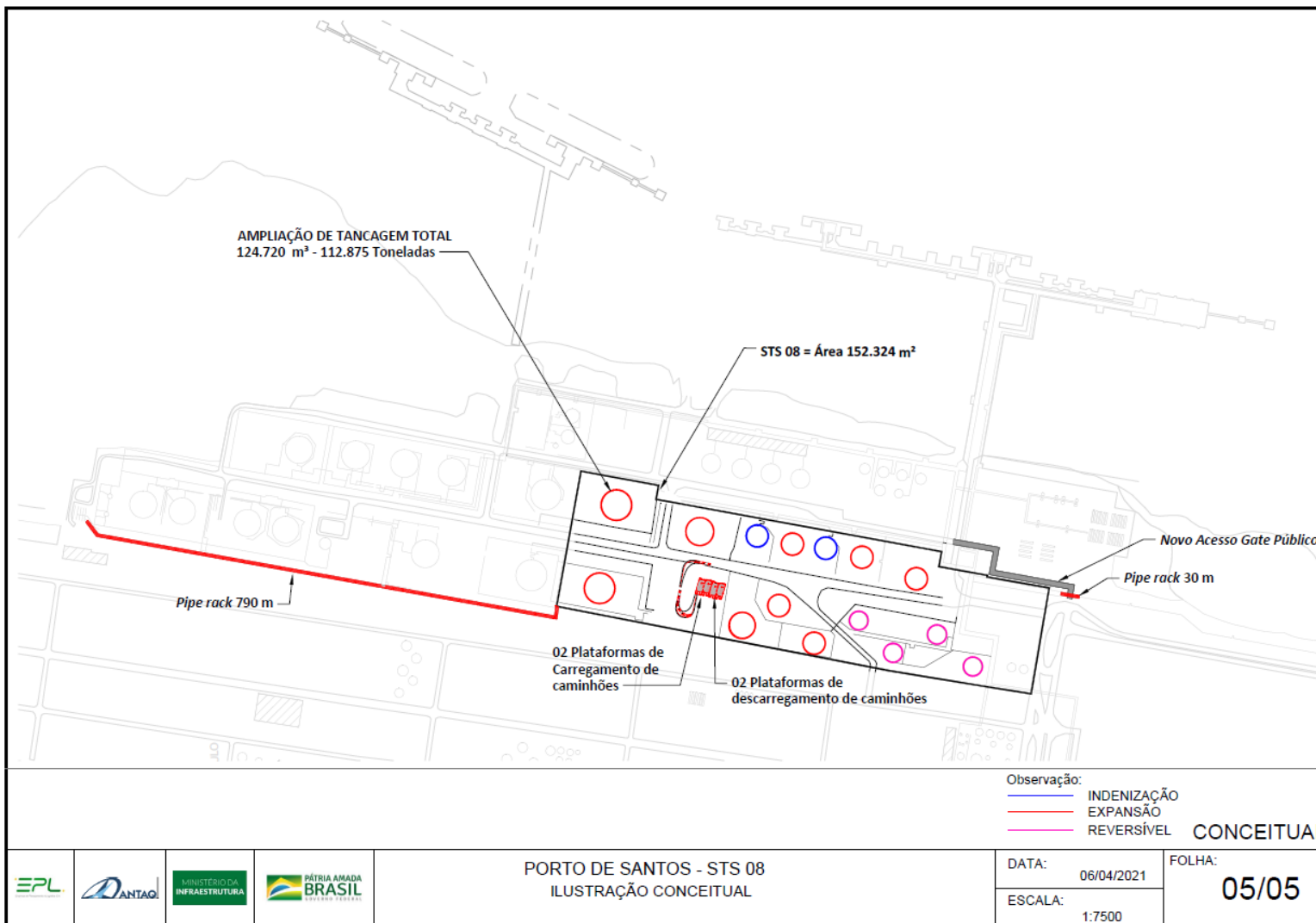
PORTO DE SANTOS - STS 08
FASE INICIAL - EXPANSÃO

DATA: 06/04/2021
ESCALA: 1:4500

CONCEITUAL
FOLHA:
04/05

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Annex C-1: Figure 5



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Annex C-2: Capex

CAPEX STS08

	Description	Unit	Quantity	Unit Cost	Total Cost
1	Terminal Development				
1.1	Fence and safety	m	1.983,00	85,57	169.694,96
1.2	Implementation of a new Fire Fighting System	Uni	1,00	4.875.844,52	4.875.844,52
1.3	Demolition	m ²	2.953,75	31,66	93.525,06
2	Edificacions				
2.1	Fixed roof carbon steel tanks with foundation	m ³	37.953,00	1.411,17	53.558.003,05
2.2	Fixed roof carbon steel tanks without foundation	m ³	86.767,00	1.239,39	107.538.165,32
3	Main equipments				
3.1	New pipelines for liquid bulk (including support)	m	5.390,00	3.447,46	18.581.808,86
3.2	New set of pumps	Uni.	4,00	1.051.470,32	4.205.881,29
3.3	Truck unloading station	Uni	2,00	1.771.823,75	3.543.647,49
3.4	Truck loading station	Uni	2,00	3.230.366,38	6.460.732,75
3.5	pipe rack - connection to the manifold STS08 - right of way	m	790,00	8.686,88	6.862.637,70
4	Investment in the Common Area of the Organized Port				
4.1	Firefighting system (terminal + SPA)	Uni	1,00	4.875.844,52	4.875.844,52
4.2	Implementation of new access -Public Gate and pier (SPA)	m ²	2.041,00	130,34	266.016,78
4.3	Building and parking - SPA, GPORT	m ²	400,00	130,34	52.134,60
4.4	Edificacions in SPA area - supervision, etc	m ²	500,00	1.507,64	753.818,82
4.5	Sentry box- Public Gate	m ²	200,00	1.507,64	301.527,53
4.6	Substation SPA area 862,5 KVA	Uni	1,00	902.040,65	902.040,65
4.7	pipe rack - Elevation of the pipeline New Access	m	30,00	8.686,88	260.606,49
5	Other				
5.1	Engineering and Administration	%	5%		10.665.096,52
5.2	Contingencies	%	5%		10.665.096,52
6	TOTAL				234.632.123,43

base-date: june/2020