

1. Introduction

This section discusses general information concerning the feasibility study of a port terminal on Technical, Economic and Environmental grounds (EVTEA). This port facility is intended for handling, storage, and distribution of liquid bulk, especially fuels. The area is located in the Alamoia region of the Port of Santos, in Southeastern Brazil and will be referred to hereon as **STS08A**.

The Brazilian Federal Government commissions feasibility studies of port terminals leases to adequately reflect the value of their assets. The feasibility studies are the basis for public bidding procedures, within the scope of the Government's plans. In general terms, the purpose of the study is to propose a fair value estimate based on several variables, such as: legal, technical, operational, economic, financial, accounting, tax and environmental.

Thus, this study seeks to define the values, deadlines and other parameters required to open **STS08A**'s bidding procedure, with the goal of providing adequate remuneration to the Port Authority, as well as allowing for an adequate return to potential investors. The Santos Port Authority's (SPA) own technical staff was responsible for preparing a first version of this study.

Through Official Letter No. 144/2019/DNOP-SNPTA/SNPTA of 10/22/2019 the National Secretariat of Ports and Waterway Transport forwarded this study to the Planning and Logistics Company (EPL) for analysis of documentation and necessary adjustments and updates of SPA's original version.

In general, the process of updating these studies consists in reviewing the information and assumptions previously adopted. More specifically, EPL's process will generally follow the steps listed below:

- Update of the area/facilities' legal and contractual situation;
- Update of the area's main parameters, such as: *dimension*, *layout*, cargo type, accesses, inventories of existing goods, operational status, etc.;
- Update of the study's operating assumptions, such as: demand forecast, prices, costs, investments, capacity, exchange rate, taxes, rent, environmental licensing, etc.;
- Incorporation of determinations and contributions from state entities made during the first round of port auctions, such as: National Court of Audits (TCU), Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA), National Agency of Petroleum, Natural Gas and Biofuels (ANP) among others; and
- Incorporation of supervening norms/rules relevant to the original preparation of the study.

It should be mentioned that **STS08A** was defined as a priority area under the Federal Government's Port Leasing Program (PAP), launched in 2013. However, even though the bidding process for this area was not followed through in the past, the authors of this study believe in the viability of the project and its adequate priority classification under PAP.

2. The Study

The feasibility study for **STS08A** is structured in sections, as explained below:

- Section A - Presentation;

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- Section B - Market Studies;
- Section C - Engineering;
- Section D - Operational;
- Section E - Financial; and
- Section F - Environmental.

Based on an evaluation of several variables related to the project's feasibility, potential investors are better able to access this opportunity under different market conditions. This transparency allows the interested parties to make safe investment decisions.

The assessment methodology used to price port leases is that of the discounted cash flow (DCF), a methodology used to estimate the value of an investment, in current (present) currency), for a given time horizon, based on expected future cash flows. The total value of the enterprise is the sum of these cash flows, to which is applied a discount rate referred to as the Weighted Average Capital Cost - WACC.

It should be clarified that in the case of **STS08A's** original feasibility study, the base date was April/2019. After the updating process, the study adopts the base date of **June/2020**.

Regarding the justification for commissioning a feasibility study for **STS08A**, it should be noted that the main activities to be carried out in the area aim to supply the demand of different kinds of fuels to the metropolitan region of São Paulo. These products (especially imported LPG) are essential for the local industries and population. In addition, the products will supply regions where there is a production deficit of diesel oil, gasoline. The vessels, which will run on bunker oil, will navigate along the coast (cabotage)

It is worth noting that the existing terminal is part of an interconnected system of four refineries, inland terminals and more than 2,000 kilometers of pipelines, where production, refining and supply are synchronized.

During the preparation of this study, the following planning documents, laws, rules, and regulations were observed:

Instrument	Description
Law No. 12,815 of June 5, 2013;	Ports Act
Decree No. 8,033 of June 27, 2013, and subsequent amendments;	Regulation of Ports Act
Normative Resolution No. 7-ANTAQ of May 30, 2016;	Regulation of areas in the Organized Port
Resolution No. 3,220-ANTAQ of 8 January 2014;	EVTEA Drafting Regulation
Resolution 5,464-ANTAQ of June 23, 2017;	EVTEA Analysis Manual
National Port Logistics Plan - PNLP (2017);	Sector planning
Master Plan of the Santos Port Complex (2019);	Sector planning
Development and Zoning Plan - PDZ of the Port of Santos (2006);	Sector planning
Regulation of exploitation of the Port of Santos-REPS (2014);	Port Regulation (REP)
10-Year Energy Expansion Plan - PDE 2027, Energy Research Company - EPE;	Sector planning
CNPE Resolution No. 09 of 9 May 2019;	Promotion of free competition in refining activity in the country

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CNPE Resolution No. 16 of June 24, 2019.

Promotion of free competition in the natural gas market

Table 1: Legal provisions for the preparation of EVTEA of areas located in the Port Complex of Santos.
Source: Own Preparation.

It is important to highlight that in Brazil, fuel supply markets have undergone a process of gradual liberalization since the introduction of the Petroleum Law of 1997. In summary, the new law broke up state monopoly on fuel supply, allowed free competition, extinguished several subsidies, and terminated import controls. According to industry data, Petrobras still has a hegemonic position in the supply of fossil-fuel products in the Brazilian market, however, its participation has been decreasing over the last few years, as a greater number of agents entered the market, making it less concentrated.

In this scenario, to be highlighted is the consolidation of a sector policy based on an open market, deverticalization, and the push for increased competition in the fuel refining, transportation and distribution sectors. Evidence in this respect is Petrobras's sale of several of its refineries, as well as liquidation of its associated enterprises in transport and distribution infrastructures.¹

The same liberal transformation took place in the national gas market². For example, CNPE's Resolution No. 16/2019 states the following: "This resolution establishes guidelines and improvements for energy policies aimed at promoting free competition in the natural gas market", establishing as a principle of this market "the expansion of competition throughout the market, including avoiding the formation of regional monopolies" (art. 1, II), "restricting transactions between traders and concessionaires of piped gas distribution where the two agents are related parties" (art. 2º, II), establishing that the agent occupying a dominant position in the natural gas sector must "completely dispose of the shares it holds, directly or indirectly, in transportation and distribution companies" (Art. 3, I).²

Regarding fuel market demand, it is worth mentioning that Brazil is the 10th largest oil producer in the world, churning-out 2.7 million barrels per day (2.8% of the world total). According to ANP's Yearbook (2019), Brazil produced 944.1 million barrels in 2018, of which 521.5 million were extracted from pre-salt (55.2% of the total). In the same year, Brazilian production of petroleum by-products was 108.2 million m³. In terms of refining, Brazil has the world's 8th largest capacity, accounting for 2.3 million barrels per day, 2.3% of the world capacity.

To handle and store these petroleum products, as of 2018, Brazil had 110 ANP authorized terminals, 61 waterway terminals (with 1,471 tanks) and 49 inland terminals (with 543 tanks), totaling 2,014 tanks. The nominal storage capacity was about 13.9 million m³, of which 5.4 million m³ (38.4% of the total) were for crude - oil, 8.1 million m³ (58.2% of the total) for petroleum by-products and ethanol, and 476.7 thousand m³ (3.4% of the total) for LPG.

In 2018, the Santos Port Complex handled 10.3 million tons of petroleum byproducts, mainly diesel oil, gasoline, fuel oil and Liquefied Petroleum Gas – LPG. Furthermore, it should be emphasized that, due to several factors, the prospects for the petroleum byproducts market in Brazil point to a scenario of higher

¹ In its agreement reached with Brazil's anti-trust agency (CADE), Petrobras will "sell eight of its oil refineries, including assets related to fuel transportation", available at: <http://www.cade.gov.br/noticias/cade-e-petrobras-celebram-acordo-para-venda-de-refinarias-de-petroleo>.

² Based on the axioms of the "New Gas Market" policy and the respective agreement reached between Petrobras and CADE, determining the sale of important assets related to the transportation of natural gas.

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proportion of imported goods, causing expected demand within the Port Santos to be biased upward. In turn, most demand studies for the Port (including this one) signal that current liquid bulk handling capacity is not sufficient, and that investments to increase capacity are necessary to meet demand.

Furthermore, it is worth noting that most petroleum by-products handled on Port of Santos premises are done through the Alamoia region, which has, so far, had less than ideal conditions for long term investment in berth capacity. The main reason for this lack of investment is because the area corresponding to **STS08A** is currently occupied by a company that does not have a long-term lease. In fact, the current occupant can only stay in the area until the winning bidder of this bid is eligible to take control. Thus, the current contractual situation does not encourage long-term investment commitments.

In this sense, the preparation of a feasibility study, aimed at opening the bidding procedure for area **STS08A** is urgent and of relevant public interest, as it seeks to guarantee the national and regional supply of energy, and in view of the strategic position of this asset. At the level of the lease holder, the new long-term contract will replace a short-term one, fostering a better environment for new investments, optimizing liquid bulk capacity in the Port. Finally, the better contractual structure is also expected to yield an increase in lease payments to the Santos Port Authority itself, enabling the Company to invest further on public Port infrastructure.

3. Description of Santos Port Complex

The Santos Port Complex can be divided in two different classes of areas: the Organized Port of Santos, an area administered by state owned Santos Port Authority (SPA), and six private terminals (TUP).

The following list encompasses the name of six private companies mentioned above:

- » TUP DP World Santos;
- » TUP Citrus Cutrale;
- » TUP Dow Brasil Sudeste (Dow Maritime Terminal);
- » Luiz Antônio Mesquita Port Integrator Terminal (Tiplam);
- » Cubatão Private Maritime Terminal (TMPC) of Usiminas; and
- » Saipem (Pipeline Logistics Base).

3.1. Location

The Santos Port Complex is located in the cities of Santos and Guarujá, in the State of São Paulo, along an estuary with its banks bordering both municipalities, and its water flow extending about 2 km into the Atlantic Ocean. On the bank on the side of the Santos municipality (Right Bank), port facilities extend from the neighborhood of Ponta da Praia to the region of Alamoia. On the other side, the left Bank lies mostly within the Guarujá municipality and extends from the Island of Barnabé to the mouth of the Santo Amaro River. In addition, the town of Cubatão also houses some of the private port facilities. Figure 1 shows the overall premises of Santos Port Complex area. **Erro! Fonte de referência não encontrada.**

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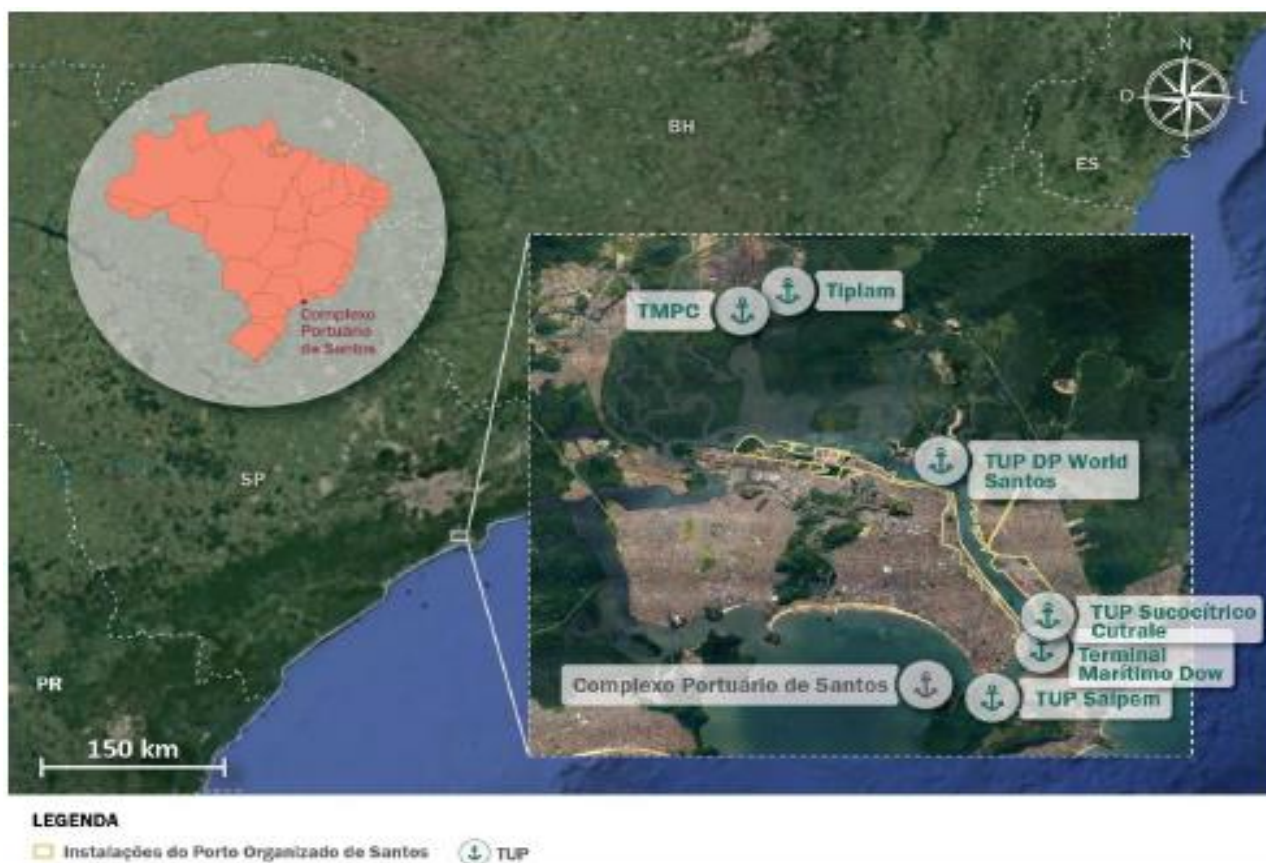


Figure 1: Location of the Port Complex of Santos.
Source: Master Plan of the Santos Port Complex - 2019.

The Port of Santos services Brazil's entire Southeast region, the South region and much of the country's Midwest region. Furthermore, the port is also responsible for handling cargoes in transit to Bolivia, Paraguay, and Chile, due not only to its location but also to the Port's quality of accesses to other modes of transportation, including air transport.

3.2. Access

3.2.1. Road Access

The Santos Port Complex main road connection to the hinterland are through routes SP-021, SP-150 (BR-050) and SP-160. The stretches of greatest relevance within these routes are known respectively as: Rodoanel Mário Covas (south and east), Rod. Anchieta and Rod. Imigrantes. In addition to the aforementioned routes, other roadway access worth mentioning include the western and eastern sections of route SP-055 (BR-101), respectively known as Rod. Pe. Manoel da Nóbrega, and Rod. Dr. Manoel Hyppolito Rego.

An important part of this roadway system is under private concessionaires that charge tolls at various points of the highway. Ecovias is responsible for the Anchieta-Imigrantes system, CCR manages the Anhanguera, Bandeirantes, Dutra, Castello Branco, Raposo Tavares highways and the western stretch of the Rodoanel, OHL manages Fernão Dias and Régis Bittencourt, DERSA manages the Northern Section of the Rodoanel and Nova Tamoios, and DER-SP manage the remaining roads. The following figure shows the roadway access to the Port of Santos:

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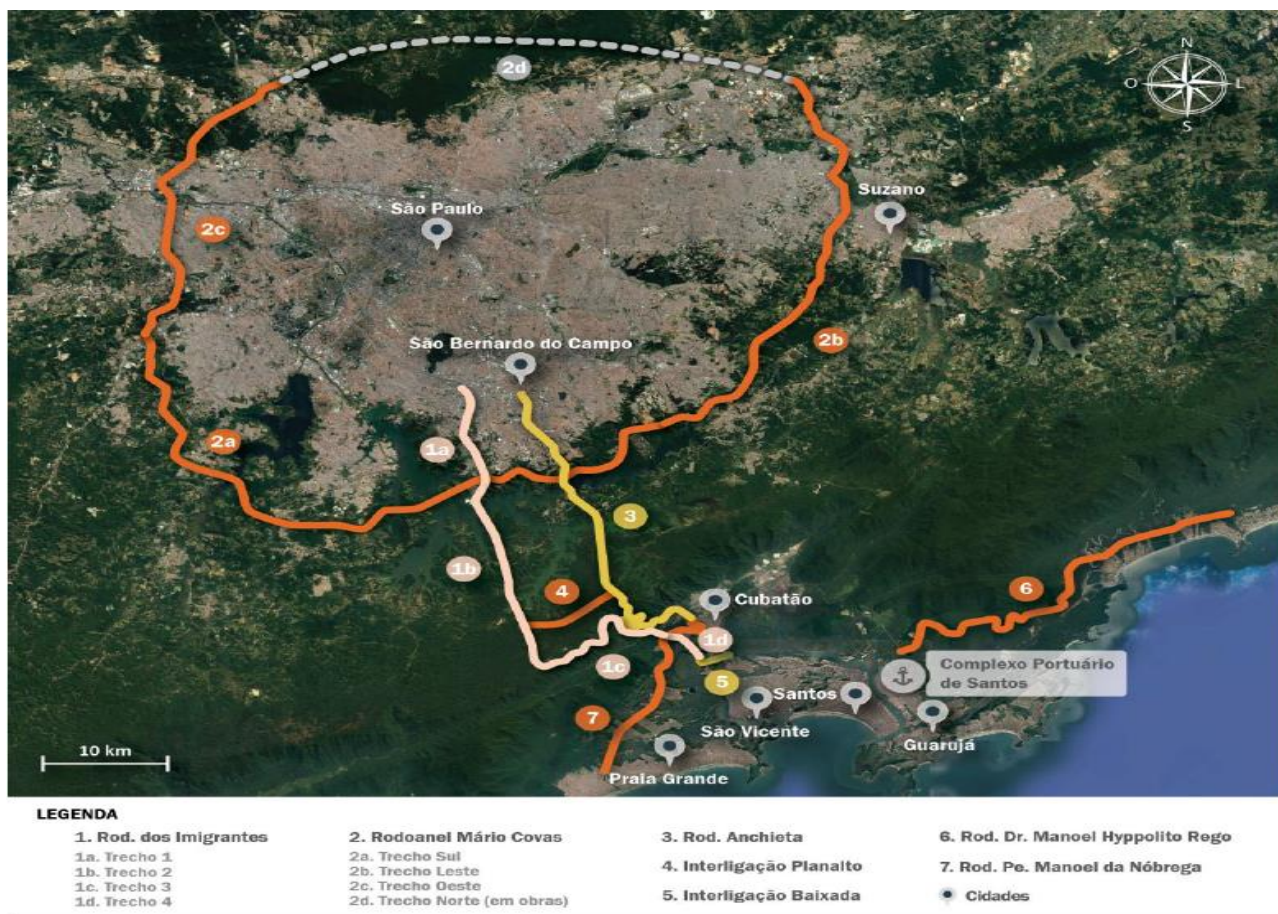


Figure 2: Road network overview - access to the Port of Santos.
Source: Master Plan of the Santos Port Complex of - 2019.

Detailing road access in Alamoia³

After the Dr. Paulo Bonavides Viaduct, a simple conversion on the right gives access to Av. Eng. Augusto Barata, segment known as "Retão da Alamoia", where the area leased to BTP is located. On the other side, when performing a conversion to the left after the said viaduct, followed by return at the roundabout ahead, one arrives at Rua Augusto Scaraboto (parallel to the viaduct), which leads to the areas of the western and eastern Alamoia region. The western part, composed of areas currently belonging to Transpetro (under a precarious legal nature), Vopak and Ultracargo, in addition to other retroport terminals existing in the region, is accessed through Av. Conselheiro Alfredo das Neves, an access that composes a binary system with Rua Dr. Alberto Schewedtzer, with Rua José Pinto Blandi as an interconnection between these two roads. The eastern part of Alamoia, consisting of areas belonging to Stolthaven, Ultracargo and Ultragaz, is accessed through Rua Augusto Scaraboto.

Such accesses are shown in Figure 3 and **Erro! Fonte de referência não encontrada. Erro! Fonte de referência não encontrada.**

³ source: master plan for santos port complex 2019

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LEGENDA

Via de acesso terrestre

- | | | | |
|----------------------------------|-----------------------------------|-------------------------------------|-----------------------------------|
| 1. Rod. Anchieta | 4. Rua Augusto Scaraboto | 7. Rua Dr. Alberto Schewedtzer | 10. Túnel Rubens Ferreira Martins |
| 2. Av. Marginal Direita Anchieta | 5. Av. Vereador Alfredo das Neves | 8. Av. Eng. Augusto Barata | 11. Av. Dr. Waldemar Leão |
| 3. Viaduto Paulo Bonavides | 6. Rua José Pinto Blandi | 9. Av. Pres. Getúlio Domeles Vargas | 12. Av. Francisco Manoel |
| Rotatória | Terminal | | 13. Rua Dr. Cláudio Luis da Costa |
| | A. Transpetro | C. Vopak | E. Ultracargo |
| | B. Norfolk | D. Stolthaven | F. Ultragaz |
| | | | G. Transbrasa |
| | | | H. BTP |
| | | | I. Liquegás |
| | | | 14. Av. Sen. Pinheiro Machado |
| | | | 15. Rua Joaquim Távora |

Figure 3: Port roads located in the Alamoia region and Jabaquara district. Source: Master Plan of the Santos Port Complex - 2019.



Figure 4: Access routes in the Alamoia region. Source: Master Plan of the Port of Santos Complex - 2019.

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3.2.1. Rail Access

Rail access to the Port of Santos is composed of the railway lines operated by MRS Logística, VLI and Rumo (former ALL Logística). The Port’s internal railway is operated by PORTOFER.

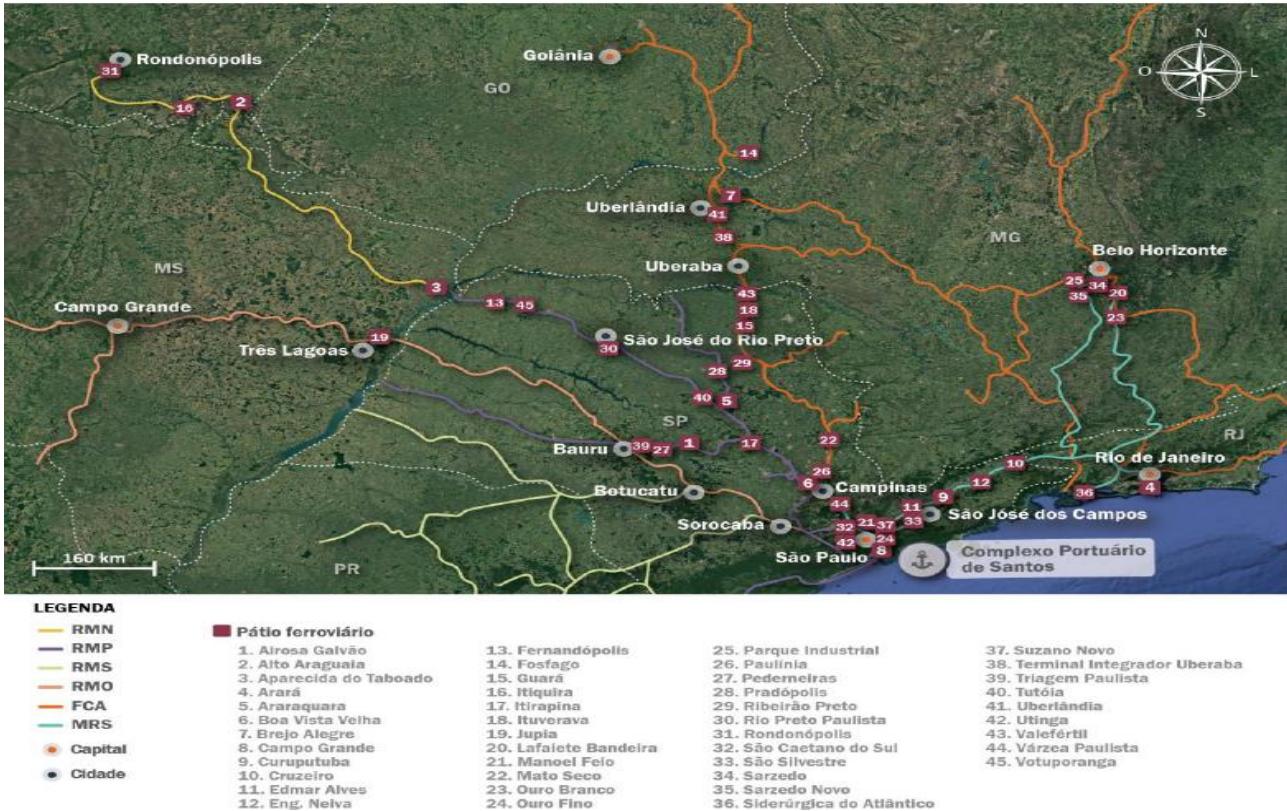


Figure 5: Rail access to the Port of Santos.

Source: Master Plan for the Port Santos Complex - 2019.

MRS operates with a rail gauge of 1.60 m and uses a cargo railway for moving cargo through the Serra do Mar (steep mountain range separating the hinterland and the sea coast). Meanwhile, to cross the Serra do Mar, Rumo uses a mixed rail gauge with a simple grip system. Finally, PORTOFER operates with mixed rail gauge.

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Figure 6: Internal Railway network administered by Portofer in the Santos Port Complex . Source: Master Plan for The Santos Port Complex - 2019.

The management of the internal railway system is quite complex due to several factors, but mainly due to the following reasons: short distances that require de-coupling and re-coupling of railway cars, several operators, human and roadway traffic interfering with the railway tracks, etc. The table below details the capacities of each different stretch that comprises the Port’s internal railway system.

Stretch	Operator	Pairs of trains per day ⁴
Paratinga-Perequê	RUMO MP	28
Perequê - Areais	MRS	22
Areais- Piaçaguera	MRS	13
Piaçaguera-Conceiçãozinha	MRS	10
Perequê- Cubatão	MRS	18
Cubatão - Santos (Valongo)	MRS	20

Table 2: Railway capacity in the Port of Santos.
Source: Declaração de Rede - ANTT- 2018

Given Brazil’s continental dimensions, and the long-distance nature of moving its agricultural produce from its center to its coastal line, recent public policy go in the direction of railway increasing quality and supply railroad capacity, in order to avoid the creation of logistical bottlenecks and its associated costs. For example, some of the most recent developments worth mentioning include: (i) The renewal of the Paulista’s railway

⁴ The most restrictive capacities observed were used when more than one sub-section comprised the stretch.

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network, with over one billion dollars of investments; (ii) New sub-concession of a stretch within the North-South Railway system; (iii) the implementation of the Ferroanel Norte; and (iv) the efforts to pass legislations allowing for a simple authorization model for investments in short railway lines.

As a result of some of the expansions described above, throughput projections for the Port of Santos’s internal railway indicate an increase from the current 30 million tons/year to about 85 million tons/year by 2023. Increase of this magnitude in the demand for railway access will require significant investments to expand the Port’s railway capacity, whether by Portofer Transporte Ferroviário Ltda (current system’s operator under Contract No. DP/25.2000), or by a consortium of railway operators, under a different contract.

3.2.2. Waterway Access

According to information obtained in the Rules and Procedures for the Captaincies of the Ports of São Paulo (NPCP-SP), the Navy’s roadmap for the South Coast, and in the Nautical Charts provided by the Santos Port Authority, the Port of Santos’s access channel has an extension of about 25km and a minimum width of 220m, with tracing as shown below.



Figure 7: Port of Santos’s Access channel.
(Source: Master Plan for the Port of Santos Complex - 2019).

The following table shows the allowed draughts limits in the access channel by stretch (Trecho).

LOCATION	BEGINNING	END	HIGH TIDE- (M)	LOW TIDE (M)	APPROVAL
Stretch I	Santos Bay	Fishing warehouse	14,5	13,5	July/2018

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Stretch II	Fishing warehouse	Great Tower	14,5	13,5	July/2018
Stretch III	Great Tower	Warehouse 6	14,5	13,5	July/2018
Stretch IV	Warehouse 6	Alamoia Terminal	14,5	13,5	July/2018
	Alamoia Terminal	End of stretch IV	13,7	12,7	September/2018
Piaçaguera Channel	Buoy #1	Usiminas Terminal	13,2	12,1	July/2018

Table 3: Access channel - Technical specifications.

Sources: Master Plan of the Santos Port Complex - 2019 - and CODESP
(<http://www.portodesantos.com.br/calado.php>).

Figure 8 illustrates section IV of the access channel, located in front of the Alamoia terminal. **Erro! Fonte de referência não encontrada.**



Figure 8: Stretch IV and Piaçaguera Channel.

Sources: Master Plan of the Santos Port Complex - 2019.

According to Ordinance No. 100/CPSP of December 20, 2018, the maximum speed allowed in the channel is 9 knots and may be reduced in some sections for security reasons.

With regard to anchorage in the Port of Santos, according to the Port Authority, Santos has six designated anchoring areas numbered from 1 to 6, as illustrated below:

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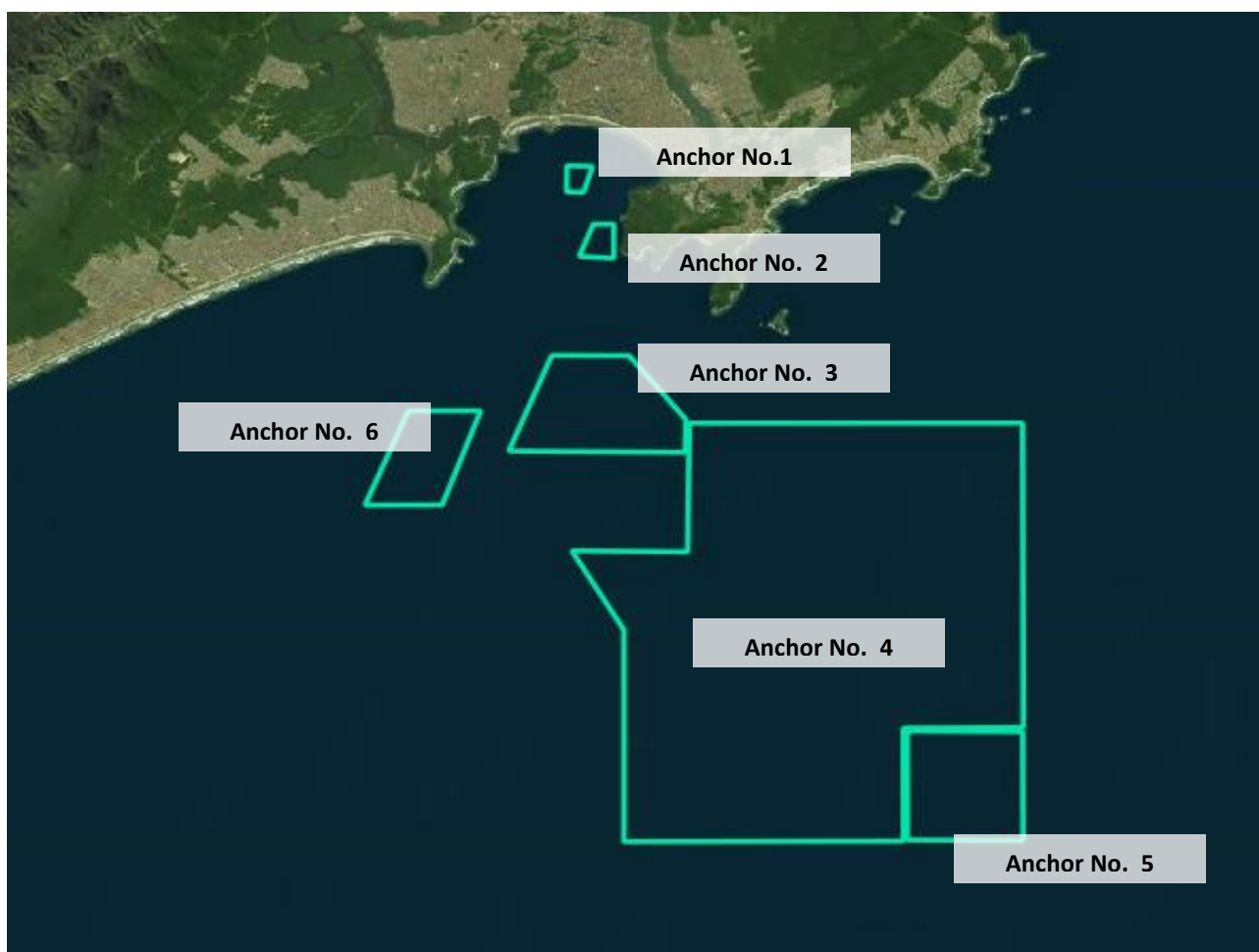


Figure 9: Anchoring of the Santos Port Complex .
Source: SPA.

The Port of Santos has a modern and high-quality equipment to control channel traffic. In technical terms, vessel traffic management is done through the Coordination, Communications and Traffic Operations Center (C3OT), which uses Vessel Traffic Management Information System (VTMIS). VTMIS, is a system consisting of cameras strategically placed along the channel, meteorological and oceanographic equipment for the measurement of the height and period of waves, the direction and intensity of marine and wind currents, and the variation of the tidal height and visibility. In essence, such equipment allows for real-time monitoring of the entire navigable channel.

3.2.3. Fluvial Access

The Port of Santos, due to the topography of its hinterland, does not have a river transport system to connect it to its hinterland. The use of this mode of transportation is limited, with the only relevant option being the Tietê-Paraná waterway. This waterway can only move cargo from the Midwest up to the inland terminals of Pederneiras (for railway) or Anhembi (highway), where cargo must be transhipped to reach the Port.

3.2.4. Pipeline Access

The Santos Port Complex has pipelines connecting the cities of Santos (RPBC refinery in Cubatão), Capuava (RECAP refinery and petrochemical complex) and Paulínia (REPLAN Refinery, Petrobras's largest refinery, and petrochemical complex).

The pipeline is mainly used to move petroleum byproducts, juices, and LPG, which respectively represent 62%, 17% and 13%, of the total mode share.

The area of the **STS08A** terminal is currently connected to the pipeline system that links Alamoia to the Transpetro/Petrobras network, and will be subject to a specific set of rules for its use, as already stated in this document.

4. Leased Area Description

The area referred to in this feasibility study, known as **STS08A**, is located in the Alamoia region, on the right bank of the Port of Santos, under the jurisdiction of the Santos Port Authority (SPA), a state-owned company under the Ministry of Infrastructure.

During phase 2 of the project, **STS08A**'s total area will correspond to **297.349 m²**, with pipeline connecting the terminal to Presidente Bernardes refinery and the Cubatão Terminal. From the Cubatão terminal, the product can also access the remaining refineries in the State of São Paulo through Petrobras's existing pipeline system. Finally, there is also a short pipeline infrastructure connecting **STS08A** with Alamoia's public pier.

Activities allowed in **STS08A** include reception, storage, and distribution of petroleum byproducts. For more information, see Section B - Market Study and Section D - Operations.

Currently, the area has 15 tanks and 6 spheres intended for the storage of liquid and gaseous bulk. These are non-reversible lease assets. Therefore, such assets will not be made available to the new lease holder without adequate compensation to the current occupant of the area. For more details, see Section B - Market Studies and Section C - Engineering.

It is important to note that the area currently occupied today by just one player is to be divided during this new contract into two distinct areas. One of the new areas is going to become STS08 and the other **STS08A**. Furthermore, the bid documents will prevent the same economic group from being the winning bidder of both areas.

However, separating the area into two will also give rise to potential conflicts between firms. Therefore, up to the period when layout adaptations can resolve these conflicts, regulations must ensure: (i) fair and equitable access to pipeline infrastructure and (ii) fair and equitable sharing of the general services infrastructure (*utilities*) available to the area.

As mentioned above, the lease surface area is 297.349 m². Products can access the terminal by pipeline, highways, and the pier (see Figure 10). As for personnel, staff and third-party users, the terminal can be accessed by a roadway that leads to Augusto Scaraboto Street and Eng. Antônio Alves Freire Avenue.

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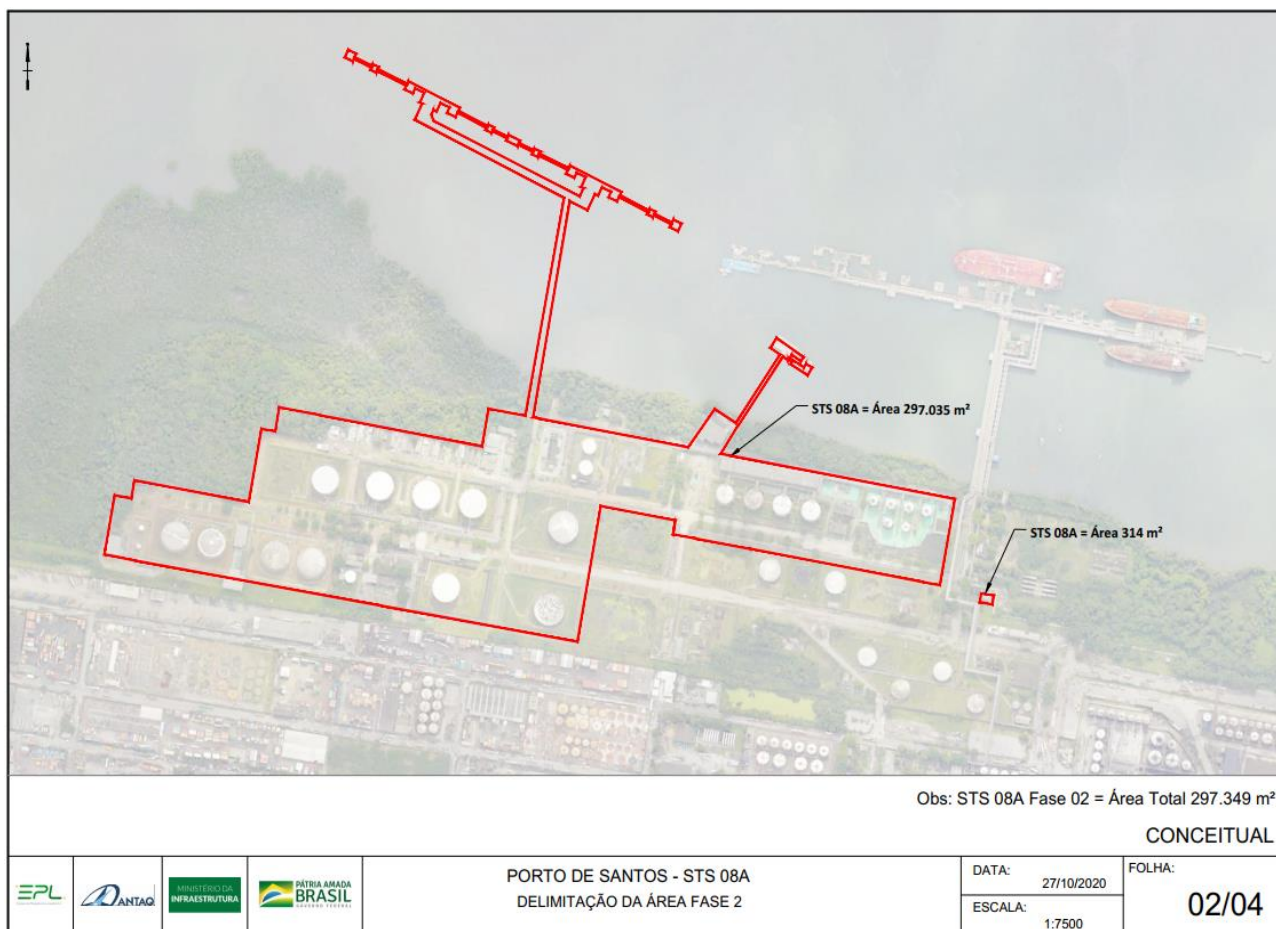


Figure 10 – Area STS08A (Phase 2).
Source: SPA

For more information, Section C - Engineering details the assumptions used for determining the necessary interventions to be made by the winning bidder.