

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 used for the handling, storage, and distribution of liquid bulk, especially fuels. The area is located in the Alamoia region of the Santos Port Complex, in Southeastern Brazil and will hereby be referred to as **STS08**.

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, the present study defines the values, deadlines and other parameters required to open **STS08's** bidding procedure, with the purpose of providing adequate remuneration to the Port Authority, as well as allowing for an adequate return to potential investors. The study was originally prepared by the technical staff of the Santos Port Authority's (SPA).

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. In particular, EPL's process will generally follow the steps listed below:

- Update of the of the area/facilities legal and contractual situation;
- Update of the area's current 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, lease value, environmental licensing, etc.;
- Incorporation of determinations/ contributions from intervening entities made during the first rounds 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 studies.

It should be mentioned that the **STS08** terminal 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 the PAP.

2. The Study

The feasibility study for the **STS08** lease area 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 **STS08’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 the **STS08** lease area, it should be noted that the main activities to be carried out in the area will aim to supply the demand of regions with a deficit in the production of diesel, gasoline and fuel oils, by means of coastal navigation and Bunker fuel supply to ships.

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.

In preparing this study, the provisions governing the preparation of projects for the exploitation of port areas were observed, as well as the main planning instruments of the port sector for the Santos Port Complex, as specified below:

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 January 8, 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, of the Empresa de Pesquisa Energética (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 Santos Port Complex
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 in 1997. In summary, the new law broke up the 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 byproducts 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, it is worth highlighting 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 transaction between traders and concessionaires of piped gas distribution where the two agents are related parties" (art. 2º, II), consigning that the agent occupying a dominant position in the natural gas sector must "completely dispose of shares it holds, directly or indirectly, in transport 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 byproducts was 108.2 million m³. In terms of refining, Brazil has the world's 8th largest capacity, being responsible 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 byproducts 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 entered into 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 entered into 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 fuel products handled on the 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 area corresponding to part of the STS08 lease is in operation, but in a precarious contractual situation, due to the termination of the previous lease agreement.-

In this sense, the preparation of a feasibility studies, aimed at allowing for the bidding procedure for area **STS08** to commence, is urgent and of relevant public interest, as it seeks to guarantee the national and regional supply of energy – given the strategic position of the asset in question –, also promoting the maximization of the use of public assets, with remuneration adequate to market levels.

3. Description of Santos Port Complex

The Santos Port Complex comprises the Organized Port of Santos, an area administered by Santos Port Authority - SPA (new corporate name of Companhia Docas do Estado de São Paulo), and six private terminals (TUP).

The following list encompasses the name of the 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. **Figure 1**

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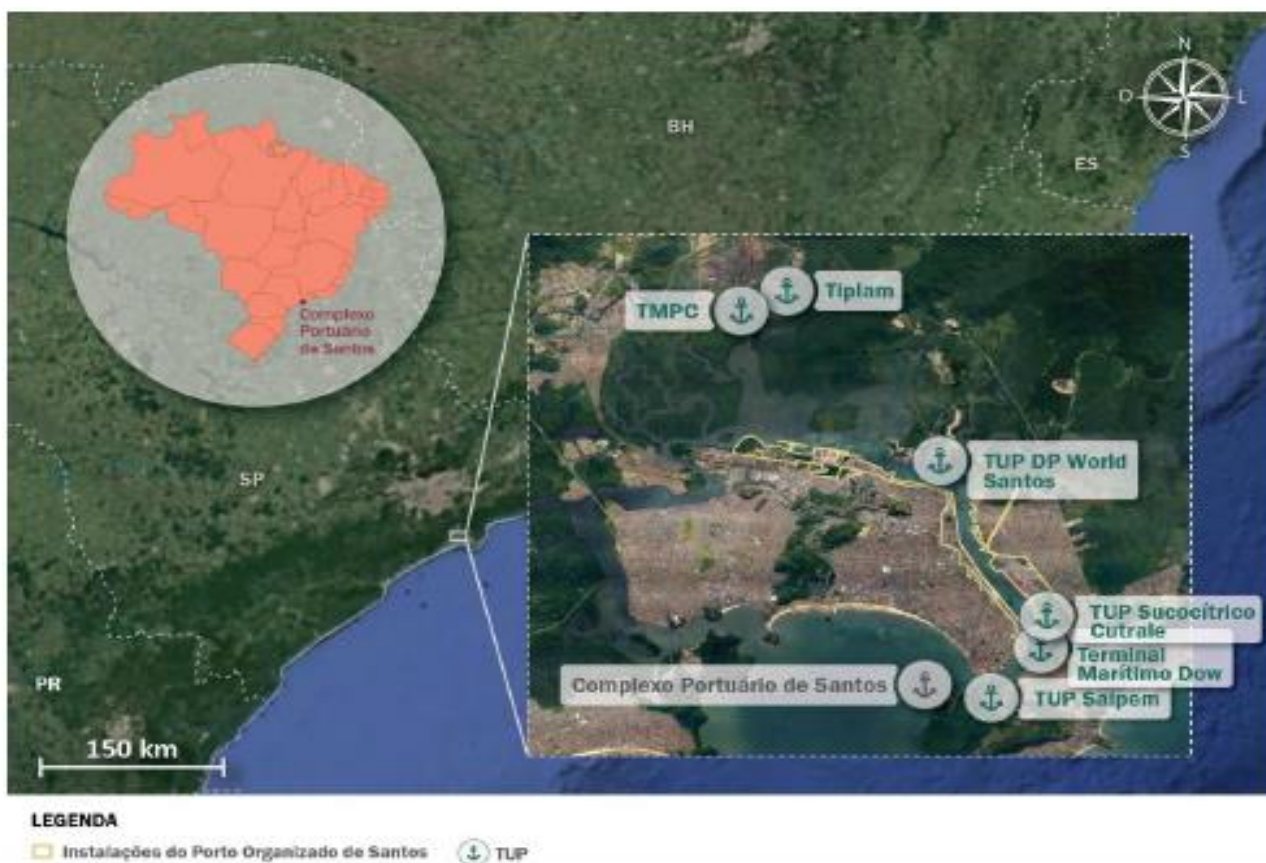


Figure 1: Location of the Santos Port Complex.
Source: Master Plan of the Santos Port Complex - 2019.

The Port of Santos hinterlands (primary and secondary) cover the entirety of Brazil’s Southeast and South region, and much of the country’s Midwest. 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 various transport modes including air transport.

3.2. Access

3.2.1. Road Access

The Santos Port Complex main road connection to its hinterland are through routes SP-021, SP-150 (BR-050) and SP-160. The highway stretches of great relevance for the study are known respectively as: Rodoanel Mário Covas (south and east), Rodovia Anchieta and Rodovia 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 Rodovia Pe. Manoel da Nóbrega, and Rodovia 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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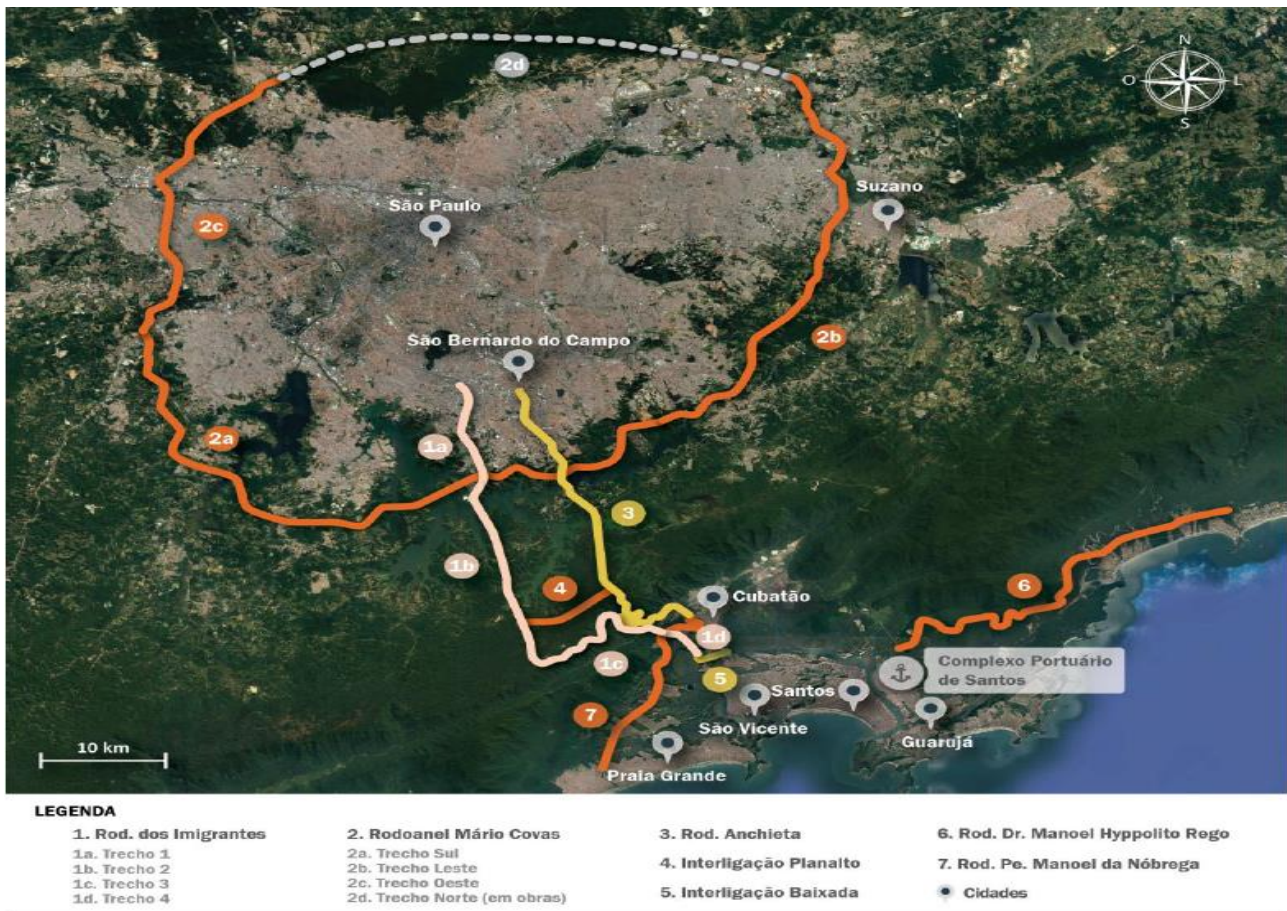


Figure 2: Road network overview - access to the Port of Santos.
Source: Master Plan of the Santos Port Complex - 2019.

Detailing road access in Alamoia³

After the Dr. Paulo Bonavides Viaduct, a simple conversion on the right gives access to Av. Eng. Augusto Barata, a 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 (in 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 Figure 3Figure 4

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 |



- | | | | | |
|---------------|---------------|---------------|---------------|-------------|
| A. Transpetro | C. Vopak | E. Ultracargo | G. Transbrasa | I. Liquegás |
| B. Norfolk | D. Stolthaven | F. Ultragaz | H. BTP | |

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 Santos Port Complex - 2019.

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3.2.1. Rail Access

The 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.

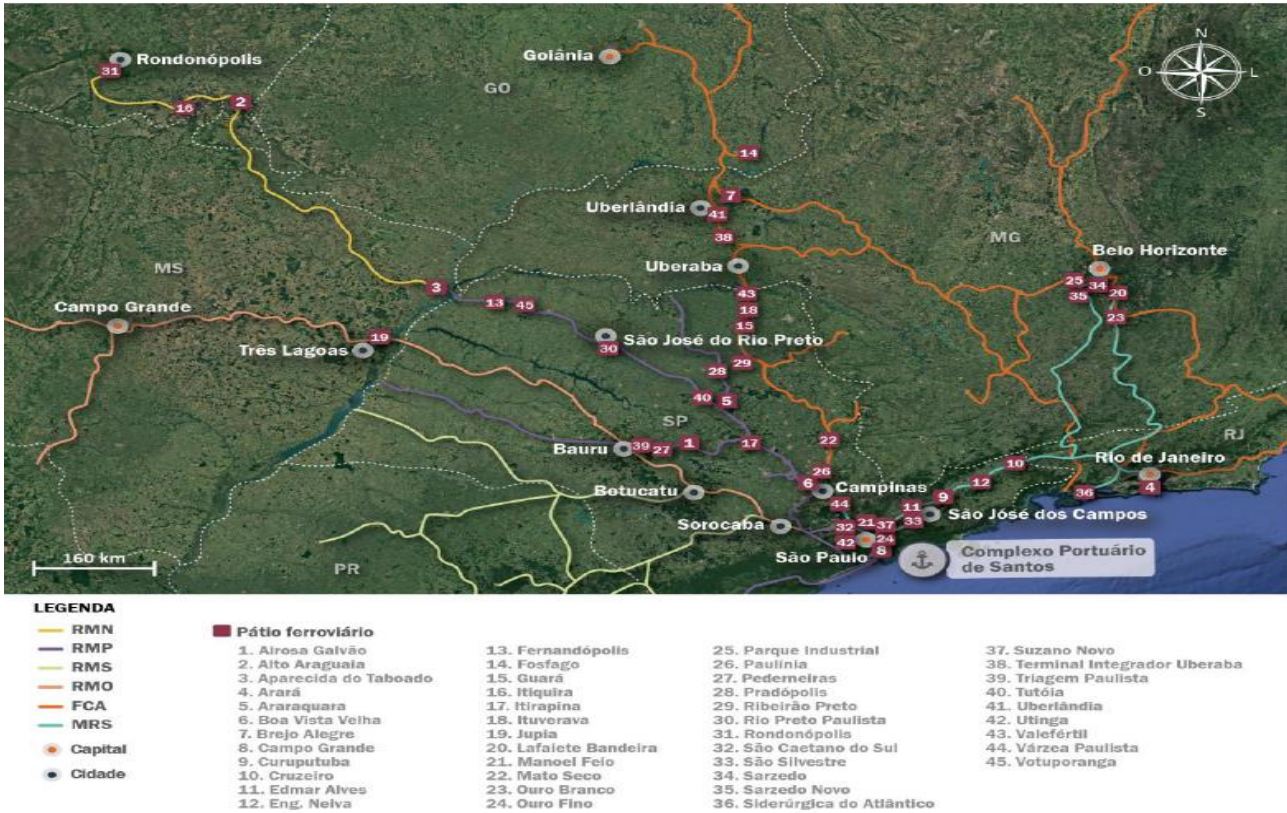


Figure 5: Rail access to the Port of Santos.

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

MRS operates with a rail gauge of 1.60 m and uses a rack for moving cargo through the Serra do Mar (steep mountain range separating the hinterland and the shoreline). Meanwhile, to traverse 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: 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 trains, several operators, human and roadway traffic interfering, etc. The table below details the capacities reported by the concessionaire companies for the year 2018.

Stretch	Operator	Pairs of trains per day ⁴
Paratinga-Pereque	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

The public policy designed to face the country's potential logistical bottlenecks involves the expansion and modernization of the rail modal as a privileged alternative for the flow of goods across the national territory. For example, some of the most recent developments worth mentioning include: (i) the renewal of the Paulista railway network; (ii) sub-concession of a stretch within the North-South Railway system; (iii) the

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

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implementation of the Ferroanel Norte; and (iv) the efforts to pass legislations allowing for a simple authorization model for investments in railway shorelines.

As a result of the investments 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 and information provided by the Companhia Docas do Estado de São Paulo (CODESP), the Port of Santos’s access channel has an extension of about 25km and a minimum width of 220m, with a layout as shown below.



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

The following table shows the allowed draughts limits in the access channel.

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

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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
Channel Piaçaguera	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. Figure 8



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 along the access to the Santos Port Complex and may be reduced in some sections for security reasons.

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



Figure 9: Anchorages in the Santos Port Complex.
Source: SPA.

The Santos Port Complex 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, and of state of the art 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 - consisting of four remote stations and a control center - 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. Cargoes from the Southeast and Midwest, which use the Tietê-Paraná waterway towards the port of Santos, are transshipped on terminals located in Pederneiras (for railroad) or Anhembi (highway), for final transport to 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 (except LGP), juices, and LPG, which respectively represent 62%, 17% and 13%, of the total mode share.

The area of the **STS08** terminal is currently connected to the pipeline system that links Alamoá to the Transpetro/Petrobras network, and will be subject to a specific set rules for its use, as already stated in this document.

4. Leased Area Description

The area referred to in this feasibility study, known as **STS08**, is located in the Alamoá 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, **STS08's** total area will reach **168.324 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 set of pipeline infrastructure connecting **STS08** with Alamoá's public pier.

Activities to be developed in the **STS08** leasing area include reception, storage, and distribution of petroleum byproducts. For more information, see Section B - Market Study and Section D - Operations.

Currently, the area has 6 tanks intended for the storage of liquid bulk, of which 4 tanks will be returned to the Port Authority upon expiration of the lease. Such existing assets will be made available to **STS08** in phase 2. For more details, see Section B - Market Studies and Section C - Engineering.

Due to the division of the area, currently occupied by Transpetro, into two distinct terminals, resulting in the **STS08** and **STS08A** lease areas, it is essential to define rules that regulate, for the period necessary for the respective adaptations, (i) the joint exploitation of the pipeline access to the terminals and (ii) the condominium of the infrastructure of general services (utilities) available to the area.

As mentioned above, the lease surface area is 168,324 m². Products can access the terminal by pipeline, highways, and the pier (see Figure 10). The terminal can be accessed by a roadway that leads it to Rua Dr. Alberto Schweitzer.

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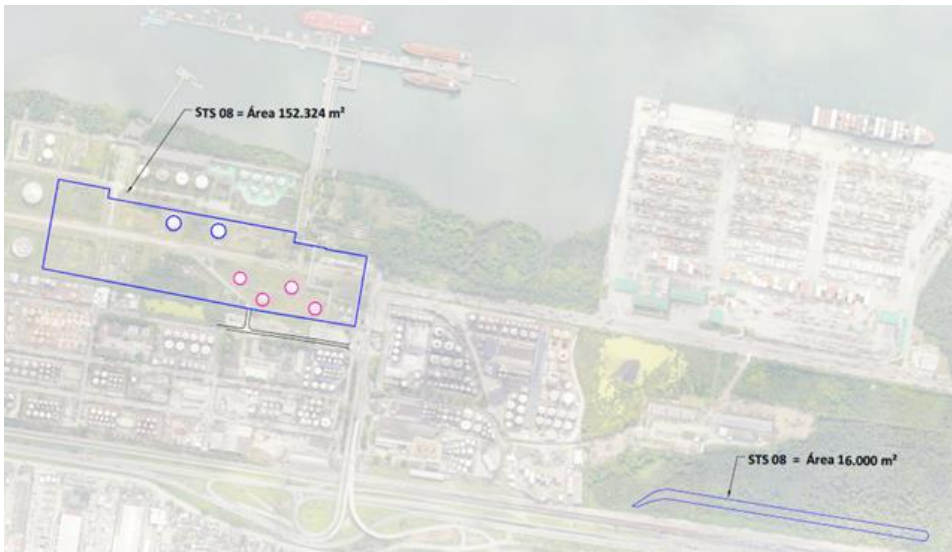


Figure 10 - Area STS08.
Source: SPA.

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