

## **SECTION 7: ALTERNATIVE ANALYSIS**

### **7.1 INTRODUCTION**

The IEM procedure stipulates that an EIA process needs to consider feasible alternatives for any proposed development. Therefore, DEAT requires that a number of possible proposals or alternatives for accomplishing the same objectives be considered. The alternatives under consideration in this EIA include the location or layout alternatives, process options, dredge disposal options, the no-development option, timing alternatives and strategic alternatives.

The rationale of the identification and screening of project alternatives is discussed in detail in Appendix B3. This engineering screening report describes alternatives that were investigated for the Tippler, Stockyard and Berth locations, Ship loader equipment and water supply alternatives. Motivation is provided as to the reasoning behind the screening of some alternatives and the selection of a preferred option.

### **7.2 STRATEGIC ALTERNATIVES TO EXPANSION OF THE IRON ORE HANDLING FACILITY**

As the EIA is investigating the expansion of an existing iron ore handling facility, alternatives need to be considered in terms of alternative processes to the current methods of handling iron ore parcels. A strategic alternative to meeting the increased iron ore demand could entail a Transnet decision to develop a similar facility at any other port in the country. However, such a decision is not considered a feasible means to increase the export of iron ore as the Port of Saldanha is the only dedicated iron ore handling facility in the country and it has been strategically earmarked for future expansion in this regard.

As discussed in the motivation for the proposed development and taking into consideration the current operations at the port of Saldanha, the proposed expansion of the iron ore handling facility will be the best option to satisfy the future need of the internationally competitive market in line with Transnet's goal to contribute to South Africa's economic growth targets (see Appendix B2).

### **7.3 LAYOUT ALTERNATIVES**

A preliminary site location analysis of alternatives was undertaken by Transnet for the development, with obvious limitations being the current layout of operations and regional location of the port where the additional expansion is needed. Based on a preliminary study, Transnet has identified three possible stockyard layout footprints within the study area. These alternative layouts have been described in the Background Information Document. Transnet has completed a more detailed study of the layouts and the revised alternative layouts 1, 2 and 3 are described below (see

Figures 15, 16 and 17). These three options were selected since they are considered the best alternatives that will minimise the environmental impact of the proposed expansion. In addition to other aspects in the decision-making process, the preferred layout will be determined, by:

- The opinion of the public, ascertained through the public consultation process;
- Specialists' recommendations;
- Environmental characteristics and constraints; and
- Technical and economic cost-benefit analyses.

The preferred layout also depends on engineering and operational feasibility and costs associated with each layout, i.e. capital costs for construction; a balance between the environmental costs associated with each layout and the engineering and operational costs.

Based on a preliminary identification of physical, biological and social constraints, none of the three alternative layouts have currently been identified as the preferred option. It should be mentioned however, that the comprehensive impact assessment phase will specifically assess the impacts of all three alternative layouts. Essentially, the EIA will comparatively assess the alternatives, determining whether each of the alternatives is environmentally suitable or not. The study will also determine which of the alternatives is the preferred layout alternative environmentally. Thus if one alternative is only marginally preferred over another from an environmental point of view, and both are considered environmentally acceptable, the recommendation could be that either of the two/three alternatives be approved.

### **7.3.1 Description of Layout Alternatives**

The following footprint descriptions for the reclamation areas are approximate at this stage. Further studies will be conducted during the EIA phase to refine these footprints (see Table 11).

*Alternative layout 1: Southward expansion, required reclamation of approximately 56ha of the bay.*

In the original port master plan, a portion of the bay was reclaimed and set aside for future stockyard expansion. This area is separated from the bay by a reclamation dam, which was formerly used for oyster cultivation. The first alternative proposes to locate the stockyards in this area, which is already earmarked for future stockyard expansion, with about half of the remaining footprint extending into Big Bay. This would require that an area of approximately 56 ha be reclaimed into the bay, south of the existing sea wall of the area for stockyard expansion and east of the quay. Reclamation will take place along the entire southern edge of the presently reclaimed area, including backfilling of about half of the reclamation dam. The area to be reclaimed extends into Big Bay by up to approximately 955 m to the east of the sea wall of the quay, and 724 m south of the reclamation dam wall. Thus, two of the proposed Stockyards and Stacker Reclaimers would be located on the reclaimed dam, while the other infrastructure and services would be built in the area reclaimed from the bay (56 ha). For this alternative, the entire footprint of the expansion would be approximately 86 ha (refer to Figure 15).

The advantages associated with Alternative Layout 1 is that it makes use of the reclamation dam and limits the impacts on the dune system.

The disadvantages associated with alternative layout 1 will be that it requires that an area of approximately 56 ha be reclaimed into Big Bay, south of the existing sea wall of the area for stockyard expansion and east of the pier. Reclamation will take place along the entire southern edge of the presently reclaimed area, including backfilling of about half of the reclamation dam.

*Alternative layout 2: Northward expansion into the dune area and eastward into reclamation dam area.*

In Alternative layout 2 a reduced amount of reclamation into the bay will be required, to accommodate conveyors from the stockpile area to the sampler building. An area of approximately 14 ha will be reclaimed into Big Bay, south of the existing sea wall of the reclamation dam. The area to be reclaimed extends into Big Bay by up to approximately 979 m east of the sea wall of the quay, and 106 m south of the dam wall. The dam area would be completely reclaimed. About 30 ha of the future stockpile area, would be used for two new Stockyards, while 27 ha of land to the north of the existing operations, in the dunes, would be used for the remaining Stockyards. For this alternative, the entire footprint of the expansion would be approximately 71 ha. The entire footprint of the expansion would lie mainly on the reclamation dam, with a portion on the fringes of the dunes (refer to Figure 16).

The advantage of alternative layout 2 is that significantly less reclamation into the bay will be required, which could result in a lower impact on the marine environment and its associated ecology.

The disadvantage of alternative layout 2 is that the dune systems, which are considered to be sensitive, will be negatively affected by the expansion footprint.

*Alternative layout 3: Eastward expansion into reclamation dam and partly into undeveloped dune area*

Alternative layout 3 has a similar amount of reclamation into the bay as in Layout 2. An area of approximately 14 ha will be reclaimed into the bay, south of the existing sea wall of the reclamation dam. The area to be reclaimed extends into the bay by up to approximately 979 m east of the sea wall of the quay, and 106 m south of the dam wall. The dam area would be completely reclaimed. About 30 ha of the reclaimed area would be used for future infrastructure, with the all the new Stockyards. All the Stockyards would be located in the area formerly used for mariculture, up to the eastern boundary of the reclamation dam wall. For this alternative, the entire footprint of the expansion would be approximately 44 ha.

The advantage is that part of the facility will be developed on already existing infrastructure, potentially decreasing the associated impacts on the Bay.

A detailed alternative analysis (comparative assessment of the impacts) of these 3 layout alternatives will be undertaken in the EIA phase.

**Table 11: Stockyard layouts showing of footprint, extent of reclamation and excess fill for each option**

Stockyard Layouts	Total Footprint (ha)	Area of dunes to be affected (ha)	Area of dam to be reclaimed (ha)	Area to be reclaimed into Bay (ha)	Volume of dredge material fill (m <sup>3</sup> )*	Volume remaining after reclamation (m <sup>3</sup> )
Alternative Layout 1	86	x	30	56	7,164,000	0
Alternative Layout 2	71	27	30	14	2,948,000	11,100,500
Alternative Layout 3	44	x	30	14	2,948,000	4,216,000

\* This includes the volume required to reclaim the dam, the extension into Big Bay and the Causeway for the Berths.

x Unknown, depends on the footprint of services installed in this area.

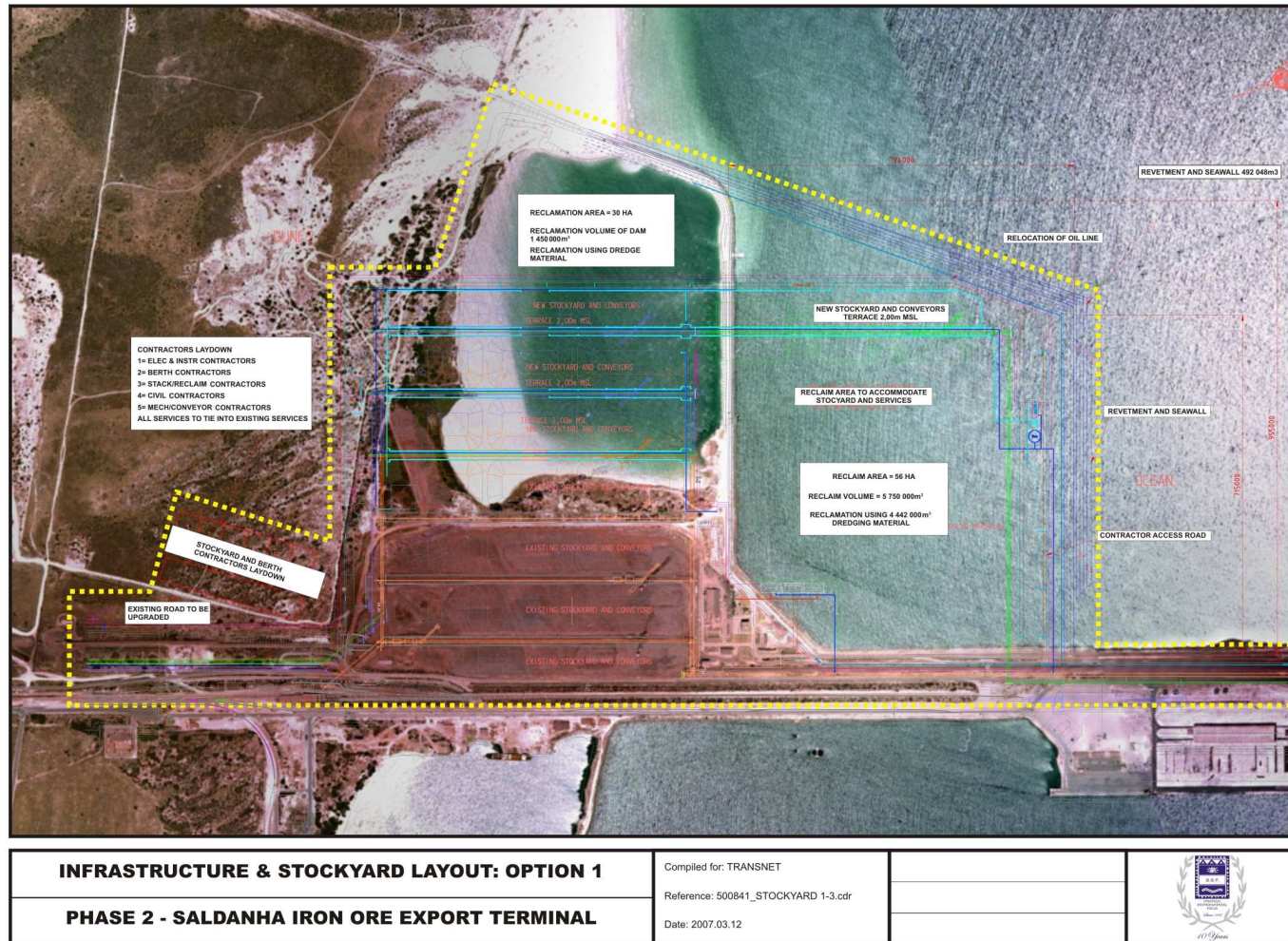


Figure 15: Alternative Layout No. 1

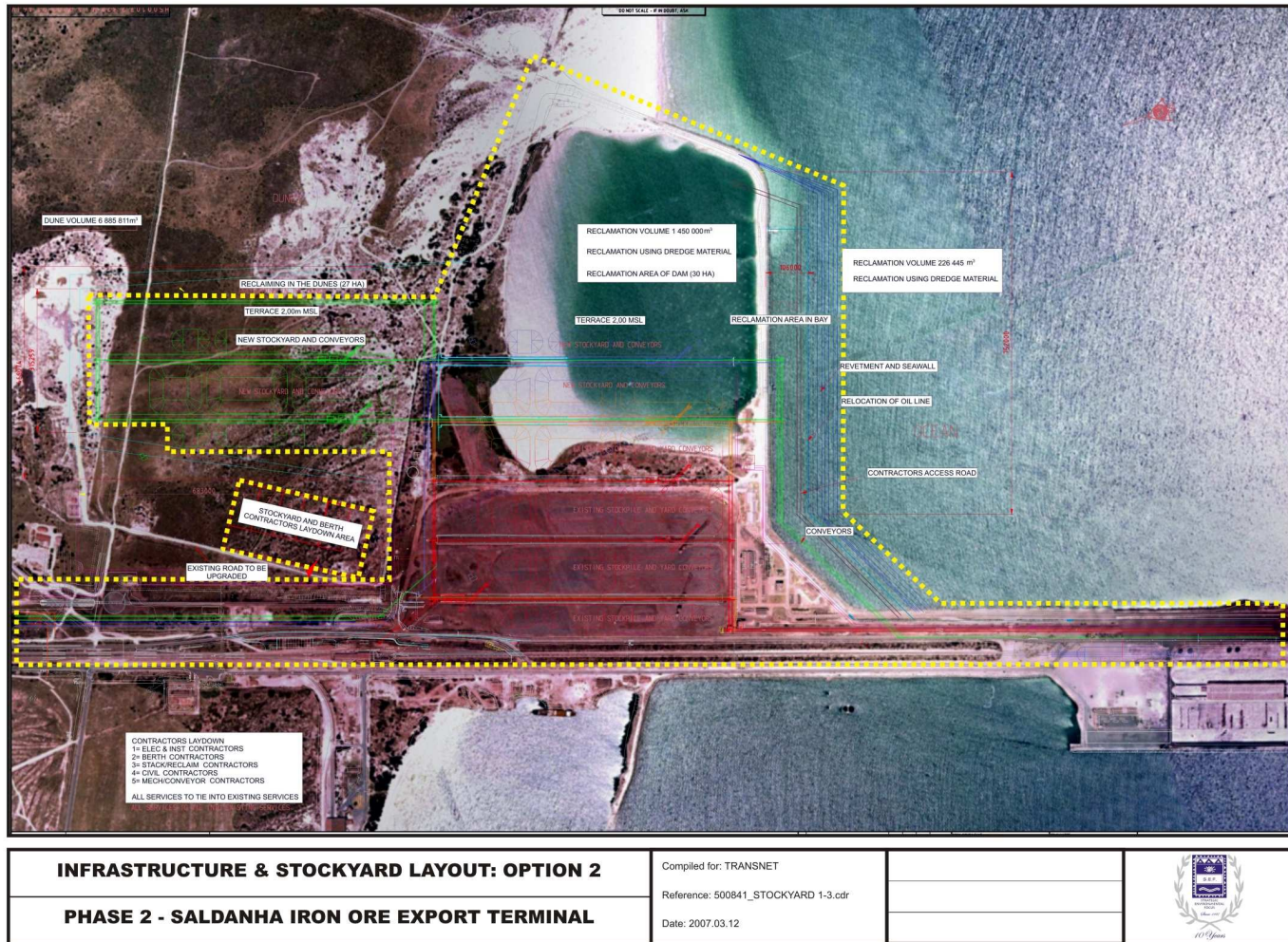


Figure 16: Alternative Layout No. 2

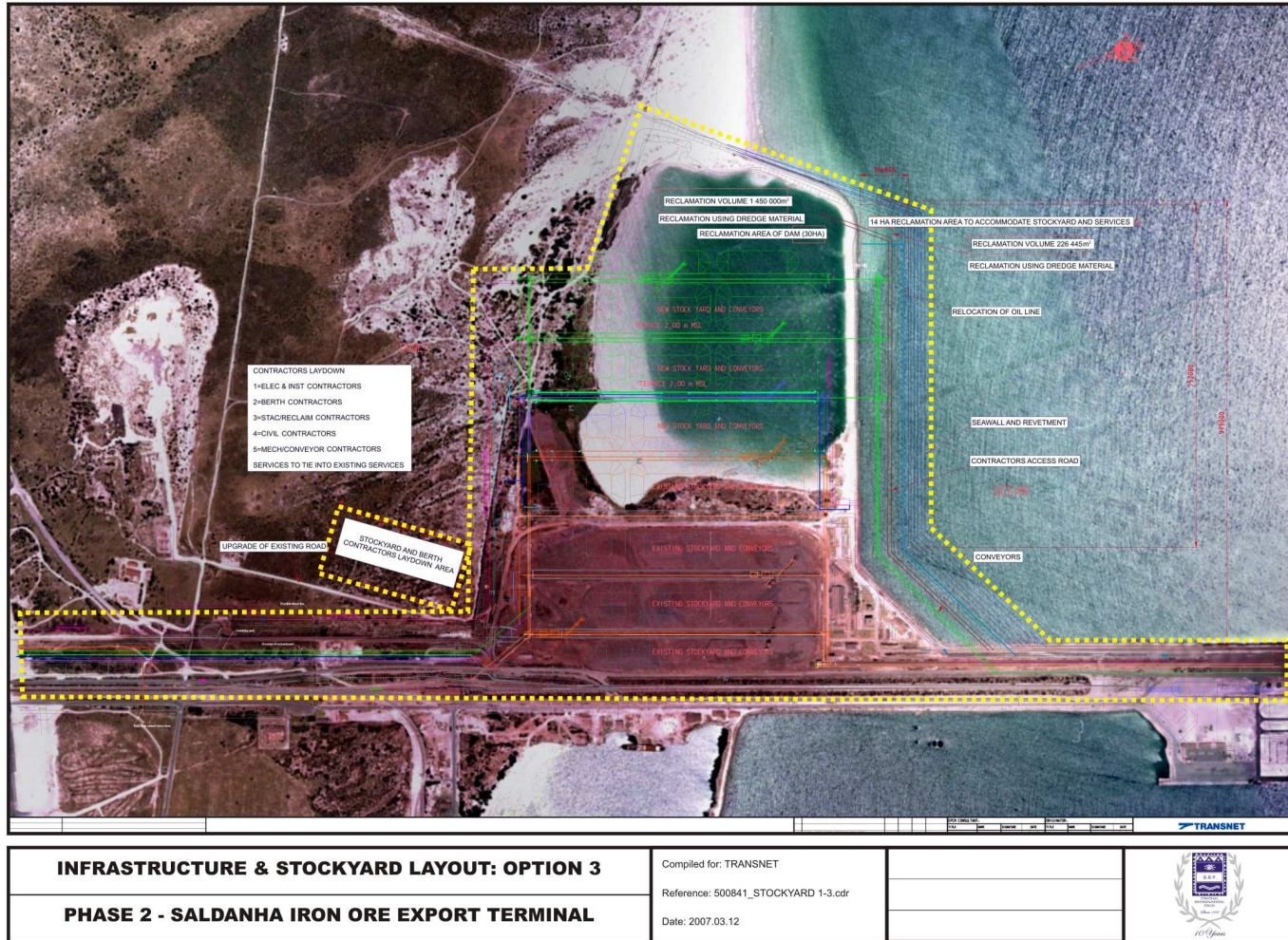


Figure 17: Alternative Layout No. 3

#### **7.4 ALTERNATIVES FOR DISPOSAL OF DREDGE**

The alternatives for disposal of excess dredge material include: disposal at sea, disposal at an inland destination, and to utilise the dredge material in some beneficial manner, such as in reclamation operations. A number of sites have been identified for the disposal at sea (Van den Bossche and Ramsay, 2007), including one described in a previous study by the CSIR (1991). The indications from the marine and coastal management authorities are that disposal at sea should be considered as a last resort (see section 2.3.1.2, which discusses disposal of dredge material). All 3 options will be considered in the EIA Phase.

#### **7.5 NO-DEVELOPMENT ALTERNATIVE**

The Department of Environmental Affairs and Tourism stresses that the no-go option should be considered in cases where the proposed development could have a significant negative impact that cannot be effectively or satisfactorily mitigated.

The physical load of iron ore parcels that will be transported from Sishen will increase substantially in the future as the mines plan to meet international demand for iron ore and the current facilities and infrastructure will be inadequate. Therefore, there is a definite need to expand the infrastructure. Failure to expand and upgrade the current infrastructure could lead to a significant loss of earnings for Transnet and the mines, as well as foreign exchange earnings by the country. If the expansion of the iron ore handling facility is not implemented, Transnet will be unable to meet the export demand, or existing contractual commitments or maintain existing reliability and quality of service. In addition, it will not be possible to meet the commitment of improving capital investment over the next 5 years in order to improve its infrastructure. This option will be further assessed in the EIA phase.

#### **7.6 TIMING ALTERNATIVES**

There is a definite need to overcome the current and future problems on the existing activities at the Saldanha port. The forecasted growth in demand over the next few years urgently requires Transnet to plan and execute goals well in advance in order to benefit from the current demand for iron. It is therefore necessary to ensure extra expansion capacity into the port area in the medium to long-term, provided that all expansion is undertaken in a sustainable manner.

The new expansion facility will be brought into operation at the time when the load growth and demand require it. It is however necessary to secure the necessary legal authorisations and associated environmental permits before hand, and to construct the necessary infrastructure to ensure that Transnet's long-term needs can be met.

The impact of not implementing the project on time must therefore be a critical part of the assessment process.

## 7.7 ALTERNATIVES TO BE ASSESSED IN THE EIA

In compliance with the EIA guidelines, a number of alternatives have been identified in an engineering screening study undertaken by Transnet (Appendix B3). The alternatives have been identified in the following areas:

- Tippler location;
- Stockyard location;
- Berth location;
- Ship loader equipment; and
- Alternative water supply.

The following groups of criteria were used in the screening exercise (where applicable, a more detailed list of criteria was used for each group of alternatives):

- Infrastructure required – must be practically achievable;
- Impact on Operations - ease of integration with current operations and infrastructure to minimise stoppages both during construction and subsequent operations; and
- Environmental and Social impacts - minimise environmental damage by developing and implementing environmentally sensitive solutions.

Prior to commencement of the EIA, it was possible to eliminate a number of these alternatives addressed within these engineering screening studies. A summary of the options which will be taken forward as part of the EIA phase is given below:-

- New Tippler Location – The ideal location for the position of the two new Tipplers is considered to be approximately 760m north of the Langebaan/Saldanha provincial road, MR 559 and between the existing rail lines and the Mittal Steel boundary fence. This has been developed in conjunction with rail alignment studies.
- Stockyard Locations – Three alternative locations have been proposed. These include further reclamation of the existing Stockyard area contained within the revetment bund, inland development into the dunes and reclamation of the existing Stockyard area contained within the revetment bund combined with reclamation into Big Bay.

- New Berth Location – The ideal location for the position of the two new berths is considered to be alongside the existing iron ore quay on the Big Bay side.
- Ship loader equipment – Three alternative ship loaders have been proposed. These include the long travel Ship loader (bridge type), the Linear Ship loader and the Long travel Ship loader (slewing type).
- Water supply alternatives – Reverse osmosis (desalination of seawater) is considered the preferred solution to the alternative water supply. Due to the urgent need for additional water supply for existing operations, the reverse osmosis plant will be subject to a separate EIA process that will run in parallel with the Phase 2 EIA.