TRANSNET

SCOPING AND ENVIRONMENTAL IMPACT ASSESSMENT

Scoping and Environmental Impact Assessment for the proposed Manganese Export Facility and Associated Infrastructure in the Coega Industrial Development Zone, Port of Ngqura and Tankatara area

DRAFT EIA REPORT

CHAPTER 2:

PROJECT DESCRIPTION

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CHAPTER 2: PROJECT DESCRIPTION

This chapter provides project-related information provided by Transnet SOC Ltd and the appointed engineering consultants, Hatch Africa. The purpose of this chapter is to present sufficient project information to undertake the EIA process.

2.1 BACKGROUND

Transnet SOC Ltd is proposing to develop a 16 Mtpa throughput Manganese ore Export Facility in the Coega Industrial Development Zone (Coega IDZ) and adjacent area (Remainder of Farm Tankatara Trust 643), located approximately 15 km north-east of Port Elizabeth (PE), Nelson Mandela Bay Municipality (NMBM), Eastern Cape Province (Figure 2.1). The terminal and the associated rail facilities will be designed to meet the medium term manganese needs, projected to be up to 16 Mtpa, but will cater for the addition of infrastructure in future.

The proposed facility would mainly consist of a manganese ore stockyard and handling facility in Zones 8 and 9 of the IDZ, which includes the Port of Ngqura (Figure 2.1), as well as a rail compilation yard in Zone 11 of the IDZ and on a portion of the adjacent property (Remainder of Farm Tankatara Trust 643). In addition, the proposed project will comprise the doubling of the railway line between the proposed compilation yard and the existing rail marshalling yard (Zones 13 and 9).This is a Greenfields development project on a portion of land measuring approximately 350 hectares within the area designated for ore handling and general industry in the Coega IDZ, as well as a portion falling within the Tankatara property (currently zoned agriculture). To this effect, Transnet intends to purchase a portion of land from Tankatara.

Figure 2.1: Locality of existing Ngqura Harbour Terminal

The manganese ore will be transported from Hotazel in the Northern Cape to the proposed Coega compilation yard via the existing railway line currently servicing the existing Manganese Ore Handling Facility located in the Port of Port Elizabeth. The trains are then organized into 100 wagon sets (known as rakes) and sent to the proposed terminal where the manganese will be offloaded at the proposed stockyard, reclaimed when needed and finally transported via a proposed conveyor system to the existing Berths C100 and C101 situated in the Port of Ngqura, for exporting via ship. The proposed Coega rail compilation yard will allow for the consolidation and de-consolidation of four 200 wagon trains per day (four loaded trains and four empty trains).

2.1.1 Manganese Background

Manganese (Mn) is a naturally occurring element that is found in rock, soil, and water, and comprises about 0.1% of the Earth's crust. Manganese ores of major commercial importance include (i) pyrolusite (MnO_2, Mn 63.2%); (ii) psilomelane (manganese oxide, containing water and varying amounts of oxides of Ba, K and Na as impurities; Mn commonly 45-60%); (iii) manganite (Mn_2O_3.H2O, Mn 62.4%); and (iv) braunite ($3Mn_2O_3$, $MnSiO_3$, Mn about 62% and SiO_2 about 10%). Manganese ore transported from the mine to the stockyard and subsequently exported from the port is expected to be primarily composed of manganese oxide (MnO) with a range of other oxides (based on a sample of ore collected from the PE Manganese Terminal - Table 2.1).

Table 2.1: Typical Manganese Ore composition based on a Sample collected at the PE Terminal (2012)

Name	(%)
SiO_2	5.85
Al_2O_3	0.34
Fe (Tot)	6.32
Fe_2O_3	9.04
TiO_2	0.02
CaO	6.03
MgO	1.76
MnO	53.81
P	0.01
K_2O	0.75
LOI	15.81
Ba	0.09

Manganese is an essential nutrient, but it has toxic effects if exposure is excessive or prolonged. Manganese oxide is not considered a fire or spill hazard, and potential health effects would be related to exposure to dust that may be generated during product transfer and handling. Care therefore has to be taken to ensure minimise manganese dust to acceptable levels. Manganese particles will eventually settle out via dry deposition into surface waters or onto soils. Transport of manganese in water is dependent on the solubility of the manganese form, and often, manganese in water will settle into suspended sediments (EPA, 2003). Although some manganese compounds are readily soluble in water, manganese oxide is poorly soluble in water (WHO, 2004). Although manganese ore is not considered hazardous, other settled solids present in the Manganese ore may be of concern. Therefore, it is still necessary to prevent manganese ore from entering streams, water bodies and wastewater systems, as this could impact on aquatic ecology and lead to increases of sediment loading in the river.

Samples of ore taken at the existing export facilities underwent leachate testing and laboratory results are presented in Table 2.2 (Water based leachate test) and Table 2.3 (Toxicity Characteristic Leaching Procedure (TCLP)) below.

Table 2.2: Water based leaching results (Ore sample collected at PE Terminal, 2012)

Request ID: 6047 **Sample ID:** 308338 **Received:** 2012-07-17 **Matrix:** Minerals **Page:** 1 / 1
Sample Number: PE/TERMINAL/MN/ORE/COARSE/DUST/SPLG/WATE **Revision Number:** 1

Method: ²UIS-AC-T100(Trace Elements by ICP-MS) **Completed:** 2012-07-31

Parameter	Value	Unit	Parameter	Value	Unit	Parameter	Value	Unit
²Ag	<0.001	ppm	²Al	0.01	ppm	²As	<0.001	ppm
²Au	<0.001	ppm	²B	0.18	ppm	²Ba	<0.001	ppm
²Be	<0.001	ppm	²Bi	<0.001	ppm	²Ca	31.4	ppm
²Cd	<0.0001	ppm	²Ce	<0.001	ppm	²Co	<0.001	ppm
²Cr	<0.001	ppm	²Cs	<0.001	ppm	²Cu	<0.001	ppm
²Fe	0.08	ppm	²Ga	<0.001	ppm	²Ge	<0.001	ppm
²Hf	<0.001	ppm	²Hg	<0.0001	ppm	²Ho	<0.001	ppm
²Ir	<0.001	ppm	²K	2.55	ppm	²La	<0.001	ppm
²Li	<0.001	ppm	²Mg	13.5	ppm	²Mn	0.54	ppm
²Mo	<0.001	ppm	²Na	12.9	ppm	²Nb	<0.001	ppm
²Nd	<0.001	ppm	²Ni	<0.001	ppm	²Pb	<0.001	ppm
²Pt	<0.001	ppm	²Rb	<0.001	ppm	²Sb	<0.001	ppm
²Sc	<0.001	ppm	²Se	<0.001	ppm	²Si	8.45	ppm
²Sn	<0.001	ppm	²Sr	0.1	ppm	²Ta	<0.001	ppm
²Te	<0.001	ppm	²Th	<0.0001	ppm	²Ti	<0.001	ppm
²Tl	<0.001	ppm	²U	<0.0001	ppm	²V	<0.001	ppm
²W	<0.001	ppm	²Y	<0.001	ppm	²Zn	<0.001	ppm
²Zr	<0.001	ppm						

Table 2.3: TCLP results (Ore sample collected at PE Terminal, 2012)

Request ID: 6047 **Sample ID:** 306790 **Received:** 2012-07-17 **Matrix:** Minerals **Page:** 1 / 1
Sample Number: PE/TERMINAL/MN/ORE/COARSE/DUST/SPLG/TCLP **Revision Number:** 1

Method: ²UIS-AC-T100(Trace Elements by ICP-MS) **Completed:** 2012-07-31

Parameter	Value	Unit	Parameter	Value	Unit	Parameter	Value	Unit
²Ag	<0.001	ppm	²Al	0.01	ppm	²As	<0.001	ppm
²Au	<0.001	ppm	²B	0.26	ppm	²Ba	<0.001	ppm
²Be	<0.001	ppm	²Bi	<0.001	ppm	²Ca	834	ppm
²Cd	<0.0001	ppm	²Ce	<0.001	ppm	²Co	<0.001	ppm
²Cr	0.03	ppm	²Cs	<0.001	ppm	²Cu	<0.001	ppm
²Fe	0.13	ppm	²Ga	<0.001	ppm	²Ge	<0.001	ppm
²Hf	<0.001	ppm	²Hg	<0.0001	ppm	²Ho	<0.001	ppm
²Ir	<0.001	ppm	²K	24.9	ppm	²La	<0.001	ppm
²Li	0.02	ppm	²Mg	86.4	ppm	²Mn	0.78	ppm
²Mo	<0.001	ppm	²Na	1310	ppm	²Nb	<0.001	ppm
²Nd	<0.001	ppm	²Ni	0.04	ppm	²Pb	<0.001	ppm
²Pt	<0.001	ppm	²Rb	0.02	ppm	²Sb	<0.001	ppm
²Sc	0.02	ppm	²Se	<0.001	ppm	²Si	24.7	ppm
²Sn	<0.001	ppm	²Sr	3.36	ppm	²Ta	<0.001	ppm
²Te	<0.001	ppm	²Th	<0.0001	ppm	²Ti	<0.001	ppm
²Tl	<0.001	ppm	²U	<0.0001	ppm	²V	<0.001	ppm
²W	<0.001	ppm	²Y	<0.001	ppm	²Zn	0.01	ppm
²Zr	<0.001	ppm						

2.2 PROJECT CONCEPTUALIZATION, OBJECTIVES AND SITE SELECTION

Manganese is currently exported through the manganese ore terminal situated in the Port of Port Elizabeth. This terminal is capable of handling up 5.5 Mtpa of manganese ore and is operated by Transnet Port Terminals (TPT). This facility was originally built in the 1960s for the export of iron ore and was subsequently converted to a manganese ore export facility when the Saldanha ore line was commissioned. The existing facility at the Port Elizabeth Port is planned to be decommissioned shortly after the new proposed Ngqura Manganese Ore Export Facility is completed. Following the development of the Port of Ngqura and the increasing international demand for manganese, the opportunity has arisen to develop a modern Manganese Ore Export Facility, with the associated infrastructure, at the Port of Ngqura located in the Coega Industrial Development Zone (IDZ).

In 2007/2008, Transnet Capital Projects commenced with a feasibility study to investigate the potential increase in manganese ore handling capacity through its rail and port infrastructure. This 2007/2008 study considered the various export locations available to Transnet that is supported with the necessary rail infrastructure. The following three locations were identified and assessed in this study:

- Refurbishment of the existing Port Elizabeth Port Manganese Ore Terminal.
- Construction of a new Manganese Terminal at the Port of Ngqura (including the Coega IDZ) with the ability to export 8 Mtpa, with a future expansion possibility to 12 Mpta.
- Exporting of Manganese Ore via the existing Iron Ore line between Sishen and Saldanha Bay, with the construction of a new Manganese Terminal at the Port of Saldanha.

The alternative to retain the existing facility at the Port Elizabeth Port and upgrade its throughput was deemed unfeasible as the facilities at the existing terminal do not have the capacity to meet the increased demand for Manganese Ore and is constrained by the available space for long term expansion.

The 2007/2008 study also identified constraints in locating the facility at Saldanha Bay. The choice between Ngqura and Saldanha was largely driven by differentials in rail tariffs and shipping rates to the two ports. Secondary considerations included:

- potential cross contamination between iron ore and manganese ore as a result of dust release,
- competition for train slots on the iron ore line, given that the iron ore line is likely to be expanded in future,
- and a reduced rail turnaround time on the Hotazel to Ngqura option (i.e. 71 hours compared to 80 hours from Hotazel to Saldanha).

A further strategic reason for the upgrade of the railway line to Ngqura is that it creates an alternative route to the Saldanha line for iron ore, and enables diversification of export options and growth potential for the country.

Therefore the Feasibility Study concluded that the Port of Ngqura was the most suitable, and therefore the preferred location, for the construction of the proposed Manganese Ore Export Facility. The findings of the Feasibility Study concluded that the Port of Ngqura (TCP, 2008) is capable of containing a Manganese throughput of 12 Mtpa and was, at the time, based on the use of two new berths A100 and A101. Subsequently, it was decided to allocate the existing berths (B100 and B101), originally designated for aluminium handling, to the Manganese Ore Export Facility negating the need for new berths to be constructed.

In 2011/2012, a review of the manganese ore mining demand determined that the long term projections for manganese demand would require the manganese corridor to be able to accommodate up to 16 Mtpa in the short term with a long term projection to increase to up to 22 Mtpa by 2025 as opposed to the originally investigated 12 Mtpa. Transnet then commissioned new studies to investigate the requirements for a new manganese terminal, situated at the Port of Ngqura, capable of handling 16 Mtpa with a few of expanding to a potential 22 Mtpa should it be required in future. The 2007/2008 Feasibility Study was reviewed (through a pre-feasibility study) and progressed to a new Feasibility Study that commenced during May 2012 to address the design requirements for this new terminal at the port of Ngqura. The information in section 2.2.1 below has been derived from the above two studies (TCP, 2008 & 2012).

2.2.1 Advantages of the Coega IDZ and Port of Ngqura

The Port of Ngqura Master Plan, the Container Terminal and prospective future cargo requirements were taken into account when undertaking the selection process for the Manganese Ore Export Facility and the following motivating points were identified during the study:

- The Port of Ngqura has the potential to expand into a regional shipping hub, as it is located on the east coast of Southern Africa. It is thus strategically positioned for trade and shipment of commodities up the east coast, to the countries of East Africa, the Indian Ocean islands, India and the Far East.
- A modern, efficient terminal at the Port of Ngqura will most probably generate lower maintenance and operating costs than the refurbished and expanded terminal at the Port Elizabeth Harbour
- The proposed project will enhance the economy of the Eastern Cape through the increase revenue generated by the expanded terminal.
- The Port of Ngqura will permit the use of larger ships, thereby lowering shipping costs.
- The existing Manganese Terminal at the Port Elizabeth Port was constructed in the 1960's and is considered to be outdated in terms of modern materials handling facilities that include systems to meet the stringent dust emissions standards and storm water regulations that are currently enforced and considered best practise.
- It is unlikely that an Environmental Authorisation will be obtained for the expansion of the existing Manganese Terminal at the Port Elizabeth Harbour.
- The site for the new Manganese Ore Export Terminal at the Port of Ngqura and Coega IDZ is situated away from sensitive receptors, such as residential areas, and will be within an area designated for heavy industrial development.
- In comparison to the Port of Ngqura, Saldanha Bay would involve increased shipping costs based on the prolonged sailing time from the principal Far East consumer base.

In addition, the Coega IDZ offers the following strategic benefits:

- This project has the ability to meet the longer term industry demands of Manganese Ore for export especially since the existing facility at the Port Elizabeth Harbour is planned to be decommissioned.
- The Port of Ngqura is situated within an existing industrial zone which has been designated for activities such as bulk ore storage in line with the original EIAs conducted for the development of the Port of Ngqura and in the IDZ.
- The proximity of the Port of Ngqura is favourable for such a development, as it negates the need for longer conveyor routes, which would inevitably create greater environmental disturbance and operational costs.
- Existing infrastructure in the Port and IDZ facilitates the establishment of the Manganese Ore Export Facility, such as:

- a road network that provides access to and from the proposed site and the berths,
- existing port infrastructure and berth(s),
- marine services (pilotage, tug assistance, berthing services and maintenance dredging) that are required for vessels that enter and exit the Port of Ngqura to load the Manganese Ore.

- Willingness of the landowners (TNPA, TFR, CDC and Tankatara Trust) to accommodate a Manganese Ore Export Facility.
- Zone 9 of the Coega IDZ remains largely undeveloped, and the proposed project is classified as a Greenfields development in the Port of Ngqura. The implementation of the proposed project within Zone 9 of the IDZ will therefore not impact on any existing industrial and other land uses within the area and is likely to stimulate projects requiring rail access.

Furthermore, the Coega IDZ is a premier location for new industrial investments in South Africa. It covers an area of approximately 11 000 hectares of which approximately 8690 hectares is available for development. The Coega IDZ constitutes a phased development which is focused around industry clusters. The Coega IDZ has been divided into a total of 14 different zones. Sectors which have been identified for the IDZ consist of Automotive, Agro Processing, Metallurgical, Educational and Training, Petro Chemical, General Manufacturing, Business Process Outsourcing and Energy. The proximity of the IDZ to the newly established deep water Port of Ngqura, as well as major transport routes and other predominant development centres such as Johannesburg and Cape Town, creates a platform for global exports by attracting foreign and local investment in manufacturing, export orientated and other industries.

2.2.2 Site Location

The Feasibility Study conducted by TCP (TCP, 2008) considered and compared various layout options and positioning of the stockyards and conveyors; however some of the locations investigated during this 2008 study are no longer available due to the land having been allocated to other developments. The outputs of this Feasibility Study resulted in the selection of the preferred locations for the proposed siting of the terminal. This is also aligned with CDCs master plan and studies. The current location for the new manganese ore handling facility and associated rail infrastructure is shown in Figure 2.2.

The CSIR conducted an Environmental Screening Study in 2008 (CSIR, 2008) with the aim of informing the feasibility planning phase for the proposed development of a Manganese Ore Export Terminal at the Port of Ngqura. This study included a rapid internal identification and assessment of environmental impacts associated with the proposed preferred locations for the manganese ore terminal. It also included specialist input in terms of marine ecology, botany, air quality and human health, visual impacts, ground and surface water, environmental law and stakeholder engagement.

2.2.2.1 Stockyard

Three different locations were assessed in the Environmental Screening Study (CSIR, 2008) for the proposed stockyard (Figure 2.3)

- Option 1: north of the National road N2,
- Option 2: south of the N2 and east of the Coega River, and
- Option 3: south of the N2 and west of the Coega River.

The preferable location for the Manganese ore stockyard is the Option 1 site, which is located further inland and in a low-lying area thus reducing potential exposure to wind that may entrain dust.

Another option for the stockpile location that was considered is south-west of the port in the coastal back-dune area. This option was screened out by Transnet in 2008 for the following reasons:

- It is fatally flawed from an environmental and social point of view due to potentially high significant negative impacts on the coastal dune system.
  - The coastal dune Thicket Vegetation & Ecotone has been identified as open space of significant value in the CDC Open Space Plan.
  - It is located next to the urban spaces and public place area which will cause severe negative social impacts
- there is a long-term plan for potentially expanding the container terminal towards the west
- from an engineering (foundations) point of view this is not a feasible option; and
- there is no practical connection to the railway system.

2.2.2.2 Conveyor Route

Six different layout options (option 1A, 1B, 1C, 2A, 2B and 3) for the conveyor route alternatives were identified and assessed as part of the screening study in 2008 (Figure 2.3). Although Option 1C was Transnet's preferred option, this option presented, from an environmental perspective, significant impacts on the Open Space Plan.

At the time Option 1A, together with the implementation of best practice management measures, was assessed to be preferable in terms of environmental factors. Key factors are that:

- it is located further inland and in a low-lying area thus reducing potential exposure to wind and resulting dust impacts
- the conveyor routing does not infringe on the Open Space Plan and follows an existing approved corridor for part of the routing
- the berth requires minimal dredging.

Following the change in the allocated berths available for the Manganese Ore Export Facility, Option 1A would no longer need to cross over areas designated for future port development. More significantly it no longer requires the construction of new berths and the associated dredging and reclamation required. This change in the available berths have also resulted in the opportunity to locate the conveyor route in a newly proposed service corridor that will be located approximately 400 meters away from the proposed Phase 2 port expansion identified in the port master plan. This proposed services corridor would also provide the opportunity to relocate the container rail away from the future back of quay activities in the proposed Phase 2 port expansion.

2.2.2.3 Compilation yard

Given the requirements for a Manganese throughput capacity of 16 Mtpa at the port of Ngqura, the rail requirements resulted in increased train lengths. The increased train lengths necessitated a new compilation yard because the existing marshalling yard located at Coega would not be able to handle such train lengths.

Three high-level alternatives were considered by TCP in 2011 for the layout of the compilation yard and rail link line, as described below:

- A linear yard crossing the northwest corner of the Coega IDZ. This option was however deemed technically unfeasible given that the wagons need to turn around to ensure even wear of both rails along the route as well as the wagon wheels. Therefore the linear option was eliminated.
- A linear yard with a turnaround loop line located in the Tankatara area towards the north-east of the IDZ. This option was deemed technically unfeasible given the distance between the linear yard and the port terminal, resulting in longer turnaround times and the site is located outside the IDZ. Therefore this option was eliminated.
- A linear yard with a turnaround loop line in the IDZ was considered. Due to the topography restrictions in terms of connecting to the existing rail line, this yard layout extended out of the IDZ into the remainder of Farm Tankatara Trust 643, and this option has been taken forward into the EIA stage for further assessment.

The topography in the area made the selection of the compilation yard site challenging. Specifically in areas where the compilation yard link lines had to be tied into the existing rail line which is situated in a valley and surrounded by areas proposed to become open space.

Following the high-level study undertaken by TCP in 2011/12, a preliminary terrestrial ecology screening study for the location of the proposed compilation yard was carried out by Jamie Pote in May 2012 (Pote, 2012). This screening study was conducted in order to identify suitable alternatives for the compilation yard to cross the Coega Opens Space areas located on both sides of the existing rail line. These alternatives would then be assessed as part of the EIA. Five options A to E (Figure 2.4) have been assessed from a terrestrial ecology point of view and the following 2 alternatives will be taken forward in the EIA (Pote, 2012):

- Alternative 1 (Preferred route): This route follows Route B and will result in an overall reduced impact to the Open Space Areas and associated loss of intact Sundays Valley Thicket. It will overlap with a transformed area, an existing access road and some Bontveld or transitional thicket vegetation. Although this option would also result in open space fragmentation, these mosaic communities tend to be more conducive to fragmentation than solid thicket units. In order to mitigate impacts, elevated open bridge structures have been proposed as part of the design as opposed to closed culverts or pipe structures to facilitate movement of species and allow ecological processes continuation due to natural light penetrating underneath the railway.
- Alternative 2: This alternative follows Route C and is positioned outside of the solid thicket. The designated open space area is slightly narrower than Routes A and B.

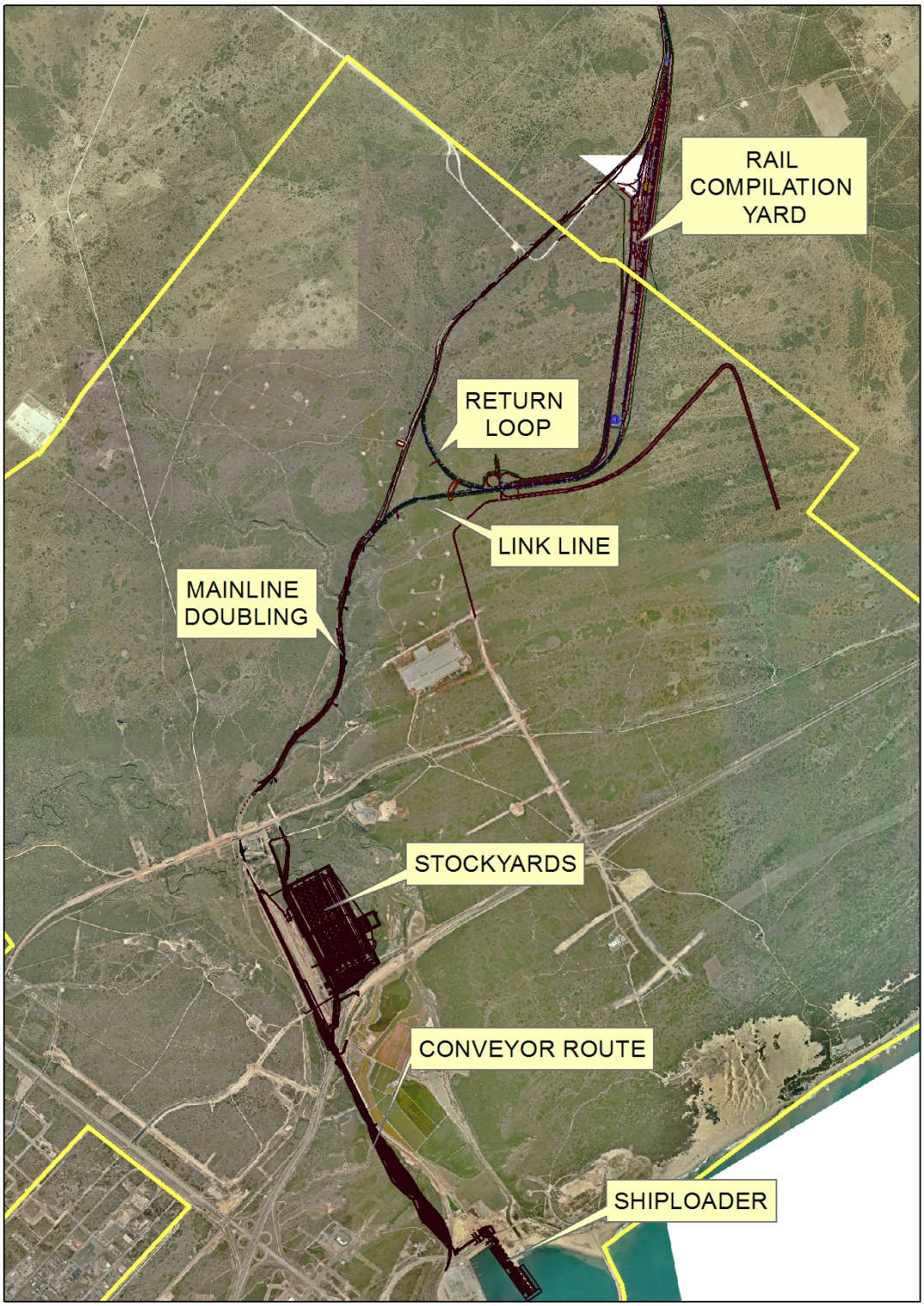
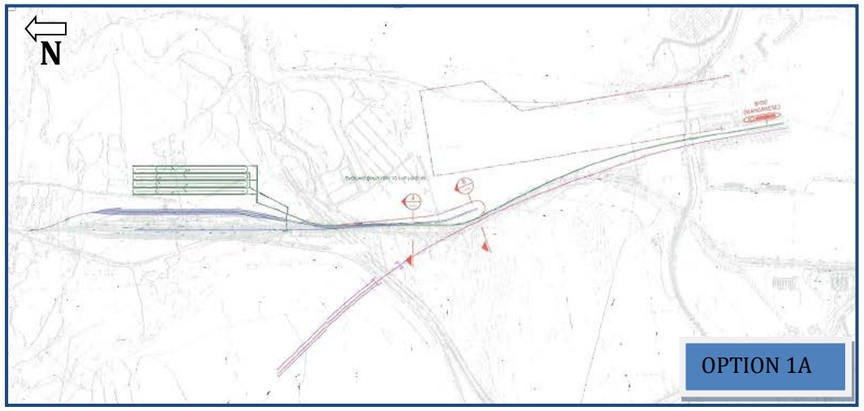
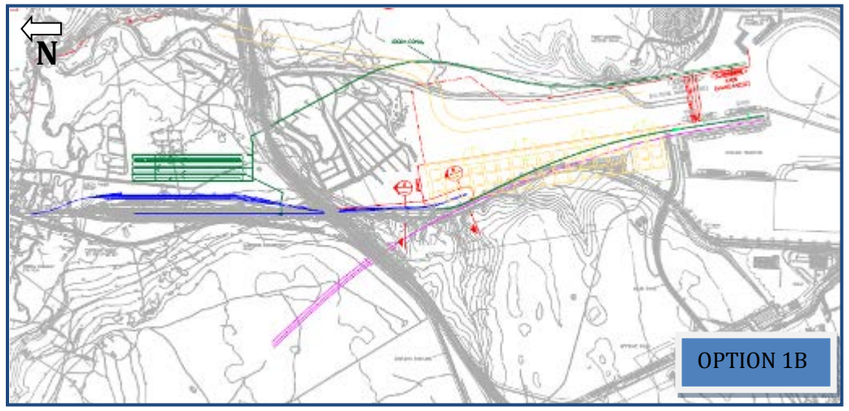
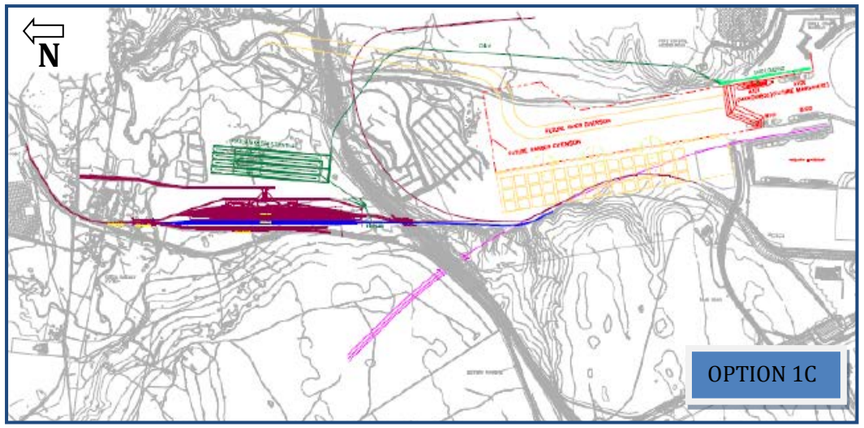
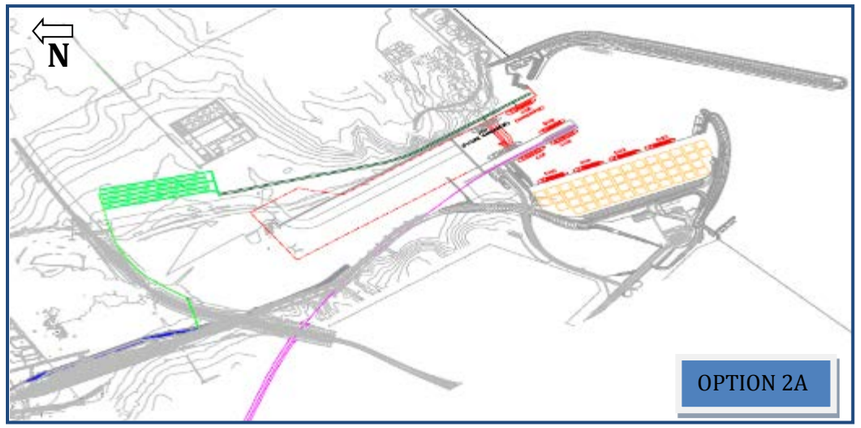


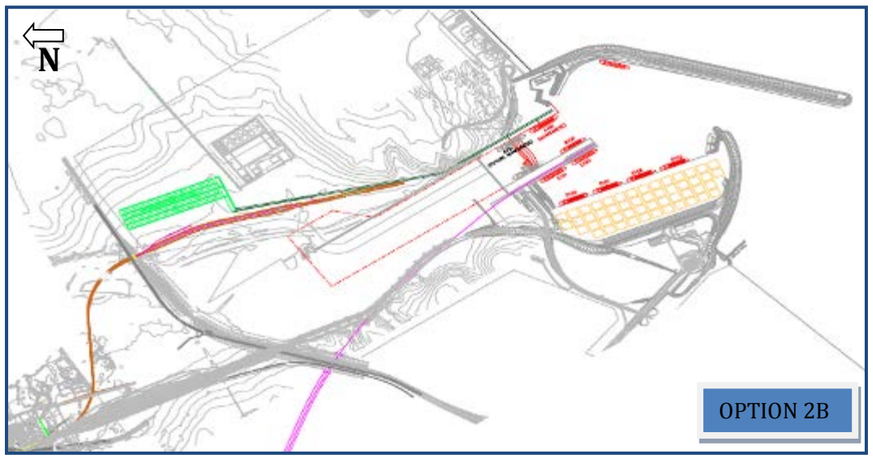
Figure 2.2: Project conceptualisation showing the entire development planned within the IDZ. The total footprint area for the development is ~350 hectares.











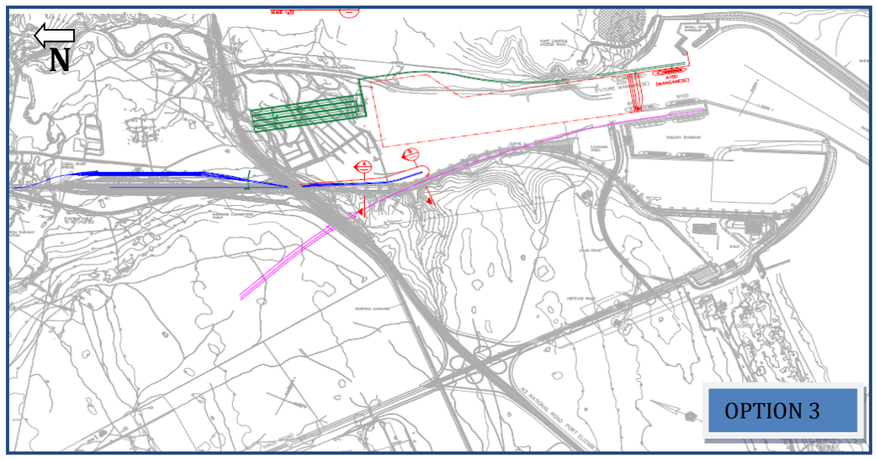


Figure 2.3: Conceptual layout options for the proposed manganese stockyard at Coega analysed in 2008 (CSIR, 2008)

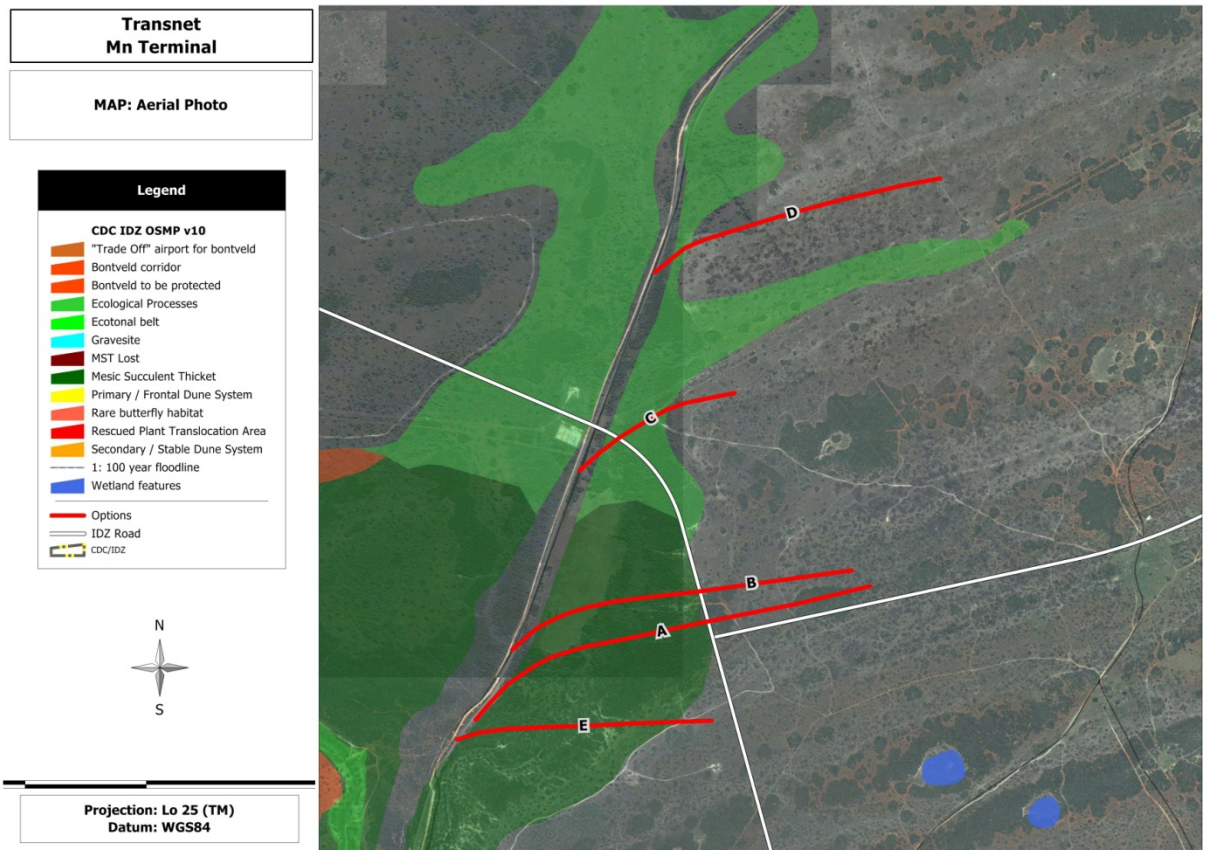


Figure 2.4: Compilation Yard and Rail Link Options (Pote, 2012)

2.3 RAIL INFRASTRUCTURE

The rail infrastructure required to service the manganese ore handling facility includes a new rail compilation yard, capable of receiving the required length trains, and an additional doubling of the rail line between the new compilation yard and the wagon emptying facilities at the terminal. The rail infrastructure will be managed separately from the port terminal infrastructure and will form part of the Transnet Freight Rail operations. A detailed description of the associated components is given in this section.

2.3.1 Compilation yard

A rail compilation yard is proposed to be located in zone 11 and zone 13 of the IDZ and on a portion of the Remainder of Farm Tankatara Trust 643. It will comprise five yard lines with crossovers at mid point to allow for the consolidation and de-consolidation of four 200 wagon trains per day. A triangle will also be included, to allow for the locomotives to turn around. The complete rail yard will also include back roads to access the locomotive and wagon maintenance workshops as well as the diesel locomotive refuelling station and locomotive washbay. The rail compilation yard will be electrified at 25 kV AC.

Electrical locomotives are used to haul the 200 wagon trains on the mainline from Hotazel to the compilation yard. From the compilation yard diesel locomotives will haul the 100 wagon rakes to and from the tippler. The main compilation yard will be fully signalled, and the rolling stock maintenance portion of the yard will be provided with yard automated signalling. The preferred layout of the rail compilation yard (black line) and the alternative layout (red line) are shown in Figure 2.5.

The current railway line is fenced. The fencing will need to be extended to include all of the new requirements (rail yard, turning triangle and the link lines) with a fence on both sides of the rail reserve. Fencing will consist of a 6 to 8 strand wire "stock" fence with a height of approximately 1.35 to 1.5m. There will be a spacing of approximately 300 mm between the strands and the distance between the bottom strands can vary to allow animals to pass through. Other fence types will be applied such as game fencing and security fencing depending on the level of protection required. The proposed railway loop and link line will also be provided with lattice bridge structures over watercourses in the Coega open space system, to allow for a continuity of the open space system corridor and for small animals to cross the railway line.

Two existing borrow pits have been identified near the compilation yard, located on the CDC property, that will supply borrow material to the compilation yard and rail doubling. These two borrow pits are ~0.5 hectares in size and will be increased in size up to a maximum of 1.5 hectares.

2.3.2 Mainline Doubling

Transnet SOC Ltd is intending to double the railway line between the proposed Coega compilation yard and the existing marshalling yard in Zone 9 of the Coega IDZ. This will be a dedicated railway line to allow for the hauling of the rakes between the proposed Coega compilation yard and the tippler. Two diesel locomotives will haul 100 wagons rakes to and from the manganese tippler yard. A total of eight 100 wagon rakes will hauled to and from the manganese tippler yard per day. This second railway line will be generally constructed within the existing servitude. The existing servitude does however need to be widened in several locations along the rail length for the proposed second railway line. The locations where the servitude needs to be widened are to the east of the existing railway line. An additional 1,2ha will be required to ensure that the servitude width is sufficient. This new dedicated line is required given the use of the existing rail line for freight and other purposes.

2.3.3 Lighting

Area lighting will be provided for the rail compilation yard area only in and around the staging lines, office buildings and workshops. Lighting at the compilation yard will conform to best practise requirements and is in line with the Occupational Health and Safety Legislation required for such a facility.

Figure 2.5: Layout of the rail compilation yard showing the preferred alternative in black and Alternative 2 in red.

Suitable erosion control measures will be included at all culverts to ensure that sediment is not washed away, e.g. reno mattress and suitable wing walls.

2.3.4 Stormwater infrastructure

Two attenuation ponds will be constructed at the rail compilation yard to collect all stormwater runoff from this area and will have a storage capacity of approximately 7514 kℓ and 200 kℓ respectively (Figure 2.6). These attenuation ponds will be simulated wetlands known as Sustainable Urban Drainage Systems (SUDS).

The stormwater management system at the compilation yard will be designed so that all stormwater from the roads, buildings roofs, etc. which is considered clean be directly released into the natural environment. The only water that will go to the attenuation ponds is the stormwater generated from the rail formation in the rail yard.
The wash bay will not be covered but it will be secondarily contained and any rain falling on the hardened surface will go through an oil/water separator. The separator's overflow will be sent to the sewer and the oil will be regularly removed by an approved contractor. In the event of a major rainfall occurrence the separator's overflow will still go into the sewer system (i.e. only stormwater from the wash bay will go through the oil/water separator).

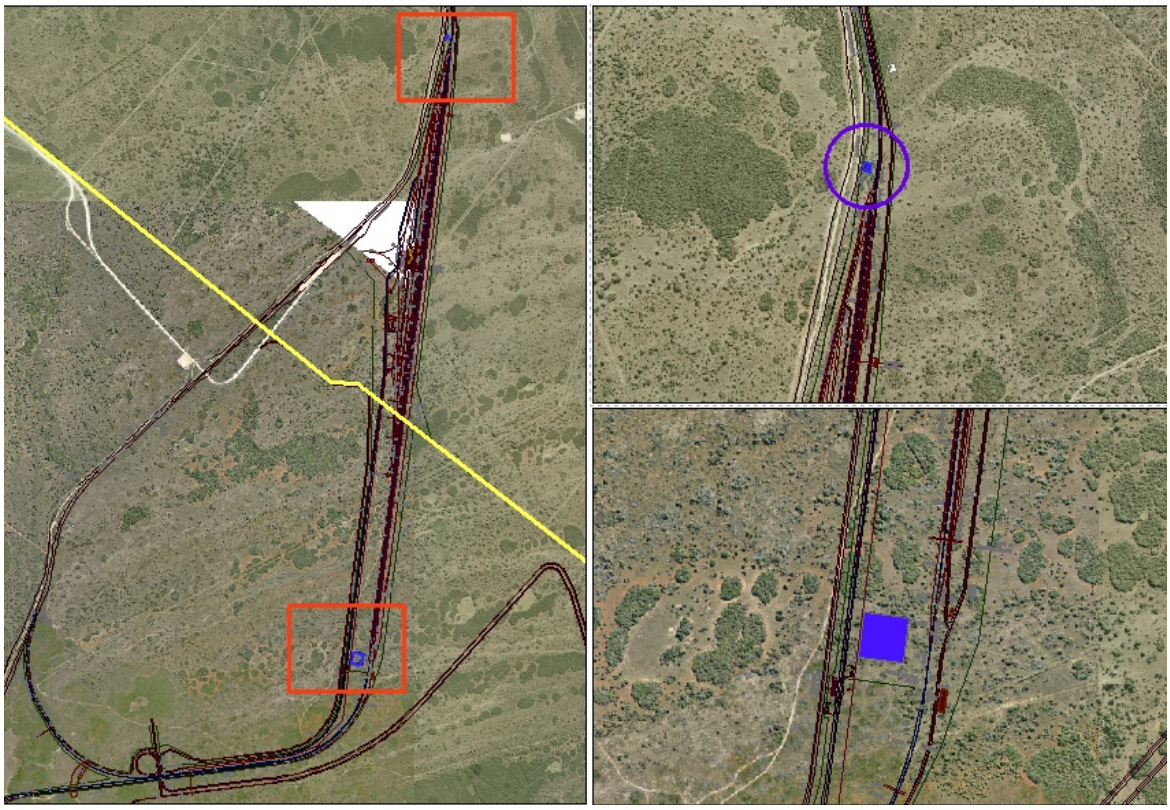


Figure 2.6: Location of two attenuation ponds at the compilation yard (Hatch, 2012)

The following is proposed by the project proponent:

- There will be an extensive drainage network throughout the site with:
  - Open, self-cleaning style drainage (for aiding maintenance)
  - Cleanout pits to be self-draining where possible to facilitate dry clean out
  - Cross drains to allow safe dozer crossing and ease of cleanout
- Water from areas outside the main polluted water footprint area will not be collected and will drain naturally off site
- Raw water storages shall be monitored for blue green algae detection for primary/secondary contact safety considerations.

Drainage culverts will be placed at various locations along the rail alignment as determined from a hydrological assessment (Coega Consolidation Yard Hydrology Report, 2012) conducted to delineate drainage lines along the rail alignment. Drainage culverts have been sized and positioned accordingly. Table 2.4 provides a list of the proposed new culverts and the associated detail of each and Figure 2.7 shows the culvert positions.

Table 2.4: Proposed culverts to be extended/constructed for the rail infrastructure.

No.	Name of Structure	Culvert Type	Size Parameters (m)				No of Barrels	Upstream Invert Level (m)	Track Formation Level(m)	Fill Height (m)	Q_{50} Flood Level (m)
			Span	Height	Diameter	Culvert Length					
1	Culvert 1@ CH2380	Box	2.500	2.500		45.000	3.000	81.000	84.250	3.250	83.250
2	Culvert 2 @ CH2880	Pipe			0.900	40.000	1.000	81.000	83.403	2.403	81.540
3	Culvert 3 @ CH2980	Pipe			0.900	40.000	1.000				
4	Culvert 4 @ CH3100	Pipe			0.900	40.000	1.000				
5	Culvert 5 @ CH3480	Pipe			0.900	54.000	1.000	78.016	82.903	4.887	79.520
6	Culvert 6 @ CH4260	Box	1.200	2.000		56.000	1.000	75.007	82.123	7.116	76.140
7	Culvert 7 @ CH4680	Box	1.200	2.000		40.000	1.000	76.000	80.861	4.861	76.470
8	Culvert 8 @ CH5060	Pipe			0.900	14.000	1.000	76.000	78.704	2.704	76.7
9	Culvert 9 @ CH7100	Box	3.000	1.500		11.000	25.000	54.108	55.885	1.777	54.810
10	Culvert 10 @ CH200	Pipe			0.900	40.000	1.000	76.000	80.967	4.967	76.470
11	Culvert 11 @ CH560	Pipe			0.900	12.000	1.000	76.000	78.967	2.967	76.700
12	Culvert 12 @ CH1580	Pipe			1.350	10.000	3.000	74.000	76.184	2.184	75.090
13	Culvert 13 @ CH2100	Pipe			1.200	24.000	1.000	73.234	78.569	5.335	74.910
14	Culvert 14 @ CH2960	Pipe			1.200	11.000	21.000	80.014	81.515	1.501	80.480
15	Culvert 15 @ CH165.8 (Existing)	Box	2.700	1.800		11.000	1.000	64.000	67.800	3.800	67.97

As the mainline doubling is only the doubling of an existing railway line all existing drainage culverts need to be extended as the existing formation will be widened to accommodate the second railway line. No new drainage culverts are required and the existing drainage culverts to be extended will be maintained as far as the type, size and number of barrels is concerned.

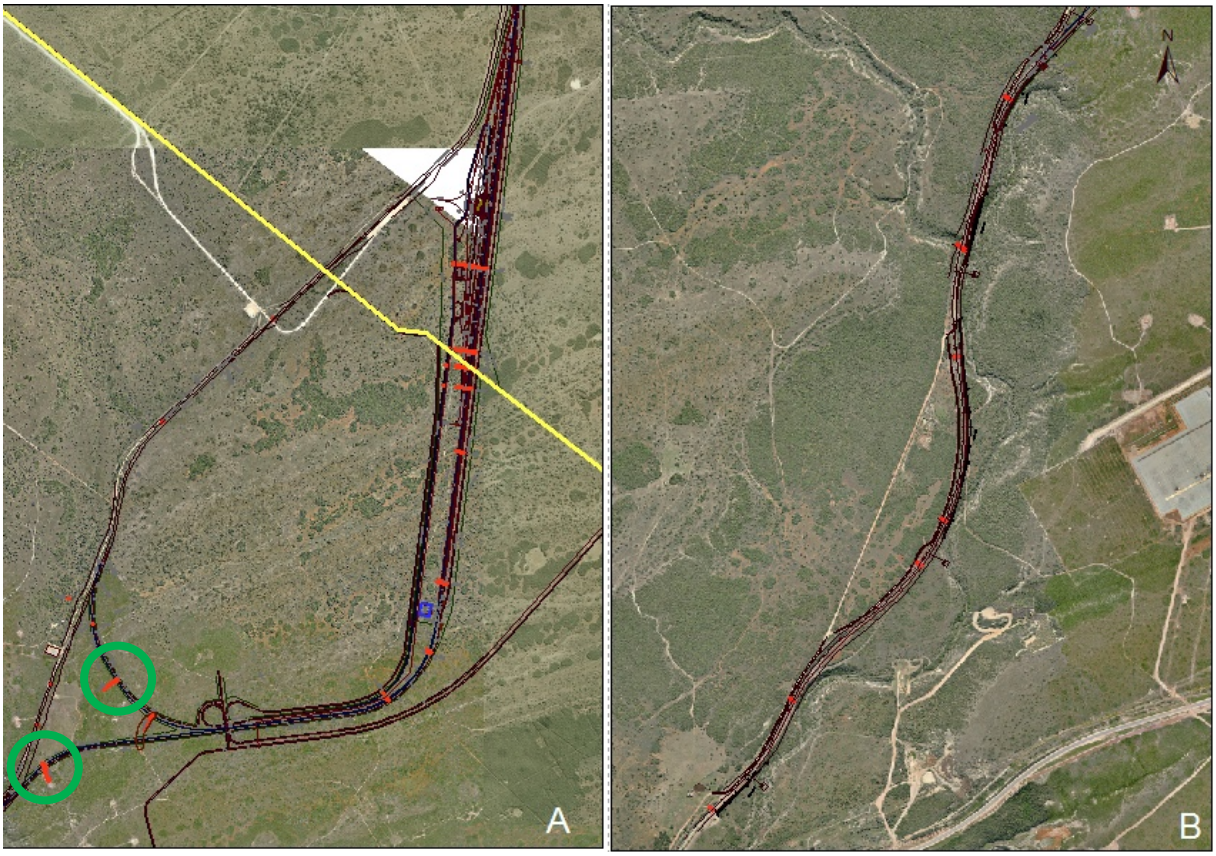


Figure 2.7: Locations of (A) new culverts along the compilation yard layout showing the locations of lattice structures in the green circles, and (B) the mainline doubling.

In order to accommodate the future open space plans, two culvert positions will be equipped with lattice bridge structures. These structures will follow the design guidelines provided by the terrestrial ecology specialist study and detailed design will commence once the execution phase commences. The locations of these lattice structures are shown in Figure 2.7.

2.3.5 Office facilities and ablutions

The following buildings are planned to be constructed at the compilation yard:

- Security building
- Two shunter cabins
- Transnet Freight Rail operations building.
- Three signalling relay rooms

The security, shunter cabins and operations buildings will be equipped with services for water supply, electricity, sewerage and stormwater drainage, as well as vehicle parking areas and telecommunication facilities.

The operations building will be equipped with water supply, electricity, sewerage and stormwater drainage as well as vehicle parking areas and telecommunication. The operations building will be

equipped with a canteen and small kitchen facilities as well as ablution facilities i.e. shower and wash facilities for personnel.

The three signalling relay rooms are only provided with electrical supply and telecommunication.

2.3.6 Maintenance facilities

Access to the Coega rolling stock maintenance facilities will be provided from this yard. The proposed rail compilation yard will also include a wagon and locomotive maintenance facility. A diesel locomotive refuelling facility consisting of 2 self contained aboveground storage tanks with a total capacity of approximately 150 m^3 and a locomotive sanding facility (containerized storage of dried and vacuum packed sand for use on locomotives to provide better traction in wet conditions). The yard will also include a locomotive wash bay for the cleaning of locomotives and provision will be made for a dirty/oily water treatment facility (for dirty water generated from the washbay as well as the rolling stock maintenance facilities). Locomotive servicing facilities will remain at the existing sites located in the Uitenhage depots.

2.3.7 Water supply

Water will be obtained from CDC or NMBM where applicable and the details will be determined as part of the feasibility study.

Fire water will be provided through a pressurized main to all hydrants on the reticulation system at a minimum pressure of 300 kPA and flow of 25 L/s.

2.3.8 Electricity Supply

Power will be supplied from the municipal network to the rail compilation yard. The compilation yard requires 500 kVa and this power requirement will be provided through overhead transmission lines (approximately 25 kV) that would need to be constructed by the NMBM. It is anticipated that the overhead transmission lines will terminate in a mini-substation positioned near the compilation yard.

2.3.9 Dust Mitigation

Once operational, the rail compilation yard will have a surfaced main access road with only internal service roads being un-surfaced. The frequency of traffic on these un-surfaced roads will be such that very little dust will be generated over a 24 hour period.

2.3.10 Access

An access road will be constructed along the proposed rail loop to the compilation yard. The access road will be surfaced. A gravel service road will be constructed inside the compilation yard and along the rail loop.

For the doubling of the railway line, the existing service road will be used for access, except for a 1km section where the second railway will displace the existing service road and a new section will need to be constructed. The new section of road will be constructed within the new rail servitude

2.3.11 Employment

New and additional employment opportunities will be limited during the operational phase as Transnet Freight Rail will only be relocating existing rail operations located in other areas of Port Elizabeth to

this new location. It is estimated that approximately 300 people will be working at the rail compilation yard over a 24hr period.

During construction it is estimated that a total of approximately 500 people would be required to complete the project over a 36 month period. This includes skilled, semi-skilled and unskilled labour.

2.3.12 Waste Management

The proposed facility will require infrastructure to store and handle general and hazardous waste streams.

During the construction phase, a significant amount of solid waste (quantity depending on the duration of the construction phase) will be produced.

Waste streams likely to be produced during the construction phase will include both general and hazardous wastes. Typical waste types will be vegetation waste from site clearing, packaging waste from building activities as well as rubble, wood and metal off cuts. Hazardous waste can be generated during the construction phase from oils, oiled rags, empty containers, paint and paint cleaning liquids and other chemicals.

These will be dealt with as per Table 2.5.

Table 2.5: Identification of potential wastes to be recycled

Types of waste	Waste disposal option
Packaging waste (uncontaminated paper, glass, cardboard, plastic, aluminium cans etc.)	Recycling
Hazardous waste (Oils, lubricants etc.)	Oil Recycling Contractor
Metals (scrap)	Metal Recycling Contractor
Wood	Wood Recycling Contractor

During the operational phase it is expected that the proposed operation will result in the production of general waste from ancillary activities such as the administration and office block, workshops and maintenance activities, as well as change rooms and ablution facilities.

It is estimated that the proposed facility will generate approximately 20 kg general waste daily, constituting mostly of cardboard, paper, plastic, tins, metals, organic compounds and glass. The amount and type of general waste produced at the proposed facility will be monitored as part of the facility's waste management plan.

Due to the nature of the proposed operation, it is likely that the facility will also produce a range of hazardous liquid and solid wastes (Typical hazardous wastes that could be produced are summarized in Table 2.3). At this stage it is not possible to quantify the various waste streams but accurate recording of hazardous waste volumes produced by the facility shall form part of the waste management system/integrated waste management plan.

Typical hazardous wastes (solid and liquid) likely to be produced at the compilation yard are from the workshop and include:

- Chemical containers
- Used chemicals and oils
- Spilled chemicals or oils
- Gloves
- Wastewater etc

It is estimated that the production of hazardous waste that will be stored on site in a temporary storage area may be more than 35 m^3 per month. Hazardous waste will be stored in a designated area. The storage area will be provided with secondary containment to prevent spills to reach stormwater or soil. The storage will only be temporary on site due to the distance to the nearest hazardous waste landfill site. Care will be taken not to exceed the 90 days temporary storage of waste on site. Hazardous waste will be collected by a reputable registered waste collector and will be disposed of at a landfill site registered to take the specific waste type. Safe disposal certificates will be obtained for all disposals of hazardous waste.

Domestic wastewater generated (from potable use) will be collected and treated on-site (as appropriate) and/or discharged to the CDC sewer system for off-site treatment. Sewage pump stations will be provided at facilities and amenities where sewage cannot gravitate to the CDC sewer system.

2.4 MANGANESE ORE TERMINAL

The proposed Manganese Ore Export Terminal will include the construction and operation of the following key components:

- Rail infrastructure from the existing rail marshalling yard leading up to the tippler and pushback lines on the opposite side of the tippler.
- A stockyard and associated infrastructure such as one tippler, three stackers, two reclaimers, stockyard conveyors system and surge bins at the stockyard.
- A conveyor system located in a new services corridor, connecting the stockyard to two ship loaders on the existing berths C100 and C101, a sampling system and associated infrastructure at the quay.
- Two stormwater control dams to service the stockyard area and the quay area.
- Terminal operational and administrative buildings and bulk services infrastructure.
- Access roads and a bridge over the Coega River to access the stockyard area.

The overall layout of the terminal is shown in figure 2.8 and Figure 2.9 shows the process flow diagram from the tippler, where trains are off-loaded, to the ship loader where ships are loaded.

The terminal and the associated rail facilities will be designed to meet the medium term manganese ore needs, projected to be up to 16 Mtpa, but will allow for the addition of infrastructure in future. The terminal will operate on a 24 hour (3 x 8-hour shifts), 365 days per year basis.

The Port of Ngqura is divided into different terminals for the export of bulk cargo, containers, and liquid bulk. The existing berths C100 and C101 (i.e. dry bulk berths) have been allocated for the

export of manganese ore. The berths allocated for this project have changed from the original berths A100 and A101, included in the environmental screening study (CSIR, 2008). Ore reclaimed from the stockyards will be transferred to the two ship loaders at these berths by an overland conveyor system. Surge bins, designed to optimize ship loading efficiency, will be located at the stockyards.

Figure 2.8: Layout of the proposed manganese terminal

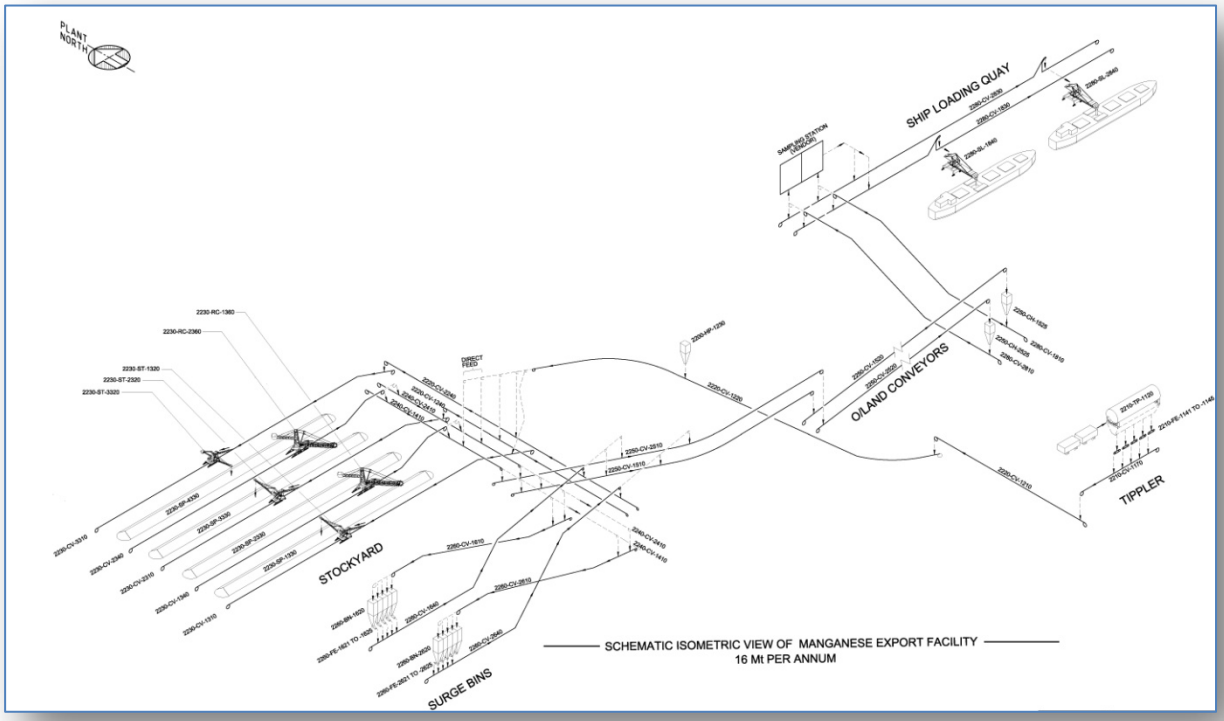


Figure 2.9: Terminal Process Flow Layout (16 Mtpa throughput).

These facilities are described in more detail in the sections that follow.

2.4.1 Offices, maintenance facilities and general infrastructure

In order to meet the operational demand of the proposed Manganese Ore Export Facility, provision has been made for the construction of operational and maintenance facilities at the stockyard area. These include an administration building, change house, canteen, security building, workshop, washbay, conveyor store shed and hazardous domestic waste collection area. The quay area infrastructure will include operational offices, sampling laboratory and sanitation serving the quay area and sampling facility.

2.4.2 Water Supply

Potable water will be required to service the administration buildings, fire water system and stockyard area dust suppression. CDC will provide potable water to the terminal. The terminal potable water supply will be connected into the existing main water pipeline located on the south western corner of the stockyard. The quay area potable water requirements will be taken from the existing potable water reticulation at the quay and at the existing office buildings.

The total water requirement for the terminal (potable and industrial water) is estimated to be 952m^3 per day. Of this volume, 879m^3 is industrial water used for dust suppression the balance being potable water. The water and surfactant systems can significantly reduce the water volumes required

to suppress the dust due to the surfactants ability to allow water to bind more readily to dust particle which forms a capping on the stockpiles. This capping can last between 14 to 21 days. The total water requirement is reduced to 340m^3 per day (potable and industrial water) when surfactants are added to the water used for dust suppression. Under this scenario the water from industrial sources is 267 m^3 per day with the balance being potable water.

It is proposed to collect runoff water in the proposed stormwater control dam (located at the stockyard) and reuse this water for stockpile dust suppression at the stockyards. In the event that the stormwater control dam is depleted of water due to water use for dust suppression or the high evaporation rate in the area, CDC will provide Transnet with either potable water or return effluent should it be of acceptable quality. No chemical treatment can be done on the water in the control dam, and as such, return effluent would need to be at acceptable levels where no further chemical treatment is required.

2.4.3 Electricity supply

The main electrical supply for the stockpile and the quay areas will come from the Coega main substation by cable at 22kV. There will be three main 22kV substations on the manganese terminal for the distribution of electricity on the terminal. It is proposed to build a site main substation at the stockyard area near the administration building. A second substation will be placed midway on the stockpile terrace to supply power to the mechanical equipment on the northern side of the stockpile terrace. A third substation will be located near the quay and will be supplied from the site main substation via a cable following the conveyor route. Several smaller low voltage 400 volt substations will be provided at load centres (typically water services area, tippler area etc).

2.4.4 Sewage connections

Domestic wastewater generated (from potable use) will be collected and treated on-site (as appropriate) and/or discharged to the CDC sewer system for off-site treatment.

- Manganese ore terminal
    - Sewage generated will be collected in a conservancy tank and pumped to the main CDC sewer pump station (western side of the rail yard). Sewage effluent will be pumped from the CDC pump station into the existing municipal sewer reticulation system for off-site treatment.
- Quay
    - A sewage system will be provided on the quay. The quay sewer system will be connected into the existing municipal sewer reticulation system and the sewage removed for off-site treatment.
    - No sewage removal is allowed for ships.

2.4.5 Access

The proposed project will also include the construction of access roads at the stockyard area. This includes construction of a new bridge (Figure 2.10) across the Coega River to provide access to the stockyard area.

The bridge design is shown in Figure 2.10(A) and consists of 3 large diameter Amco steel sections, each one of these steel sections will be 7.3 meters in diameter. A set of 3 steel sections will placed in the main River flow and an additional set of 3 steel sections will be placed 50 meters north in the

secondary flow of the Coega River. The design is such that it would be able to cope with full flood conditions in the River.

The design of the bridge is driven by the need to have the access road established early during the construction phase in order to allow large pieces of equipment to be delivered to site.

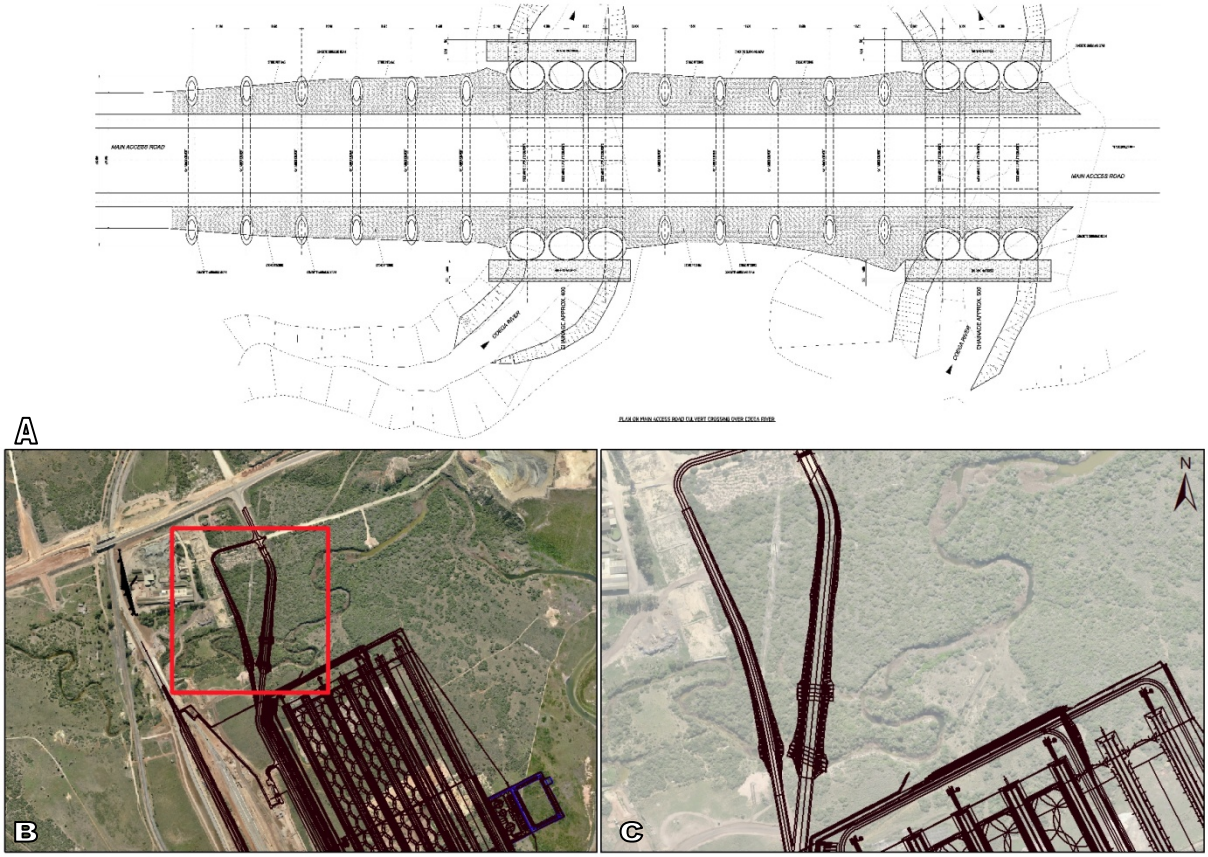


Figure 1.10: (A) Design and (B) location of the proposed Coega River bridge (C) in relation to the existing un-surfaced road.

2.4.6 Employment

The total number of construction workers is still to be assessed according to the typical South African standard of construction. The average workforce during the estimated 36 months construction phase is approximately 1 000 workers (at peak times). The workforce would be sourced locally where possible, however, it is likely that some of the semi-skilled workforce would come from outside the immediate vicinity. Sourcing of labour will be done according the CDC Zone Labour Agreement, which includes requirements for promoting use of local labour and broad-based black economic empowerment (Refer to Box 2.1). Operation of the Manganese Ore Export Terminal would require approximately 250 employees working over two shifts of 8 hours per day.

Box 2.1 Requirements for Recruitment and Labour Management for projects within the Coega IDZ

REQUIREMENTS FOR RECRUITMENT AND LABOUR MANAGEMENT FOR PROJECTS WITHIN THE COEGA IDZ

Provided by: Duncan Grenfell, Unit Head: Recruitment and Placement - Human Capital Solutions, Coega Development Corporation

Date: August 2012

- All construction activities on the Coega IDZ and at the Port of Ngqura require full compliance to the Coega Zone Labour Agreement (the Coega ZLA);
- The Coega ZLA was negotiated between the Construction Industry Employer Associations and the Construction Industry Trade Unions and concluded on 25 September 2002. This agreement was subsequently endorsed by both the Coega Development Corporation and Transnet National Ports Authority for application on all construction sites within the confines of the Coega IDZ and the Port of Ngqura;
- In order to maximise local labour opportunities, preference for employment in Civils and Building Task Grades A to D (Annexure H1 of the Coega ZLA) and MEI Category 1 to 3 (Annexure H2 of the Coega ZLA) shall be given to local candidates residing in Nelson Mandela Bay who are in possession of appropriate qualifications, skills or experience in the construction or contracting industries.
- Recruitment of all additional local labour shall only take place through the Recruitment & Induction Centre provided by the Coega Development Corporation.
- Contractors will be entitled to staff a project on the IDZ with seconded labour for core skills in categories other than those referred to here above, through the Secondment approval process as managed by the Recruitment & Induction Centre provided by the Coega Development Corporation.
- The wage schedules to the Coega ZLA are updated annually to reflect Industry wage increases granted. Annexure H1 is based on the SAFCEC–NUM Agreement which is typically effected from 01 September annually, whilst the Annexure H2 increases negotiated through the Metal & Engineering Industries Bargaining Council, which is typically effected from 01 July annually.

2.4.7 Waste Management

The proposed facility will require infrastructure to store and handle general and hazardous waste streams.

During the construction phase, solid waste (quantity depending on the duration of the construction phase) will be produced. These will include both general and hazardous wastes. Typical waste types will be vegetation waste from site clearing, packaging waste from building activities as well as rubble, wood and metal off cuts. Hazardous waste can be generated during the construction phase from oils, oiled rags, empty containers, paint and paint cleaning liquids and other chemicals. These will be dealt in a similar way as during the operations. Table 2.6 lists the anticipated general waste items and the intended way of handling.

Table 2.6: Identification of potential wastes to be produced at the terminal

Waste Type	End Use
Food Waste	Disposal to landfill
Used PPE	Disposal to Landfill
Paper and Cardboard	Recycled
Steel Strapping	Recycled
Plastic	Recycled
Pallets	Refine/Reuse
Wood	Refine/Reuse
Conveyor Belting	Disposal to Landfill
Waste Tyres	Refine/Reuse
Conveyor Idlers	Recycled
Electrical Cables	Recycled
Steel Rope	Recycled
General Scrap Steel	Recycled
Pipe Work	Recycled
Chains	Recycled
Wire Mesh	Recycled
Scrap Drills	Recycled
Pumps	Refurbish/Reuse
Winches	Refurbish/Reuse
Electrical Motors	Refurbish/Reuse
Bearings	Recycled
Hoses	Recycled
Cutter Tips	Recycled
Fuses and Electrical	Recycled

During the operational phase it is expected that the proposed operation will result in the production of general waste from ancillary activities such as the administration and office block, workshops and maintenance activities, as well as change rooms and ablution facilities.

It is estimated that the proposed facility will generate approximately 20 kg general waste daily, constituting mostly of cardboard, paper, plastic, tins, metals, organic compounds and glass. The amount and type of general waste produced at the proposed facility will be monitored as part of the facility's waste management plan.

Due to the nature of the proposed operation, it is likely that the facility will also produce a range of hazardous liquid and solid wastes (Typical hazardous wastes that could be produced are summarized in Table 2.7). At this stage it is not possible to quantify the various waste streams but accurate recording of hazardous waste volumes produced by the facility shall form part of the waste management system/integrated waste management plan.

Table 2.7: Summary of typical hazardous wastes (solid and liquid) likely to be produced at the proposed facility

Waste Type	End Use
Lubricating oil	Refine/Reuse
Grease	Refine/Reuse
Contaminated PPE	Disposal to Landfill
Hydraulic Oil	Refine/Reuse
Used Filters	Disposal to Landfill
Used Rags and Waste	Disposal to Landfill
Used Spill Kits	Disposal to Landfill
Hydraulic Hoses	Disposal to Landfill
Seals	Disposal to Landfill
Waste Solvents	Disposal to Landfill
Batteries	Recycled
Aerosol Cans	Disposal to Landfill
Petroleum Contaminated Soils	Disposal to Landfill
Fluorescent Tubes	Recycled
Emergency Response Wastes	Disposal to Landfill

It is estimated that the production of hazardous waste that will be stored on site in a temporary storage area may be more than 35 m^3 per month. Hazardous waste will be stored in a designated area. The storage area will be provided with secondary containment to prevent spills to reach stormwater or soil. The storage will only be temporary on site due to the distance to the nearest hazardous waste landfill site. Care will be taken not to exceed the 90 days temporary storage of waste on site. Hazardous waste will be collected by a reputable registered waste collector, every month, and will be disposed of at a landfill site registered to take the specific waste type. Safe disposal certificates will be obtained for all disposals of hazardous waste as dictated by the environmental management system.

In addition to the above wastes, process wastes such as contaminated stormwater and manganese ore mud are anticipated to be generated on site. These will be dealt with in the following way:

- Contaminated stormwater generated on site will be collected in the stormwater retention dam. The water will be recycled for use in the dust suppression system.
- Manganese mud will be collected from the bottom of the stormwater retention dam near the stockyard and will be disposed of at the Aloes Municipal landfill site (a waste classification will be done during the operations to determine the chemical constituents, their concentrations and disposal requirements). The majority of the runoff will be collected in the silt traps and put back onto the stockpiles as product. The mud from the dams will be cleaned out once a year and is expected to be minimal.

Where possible and economically viable, recycling will be undertaken.

An onsite waste storage area will be designated for the storage of general and recyclable wastes. The waste area will be constructed on a hard surface to minimise risk of pollution to soil or groundwater. Bins will be provided for specific recyclables by the selected waste contractor based on the volumes

generated at the plant. Collection will be done at frequent intervals or when the containers are nearly full, at the same time ensuring that the waste will not exceed a 90 day storage period.

Waste that cannot be recycled will be disposed as required at the general waste site in the NMBM area. Records will be obtained for the collection and disposal of the general waste where the municipal system cannot be used.

2.4.8 Stormwater Management

Stormwater runoff from the terminal infrastructure will be collected in stormwater control dams. The main stormwater control dam will be located at the stockyard with a second stormwater control dam to service the quay area. These are described under the stockyards and quay water management sections that follow (Refer to sections 2.4.11 and 2.4.13).

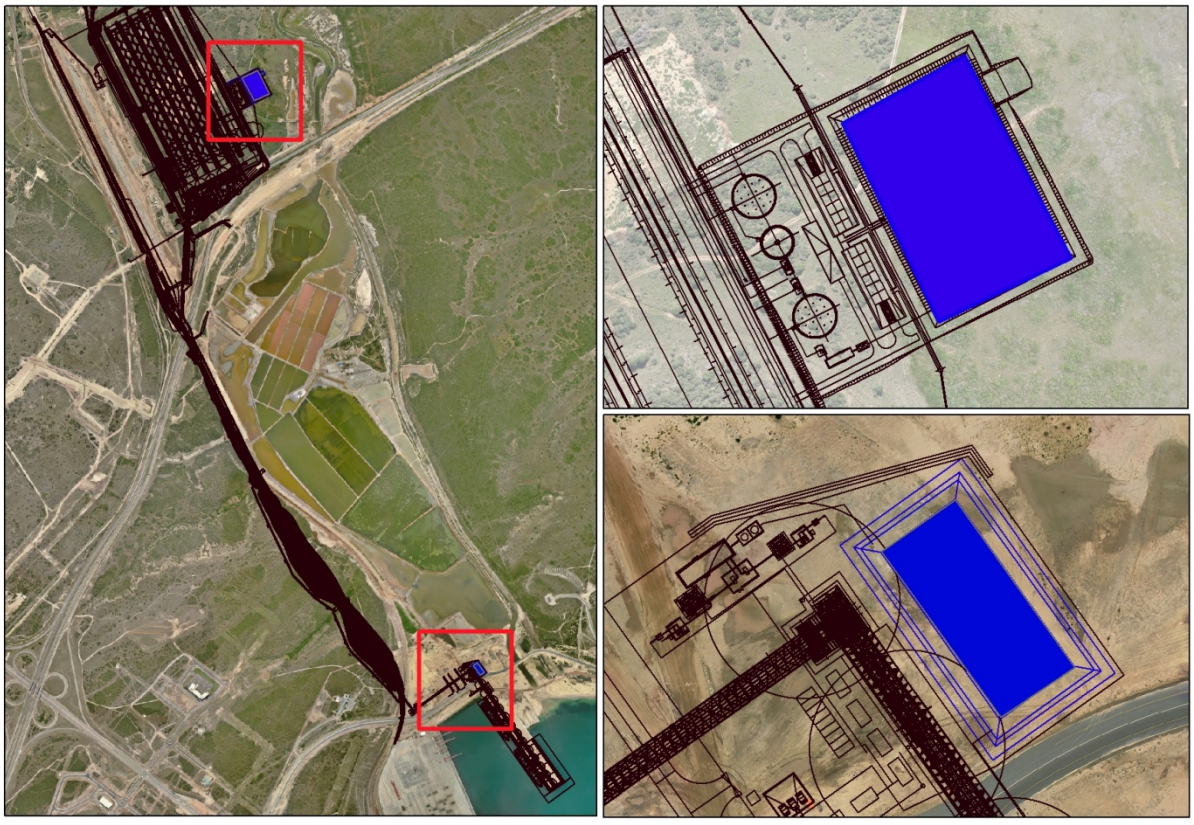


Figure 2.11: Stormwater retention ponds at the terminal site.

2.4.9 Lighting

Lighting will be provided in the working areas as per the requirements of Occupational Health and Safety Act to ensure safe working areas. High mast lighting will be installed on working areas such as the stockyard, tippler, offices and ship loader. Lighting provided will be in such a way that light spill is minimised although safety requirements can be met. This will be done with the use of luminaries with a defined cut off.

2.4.10 Tippler

2.4.10.1 Design and operational overview

The tippler will be located to the south-east of the existing marshalling yard, just north of the N2. The location of the tippler is limited by the bridge river crossing to the north and the distance required for a 104 wagon rake run-out distance. To the south, it is limited by the N2 freeway bridge.

Geotechnical investigations are currently under way to determine the subsoil conditions in the tippler and conveyor corridor. Limited blasting may be required in the tippler vault and tippler tunnel should rock outcrops (not detected during geotechnical investigations) be present.

Diesel locomotives will haul the 104 (100 in future) wagon sets from the compilation yard to and from the tippler. The tippler will unload the rail wagons into the tippler hopper, in the vault beneath the tippler. Apron feeders under the hopper will feed the ore to the conveyor system, which will elevate to ground level and transport the ore to the stockyards. The system will be designed to operate at approximately 5 100 tonnes/hour.

2.4.10.2 Water management

Runoff water in the tippler vault and tunnel will be collected in sumps and pumped to the stormwater dams at the stockyard area.

2.4.10.3 Dust mitigation

The tippler drum will be enclosed in a shroud and will be located inside a metal sheeted building. Dust suppression systems such as water sprays and surfactant dosing systems will be installed for dust control at the tippler hopper and downstream feeder and conveyor transfer points.

2.4.11 Stockyard

2.4.11.1 Design and operational overview

The proposed stockyard will be located in Zone 9 of the Coega IDZ, north of the N2 National Road between the Coega River to the north and east and the existing Port of Ngqura container rail staging yard to the west.

The stockyard will cover an area of approximately 40 hectares. The stockyards will be arranged in four rows. These rows each span approximately 50 m in width, 800 m in length, and 17 m in height. Six stockpiles will be required for each of the four stockpile rows to accommodate the number of different ore grades the terminal will be required to handle. The stockyard will be able to hold a volume of approximately 2.4 million tonnes of manganese ore.

The infrastructure within the stockyard will include three stackers and two reclaimers as well as the associated stockyard conveyor system. Ore from the tippler will be fed to the stockyard by the conveyor system and on to the each stacker via a tripper. The stackers will have luffing and slewing functionality and travel on tracks to stack ore across the length of the stockyard. The tracks will be placed on elevated concrete slabs and the stockyard height is slightly reduced resulting in a retainment structure around each stockyard line. The entire stockyard area is further contained and all runoff will be directed towards the stormwater dam.

Figure 2.12: Proposed location of Manganese stockyard in relation to N2 bridge with associated Coega River flowing underneath (at left – looking eastwards) and port in distance (at right – looking southwards)

The stacking equipment will have a continuous stacking capacity of approximately 5 100 tonnes/hour. The reclamation process will be carried out by two luffing and slewing bucket wheel reclaimers, which will reclaim at a rate of approximately 5 400 tonnes/hour.

A PVC lining will be installed underneath the stockpile to collect the runoff water. This water will be diverted to the storm water retention dam, for reuse in stockpile dust suppression. Fill material required for the stockyard, rail alignment and other project components will be obtained from the existing Coega Kop Quarry under Transnet's current approved Environmental Management Plan for this site.

2.4.11.2 Water Management

A stormwater control dam will be constructed at the stockyard with a storage capacity of approximately 50 Mℓ (megalitres) and will have a free board of 800 mm at full capacity with an additional free board allowance for accommodating a 1:100 year stormwater event. The main function of the stormwater retention dam will be to collect stormwater runoff from the stockyards and water from the tippler sump via pipes attached on the conveyor structure. Two silt traps/settling ponds leading to the control dam will allow manganese ore dust and solids to settle out before entering the main dam. These ponds will be cleaned regularly and the manganese mud from these ponds will be handled as product and returned to the stockpiles.

2.4.11.3 Dust mitigation

Passive mitigation: The stockyard is located in a relatively low lying area which will minimise the effects of wind. A berm will be provided on the western side of the stockyard, to further reduce the prevailing wind generating dust in the stockyard area.

Stockpiles: Chemical surfactants will be added to the ore at the tippler, which will form a capping layer on the stockyards to prevent windblown dust. Water cannons will be provided to damp down the stockpile surface when required.

Stockyard equipment: The stackers and reclaimers will all be equipped with a water supply via a hose reel. The stackers will spray water onto the manganese ore as it falls onto the stockpile. The reclaimers will also incorporate dust suppression at the bucket wheel and the transfer to the stockyard conveyor.

Conveyors: The conveyor transfer points will be designed to minimise dust generation and will be fitted with dust suppression sprays. Conveyors will be equipped with doghouse type sheeting where possible to minimize the effects of winde. Elevated sections of stockyard conveyors will feature wind boards. Major transfer points will be inside sheeted transfer towers.

Surge bins: The surge bin feed conveyors will feature dust suppression where they transfer into the bins. The bins are open on top, but are covered by a sheeted building that encloses the feed conveyor and bins. The surge bin vibrating feeders will be covered and fitted with dust suppression sprays.

2.4.12 Conveyor Route

2.4.12.1 Design and operational overview

An overland conveyor system will link the stockyards to the ship loaders on the existing Berths C100 and C101. The two overland feed conveyors will run from the main transfer complex at the stockyards to a transfer tower located on the west side of the Ngqura Container Terminal (NCT) railway line, just north of the N2 bridge and feed to the overland conveyors. The two 2.5 km overland conveyors run in parallel, passing underneath the N2 bridge and to the quay feed conveyors along a new services corridor.

2.4.12.2 Services Corridor

A new services corridor will be created between the manganese stockyards and the NCT. This corridor must be routed 400m behind the coping line of the existing B-berths to accommodate future port expansion plans.

The new overland conveyor and manganese train pushback tracks will be routed in a cutting along this new services corridor. The cutting for the services corridor will be designed to accommodate certain additional infrastructure such as the NCT tracks in future, without significant operational disruptions.

2.4.12.3 Dust mitigation

The two overland conveyors will run in parallel inside a covered gallery (constructed using metal sheeting) to prevent windblown dust being generated. This is illustrated in Figure 2.14. Major conveyor transfer points will be inside sheeted transfer towers. The gallery will have a concrete floor to contain any potential spillage, which will then be collected manually and taken back to the stockyards. The conveyor transfer points will be designed to minimise dust generation and fitted with dust suppression sprays.

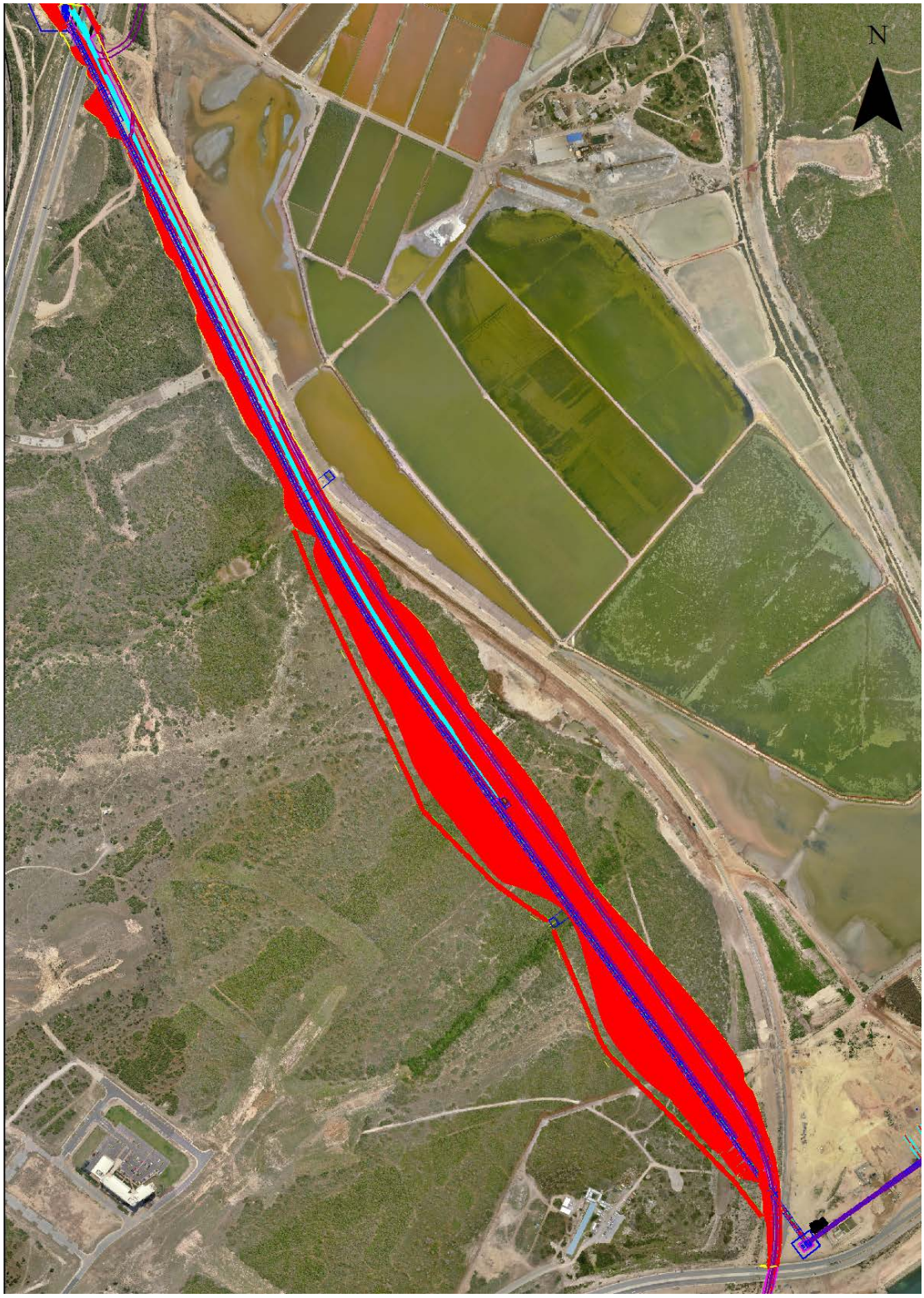


Figure 2.13: Conveyor route showing the proposed services corridor to be established.

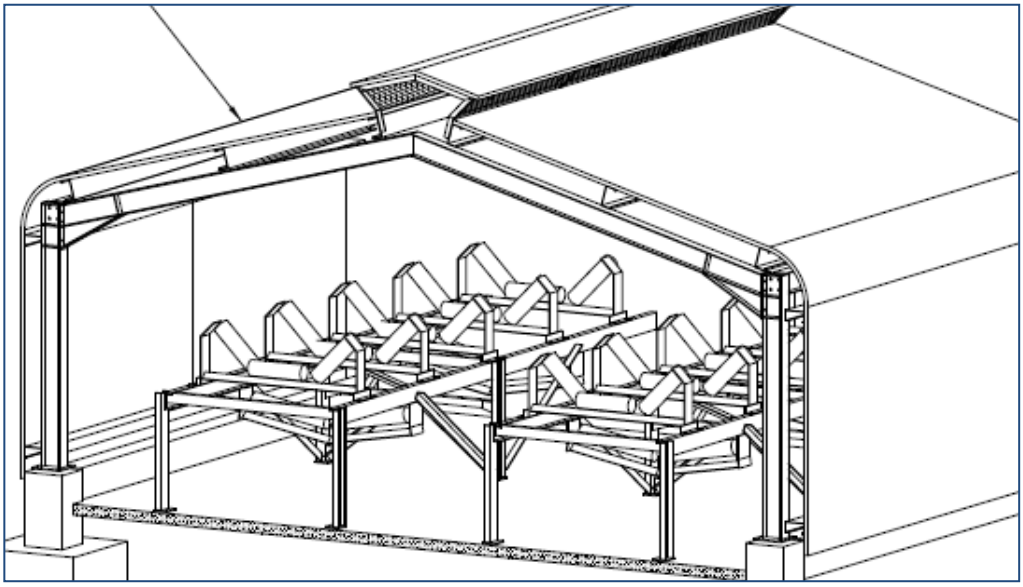


Figure 2.14: Cross-sectional view of the Overland Conveyor System

2.4.13 Quay infrastructure and ship loaders

2.4.13.1 Design and operational overview

Manganese ore reclaimed from the stockyards will be transferred to the ship loaders via the overland conveyors as described above. The overland conveyors will transfer ore to the two quay feed conveyors, which transfer to the quay conveyors that feed the ship loaders running along the existing C100 and C101 berths. A sampling plant prior the quay conveyors will collect and process ore samples for analysis in a sampling laboratory.

The ship loaders will have long travel, luffing and slewing movement capabilities, which will ensure that all positions of the ship are reachable during loading. The ship loaders (Figure 2.11) will be designed to load vessels at a rate of up to 5 400 tonnes/hour.

Figure 2.15: Example of the proposed shiploaders

The existing dry bulk quays C100 and C101 will be utilised for the proposed project as the designated Manganese Ore Handling quays. The ship loading system will be designed to load two Handymax or Panamax vessels of up to 80 000 DWT simultaneously.

2.4.13.2 Water management

A second stormwater control dam will be constructed at the quay area near the transfer to the quay conveyors. It will have a storage capacity of approximately 10 Mℓ and will be designed to accommodate a 1:100 year fluid inflow. The main function of this dam will be to prevent quay area runoff from entering the marine environment. All stormwater accumulated under the services corridor will be collected in a sump and sent to this stormwater control dam.

2.4.13.3 Dust mitigation

Conveyor transfer points will be designed to minimise dust generation and will be fitted with dust suppression sprays. Elevated sections of the quay feed conveyors will be inside a sheeted portal structure to minimise the effects of wind. Elevated sections of quay conveyors will feature wind boards. Transfer points will be inside sheeted transfer towers.

2.5 OPERATIONAL MANAGEMENT

The operational management of the compilation yard and terminal will be dictated by the operating procedures to be developed during the commissioning phase of the compilation yard and terminal. These operating procedures will be developed as part of the operational management plan. The objective of the operational management plan is to ensure that the operations establish and maintain documented Environmental Management procedures to ensure that potential impacts from the operations are mitigated and documented as per Environmental Management System and meet all Legal and other Transnet requirements. This will be done by developing objectives and targets that

are consistent with the Legislation, Transnet SHERQ policy and the Environmental Charter, including commitment to continual improvement.

Objectives and targets shall be regularly reviewed and revised to reflect desired improvements in compilation yard and Bulk Terminal Environmental performance.

The operational procedures will include, but not be limited, to the following:

- Identifying and listing all activities, processes and services
- Assessment of all the environmental risks
- Manage the Environmental Risk Assessment Database
- Establish and Maintain the Legal Register
- Ensure compliance with Environmental legislation
- Establish and document objectives and targets for the facility
- Establish and document objectives and targets per SHEQ Department
- Establish programmes/plans to achieve and set objectives and targets for the facilities
- Establish programmes/plans to achieve set objectives and targets for the SHEQ Department
- Define Structures and Responsibilities
- Delegate Authorities (Legal Appointment)
- Administer and co-ordinate EEnvironmental Legal Appointments
- Identify Environmental Training
- Perform Training Needs Analysis
- Co-ordinate the Training Function
- Provision of training
- Communicate relevant environmental information for (internally)
- Communicate relevant environmental information to Interested & Affected Parties including Authories, the public and the media

2.6 DUST MITIGATION PHILOSOPHY

Dust control on bulk terminals is generally performed using two common methods. These methods include the use of dust extraction within enclosed areas and dust suppression using wet methods such as water, with or without dust suppression additives.

2.6.1 Dust Extraction

A typical dust extraction system will comprise ducting and inlet manifolds placed in enclosed areas (e.g. the tippler and transfer points) with extractor fans and filters generally located external to the building. The filter traps fine dust particles extracted from the working areas. The filters then have to be cleaned out regularly and the result is that bags of very fine particulate matter are obtained that need to be stored prior to disposal.

This method results in an additional waste stream (fine ore dust) that requires proper handling and storage on site prior to disposal. Storage bags also typically tear during the handling of ore dust and adverse weather conditions may result in premature weathering of the bags that results in the secondary release of the very fine ore dust stored. This secondary release of dust is generally considered to be worse than dust released during normal operations due to its fine nature leads to it being susceptible to dispersion even in light wind conditions.

2.6.2 Wet Suppression

Wet suppression involves the use of water added at strategic areas in the bulk handling process to reduce the amount of dust generated. Typically this results in water addition during unloading, stacking, reclaiming and ship loading. The ore is therefore kept moist to ensure that dust particles remains bound to each other as well as to the ore lumps. The consumption of water can be greatly reduced by the addition of chemical surfactants that makes the effect of the water addition last longer than in normal situations. In addition, water is also sprayed to the stockpiles to assist in the dust suppression effectiveness.

2.6.3 Ngqura Terminal Philosophy

The dust mitigation philosophy that has been incorporated into the terminal design is such that dust generation is minimized and dust releases controlled on site without creating additional waste streams. In this regard, the design has opted for control of dust using a combination of wet methods (using water) and surfactants (using dust suppressants).

The advantage of this approach is that no stockyard space is required for temporary storage of manganese ore waste and none of this ore waste would be directed into landfills in the regional area. In addition, the dust that would otherwise be captured using dust extraction remains with the ore and is exported as a product. The water use of the terminal, using dust suppression with the aid of surfactants also results in a ~60% reduction in water demand for the wet dust suppression.

2.7 BEST PRACTISE

The proposed development includes several best practise measures that are generally included in the design. A summary of the best practise principles, incorporated into the design, are given below.

2.7.1 Rail Infrastructure and operations

- Longer trains are proposed to reduce the total project footprint. This means that fewer trains and trips are required.
- The locomotives to be used as part of this development will include new generation dual voltage machines. The use of these locomotives allows Transnet to have fewer in operation but still achieving a better tractive effort across the entire rail route.
- The diesel locomotives proposed for use between the two compilation yards are more fuel economic even though they are more powerful, resulting fewer emissions and fuel usage.
- The open space areas within the IDZ are being accommodated through the construction of open lattice bridges, in consultation with the specialist. The design team approached the ecological specialist indicating that the use of standard culverts linking the various open space areas traversed were unlikely to facilitate movement of animals between areas. The ecologist then produced a solution to facilitate natural corridors below the rail infrastructure.

2.7.2 Port Terminal

- Dust suppression systems have been included throughout the terminal design, from the point of ore off-loading to ship loading.
- A berm and screen will be placed on the windward side of the stockyard to break the speed of winds entering the stockyard (Figure 2-16).

- Water use includes the identification of potential industrial water sources. In addition, the addition of surfactants results in a ~60% reduction in the water demand for the entire terminal.
- The use of surfactants, as opposed to dust extraction, results in the elimination of a waste stream that would otherwise be required to be disposed of at a municipal waste site.
- Operational procedures will be incorporated into the OMP (see section 2.5 Operational Management) to further reduce, specifically dust generation, associated impacts that may result from the terminal operations.
- The storm water design is such that all storm water on site is isolated from the surrounding environment.
- All infrastructure is situated well above the 1:100 flood line levels as determined.
- The stockyard is lined and will prevent any manganese ore leachate from penetrating into the underlying groundwater table.

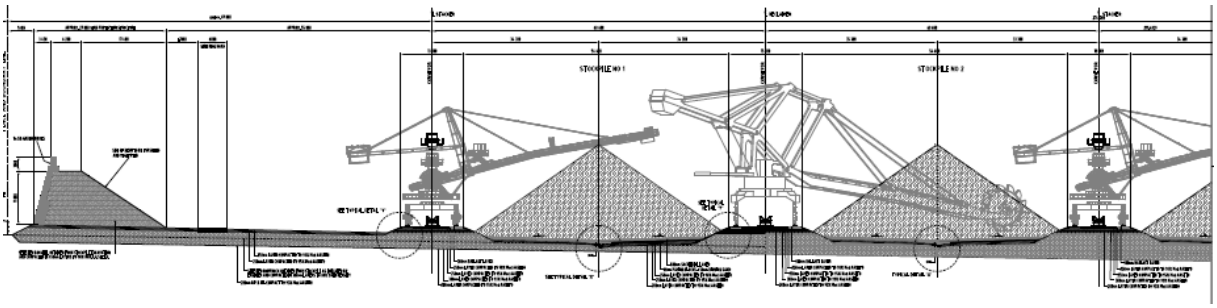


Figure 2-16: Stockyard cross section showing the proposed berm on the left.

2.8 OVERVIEW OF THE PROJECT ACTIVITIES

2.8.1.1 Construction

The construction phase will involve the transportation of personnel, construction material and equipment to the site, and personnel and waste away from the site. In terms of site establishment, the site lay down areas and the main site camp and satellite camps will need to be established by the Contractor that has been appointed to execute the works. The terminal will require the Coega River bridge construction to be completed early in the construction works in order to allow the transport of equipment to site over the Coega River.

2.8.1.2 Site Establishment and Lay-Down Areas

One of the first construction activities at the terminal will be for the main earthworks contractor to clear the area and construct a platform. This will be the area for the permanent site offices of the site-based project team and various contractors.

Space will be available at both the quay and stockyard locations to establish the various contractors. There will be separate construction power sources at both areas. The construction power for the stockyard section will be derived from the 11 kV overhead line supplying power to the rail marshalling yard. An isolator will be installed to tap power off the 11 kV overhead line. An underground cable feeder from the isolator will then supply a series of mini-substations throughout the construction areas.

The power supply for the shipside construction area will be sourced from the Port Crafts mini-substation (140-MS-01) located in the finger jetty. A new mini-substation will be installed in the shipside construction area and supplied with power from the ring-main unit of the Port Crafts mini-substation.

Water connections will be made to the existing main water supplies.

The earthworks contractor will be responsible for the construction of the laydown area to be used for offloading and assembly of equipment. A laydown area will be provided to the west and adjacent to the container rail yard for the Plate laying contractor who will stack rails and sleepers. These will be stacked along the full length of the rail yard area as required.

2.8.1.3 Construction Sequencing

The sequencing of construction activities for critical areas are listed below:

- Terminal Platform
    - Bulk earthworks including the terrace platform
    - Commence with the installation of the perimeter fencing
    - Detailed earthworks including terrace layer-works and service road
    - Installation and construction of stormwater management system including sub-soil drains and v-drains
    - Installation of underground service ducting
    - Construction of the berms including layer-works
    - Construction of concrete structures including service pits, gantry bases, etc.
    - Track work for the stackers and reclaimers
    - Installation of the conveyor structures/conveyor
    - Erecting of the reclaimers and stackers
    - Installation and connection of utilities including potable water pipes and power supply
    - Testing and commissioning.

- Tippler
    - Piling to depth of over 22 m
    - Earthworks, excavation at intervals and installation of soil nails and shotcrete
    - Temporary drainage management
    - Construction of all the concrete structures including the floor slab, tippler vault and incline conveyor tunnel
    - Backfilling
    - Installation of tippler structures and conveyor which will include heavy lifting.
    - Occupational permits will be required to allow for the major tippler activities to be carried out adjacent to the rail line as well as some lifting activities.

Site remediation
Upon completion of construction and removal of equipment, the temporary works areas will be rehabilitated.

2.8.1.4 Operation and Commissioning

A commissioning manager reporting to the construction manager will manage the integrated commissioning process in accordance with the agreed verification procedure supported by Transnet and the relevant contractors on site. The relevant contractors will be responsible for organising and carrying out all equipment tests and trials as specified in their specific contract document.

The terminal will operate on a 24-hour (3 x 8-hour shifts), 365 days per year basis, with up to 25 grades (including 12 common user grades) handled through the export system. It is anticipated that four 200 wagons trains will arrive daily at the compilation yard, 349 days per annum on a 24 hour a day basis.

2.8.1.5 Traffic

The construction phase of the plant will bear the greatest traffic load as it comprises construction workers required to be on site, as well as the requirement to have materials delivered to the construction site. This volume will decrease when the facility will be commissioned.

It is essential that the use of public transport (buses and minibus taxis) should be encouraged. The CDC has already entered into a contract with the Algoa Bus Company to transport locally employed workers from designated pick-up points to the IDZ. The provision of a reliable public transport service by the contracted bus operator to convey workers from the metropolitan area to the IDZ during construction and operation must be monitored by the CDC as the contracting authority. This will mitigate the need for workers to seek other modes of transport like cars and taxis, which would result in greater peak hour traffic congestion.

2.8.1.6 Project schedule

Transnet SOC Ltd initiated the feasibility studies and the approvals process in early 2011/2012. The commencement of construction is planned for September 2014 in order for the exporting terminal to become operational in late 2017, as is detailed in the proposed project schedule below showing the completed actions and anticipated future actions (Table 2.8).

Table 2.8: Proposed project schedule for the Manganese Export Terminal

Description	Forecast
Project Start	13 March 2012
Appointment of Terminal Operator	31 October 2013
Anticipated Issuing of Environmental Authorisation	29 November 2013
Anticipated AEL Approval	30 June 2014
Construction Start	22 September 2014
First Manganese on Ship	15 December 2017
Construction and Cold Commissioning Complete	20 September 2017
Hot Commissioning Complete	01 March 2018
Site De-Establishment Complete	03 May 2018
Project End	28 June 2018

Construction is anticipated to last for a period of 36 months. The first ship loading is planned for early 2017 and the terminal will be capable of operating at full capacity production immediately but may not reach full capacity until further mining expansion is needed beyond 2025. The life of the project is expected to be for as long as mining takes place after which it will be decommissioned.

It is estimated that the capital investment associated with the proposed Manganese Export terminal (including the compilation yard) would be approximately R7.5 billion.

2.9 DECOMMISSIONING

The terminal site is intended to service the manganese ore mining industry within South Africa. The terminal is therefore intended to have a life span equivalent to the mining industry which currently consists of 80% of the world known manganese ore resources. It is therefore anticipated that the terminal could be in operation for the next 40 -60 years or even longer. The terminal design allows for further expansion, should the demand for manganese ore increase beyond 16 Mtpa in future. The terminal would be able to handle up to 22 Mtpa (currently projected long term export growth of the South African Manganese industry) which would require and additional two stockyard lines that would be situated in between the stormwater control dam and the current proposed stockyards. This expansion has been allowed for in the designs and the stockyard location, as well as an additional tippler site has been allowed. The rail compilation yard is design to be capable of an expansion to handle the train lengths required for such an upgrade. The alternative compilation yard would not be able to handle such an expansion.

However, should the terminal become redundant in future, it could be repurposed for handling of other bulk materials. Alternatively the site would be decommissioned through rehabilitation of the stockyards and removal of the equipment.