2019

DRAFT BASIC ASSESSMENT REPORT FOR THE PROPOSED UPGRADE OF STORM WATER AND ENVIRONMENTAL SYSTEMS IN THE PORT OF SALDANHA WITHIN SALDANHA BAY LOCAL MUNICIPALITY IN THE WESTERN CAPE PROVINCE

31 JANUARY 2019

NSOVO ENVIRONMENTAL CONSULTING

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"From the world we live to the world we seek"

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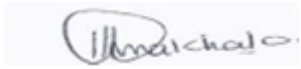
Draft Basic Assessment Report	Masala Mugwagwa 	Munyadziwa Rikhotso  Mbavhalelo Ngobeni 

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LIST OF ACRONYMS AND ABBREVATIONS

CBA	Critical Biodiversity Area
DEA	Department of Environmental Affairs
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
I&APs	Interested and Affected Parties
IUCN	International Union for Conservation of Nature
IOT	Iron Ore Terminal
MTP	Multi-Purpose Terminal
Mm	Millimetre
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998)
TPT	Transnet Port Terminal
TNPA	Transnet National Port Authority
SAHRA	South African Heritage Resources Agency
SBM	Saldanha Bay Municipality
SWMP	Storm Water Master Plan
SOC	State Owned Company
SQG	Sediment Quality Guideline
WULA	Water Use Licence Application

WQG	Water Quality Guideline

EXECUTIVE SUMMARY

Nsovo Environmental Consulting (Nsovo) has been appointed by Transnet SOC Limited (Transnet) to undertake the Basic Assessment process in line with the requirements of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) and the Environmental Impact Assessment Regulations of December 2014 as amended in April 2017 (the Regulations) for the proposed upgrade of storm water and environmental system within the Port of Saldanha (the Port) in the Western Cape Province.

The areas under consideration are owned by Transnet and the development only deals with natural and industrial runoff. The primary objective of the proposed upgrade is to implement relevant recommendations of the Storm Water Master Plan (SWMP) and ensure that it aligns and fully complies with the requirements of South African Legislation as well as world best practices. Subsequently, Transnet proposes to upgrade the storm water and environmental systems in the Port with the view to prevent future uncontrolled discharges into the marine environment and the municipal sewage system. This requires that all surface water runoff from contaminated areas within the Port is contained and iron ore dust and other pollutants are removed either by settlement of sediments and/or treatment to bring the effluent pollutants concentrations to within allowable concentrations before the runoff enters the natural environment.

Storm water management infrastructure including surfaces, channels, ponds, berms and infiltration trenches need to be installed and/or altered for this purpose. The proposed scope of work entails the following key activities:

- The development of two new storm water retention/evaporation ponds;
- Introduction of infiltration channels where necessary;
- The resizing and reshaping of thirteen (13) existing storm water retention ponds;
- The development of a waste water treatment facility (below 2000m^3 in capacity);
- Caisson collection reservoir and pumping system;
- The upgrade of storm water management infrastructure; and
- The cleaning of existing storm water management systems.

Based on the scope of work provided, the proposed activities will trigger listed activities under the National Environmental Management Waste Act, 2008 (Act 59 of 2008) as amended. As such, a Waste Management License is required in order to align with the requirements of the legislation.

The Basic Assessment Report (BAR) will be compiled as per the requirements of Appendix 1 of the NEMA Regulations. This report aims to fully assess the impacts of the project on the affected environment. To ensure that the report complies with the minimum requirements and further addresses the potential impacts in a comprehensive manner, specialist input was sought from the following specialists:

a) Terrestrial and marine biodiversity impact assessment

Anchor Environmental compiled a Terrestrial and Marine Biodiversity Impact Assessment Report that describes the affected environment within the study area and assesses potential impacts. The marine biodiversity component drew on the findings of the "State of the Bay" monitoring work that has been conducted by Anchor Environmental on behalf of the Saldanha Bay Water Quality Trust since 2006 while the terrestrial component focused on available information pertinent to the study area and observations made during a site visit in August 2017. The specialist rated the identified impacts on both marine and terrestrial biodiversity 'low' and mitigation measures were proposed.

b) Heritage Impact Assessment

Vhubvo Archaeo-Heritage undertook the Heritage Impact Assessment which confirmed that a Phase 1 Heritage Impact Assessment would not be necessary given that several studies have been undertaken previously and no obvious sites of heritage significance were noted. The specialist further recommended that should any oceanic artifacts be discovered, the work must stop and a suitable qualified archaeologist must be called to site.

c) Waste classification

In November 2017 **Interwaste** undertook the requisite waste classification to determine whether the waste within the ponds is classified as general or hazardous. The waste classification exercise revealed that the waste in the ponds is non-hazardous. On 19 July 2018 a draft Basic Assessment Report together with the Waste Classification Report were submitted to DEA for review and comment. After review, DEA requested that the samples recovered on site be sent to an independent laboratory and scientist for the second opinion as they did not believe the waste to be general. Refer to Appendix I. Subsequently **WSP** was appointed and undertook the waste classification for second opinion in November 2018. The exercise yielded the same results, i.e. the waste is not hazardous (general). Both the Waste Classification Reports are attached as Appendix D.

d) Geo-Hydrological Study

Sustainable Drop Projects (Pty) Ltd has been appointed to undertake the Geo-Hydrological Impact assessment for the proposed development.

The study was recommended by the Western Cape Department of Water and Sanitation, the reason being that the proposed development may potentially have an impact on the ground water. According to the Geohydrological study, groundwater monitoring within the existing boreholes at the study site is recommended as the observed static water levels in boreholes on site being higher than 5 metres below ground level. Monitoring will be necessary especially if the resizing that is proposed for some of the existing ponds will make them deeper thus increasing the opportunity for percolation of storm water into the shore/sea, Appendix C4 contains the Geo-Hydrological Report.

The specialist reports compiled comply with the requirements of Appendix 6 of the NEMA EIA Regulations.

One of the key requirements of a comprehensive EIA is the consideration of alternatives which could relate to location, technical or structural as well as the no-go alternative. No site alternatives were considered for this project as it entails an upgrade of existing infrastructure within the Port. As such, technical alternatives were considered and these include the following:

- Full Containment – Zero Discharge; and
- Controlled discharge option.

The controlled discharge option is the preferred option as it considers the feasibility of detainment of storm water runoff for a long period of time in order to reduce peak flow, slow down the runoff, treatment of runoff to improve the effluent quality and discharging the effluent in a controlled manner which is in line with the industry's best practice. This option is in line with the best practice of storm water management in urban and industrial areas. This approach to the management of storm water would apply to both the large flat open areas consisting of paved or unpaved surfaces such as the stockyard and standing areas where goods are loaded and offloaded. Based on an assessment and analysis of both technical and environmental attributes, this option will yield more benefits on the environment.

The No Go alternative was dismissed on the basis that positive impacts associated with the preferred alternative will not be realized and will compromise environmental sustainability. Further, the marine and

terrestrial specialist highlighted that ecological condition of the remaining natural areas of the site is more likely to become degraded and transformed under the 'No Go' scenario.

Both positive and negative environmental impacts were assessed, ranging from habitat loss to operational effects. The identified impacts are considered to be low to medium in significance without mitigation and can be reduced to low by implementing proposed mitigations. No negative impacts were rated as 'high', however; high significance impacts with a positive status were identified for the operational phase.

Following a detailed impact assessment, the Environmental Assessment Practitioner (EAP) recommended that the proposed upgrade of the storm water management system within the Port be approved and the Controlled Discharge alternative be authorized. Recommendations made by the specialists must be taken into consideration and the mitigation measures in the EMPr must be fully implemented.

1. INTRODUCTION OF THE PROPOSED PROJECT

Nsovo Environmental Consulting has been appointed by Transnet SOC Limited (hereafter referred to as Transnet) to undertake the Environmental Impact Assessment (EIA) studies in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the Environmental Impact Assessment Regulations of 2014 as amended in April 2017 for the proposed upgrade of storm water management system in the Port of Saldanha within the jurisdiction of Saldanha Local Municipality in the Western Cape Province.

The Port of Saldanha (hereafter referred to as the Port) is the largest iron ore handling port in South Africa. Iron ore is transported to the Port by rail from Sishen in the Northern Cape where it is stockpiled prior to loading onto bulk iron ore carriers for export purposes. The Port also serves base metal mines and an adjacent heavy minerals smelter as well as the crude oil storage facility near the Port.

The Port of Saldanha was constructed during the 1970's to facilitate the export of iron ore, bulk crude oil and break-bulk terminals were subsequently added to the facilities in the Port. In the early 2000's the first phase of expansion to the iron facility was undertaken, which included expansion of the stockyard area and provision of a second tippler, two additional stacker declaimers and the upgrading of the ship loaders.

Various storm water management infrastructures have been constructed within the Port. The Storm Water Master Plan (SWMP) of 2013 for the Port of Saldanha indicates that the existing storm water management infrastructure of certain areas in the Port is inadequate for 1:50 year flood line conditions. As such, if the infrastructure is not upgraded and/or replaced, uncontrolled discharge into the bay and municipal system will be imminent. Consequently, Transnet proposes to undertake the upgrading of the storm water and environmental systems within the Port. The proposed development entails the upgrade of the existing storm water infrastructure in both operational and non-operational areas of the Port in order to improve the storm water infrastructure systems.

The project proponent is Transnet and the Competent Authority is the National Department of Environmental Affairs (DEA). The proposed project will be undertaken in terms of NEMA and the EIA Regulations as amended (hereafter referred to as the Regulations) and other applicable Acts and Legislations will be equally considered.

2. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

Nsovo has been appointed by Transnet as the EAP for the proposed project and meets the general requirements as stipulated in the EIA Regulation 13 (1) of 2017. Nsovo is therefore:

- Independent and Objective;
- Has expertise in conducting EIA's;
- Takes into account all relevant factors relating to the application; and
- Provides full disclosure to the applicant and the relevant environmental authority.

Table 1: Details of the Environmental Assessment Practitioner (EAP)

Name of Company	Nsovo Environmental Consulting
Person Responsible	Masala Mahumela
Professional Registration	South African Council for Natural Scientific Professions (SACNASP)
Postal Address	P/Bag x29 Postnet Suite 697 Gallo Manor 2052
Telephone Number	011 041 3689
Fax Number	086 602 8821
Email	masala.mahumela@nsovo.co.za
Qualifications & Experience	B.Sc. Honours Environmental Management **10 years of experience**
Project Related Expertise	In terms of project related expertise ,the EAP has undertaken the following projects: • EIA for the proposed Shongweni substation and Hector - Shongweni 400kV powerline in Kwazulu Natal Province.

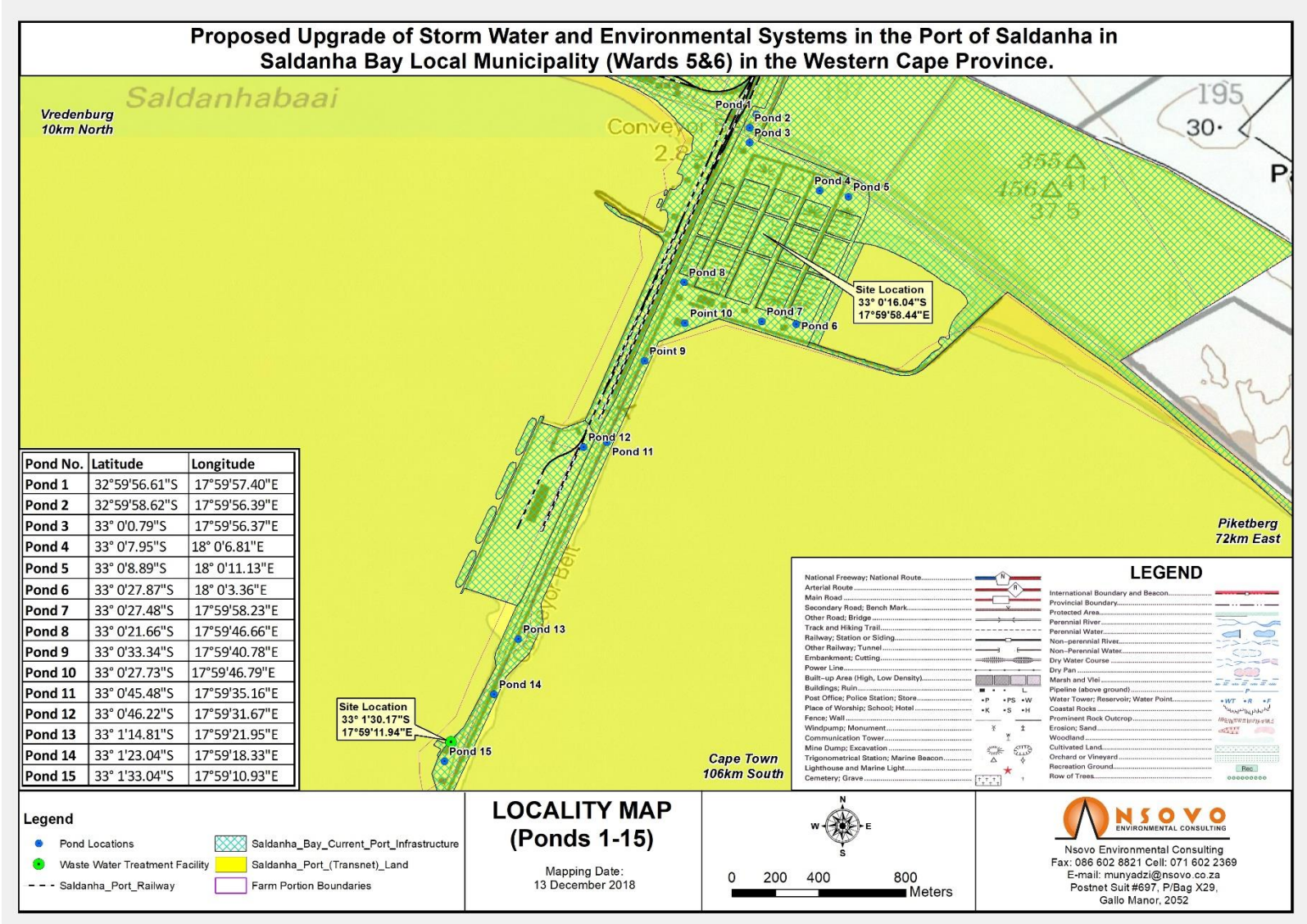
	• EIA for the proposed Inyaninga substation and Inyaninga – Mbewu 400kV powerline in Kwazulu Natal Province. • EIA for the proposed Tubatse strengthening phase 1 – Senakangwedi B integration within the jurisdiction of Greater Tubatse Local Municipality in Limpopo Province. • EMPr, WULA and EA amendment for the proposed Juno Gromis 400kV power line • Basic Assessment for the proposed Decommissioning and Demolition of Verwoedberg Substation and 275kV power. Basic Assessment for Bloemendal Substation and loop in and out lines.).

3. DESCRIPTION OF LOCALITY AND THE PROPERTY ON WHICH THE ACTIVITY IS TO BE UNDERTAKEN AND LOCATION OF ACTIVITY ON THE PROPERTY

This section provides detailed information of the location of the proposed development.

3.1 LOCALITY OF THE PROPOSED PROJECT

Figure 1 below depicts the site locality area at a scale of 1:50 000. The project site is zoned industrial and is used as an iron ore export facility by Transnet. Refer to **Appendix A** for the locality and sensitivity maps.



Pond No.	Latitude	Longitude
Pond 1	32°59'56.61"S	17°59'57.40"E
Pond 2	32°59'58.62"S	17°59'56.39"E
Pond 3	33° 0'0.79"S	17°59'56.37"E
Pond 4	33° 0'7.95"S	18° 0'6.81"E
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Pond 7	33° 0'27.48"S	17°59'58.23"E
Pond 8	33° 0'21.66"S	17°59'46.66"E
Pond 9	33° 0'33.34"S	17°59'40.78"E
Pond 10	33° 0'27.73"S	17°59'46.79"E
Pond 11	33° 0'45.48"S	17°59'35.16"E
Pond 12	33° 0'46.22"S	17°59'31.67"E
Pond 13	33° 1'14.81"S	17°59'21.95"E
Pond 14	33° 1'23.04"S	17°59'18.33"E
Pond 15	33° 1'33.04"S	17°59'10.93"E

Figure 1: Locality map of the Port of Saldanha

3.1.1 PROVINCE AND PROVINCIAL BOUNDARIES

The proposed development will be undertaken within the Port of Saldanha in the Western Cape Province; situated on the northern shore of Saldanha, approximately 106km north-west of Cape Town. The Province borders Northern Cape and Eastern Cape Provinces.

3.1.2 MUNICIPALITY

The proposed project is located within the jurisdiction of Saldanha Bay Local Municipality which is under the West Coast District Municipality.

3.1.3 MUNICIPAL WARDS

The Saldanha Bay Local Municipality is currently structured into 14 Wards. However, the proposed project will be undertaken only within Wards 5 and 6.

3.1.4 AFFECTED PROPERTIES

Table 2 below shows properties affected by the proposed project together with the 21 digit Surveyor General Code as follows:

Table 2: Properties affected by the proposed project

Farm name	Surveyor General Code	Farm No.	Portion No.	Pond Number
Pienaars Poort	C04600000000019700012	197	12	
	C04600000000019700007	197	7	
	C04600000000019700008	197	8	1
	C04600000000019700009	197	9	
	C04600000000019700014	197	14	
	C04600000000019700015	197	15	
	C04600000000019700016	196	16	
Yzervarkensburg	C04600000000012900017	127	17	
	C04600000000012900005	129	5	
Farm 195	C04600000000019500000	195	0	
	C04600000000019500007	195	7	

Farm name	Surveyor General Code	Farm No.	Portion No.	Pond Number
Farm 196	C04600000000019600000	196	0	2
Farm 1185	C04600000000118500000	1185	0	3,4,5,6,7,8,9,10,11,12,13,14, 15

3.2 SURROUNDING LAND USES

This section provides the description of the land uses within and around the proposed study area which include residential, commercial and industrial and are discussed as follows:

3.2.1 RESIDENTIAL AREAS

The residential properties located around the study area are community households which are dominated by medium to low density residential developments which include Saldanha and Vredenburg which are located approximately 9km and 12km from the Port respectively.

3.2.2 COMMERCIAL AND INDUSTRIAL

Table 3 below shows the main economic sectors within the district and local municipalities and these include: agriculture, community services, construction, general government services, finance, manufacturing, transport and trade.

Table 3: Main economic sectors (Integrated Development Plan (IDP), 2017)

Economic Sectors	Percentage Contribution	
	West Coast District Municipality	Saldanha Bay Local Municipality
Finance, insurance, real estate and business	24%	31.7%
Agriculture, forestry and fisheries	15%	7.9%
Construction	5%	3.3%
Community, social and personal services	4%	5.1%
Manufacturing	18%	13.3%

Economic Sectors	Percentage Contribution	
	West Coast District Municipality	Saldanha Bay Local Municipality
General government	11%	17.7%
Transport, storage and communication	9%	9%
Trade	13%	10.1%

3.3 SURFACE INFRASTRUCTURE

This section provides the description of the surface infrastructures situated within the proposed study area which include the maintenance terminal, small craft harbour and Mossgas Platform which are located within the Port but not affected by proposed project. Areas affected includes the road network, multipurpose terminal , stockyard, ore jetty, tippler area and cause way which are briefly described and is as follows:

3.3.1 ROAD NETWORK

The primary access roads to the Port are via the existing R27 and R399. Therefore, there is no need for construction of additional roads to access the port.

3.3.2 MULTIPURPOSE TERMINAL

The Multipurpose Terminal (MPT) consists of 870m long concrete quay with a concrete paved area and a gravelly laydown area which consists of workshops and machinery parking for heavy equipment. The drainage system at the concrete paved area comprises of a vast pipe network and concrete grit channel. The underground pipe network drains water from the main access road and warehouse into the bay under the quay wall. The concrete grit channel which runs parallel to the quay discharges stormwater to the filter separator system, which filters the water before it gets discharged to the sea. The gravelly laydown area has stormwater system which drains water from the workshop and the other gravel areas has no formal drainage system.

The capacity of the existing infrastructure at the paved area was assessed and it was found to be adequate to handle the maximum storm. The stormwater master plan stated that residue and spillages result from loading activities of metal oxides including zinc, lead and copper which flow uncontrolled into the sea. In order to reduce the flow of these

contaminants into the sea, Transnet is proposing to install the ecostorm plus 1000 filter systems which filter heavy metal.

The filter system can only accommodate lower flow rates; a 0.6m wide flat channel is proposed to intercept the water from the pipes to slowly overflow into a stilling basin (20m x 4m x 2.5m deep) which is proposed where the grit channel is located. The stilling basin is divided into 3 chambers and the invert level of the stilling basin is below the outlet into the filter system. For this reason, a pump is therefore required at each chamber to pump water into circular rocla manholes which accommodate 3 x Ecostorm plus 1000 filter systems to filter heavy metals before they get discharged into the sea. The proposed pumps are all automatic 5l/s pump with floats and a control panel.

At the gravelly laydown area, Transnet proposes to have the machinery and storage area surfaced with 2 x 50 layers of asphalt with layer works to prevent informal pond depressions resulting from heavy loading. The stormwater from the workshop buildings and portion of the main access road which is discharging into the sea is redirected to the new pond 12 and the outlet to sea has to be blocked.

There is an agreement with the Saldanha Bay Municipality that after filtration, the stormwater will be discharged into the municipal effluent line. The current project will divert some of the water in this system to a new evaporation pond to cater for new design catchments. The project will also upgrade the separator as well as free blockages in the existing network. Refer to Figure 2 for the Multi-Purpose Terminal map, further, an A3 size map of the MPT is attached as **Appendix A**.

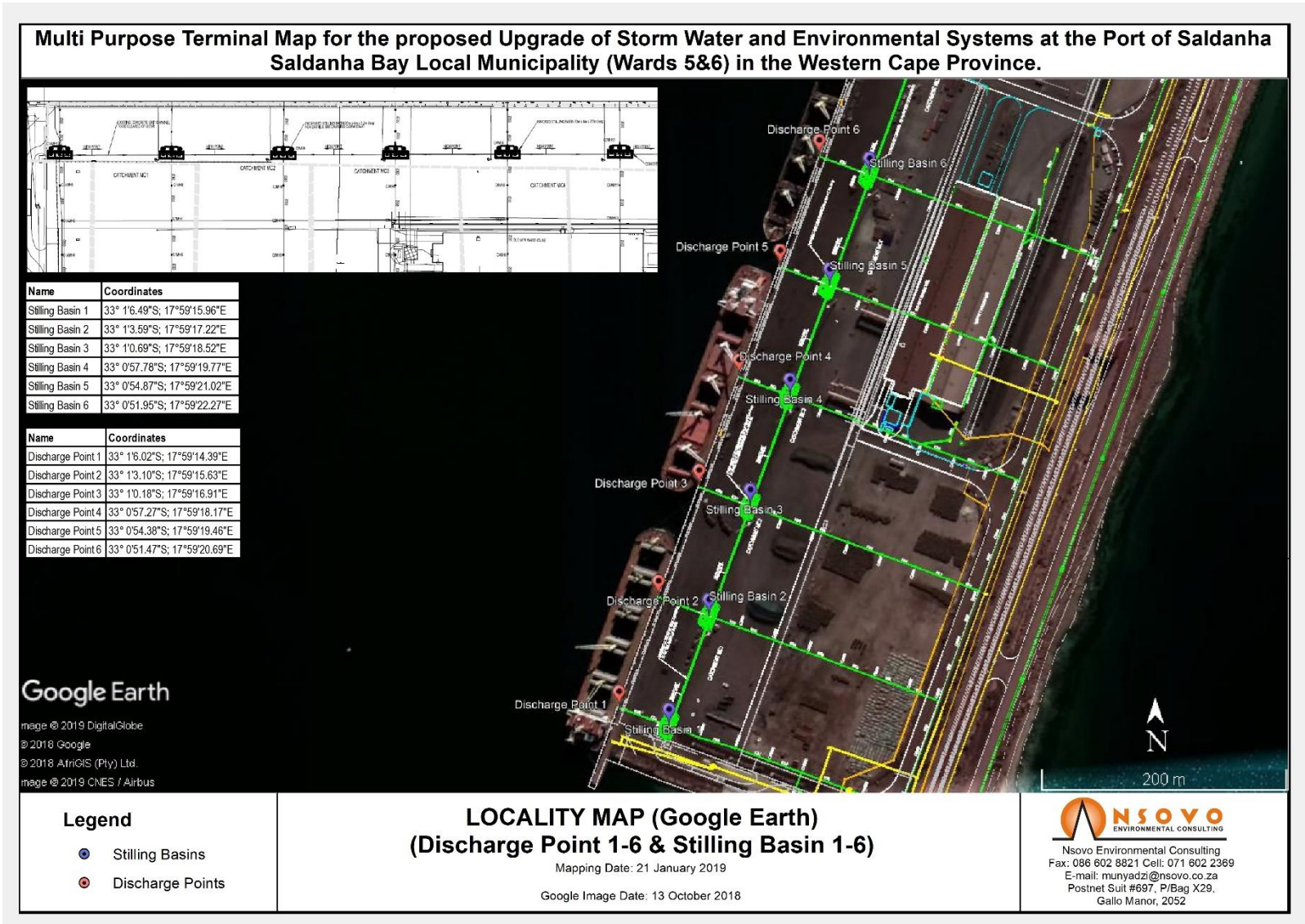

Figure 2: Map indicating the proposed activities at the MPT

3.3.3 MAINTENANCE TERMINAL

The maintenance terminal lies adjacent to the rail embankment along the north-south access road that extends from the Port entrance to the ore jetty. Its main function is for the maintenance of vessels and marine infrastructure as well as for dismantling of old vessels and marine equipment. The storm water from this terminal is also discharged adjacent the access road which runs into the rail embankment catchment.

3.3.4 SMALL CRAFT HARBOUR

A small craft harbour is located within the Port and it entails the control tower area and jetty area.

3.3.5 MOSSGAS PLATFORM

The Mossgas platform is also situated within the Port and was used to construct the oil and gas platforms which are now located off the coast of Mossel Bay. The platform area is extensive and consists of a large hard standing gravel area that contains warehouses, workshops, administration office buildings and two large storm water detention ponds on either side of the quarry.

3.3.6 STOCKYARD

The stockyard area forms part of the proposed upgrading of storm water management system. This area primarily consists of iron ore stockpiles which receive ore from tipplers via conveyor belts. It also contains an administration complex from where stockyard activities are controlled. The engineering scope entails modification of existing ponds to function effectively against its collection catchment area. It will also include the construction of new ponds to cater for additional run-off.

3.3.7 TIPPLER AREA

The tippler area extends from the southern end of the rail corridor towards the rail embankment and lies east of the backfill area and west of the northern tip of the stockyard. The main function of the tippler area is to load the iron ore for the purpose of transportation. The iron ore is received at the tippler area from the incoming rail carriages and distributed through conveyor belts to the stockyard, ore jetty and other handling areas.

The engineering scope entails modification of existing ponds to function effectively against its collection catchment area. In addition to this, there are infiltration channels along the rail embankment to prevent surface runoff entering the road.

3.3.8 ORE JETTY

The ore jetty is a concrete structure that extends out to sea and it extends westerly from the end of the causeway area within the Port. This ore jetty is 990m long which consist of two iron ore berths and one crude oil berth linked to the shore along a 3.1 km long causeway. Further, the ore jetty is a composite concrete bridge type structure supported on reinforced concrete caissons founded on the seabed. The proposed activities which will be carried out within this area include sealing of the jetty to allow for effective storm water management.

Its primary function is to house docked vessels and the bulk material handling equipment that loads vessels with commodity. Currently there is no storm-water control which becomes contaminated with Iron ore which is the main export commodity. The design premise to control storm water discharge into the bay is to seal off the jetty surface. Once this is done the storm water is then designed to flow into U-shaped grid channels towards holes cut in the slab. The holes are connected to a piping system that channels water into a below slab level caisson which houses a reservoir and pump system. The Pump system resurfaces and extends towards a land-based treatment facility. This treatment facility removes the solids and reintroduces the water into the ports conveyor belt and dust suppression systems.

3.3.9 CAUSEWAY

The causeway area extends from the end of the MPT catchment to the ore jetty which links all the services from the main iron ore handling operations at the stockyard to the ore jetty. There is formal storm water infrastructure outside the causeway area surrounding the buildings. Two asphalt surfaced access roads run along the length of the causeway.

Engineering Scope: Modifying existing ponds to function effectively against its collection catchment area. In addition to this, there are also infiltration channels along the rubble mount embankment to prevent surface runoff entering the bay.

4. DESCRIPTION OF THE SCOPE PROPOSED ACTIVITIES

This section provides the description of the proposed activities which include the scope of the proposed development mainly focusing on the listed activities which trigger the Basic Assessment process.

4.1 BACKGROUND AND THE PROPOSED SCOPE OF WORK

In 2012, Hatch Goba Consulting revised and updated the Storm Water Master Plan (SWMP) for the Port of Saldanha which replaced the original SWMP plan that was compiled in 2003. The area covered by the SWMP divided the study area into five major catchments which are defined by their physical characteristics and operational activities including existing drainage system boundaries. However, of the 5 mentioned catchments, the proposed project will only cover two catchments (i.e. catchments 3 and 4) and respective sub-catchments as per Table 4 below. Catchment 3 entails the Service Corridor which is subdivided into nine smaller sub-catchments of which only 5 (3C, 3F, 3G, 3H and 3I) will be impacted by the project scope as per Table 4. Catchment 4 is the stockyard which is subdivided into three (4A, 4B and 4C) smaller sub-catchments. This catchment consists of primarily the iron ore stock yard and the administration complex. Areas under consideration within catchment three and four are as follows:

Table 4: Catchments applicable to the proposed project

CATCHMENT THREE	
Area 3C	Tippler area
Area 3F	Rail Embankment
Area 3G	Multipurpose Terminal
Area 3H	Causeway
Area 3I	Ore Jetty
CATCHMENT FOUR	
Area 4A	Stockyard North
Area 4B	Stockyard Centre
Area 4C	Stockyard South

Furthermore, all the areas under consideration are owned by Transnet and the catchments only deal with natural and industrial runoff. The primary objective is to implement the recommendations of the SWMP and ensure that it aligns and fully complies with the requirements of the South African Legislation.

The following scope of work will take place within the areas mentioned above:

- The development of two new storm water retention ponds;
- Introduction of infiltration channels where necessary;
- The resizing and reshaping of 13 existing storm water retention ponds;
- The development of a waste water treatment facility which does not trigger any listed activity as its capacity is below 2000m^3;
- Development of caisson collection reservoir and pumping system;
- The upgrade of storm water management infrastructure; and
- The maintenance (cleaning and unblocking) of existing storm water management systems.

4.2 ACTIVITIES ASSOCIATED WITH THE PROJECT

The construction phase of the proposed project will take approximately 2 years and the activities included are discussed hereunder.

4.2.1 SITE WALK-DOWN

The main aim of conducting the site walk-down is to ensure that sensitive areas are identified, avoided where necessary and buffers are created for conservation purposes.

4.2.2 VEGETATION CLEARANCE AND REMOVAL OF SEDIMENT

The proposed development will require clearance of vegetation within the existing ponds in order to create space for construction. Only flora within the immediate construction footprint will need to be cleared for the construction purposes. Further, sediment that has accumulated in the ponds will be removed and disposed in accordance with the recommendations of the Waste Classification Reports (Appendix C3) and the Environmental Management Programme (EMPr) as well as Transnet policies and guidelines.

4.2.3 UPGRADE OF EXISTING AND DEVELOPMENT OF NEW PONDS

The proposed development entails the upgrading of the storm water management systems including the resizing (expansion or reduction) of 13 existing ponds and development of 2 new ponds (Pond 6 and 12) that are located at the Stockyard and the MPT respectively thus a total 15 ponds with a combined capacity of approximately 30 000 m^3

on completion of the project as depicted in **Figure 3** below. The map, facility illustration as well as the 5 corners of each of the proposed ponds are attached as **Appendix F.**

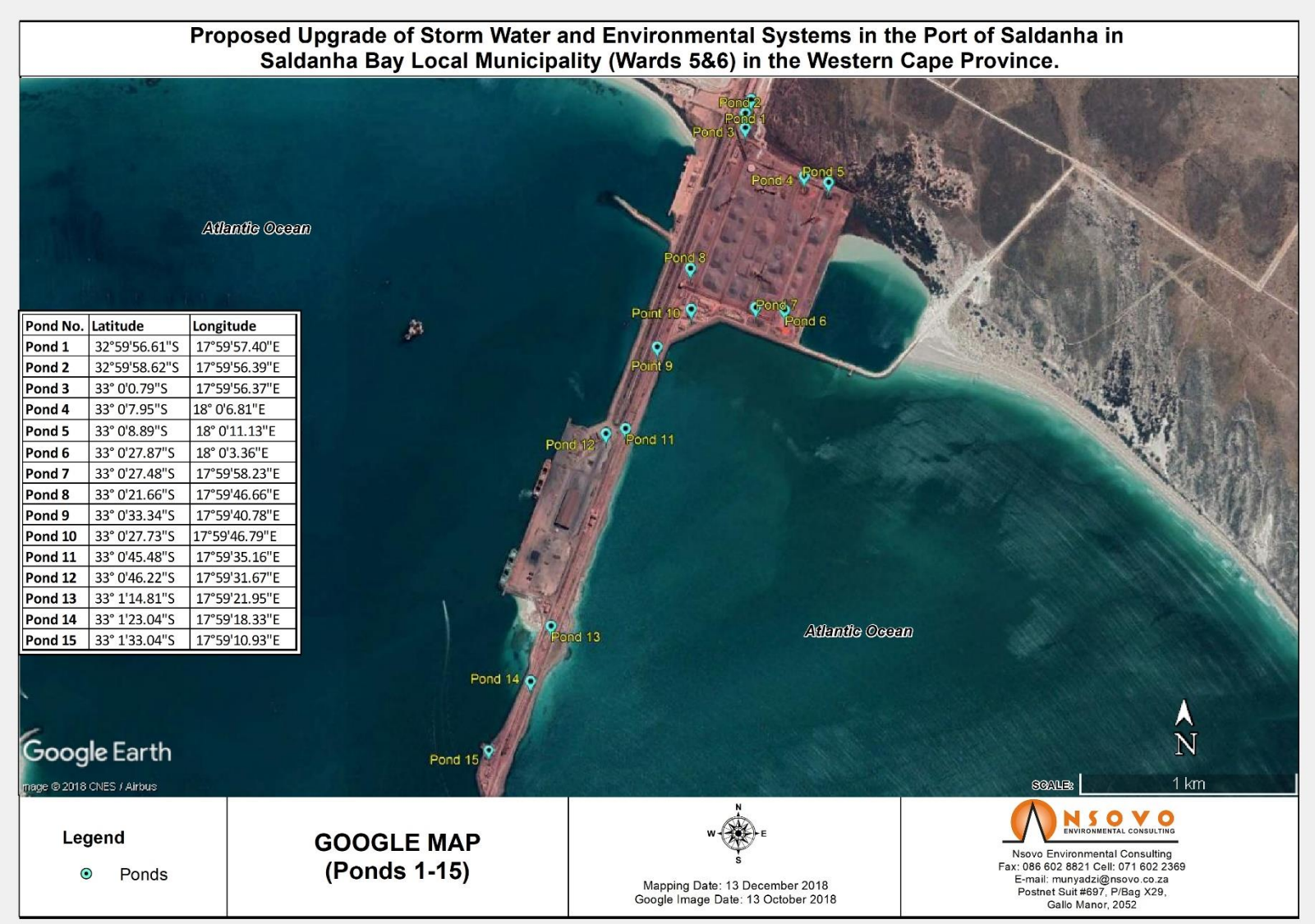

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Figure 3: General view of the ponds location

Table 5 below illustrates the number of existing and proposed ponds as well as their existing and proposed capacities while **Appendix F** includes the designs of the proposed infrastructure.

Table 5: Existing and proposed pond capacities

Name	Area (m2)	Existing Capacity (cubic meters)	New Capacity (cubic meters)
Pond 1	59602	3939	2086
Pond 2		3727	2086
Pond 3	14461	140	500
Pond 4	154062	1480	5130
Pond 5	57908	1012	1200
Pond 6 (new)	61144	0	1440
Pond 7	167207	1276	4042
Pond 8	40803	164	1040
Pond 9	57776	700	700
Pond 10	6941.340	4858	4858
Pond 11	3705.976	2594	2594
Pond 12(new)	54114	0	2500
Pond 13	33110	1000	1000
Pond 14		1000	1000
Pond 15	7100	361	400
TOTAL		**22251**	**28876**

The civil works will include the establishment of foundations for the proposed new retention ponds as well as the deepening of the existing ones.

4.2.4 WASTE WATER TREATMENT FACILITY AND PUMP SYSTEM

The proposed project entails the development of Waste Water Treatment Facility within the Port. Some of the storm water within the Port will be channelled to the waste water treatment facility where it will be treated and reused for

dust suppression of iron ore on conveyor belts. The proposed waste water treatment facility will have a capacity below 2000m^3 and as such does not trigger a listed activity.

4.2.5 EXPANSION AND RESHAPING STORM WATER PONDS

The proposed project entails resizing and reshaping (shallower and smaller in some cases) of existing storm water retention ponds for containment of storm water. It is anticipated that existing storm water retention ponds will be expanded either wide or deep depending on the availability of space around the ponds so as to increase their capacity. This will include the following:

- **Ponds**: Reshaping and providing adequate capacity for the catchment area it services infiltration; and
- **Trenches:** Allow for natural filtration before reaching the ground water course. This is achieved by graded materials as per specification. Usually placed at land edge to stop bay contamination.

4.2.6 COMPLETION OF CONSTRUCTION WORK

Once construction work is complete, the site will be rehabilitated as per the specifications of the EMPr and approved Method Statements. The rehabilitation activities will include but not limited to:

- Removal of excess construction material and waste;
- Repairing any damage caused by construction activities;
- Rehabilitation of the area affected by proposed activities; and
- Replacing topsoil and planting indigenous vegetation where necessary.

4.3 LISTED ACTIVITIES APPLICABLE TO THE PROJECT

The proposed development triggers listed activities in terms of EIA Regulations as amended and these are listed in Table 6 below:

Table 6: Listed Activities triggering Basic Assessment process

Listed activities	Activity/Project description
National Environmental Management: Waste Act 59 of 2008	

Listed activities	Activity/Project description
Category A Item 1 The storage of general waste at lagoons.	The proposed development entails resizing of 13 existing and development of 2 new storm water evaporation ponds which are defined as "lagoons" under NEMWA. These ponds are located at the coordinates mentioned in Figure 1. The maximum holding capacity of each pond is depicted in Table 5 above. The ponds will hold contaminated storm water (waste) which has been classified twice and found to be "General".
Category A Item 12 The construction of a facility for a waste management activity.	The proposed project entails the development of two new storm water retention ponds (ponds 6 and 12) for the storage of iron ore waste which is classified as general waste.
Category A Item 13 The expansion of a waste management activity listed in Category A or B of this Schedule which does not trigger an additional waste management activity in terms of this Schedule	The existing 13 ponds will be expanded and or reshaped for the storage of iron ore waste which is classified as general waste.

5. APPLICABLE LEGISLATION AND GUIDELINES

The EIA Regulation of December 2014 as amended, **Appendix 1**, Section 1(e) requires description of applicable legislations in the Basic Assessment Report. Therefore, this section lists and describes the legislations applicable to the proposed development as indicated in **Table 7** below.

Table 7: Legislation pertaining to the proposed project

Aspect	Relevant Legislation	Brief Description
Environment	• National Environmental Management: Act 1998, (Act No. 107 of 1998) as amended.	The overarching principles of sound environmental responsibility are reflected in the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) apply to all listed projects. Construction and operation of activities have to be conducted in line with the generally accepted principles of sustainable development, integrating social, economic and environmental factors.
	• Environmental Impact Assessment Regulations, December 2014 as amended in April 2017	The Environmental Impact Assessment (EIA) process followed is in compliance with the NEMA and the Environmental Impact Assessment Regulations of December 2014 as amended. The proposed development involves "listed activities", as defined by NEMA. Listed activities are an activity which may potentially have detrimental impacts on the environment and therefore require Environmental Authorisation (EA) from the relevant Competent Authority, in this case DEA.
Biodiversity	• National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	The purpose of the National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed.
Protected Areas	• National Environmental	The purpose of this Act is to provide for the protection, conservation and management of ecologically viable

Aspect	Relevant Legislation	Brief Description
	Management: Protected Areas Act, 2003 (Act No. 57 of 2003)	areas representative of South Africa's biological diversity and its natural landscapes.
Heritage Resources	• National Heritage Resources Act, 1999 (Act No. 25 of 1999)	The National Heritage Resources Act, 1999 (Act No. 25 of 1999) legislates the necessity for cultural and heritage impact assessment in areas earmarked for development, which exceed 0.5 ha. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits are administered by the South African Heritage Resources Agency (SAHRA).
Air quality management and control	• National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004)	The objective of the Act is to protect the environment by providing reasonable measures for the protection and enhancement of air quality and to prevent air pollution. The Act makes provision for measures to control dust, noise and offensive odours. Section 32 of The National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004) deals with dust control measures in respect of dust control.
Noise Management and Control	Noise Control Regulations in terms of the Environmental Conservation, 1989 (Act 73 of 1989)	The assessment of impacts relating to noise pollution management and control, where appropriate, must form part of the EMPr. Applicable laws regarding noise management and control refer to the National Noise Control Regulations issued in terms of the Environment Conservation, 1989 (Act 73 of 1989).

Aspect	Relevant Legislation	Brief Description
Water	National Water Act, 1998 (Act 36 of 1998)	This Act provides for fundamental reform of law relating to water resources and use. The preamble to the Act recognises that the aim of water resource management is to achieve sustainable use of water for the benefit of all users and that the protection of the quality of water resources is necessary to ensure sustainability of the nation's water resources in the interests of all water users.
Human	The Constitution of South Africa, 1996 (Act No. 108 of 1996	The Constitution of South Africa, 1996 (Act No. 108 of 1996) provides for an environmental right (contained in the Bill of Rights, Chapter 2). The State is obliged "to respect, protect, promote and fulfil the social, economic and environmental rights of everyone…" The environmental right states that: "Everyone has the right - a) To an environment that is not harmful to their health or well-being; and b) To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that - • Prevent pollution and ecological degradation; • Promote conservation; and • Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."
Waste		This act provides fundamental reform of the law regulating waste management in order to protect health and the environment by providing reasonable

Aspect	Relevant Legislation	Brief Description
	National Environmental Management: Waste Act 59 of 2008 as amended.	measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development. This act also ensures the provision of national norms and standards for regulating the management of waste by all spheres of government. The National Environmental Management: Waste Act provides for specific waste management measures; licensing and control of waste management activities; remediation of contaminated land; compliance and enforcement; and for matters connected therewith.
Coastal Management	National Environmental Management: Integrated Coastal Management Act 24 of 2008.	The main aim of this act is to establish a system of integrated coastal and estuarine management in the Republic of South Africa, including norms, standards and policies, in order to promote the conservation of the coastal environment, and maintain the natural attributes of coastal landscapes and seascapes, and to ensure that development and the use of natural resources within the coastal zone is socially and economically justifiable and ecologically sustainable.

6. DESCRIPTION OF THE NEED AND DESIRABILITY OF THE PROPOSED ACTIVITY

6.1 MOTIVATION FOR THE DEVELOPMENT

The Port of Saldanha is the largest iron ore terminal in South Africa and within this Port there are existing storm water systems. As indicated above, various storm water management infrastructures have been constructed within the Port, however, some of these infrastructures within certain areas of the Port is inadequate to accommodate a 1:50 year peak flood event. Consequently, if the infrastructure is not upgraded and/or replaced, uncontrolled discharge into the bay and municipal system will be imminent.

The purpose and motivation for this project is to ensure that uncontrolled discharge into the marine environment surrounding the port is avoided through upgrading existing infrastructure and developing new infrastructure (where required) to ensure adequate storm water management systems within the Port. The proposed development entails the upgrade of the existing storm water infrastructure in both operational and non-operational areas of Transnet in order to improve the storm water infrastructure, thus, allow for effective management of storm water. Furthermore, the proposed project will ensure the following:

- Efficient and effective storm water management within the Port of Saldanha;
- Maintenance of the existing storm water system; and
- Improvement of South Africa's socio-economic status.

7. DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED ACTIVITY, SITE AND LOCATION WITHIN THE SITE

This section describes the process followed to reach the proposed preferred activity, site and location within the site. This process included a review of the proposed project site as well as the technical aspect.
The proposed project will be undertaken within the existing operational Port, as such, no site alternatives are being considered for the project. Further, the proposed development will not change or expand the footprint of the existing Port in any way.

The selection of project alternatives was primarily based on Transnet's prefeasibility study (SWMP, 2013) that technically determined the broad location of required storm water infrastructure. Subsequent site visits were undertaken by the engineering, environmental and specialist teams to inform the decision on alternatives. Further public consultation was undertaken to assess the viability of the selected alternatives.

7.1 DETAILS OF ALTERNATIVES CONSIDERED

7.1.1 SITE ALTERNATIVES

The proposed development entails upgrading of existing infrastructure within an operational Port, as such; no site alternatives have been identified as this will defeat the purpose of the project.

7.1.2 TECHNICAL ALTERNATIVES

7.1.2.1 Full Containment – Zero Discharge

The Full Containment – Zero Discharge Alternative entails the containment of all storm water runoff from the site. This option was considered to prevent any possible contamination of the receiving environment. However, it requires large under-utilised area for big evaporation ponds to contain storm water runoff and controlled discharge points where treatment can be applied. Furthermore, the layout of the infrastructure at the Port is compact with inadequate space for the required evaporation ponds.

7.1.2.2 Controlled Discharge

This option considered the feasibility of detainment of storm water runoff for a long period of time in order to reduce peak flow, slow down the runoff, treatment of runoff to improve the effluent quality and discharging the effluent in a controlled manner which is in line with the industry's best practice. The controlled discharge approach is in line with the best practice of storm water management in urban and industrial areas. This approach to the management of storm water would apply to both the large flat open areas consisting of paved or unpaved surfaces such as the stockyard and standing areas where goods are loaded and offloaded.

7.1.3 NO-GO ALTERNATIVE

In accordance with GN R.982 of the Regulations, consideration must be given to the option not to act. This option is usually considered when the proposed development is envisaged to have significant negative environmental impacts that mitigation measures cannot ameliorate the identified impacts effectively. The no-go alternative would be the option of not undertaking the development of the proposed project. It must be borne in mind that this project is in response to the recommendation of the SWMP, 2013, which intended to align the storm water management system with best practice and ensure full compliance with the requirements of the legislation. As such, the no-go alternative would imply the Port continues to operate with inadequate storm water management systems which could have potential negative impacts on the environment. Upgrading the current storm water management system certainly has positive long-term impacts on terrestrial biodiversity as the ecological condition of the remaining natural areas of the site is more likely to become degraded and transformed under the 'No Go' alternative.

8. PUBLIC PARTICIPATION PROCESS

The Regulations require that during the Basic Assessment process, the Organs of State together with Interested and Affected Parties (I&APs) and the public be informed of the application for Environmental Authorisation (EA) and be afforded an opportunity to comment on the application.

Public Participation Process (PPP) is any process that involves the public in problem solving and decision-making and it forms an integral part of the Basic assessment and EIA process. The PPP provides people who may be interested in or affected by the proposed development, with an opportunity to provide comments and to raise issues or concern, or to make suggestions that may result in enhanced benefits for the project. The primary purpose of the PPP report is as follows:

- To outline the PPP that was undertaken;
- To synthesise the comments and issues raised by the key stakeholders, I&APs and
- To ensure that the EIA process fully address the issues and concerns raised, if any.

Chapter 6, Regulation 39 through 44, of the April 2017 EIA Regulations stipulates the manner in which the PPP should be conducted as well as the minimum requirements for a compliant process. These requirements include but not limited to:

(a) Fixing a notice board at or on the fence of-

(i) The site where the activity to which the application relates is or is to be undertaken; and
(ii) A place conspicuous to the public at the boundary of the site

(b) Giving written notice to-

(i) The occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
(ii) The owners or persons in control of that land occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;
(iii) The municipal councillor of the ward in which the site and alternative site is situated and any organisation of rate payers that represent the community in the area;
(iv) The municipality which has jurisdiction in the area;
(v) Any organ of state having jurisdiction in respect of any aspect of the activity; and

(vi) Any other party as required by the competent authority;

(c) Placing an advertisement in-

(i) Two of the local newspapers within or around the proposed site; or

(ii) Any official gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of the Regulations.

8.1.1 PUBLIC PARTICIPATION PRINCIPLES

The principle of the Public Participation holds that those who are affected by a decision have the right to be involved in the decision-making process (i.e. the public's contribution will influence the decision). One of the primary objectives of conducting the PPP is to provide interested and affected parties with an opportunity to express their concerns and views on issues relating to the proposed project. The principles of public participation are to ensure that the PPP:

- Communicates the interests of and meet the process needs of all participants.
- Seek to facilitate the involvement of those potentially affected.
- Involves participants in defining how they participate.
- Is as inclusive and transparent as possible, it must be conducted in line with the requirements of regulation 39 - 44 of the April 2017 EIA Regulations.

8.1.2 APPROACH AND METHODOLOGY

The Public Participation approach adopted in this process is in line with the processes contemplated in Regulations 39 - 44 of the EIA Regulations of April 2017, in terms of the National Environmental Management Act, 1998 (Act 107 of 1998), which provides that Interested and Affected Parties (I&APs) must be notified and is as follows:

8.1.3 IDENTIFICATION OF INTERESTED AND AFFECTED PARTIES

I&APs identified include pre-identified stakeholders (government department), landowners and the general public. Notifications and request for comments were submitted to the following key stakeholders:

- National Department of Environmental Affairs;
- Western Cape Department of Environmental Affairs and Development Planning;
- National Department of Water and Sanitation;
- Western Cape Department of Transport and Public Works;
- Department of Water and Sanitation Bellville;
- South African Heritage Resource Agency;
- Wildlife and Environmental Society of South Africa;
- CapeNature;
- National Department of Water and Sanitation; and
- Saldanha Bay Local Municipality;
- West Coast District Municipality
- Heritage Western Cape

Notifications will be sent to various stakeholders by registered mail; email and any other legislated form of communication as appropriate.

8.1.4 PUBLIC PARTICIPATION DATABASE

Regulation 42 of GN R. 982 requires a register of I&APs be kept by the public participation practitioner. In fulfilment of this requirement, an I&AP database will be opened and will include registered I&AP contact details. Further, this register will be updated throughout the project cycle.

8.1.5 SITE NOTICES

A2 size site notices will be fixed at different conspicuous locations within and around the proposed project area such as the Saldanha Bay Local Municipality, Saldanha Library, and Main Entrance of Port of Saldanha etc. Further, A5 site notices will be distributed to members of the public within 100m of the boundary of the Port. Photographic evidence of placement of site notices and proof of distribution will be included in the Final BAR.

8.1.6 NOTIFICATION OF SURROUNDING LAND OWNERS / OCCUPIERS BY REGISTERED MAIL

Notification letters will be posted via registered mail to stakeholders. The purpose of the notices will be to inform them of the proposed project, afford them an opportunity to register as I&AP and also to invite them to comment or raise any issues pertaining to the proposed project.

8.1.7 PLACEMENT OF ADVERTISEMENT IN THE LOCAL NEWSPAPER

Two advertisements aimed at further informing the I&APs of the proposed activity will be placed on two newspapers as appropriate. . A 30 days period will be allowed for the public to submit their comments, issues and concerns.

8.1.8 PLACEMENT OF DRAFT BASIC ASSESSMENT REPORT FOR REVIEW COMMENTS

I&APs as well as the general public will be notified of the availability of the draft Basic Assessment Report (BAR) for review and comment via newspaper adverts, registered mail, emails and any other necessary mode of communication. Copies of the draft BAR will be placed at various accessible locations in and around the project site including the Nsovo Website. Further, copies of the draft BAR will be submitted to various Organs of State for review and comments including:

- National Department of Environmental Affairs (Including Oceans and Coast Section);
- Western Cape Department of Environmental Affairs and Development Planning;
- Department of Water and Sanitation, Bellville;
- West Coast District Municipality;
- Heritage Western Cape;
- South African Heritage resources Agency;
- Western Cape Department of Agriculture; and
- Cape Nature

8.1.9 PUBLIC MEETINGS

No public meetings have been held to date, however, should it be deemed necessary, meetings will be scheduled and this will be communicated with the I&APs.

8.2 A SUMMARY OF ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Comments, issues and concerns raised will be addressed accordingly and proof of this be submitted to the DEA.

9. DESCRIPTION OF THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE ALTERNATIVES FOCUSING ON THE GEOGRAPHICAL, PHYSICAL, BIOLOGICAL, SOCIAL, HERITAGE AND CULTURAL ASPECTS

This section outlines the socio-economic and biophysical environment that could be affected by the proposed development. Using the project description in Section 4 and knowledge of the existing environment, potential interactions between the project and the environment are identified below. The potential effects of the project on the human environment, socio-economic conditions, physical and cultural resources are included.

9.1.1 SOCIO-ECONOMIC DESCRIPTION

This section presents the socio-economic aspects of the proposed area focusing on the Province, Local Municipality and Districts of the proposed projects.

9.1.1.1 Provincial Description of the Proposed Project

The proposed upgrade will be undertaken in the Western Cape Province which is located on the southern tip of the African continent between the Indian and Atlantic Oceans, inland bordered by the Northern Cape and Eastern Cape Provinces. Refer to **Figure 4** below. The region is topographically and climatically diverse and it has a temperate southern coastline fringed with mountains. This province covers an area of 129 462km² and has a population of approximately 6 279 730. It is the fourth-largest province in South Africa by surface area and also ranks fourth in population. The capital city of the Western Cape is City of Cape Town and other towns include but not limited to George, Knysna, Paarl, Swellendam, Oudtshoorn, Stellenbosch, Worcester, Mossel Bay and Strand.

The Western Cape is divided into one metropolitan municipality (City of Cape Town Metropolitan Municipality) and five district municipalities. The five districts are further subdivided into 24 local municipalities.

Fishing is the most important industry along the west coast and sheep farming is the mainstay of the Karoo. The province has a well-established industrial and business base and the lowest unemployment rate in the country. Main

economic sectors such as finance, real estate, ICT, retail and tourism have shown substantial growth, and are the main contributors to the regional economy.

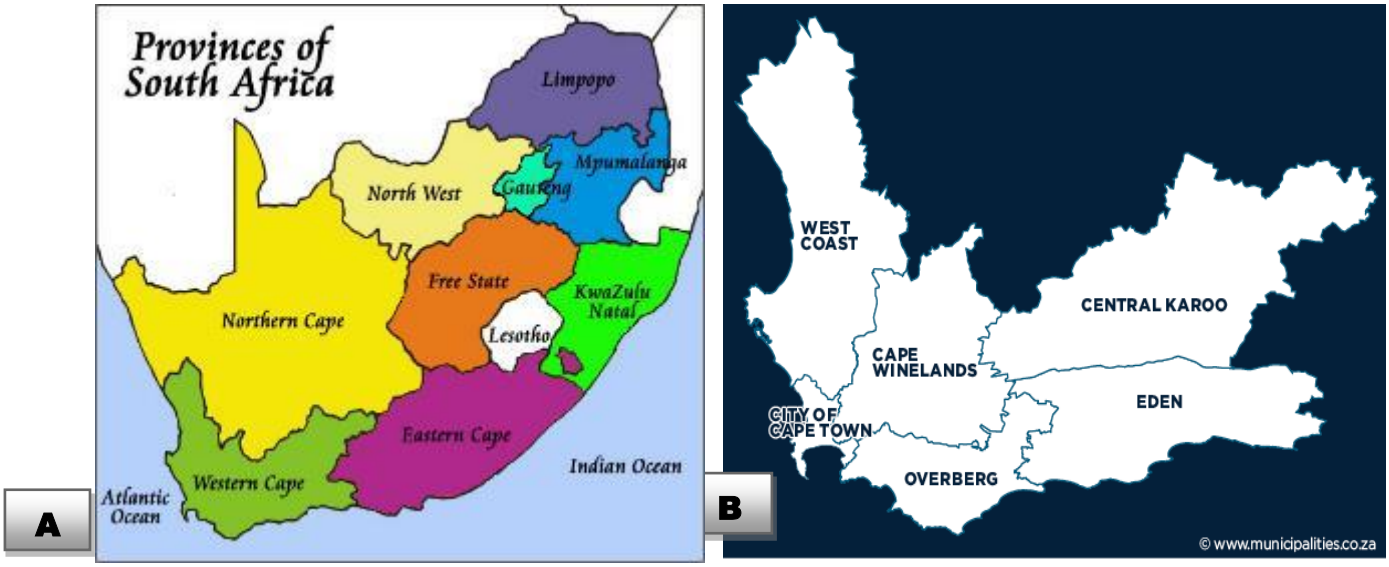

Figure 4: Photograph-A shows the provinces of South Africa while Photograph B shows districts of Western Cape

9.1.1.2 West Coast District Municipality

The West Coast District Municipality is a Category C municipality and is adjacent to the Namakwa District to the north and north-east, City of Cape Town to the south and Cape Winelands District to the south-east as depicted in **Figure 4B** above and **Figure 5** below. It is bordered by the Atlantic Ocean to the west. This district covers an area of approximately 13 124km² and is comprised of five local municipalities namely: Swartland, Bergrivier, Matzikama, Cedarburg, and Saldanha. The proposed project will be undertaken within the Saldanha Bay Local Municipality.

The major towns in the west coast district include Bitterfontein, Chatsworth, Citrusdal, Clan William, Langebaan, Lutzville, Malmesbury, River lands, Saldanha, St Helena Bay, Strandfontein, Vanrhynsdorp, Vredenburg and Vredendal.

The main economic sectors within the west coast district include the following:

- Finance, insurance, real estate and business services (24%);
- Manufacturing (18%);
- Agriculture, forestry and fishing (15%);
- Wholesale and retail trade, catering and accommodation (13%);
- General government (11%);

- Transport, storage and communication (9%);
- Construction (5%); and
- Community, social and personal services (4%).

Figure 5: Map showing the West Coast Local Municipalities

9.1.2 SALDANHA BAY LOCAL MUNICIPALITY

The Saldanha Bay Local Municipality is a Category B municipality located in the West Coast District, approximately 140km north of Cape Town. This local municipality covers the area of approximately 2 015km². The municipality is bordered in the north by Bergrivier, in the south by the West Coast National Park, which forms part of the West Coast District Management Area, in the east by Swartland, and in the west by the Bergrivier.

It is the smallest of the five local municipalities that make up the West Coast district, accounting for 6% of its geographical area. The major cities and/or towns within the municipality include the following: Hopefield, Jacobs Bay, Langebaan, Paternoster, Saldanha, St Helena Bay and Vredenburg.
The Main Economic Sectors of the Saldanha bay local municipality are finance, insurance, real estate and business services (31.7%), general government (17.7%), manufacturing (13.3%), wholesale and retail trade, catering and accommodation (10.1%), transport, storage and communication (9.3%), agriculture, forestry and fishing (7.9%), community, social and personal services (5.1%), construction (3.3%).

9.1.3 CLIMATIC CONDITIONS WITHIN THE STUDY AREA

The Saldanha Bay and surrounding area has a Mediterranean climate with maximum temperatures ranging between 20ºC and 30ºC. Rain falls predominantly in winter and the mean annual precipitation is approximately 330mm. The site receives low rainfall and winds are generally south-westerly during summer and north-easterly during the winter rainfall months. The highest rainfall occurs predominantly during May, June and July.

9.1.4 SURFACE WATER WITHIN THE STUDY AREA

The study area is surrounded by several sensitive areas such as NFEPA wetland and rivers. Furthermore, the wetlands include both artificial and natural. However, as shown in **Figure 6** below none of the NFEPA wetlands and rivers are present within the proposed study area. The NFEPA Rivers surrounding the study area are categorised as moderately modified rivers which include Bok River located within the western section which flows from the north to south entering the Saldanha Bay estuary. The entire proposed Port is situated within the Berg catchment whereby the Quaternary catchment is known as G10M.

The most sensitive area around the development site is the Langebaan Lagoon which is located south-east of the Port. A small RAMSAR site known as Marcus Island is situated close to the central point within the Saldanha Bay but far from the proposed study area.

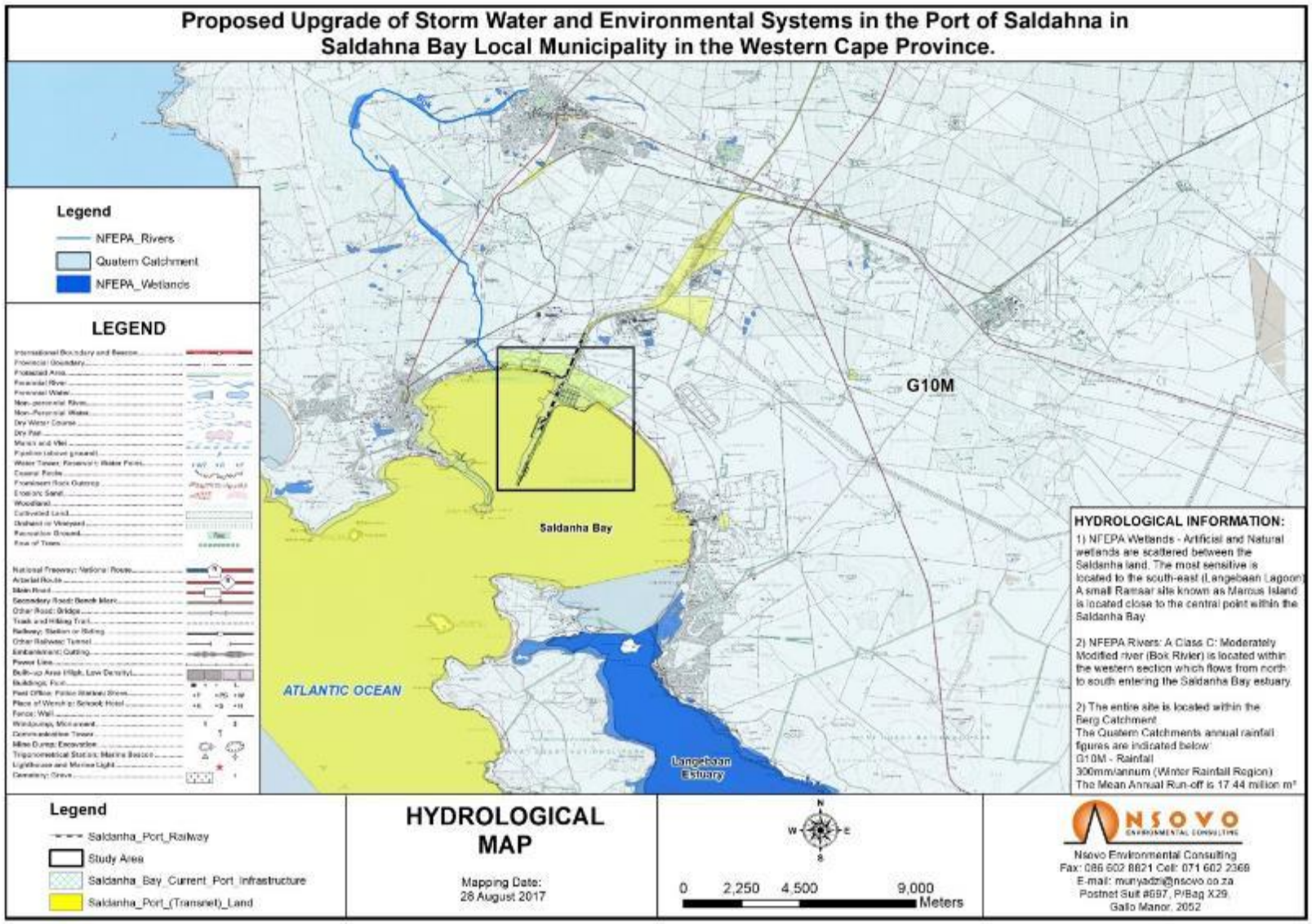

Figure 6: Hydrological map of the proposed area

9.1.5 VEGETATION

The Saldanha Bay lies within the Fynbos biome, which makes up a large proportion of the Cape Floristic Region. The CFR is internationally recognised as an area with extraordinarily high biodiversity and endemism. It is home to over 9000 vascular plant species, of which 69% are endemic. This highly diverse floral kingdom provides a diversity of different habitat types and abundant food resources, which in turn support diverse insect, mammal, bird and reptile communities. At least 70% of all the plant species in the Cape region do not occur elsewhere, and many have a very small range (these are known as narrow endemics). Habitat fragmentation is considered a major threat to the survival of such range of restricted species and is brought about by agricultural practices, urbanisation, industrialisation and the spread of invasive plants.

The specialist highlighted that The Vegetation Map of South Africa, Lesotho and Swaziland (SANBI 2012) shows the original distribution of southern African vegetation types. The naturally occurring vegetation types (i.e. the vegetation that would have historically covered the area) in the study area include (1) Saldanha Flats Strandveld, (2) Langebaan Dune Strandveld (3) Saldanha Lime Stone Strandveld (4) Cape Seashore Vegetation and (5) Cape Inland Salt Pans. The Saldanha Flats Strandveld vegetation type is listed as Endangered based on the latest available information and extends into the northern parts of the study site. The vegetation types are described by Rebelo et al. 2006 (in Mucina & Rutherford, 2006), which has been provided in alongside the threat status of each vegetation type on the Table below 7 and Figure 9 below:

Table 8: Threat status of the identified vegetation types within the study area (Anchor, 2017)

Vegetation Type	Description (Mucina and Rutherford 2006)	Threat Status
Saldanha Flats Strandveld	Sclerophyllous shrublands built of a sparse emergent and moderately tall shrub layer, with an open succulent shrub layer forming the undergrowth. With conspicuous displays of geophytes and annual herbaceous flora in spring	Endangered
Langebaan Dune Strandveld	Flat to slightly undulating old coastal dune systems and stabilised inland duneveld supporting closed, evergreen, up to 2 m tall, sclerophyllous shrubland with prominent annual herbaceous flora occurring in gaps (and forming spectacular displays, especially after good rain in late winter).	Least Threatened

Saldanha Lime Stone Strandveld	Slightly undulating ridges and steeper coastal slopes supporting low shrublands built of low succulent-stemmed and deciduous, fleshy leaved shrubs in deeper soils. Patches of prostrate, succulent-leaved dwarf shrubs and annual or geophytic herbs occupy cracks or shallow depressions in the exposed limestone.	Least Threatened
Cape Seashore Vegetation	Beaches, coastal dunes, dune slacks and coastal cliffs of open grassy, herbaceous and to some extent also dwarf-shrubby (sometimes succulent) vegetation, often dominated by a single pioneer species. Various plant communities reflect the age of the substrate and natural disturbance regime (moving dunes), distance from the upper tidal mark and the exposure of dune slopes (leeward versus seaward).	Least Threatened
Cape Inland Salt Pans	Small depressions dominated by low succulent scrub composed of creeping chenopods and salt-tolerant herbs and grasses. The saline Overberg alluvia are dominated by a low succulent shrub, *Sarcocornia mossiana*.	Least Threatened

The Saldanha Flats Strandveld vegetation type is listed as Endangered based on the latest available information and extends into the northern parts of Catchments 3. Proposed activities in the northern part of the Service Corridor (Catchment 3) include re-vegetation of bare soil to prevent erosion, which could have a localised positive impact on the endangered vegetation type provided that indigenous vegetation is used. This part of the study site is already highly disturbed and mainly consists of train tracks and adjacent service access roads. No activities have been proposed for the Dune Area (Catchment 5) as a whole.

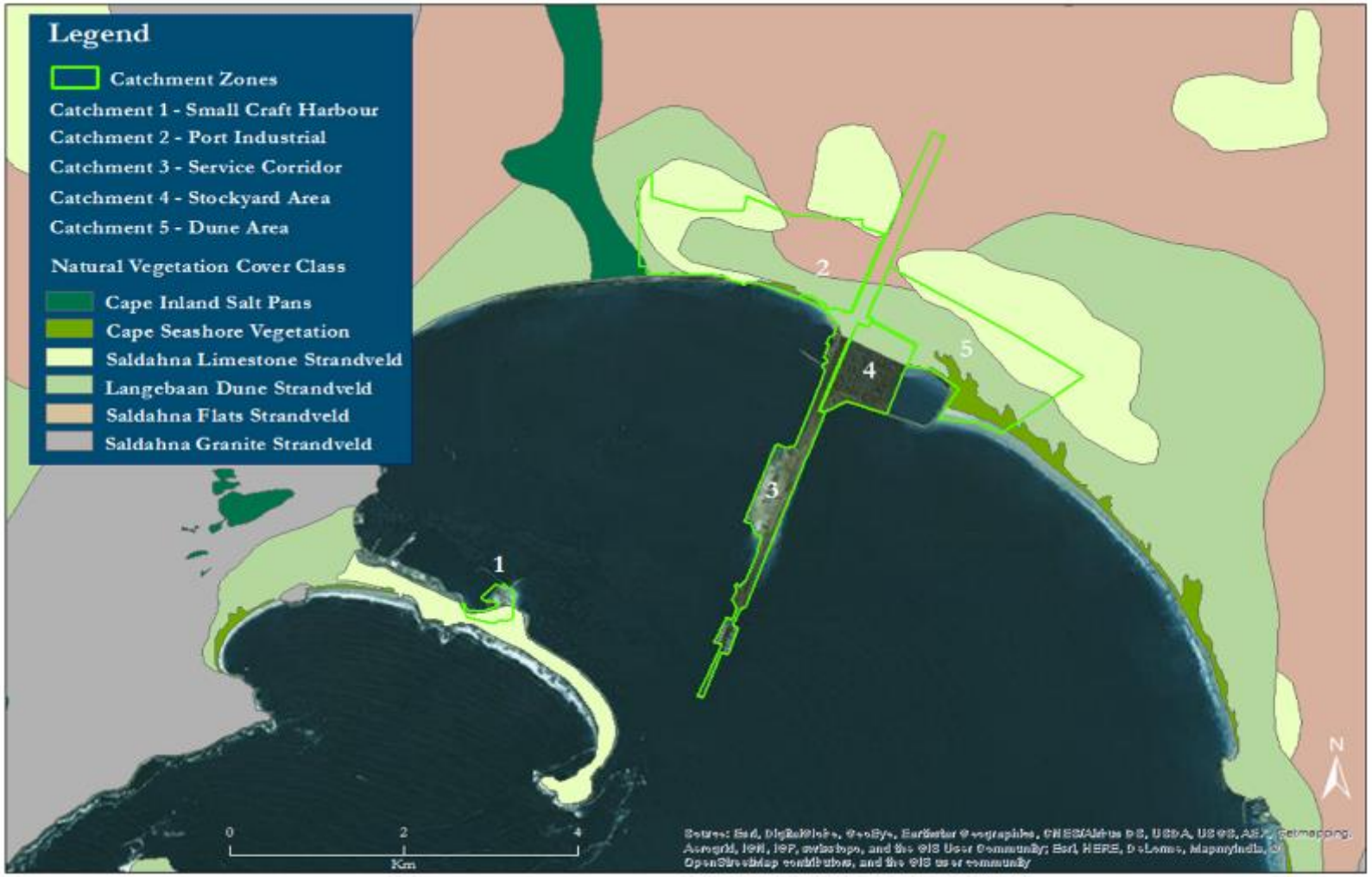

Figure 7: The National Vegetation Map 2012 for Saldanha Bay. The map shows that natural vegetation types occurring in the study area include the Cape Seashore Vegetation, Langebaan Dune Strandveld, Saldanha Limestone Strandveld, Saldanha Flats Strandveld, and a very small area of Cape Inland Salt Pans (Source: SANBI 2012) (Anchor, 2017)

The study area falls within the planning domain of the Western Cape Biodiversity Spatial Plan (WCBSP) for Saldanha Bay (CapeNature 2017), which includes Critical Biodiversity Areas (CBA) 1, CBA2, Ecological Support Areas (ESA) 1, Other Natural Areas (ONA), and Protected Areas (PA) as depicted in **Figure 8** below. Critical Biodiversity Areas are regarded as essential areas for the achievement of regional conservation targets and are designed to ensure minimum land take for maximum result (Maree & Vromans 2010). A large part of the study area (i.e. Catchments **1**, **3 and 4**) is artificial land (iron ore and Small Craft Harbour jetties) that remain highly disturbed and vegetation has not successfully established in these areas. Therefore, much of the affected area is of little conservation value; however, the north-western part of the study area falls within Critical Biodiversity Area 1, Ecological Support Areas and Other Natural Areas with large open areas of intact vegetation. The north-eastern part of the study site lies primarily within Critical Biodiversity Area 1 as depicted in **Figure 10** below but none of the proposed activities will occur within this area.

Figure 8: The Western Cape Biodiversity Spatial Plan (WCBSP) for Saldanha Bay. The map shows Critical Biodiversity Areas 1 and 2, Ecological Support Areas, Other Natural Areas and Protected Areas in relation to the study site (Catchments 1-5) (Source: CapeNature 2017).

9.1.6 AIR QUALITY AND POLLUTION

Air quality defined, includes noise and odour and addresses all sources of air pollution (i.e. point, area and mobile sources). Poor air quality does occur in Saldanha Bay Municipality due to major industrial activity primarily made up of iron, steel production as well as iron ore export (Saldanha Bay Municipality IDP, 2016). Monitoring of air quality in Saldanha Bay has revealed that air quality standards are exceeded on occasion. An Air Quality Management Plan for the Municipality has been developed to comply with the National Environmental Management: Air Quality Act, 39 of 2004 and more specifically, to provide guidance on Air Quality Management in the Saldanha Bay Local Municipality. The Plan identifies air pollution sources in the proposed locations as follows:

- Biomass burning (veld fires);
- Vehicle emissions;
- Waste treatment and disposal;
- Dust from infrastructural development;
- Dust from unpaved roads; and
- Other fugitive dust sources such as wind erosion of exposed areas.

The sources of air pollutants within the immediate proposed area are the operational areas. The emissions from these areas are likely to result in local areas of elevated concentrations of air pollutants. The motor vehicle congestion in holiday towns and along the R27 and R399 roads result in elevated ambient concentrations of particulates and Nitrogen Oxides (NO_2) at times.

9.1.7 HERITAGE

Investigation of past archaeological studies in the region, aerial photography and historical map, coupled with a site visit undertaken in August 2017 revealed that the development is proposed on an area where no archaeological sites, burial grounds or isolated artefacts can be found.

The proposed development is located on a reclaimed land from sea as depicted in the figure below; therefore, no land based archaeological artefacts or graves are expected. Furthermore, it should also be noted that the area proposed for the upgrade is highly disturbed by previous related excavation and preceding installation

of storm water management facilities. As a result, the possibility of impacts on any heritage features is highly unlikely and therefore negligible. Although the proposed project entails expansion of existing ponds which will require deeper excavations, it should be borne in mind that several archaeological studies (Hart 2007, Van Rooyen and Gertenbach 2007) had been conducted in the area, and none discovered any archaeological finds.

Figure 9: An overview of the historical topographical map of the area of the *Port* as indicated by the red arrow (Deeds: 3317BB, 1973). Note that the port had not been established during this era.

9.1.8 LOCAL OCEANOGRAPHY

This section provides the description of the local oceanography within and around the proposed study area.

9.1.8.1 Tides, current and temperature

The West Coast is subject to semi-diurnal tides, with each successive high (and low) tide separated by 12 hours. Tidal variation on the West Coast usually ranges between 0.28 m (relative to chart datum) at mean low water springs and 1.91 m at mean high water springs, with the highest and lowest astronomical tide being 2.25 m and 0.056 m respectively. During summer conditions from November to February, prevailing south-southwest (SSW) winds cause regional scale upwelling (Weeks *et al.* 1991a & b, Monteiro & Largier 1999).

In the winter from May to August, winds are gentle and blow predominantly from the north-northeast (NNE) (CSIR 2015).

Current strengths within Big Bay are moderate (10-20 $cm.s^{-1}$) and current direction within the main channels is dependent on the tidal state. Circulation patterns in Big Bay changed subtly with the construction of the ore jetty in 1975 with enhanced south-westerly currents occurring along the ore jetty (Weeks *et al.* 1991a). Construction of the ore jetty provided some protection from waves along the northern shore of Big Bay, resulting in a shore sheltered and semi-sheltered area (Hutchings & Clark 2016). Harbor construction has constrained water circulation within Small Bay, enhancing the general clockwise pattern and increasing current speeds along the boundaries, particularly the south-westward current flow along the iron ore/oil terminal (Weeks *et al.* 1991a). Small Bay is very sheltered from offshore swell (PRDW 2012).

9.1.8.2 Sediments

Sediments within Big Bay are mostly sandy (>95% on average in 2016 samples) with a small (on average <3%) mud fraction (Anchor 2015). The highest mud fraction in sediments occurred in the vicinity of the ore jetty and towards the center of the Bay. Organic matter and contaminants such as metals and organic toxic pollutants are predominantly associated with fine sediment particles such as mud. This is due to the fact that fine grained particles have a relatively larger surface area for the adsorption and binding of pollutants.

Saldanha Bay has fairly turbid water, due to both organic and inorganic particulates suspended in the water column (van Ballegooyen *et al.* 2012). Turbidity, particularly in Big Bay, generally peaks under strong wind and wave conditions (Hutchings & Clark 2016). Phytoplankton blooms and shipping movements have also been observed to cause significant increases in turbidity in the Bay. Average levels of Total Suspended Solids (TSS) in the Bay are in the order of 4.08 mg/l (± 2.69 mg/l SD) and peak at around 15.33 mg/l (Carter and Coles 1998), and variations in turbidity caused by these different driving forces are clearly demonstrated in Google Earth images (van Ballegooyen *et al.* 2012).

9.1.9 BIOGEOGRAPHY

Saldanha Bay falls within the Southern Benguela ecoregion, which is nested within the Southern Benguela ecoregion (Sink *et al.* 2012). This bioregion extends from Cape Agulhas northwards into Namibia. At a finer spatial scale, the Saldanha Bay - Langebaan Lagoon system falls within the South-Western Cape inshore

ecozone (Cape Point to Cape Columbine). This ecozone is a transition zone between the cooler Namaqua and warmer Agulhas inshore ecozones, and shares components of the biota from both neighboring ecozones. For most groups, marine species diversity decreases from east to west, whilst biomass increases. The presence of the large tidal Langebaan Lagoon, however, creates a unique habitat type, the only Lagoon habitat type recognized in the 2011 NBA (Sink *et al.* 2011). Due to ground water input, Langebaan Lagoon shares some characteristics with estuaries. Sun warming of nutrient rich waters creates a unique, productive and sheltered habitat with refuge for marine species more usually associated with estuaries or marine habitats in the Agulhas inshore ecozone. The 2011 NBA included the aquatic area surrounding Schaapen and Meeu Islands within Langebaan Lagoon, and the entire Lagoon habitat is rated as vulnerable.

9.1.10 ECOLOGY

This section provides the description of the ecology which is found within and around the study area including rocky shore, sandy beaches, fish and birds.

9.1.10.1 Rocky shores and sandy beaches

The Saldanha Bay-Langebaan Lagoon system has both rocky shores and sandy beaches, which support fauna and flora typical of the cold west coast. Exposed and semi-exposed rocky shores tend to be dominated by the alien mussel *Mytilus galloprovincialis* and the alien barnacle *Balanus glandula* (Robinson *et al.* 2007), while algae are more prolific on sheltered shores). Sandy shores within Big Bay are predominantly exposed to high degrees of wave action and tend to support a lower diversity and biomass of organisms than the sheltered shores within the Lagoon. Although the system is entirely marine, estuarine species such as the common sand prawn (*Callichirus kraussi*) and the estuarine mudprawn (*Upogebia africana*) occur. Beds of the sea grass *Zostra capensis* are distributed intermittently over the sand flats, and provide habitat for the rare limpet *Siphonaria compressa* (Angel *et al.* 2006). Fifty-two species typical of semi-exposed rocky shores along the West Coast have been recorded on rocky shores in Saldanha Bay (Anchor 2015).

Figure 10: Rocky shore sites in Saldanha Bay dominated by the alien mussel Mytilus galloprovincialis (Anchor 2015).

9.1.10.2 Benthic Macro fauna

Sub tidally, the nutrient rich waters of the Saldanha Bay - Langebaan Lagoon system support an abundant and diverse benthic macro faunal community on soft sediment habitats. Approximately 80 macro faunal species are regularly found within the system, with in faunal abundance in Small Bay averaging around 1 500 individuals/m^2 and biomass around 900 g/m^2 (Anchor 2015, 2016). Benthic macro faunal communities have remained relatively stable over time (Anchor 2015, 2016). However, extensive dredging activities undertaken during 2007 and early 2008 appear to have had bay-wide impacts on the macro benthic community structure, resulting in a temporary loss of less tolerant species and a shift in community composition to one dominated by more tolerant species (Anchor 2015). The hardier filter feeders such as the prawn *Upogebia capensis* were abundant in both Big Bay and Small Bay, but the more sensitive filter feeders such as the amphipods *Ampelisca spinimana* and *A. anomala*, the mollusc *Macoma odinaria* and the polychaete *Sabellides luderitzi* were notably more abundant in Big Bay than Small Bay. Similarly, the sea pen *Virgularia schultzei*, widely regarded as a sensitive species was found only in Big Bay (Anchor 2015). This species was reportedly very abundant in Saldanha Bay prior to port development but is now completely absent from Small Bay and is rare in Big Bay (Anchor 2015).

Biological indicators, such as species abundance, biomass and diversity, provide a direct measure of the state of the ecosystem in space and time. Benthic macro fauna is the biotic component most frequently monitored to detect changes in the health of a marine environment as they are short lived and their community composition responds rapidly to environmental change (Warwick 1993). They also tend to be directly affected by pollution, are easy to sample quantitatively (Warwick 1993), and are scientifically well-studied compared to other sediment-dwelling components. Variations in species diversity (represented by the Shannon Weiner Index, H') for Saldanha Bay, and Langebaan Lagoon in 2015 are presented in (Anchor, 2015). Diversity was

intermediate in Big Bay and lowest around the IOT. Poor diversity is most likely attributable to the higher levels of disturbance, mainly dredging, and a high proportion of mud in the sediment. High levels of disturbance associated with pollution can allow a small number of opportunistic, short-lived r-selected species to colonize the affected area and prevent a more diverse community comprising longer living k-strategist species from becoming established.

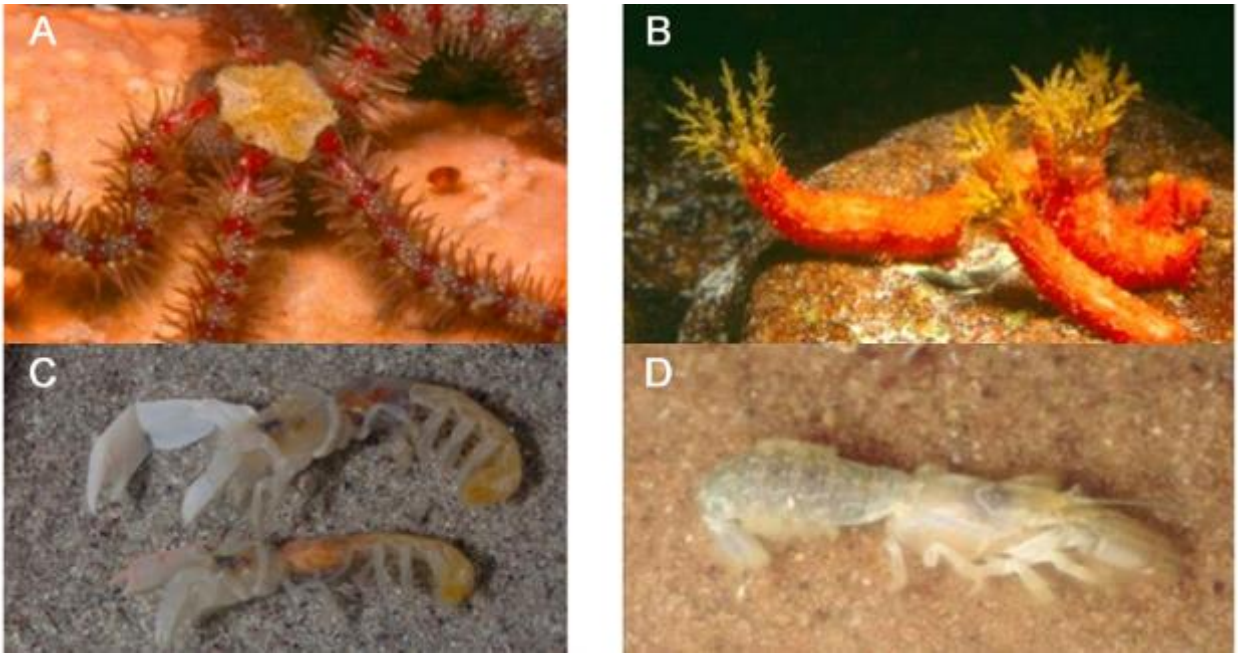

Figure 11: Benthic macro fauna species frequently found in Saldanha Bay include: –Brittlestars (A), Sea cucumbers (B) and X prawns (C and D).

9.1.10.3 Alien and invasive species

At least 28 confirmed marine alien species have been recorded from Saldanha Bay and/or Langebaan Lagoon (Anchor 2015). Most of the introduced species in South Africa have been found in sheltered areas such as harbours, and are believed to have been introduced through ballast water discharge or hull fouling (Griffiths *et al.* 2008). Invasive species include the Mediterranean mussel (*Mytilus galloprovincialis*), the European green crab (Carcinus maenas) (Griffiths *et al.* 1992, Robinson *et al.* 2005), the acorn barnacle Balan*us glandula* (Laird and Griffiths 2008), and the Pacific South American mussel (*Semimytilus algosus*) (de Greef *et al.* 2013)

Mytilus occurs mainly on exposed rocky shores in Saldanha Bay (i.e. North Bay, IOT, Marcus Island and Lynch Point) and is present in low numbers at the more sheltered sites. Populations grew fairly rapidly in the

period 2005 until 2012/2013 at most exposed sites, after which populations stabilized. This mussel is by far the most dominant faunal species on the rocky shore and covers 100% of the available space across substantial portions of the shore at some sites. It reaches its highest densities low on the shore in areas exposed to high wave action. No live European green crab specimen has been found in Saldanha Bay, but a single dead specimen was picked up by Robinson *et al.* (2004) in Small Bay at the Small Craft Harbor. Due to a lack of specimens, it is unlikely that there is an extant population in Saldanha Bay at present. Abundance of the acorn barnacle was very high when it was first detected in 2010 but has been declining at most sites except at the IOT. The Pacific South American mussel is usually present only on wave exposed shores, although in Saldanha Bay it has been observed on the ropes at mussel farms.

9.1.10.4 Fish

Due to the sheltered nature of Saldanha Bay and the abundance of nutrients as a result of upwelling, the area is an important nursery ground for a variety of fish species. There is considerable life history and tagging evidence that populations of key fishery species, namely hound sharks, white stumpnose, steentjies and elf, are resident within the Saldanha Bay-Langebaan Lagoon system and comprise semi-isolated, largely self-recruiting populations (Kerwath *et al.* 2009, Tunley *et al.* 2009, Attwood *et al.* 2010, Hedger *et al.* 2010, da Silva *et al.* 2013). The shallow surf zone areas around the periphery of Saldanha Bay are especially important, thus designated areas within the Langebaan Lagoon are closed to fishing.

Monitoring of fish populations in Saldanha Bay was initiated by means of experimental seine-netting in 1986. Surveys undertaken in 2011 recorded good recruitment of harders (*Liza richardsonii*), white stumpnose (*Rhabdosargus globiceps*), gobies (*Caffrogobius* sp.) and silversides (*Atherina breviceps*) in Big Bay (Anchor 2012a). In Small Bay, however, where commercially important species such as white stumpnose have traditionally been most abundant, there were clear signs of decline (Anchor 2012a).

9.1.10.5Birds

Saldanha Bay, Langebaan Lagoon and the associated islands provide important shelter, feeding and breeding habitat for at least 53 species of seabirds, 11 of which are known to breed on the islands of Malgas, Marcus, Jutten, Schaapen and Vondeling (Anchor 2015). These islands support important breeding colonies of African penguins (*Spheniscus demersus*), Cape gannets (*Morus capensis*), Cape cormorants (*Phalacrocorax capensis*), bank cormorants (*Phalacrocorax neglectus*), white-breasted cormorants (*Phalacrocorax carbo lucidus*), crowned cormorants (*Phalacrocorax africanus*), kelp gulls (*Larus dominicanus*), Hartlaub's gulls (*Larus hartlaubii*) and swift terns (*Sterna bergii*) (Anchor 2006). The African

penguin, Hartlaub's gull, Cape bank cormorant and crowned cormorant are endemic to the Benguela region. The rocky shore environment supports the endemic African black oystercatcher (*Haematopus moquini*), a population which is successfully recovering from low numbers; while the tidal flats of the Lagoon support large numbers of migrant waders during the summer months (Summers 1977). The IUCN lists African penguins, Cape cormorants, and Bank cormorants as "endangered" species; oyster catchers and crowned cormorants as "near threatened"; and Cape gannets as "vulnerable" (IUCN 2017). Most of these species is piscivorous and depends largely on a healthy population of fish for sustenance.

Over 67 species of water birds have been recorded in the Langebaan Lagoon system (Anchor 2006). Thousands of migratory waders visit Langebaan Lagoon during the austral summer, making it the most important 'wintering' area for these birds in South Africa (Underhill 1987). Since Langebaan Lagoon regularly supports over 20 000 waders, it is recognised as an internationally important site under the RAMSAR Convention on Wetlands of International Importance to which South Africa is a signatory.

9.1.10.6 Sea farm dam

An artificial rocky breakwater encloses a 25 hectare, coffer dam (Seafarm Dam, or the "oyster pond") at the base of the ore jetty that was created during the existing oil pipeline construction. The average depth of seawater in the dam is approximately 4m and it is connected to the sea via a pipe that allows for limited tidal fluctuation (about 10 cm). The complete infilling of Sea farm dam is planned (PRDW 2010). Since 1984, Sea farm dam has been used intensively for shellfish mariculture, but production ceased in the early 2000s due to continual harmful blooms of the invasive algae *Aureococcus anophagefferens* (Probyn *et al*. 2001, 2010).

The biophysical environment within Sea farm dam is distinct from the surrounding Big Bay, due to the limited exchange of water through the pipeline. Sea farm water is characterized by reduced oxygen and nitrate concentrations and elevated temperature, ammonia and phosphate levels (Brown *et al*. 1983, Wells 1989, Rundgren 1989). The Sea farm biological community is composed of dinoflagellate phytoplankton, rotifers, sea hares, cultured black mussels and oysters (Brown *et al*. 1983). Blood worm *Arenicola loveni* are reportedly abundant in the shallow sandy areas of the dam, whilst fish species included most of those found within the surrounding bay. The Sea farm dam was for several years a popular bait collecting and shore angling site during the 1990s, but public access has since been closed.

The sandy shore adjacent to Sea farm dam is the most sheltered part of the Big Bay shoreline. No data exists on the sandy beach macrofauna inhabiting this beach, but the biota is likely to be similar to that found on

sandy shores in Small Bay with comparable levels of wave exposure. This sheltered beach is used by gulls, common terns, White breasted and Cape cormorants as a roosting site.

10. METHODOLOGY FOR ASSESSING SIGNIFICANCE OF POTENTIAL IMPACTS

The assessment of impacts is largely based on the Department of Environmental Affairs and Tourism's (1998) Guideline Document: Environmental Impact Assessment Regulations. The assessment will consider impacts arising from the proposed activities of the project both before and after the implementation of appropriate mitigation measures.

The impacts are assessed according to the criteria outlined in this section. Each issue is ranked according to extent, duration, magnitude (intensity) and probability. From these criteria, a significance rating is obtained, the method and formula is described below. Where possible, mitigation recommendations have been made and are presented in tabular form.

The criteria given in the tables below will be used to conduct the evaluation. The nature of each impact will be assessed and described in relation to the extent, duration, intensity, significance and probability of occurrence attached to it.

Table 9: Methodology used in determining the significance of potential environmental impacts

Status of Impact The impacts are assessed as either having a: negative effect (i.e. at a `cost' to the environment), positive effect (i.e. a `benefit' to the environment), or Neutral effect on the environment. **Extent of the Impact** (**1**) Site (site only), (**2**) Local (site boundary and immediate surrounds), (**3**) Regional (within the City of Johannesburg), (**4**) National, or (**5**) International. **Duration of the Impact** The length that the impact will last for is described as either: (**1**) immediate (<1 year)

(**2**) short term (1-5 years),
(**3**) medium term (5-15 years),
(**4**) long term (ceases after the operational life span of the project),
(**5**) Permanent.

Magnitude of the Impact
The intensity or severity of the impacts is indicated as either:
(**0**) none,
(**2**) Minor,
(**4**) Low,
(**6**) Moderate (environmental functions altered but continue),
(**8**) High (environmental functions temporarily cease), or
(**10**) Very high / Unsure (environmental functions permanently cease).

Probability of Occurrence
The likelihood of the impact actually occurring is indicated as either:
(**0**) None (the impact will not occur),
(**1**) improbable (probability very low due to design or experience)
(**2**) low probability (unlikely to occur),
(**3**) medium probability (distinct probability that the impact will occur),
(**4**) high probability (most likely to occur), or
(5) Definite.

Significance of the Impact
Based on the information contained in the points above, the potential impacts are assigned a significance rating (**S**). This rating is formulated by adding the sum of the numbers assigned to extent (**E**), duration (**D**) and magnitude (**M**) and multiplying this sum by the probability (**P**) of the impact.
S=(E+D+M)P

The significance ratings are given below
(**<30**) low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
(**30-60**) medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
(**>60**) high (i.e. where the impact must have an influence on the decision process to develop in the area).

11. DESCRIPTION OF THE ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS INCLUDING CUMULATIVE IMPACTS IDENTIFIED

This section describes the potential impacts that the proposed project may pose on the receiving environment. Impacts associated with the relevant environmental components within the study area as identified, have been assessed based on the consultant's opinion in consideration of the site and previous experience on similar undertakings as well as consultation with specialist studies.

11.1 POTENTIAL ENVIRONMENTAL IMPACTS IDENTIFIED

Potential environmental impacts identified for the proposed development are described in **Table 10** below**.**

Table 10: Potential Environmental Impact Identified

Issue	Rating	Description
Employment	Positive-No mitigation required	Job creation and investments into the project will result in opportunities during the planning and design phase. This impact will typically be limited to skilled engineers and planning professionals. Proposed project will result in very limited opportunities to the skilled local community during the construction phase. This impact will be positive and provincial in extent.
Air Pollution	Neutral	Potential air pollutant during construction may be dust emanating from site preparation and excavations during the construction phase. Given the nature and magnitude of the proposed project, it is anticipated that before mitigation the impact will be local in extent, and short term. Mitigation measures such as dust suppression can reduce the impact to become site specific.
Terrestrial Biodiversity	Negative and Positive	Potential negative impacts on terrestrial biodiversity that may arise as a result of the proposed development during the construction phase include: • Loss of vegetation although minimal; and • Loss of ecological processes associated with the loss of vegetation. Positive impacts associated with the proposed development include: • Rehabilitation of erosion-prone areas; and • Diversion of contaminated storm water away from remaining natural areas.

Issue	Rating	Description
Marine Biodiversity	Negative	Potential impacts on marine biodiversity that may arise during the construction phase include: • Temporary loss of artificial concrete habitat; • Possibility of increased noise and vibration; • Mobilisation of contaminants in terrestrial sediments through construction activities and subsequent run-off into the Bay; • Generation and disposal of waste; and • Possibility of spillage of hazardous substances.
Noise and vibration	Negative	In South Africa, the assessment of noise levels in the environment is governed by the South African Bureau of Standards (SABS) noise standard 0103 – 'The measurement and rating of environmental noise with respect to annoyance and to speech communication' (SABS 1994). Additional SABS standards cover the measurement of noise over different distances from the source (SABS 0357 – 'The calculation of sound propagation by the Concave method'), and standards for different sectors (e.g. industry). During construction operations, noise may have an impact on marine organisms in the Port. Noise may be generated by construction activities (e.g. earthmoving vehicles, service vehicles, vessels, cranes, heavy machinery, generators, chopping, drilling, grinding etc.). Marine invertebrates have been shown to be relatively insensitive to low frequency sound, whilst fish appear to be able to tolerate moderate sound levels. Foraging seabirds and cetaceans are expected to avoid the sound source should it reach levels sufficient to cause discomfort. Due to the existence of similar habitats within the Bay, it is not expected that avifauna will be excluded from feeding on a particular food source.

Issue	Rating	Description
		As a precautionary measure, mobile equipment, vehicles and power generation equipment should be subject to noise tests which are measured against manufacturer specifications to confirm compliance before deployment on site. Noise emissions from mobile and fixed equipment should be subject to periodic checks as part of regular maintenance programmes to allow for detection of any unacceptable increases in noise. After mitigation is considered, the impact of noise and vibration on the marine environment is considered to be 'insignificant'.
Waste	Negative	South Africa has laws against littering, both on land and in the coastal zone; however, these laws are seldom rigorously enforced. Objects which are particularly detrimental to marine fauna include plastic bags and bottles, pieces of rope and small plastic particles. Large numbers of marine organisms are killed or injured daily by becoming entangled in debris or as a result of the ingestion of small plastic particles (Wallace 1985, Gregory 2009, Wright *et al*. 2013). If allowed to enter the ocean, solid waste may be transported by currents for long distances out to sea and around the coast. Thus, unlike fuel or sewage contamination, the extent of the damage caused by solid waste is potentially large. The impact of floating or submerged solid materials on marine life (especially seabirds, cetaceans and fish) can be lethal and can affect rare and endangered species. The problem of litter entering the marine environment has escalated dramatically in recent decades, with an ever-increasing proportion of litter consisting of non-biodegradable plastic materials. In order to reduce this, all domestic and general waste generated must be disposed of responsibly. All reasonable measures must

Issue	Rating	Description
		be implemented to ensure there is no littering and that construction waste is adequately managed. Staff must be regularly reminded about the detrimental impacts of pollution on marine species and suitable handling and disposal protocols must be clearly explained and sign boarded. The 'reduce, reuse, recycle' policy must be implemented. This impact is rated as 'medium' without mitigation and is reduced to 'low' by implementing the actions outlined
Soil Erosion	Negative	Movement of heavy machinery across the land as well as vegetation clearance may cause destabilisation of soils which then become susceptible to erosion. Continuous movement of vehicles over the land during the construction phase may leave it susceptible to erosion.
Heritage	Neutral	Investigation of past archaeological studies in the region, aerial photography and historical map, coupled by a site visit revealed that the development is proposed on an area where no archaeological sites, burial grounds or isolated artefacts can be found. On that note, the heritage specialist thus recommended that the project be exempted from any archaeological assessment studies, since the landscape is severely degraded for any archaeological site/and or artifact to be found.
Hazardous substances	Negative	The risk of spillage of a variety of hazardous substances may occur during the use of heavy machinery, construction vehicles and construction vessels. For example, spillage may occur as a result of fuel leaks, refueling, or collision. Hydrocarbons are toxic to aquatic organisms and precautions must be taken to prevent them from contaminating the marine environment. This impact can be mitigated successfully if the contractor implement a rigorous environmental management and control plan to limit ecological risks from accidents. All fuel and oil must be stored with adequate spill protection and no leaking vehicles should be permitted on

Issue	Rating	Description
		site. Intentional disposal of any substance into the marine environment is strictly prohibited, while accidental spillage must be prevented, contained and reported immediately. After mitigation, the impact of accidental spillage is considered to be 'very low'.
Ecological impacts of the containment of contaminated storm water runoff	Positive	Trace/heavy metals are often regarded as pollutants of aquatic ecosystems. However, they are naturally occurring elements, some of which (e.g. copper and zinc) are required by organisms in considerable quantities (Phillips 1980). Aquatic organisms accumulate essential trace metals that occur naturally in water as a result of, for example, geological weathering. All of these metals, however, have the potential to be toxic to living organisms at elevated concentrations (Rainbow 1995). Human activities greatly increase the rates of mobilization of trace metals from the earth's crusts and this can lead to increases in their bioavailability in coastal waters via natural runoff and pipeline discharges (Phillips 1995). Dissolved metal concentrations in water are typically low (presenting analytical problems), have high temporal and spatial variability (e.g. with tides, rainfall events etc.) and most importantly reflect the total metal concentration rather than the portion that is available for uptake by aquatic organisms (Rainbow 1995). There is an increasing global trend to monitor the long term effects of water quality by assessing impacts on specific marine species or species assemblages. Mussels and oysters (i.e. filter feeding organisms) are considered to be good indicator species for the purpose of monitoring water quality as they tend to accumulate trace metals, hydrocarbons and pesticides in their flesh. Mussels are sessile organisms (anchored in one place for their entire life) and will be affected by both short-term and long-term trends in

Issue	Rating	Description
		water quality. Monitoring the contaminant levels in mussels can therefore provide an early warning of poor water quality and dramatic changes in contaminant levels in the water column.
Surface and Groundwater Pollution	Neutral	The impact on water quality, if any, could be sedimentation, decrease in quality and possible contamination of surface water and groundwater. This could result from fuel spillages, sewer systems, liquid waste, etc. An increased volume of storm water runoff, peak discharges, and frequency and severity of flooding is therefore often characteristic of transformed catchment. The impact on water is site specific but can be local or regional if proper measures are not put in place. This proposed project will include an application for a Water Use Licence with DWS considering that some of the proposed activities trigger section 21(g) of the National Water Act.
Climate	Neutral	Local climate conditions are not of a significant concern to the proposed project. In a broader scale the project will have no impact on the local and/or global climate change.
Traffic	Negative	Construction material and equipment will be delivered to the site during the construction phase, it is therefore expected that traffic will be negatively impacted especially on the R27 and R399.

11.2 IMPACT RATING

This section presents the assessment anticipated impacts of the proposed project as well as mitigation measures. Identified impacts for the proposed Controlled Discharge alternative are similar to the Zero Discharge and they include the following impacts:

Pre-construction Phase

- Employment opportunities

Construction Phase:

- Marine Biodiversity
- Terrestrial biodiversity;
- Archaeology and cultural heritage;
- Hydrological;
- Noise and vibration; and
- Generation of waste.

Although some of the identified negative impacts such as the impacts on terrestrial biodiversity were rated very high they can be reduced to low with mitigation in place. Nonetheless the rest of the impacts are rated low and manageable.

The rehabilitation of erosion-prone areas by repairing erosion runnels and re-vegetating where possible has been identified as a positive impact of high significance.

Operational Phase

The proposed upgrade will result in proper diversion of contaminated storm water away from remaining natural areas; which is a positive impact of high significance.

NO-GO ALTERNATIVE

The Impact identified for the no-go option includes the following:

- A negative impact of high significance was identified; it relates to the ecological effects as a result of loss of intact habitat as a result of uncontrolled storm water runoff.
- The ecological condition of the site is more likely to become more degraded and transformed under the 'No Go' scenario this impact is negative and of high significance.

Table 11: Impact ratings associated with the proposed project

Potential impacts of the project	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
11.2.1 NOISE AND VIBRATION							
Noise may be generated by construction activities (e.g. earthmoving vehicles, service vehicles, generators drilling etc.). It is expected that this noise may have an impact on marine organisms at the Port. Given the ambient noise level at the Port, expected noise levels as a result of the proposed development will be of low significance with proper mitigation.							
Increased noise and vibration	No	Negative	1	2	4	3	**21= Low**
	Yes	Negative	1	2	2	2	**10= Low**
Mitigation Measures							
• Ensure that all construction equipment is well serviced as per the manufacture's manual throughout the construction phase. • The requirements of the Western Cape Noise Control Regulations (Provincial Notice 200/2013) of 20 June 2013 must be adhered to.							
11.2.2 TEMPORARY LOSS OF ARTIFICIAL HABITAT (MARINE BIODIVERSITY)							
An artificial intertidal zone exists on quay structures at the Iron Ore Terminal (IOT) and these are colonized by a number of intertidal invertebrate fauna and flora (e.g. mussels, barnacles, crabs, sea lettuce), which characterize much of the intertidal habitat in Small Bay. Although existing intertidal, sub tidal and terrestrial habitat may be altered, similar habitat will exist after construction. Since this disturbance will not result in a net loss of habitat and since the existing habitat is artificial, the significance of this impact is rated as 'very low' and no mitigation is required.							
Impacts on habitat	Yes	Negative	1	3	4	2	16=Low
	No	Negative	1	2	2	2	10=Low
Mitigation Measures							

Potential impacts of the project	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• Only vegetation within the immediate construction footprint must be cleared.							
11.2.3 IMPACT OF WASTE GENERATION AND DISPOSAL							
The proposed development will entail cleaning of waste within the existing ponds within the Port; which is classified as waste containing iron ore which will be disposed of at a registered waste disposal site. Further, construction waste is expected which could similarly impact marine environment as large numbers of marine organisms are killed or injured daily by becoming entangled in debris or as a result of the ingestion of foreign particles. This impact is rated as 'medium' without mitigation and is reduced to 'low' with proper mitigation.							
Generation of waste	No	Negative	2	4	6	3	36 = Medium
	Yes	Negative	1	3	4	2	16= Low
Mitigation Measures							
• Inform all staff about sensitive marine species and the responsible disposal of construction waste. • Suitable handling and disposal protocols must be clearly explained and sign boarded. • All domestic and general waste generated must be disposed of responsibly. • All reasonable measures must be implemented to ensure there is no littering and that construction waste is adequately managed. • Staff must be regularly reminded about the detrimental impacts of pollution on marine species and suitable handling and disposal protocols must be clearly explained and sign boarded. • The 'reduce, reuse, recycle' policy must be implemented where possible.							

Potential impacts of the project	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
11.2.4 THE EFFECT OF THE SPILLAGE OF HAZARDOUS SUBSTANCES ON MARINE BIOTA							
The risk of spillage of a variety of hazardous substances may occur during the use of heavy machinery, construction vehicles and construction vessels as a result of fuel leaks, refueling, or collision. Hazardous substances could impact negatively on soil and water resources thus affecting aquatic organisms due to their toxic nature. This impact is of medium significance without mitigation and can be reduced low with proper mitigation measure.							
Hazardous substance impacts	Yes	Negative	2	3	6	3	**33 = Medium**
	No	Negative	2	2	4	2	**16= Low**
Mitigation Measures							
• Ensure that stringent waste management practices are in place at all times. • Maintain high safety standards and employ "good housekeeping" practise that incorporate plans for emergencies. • Use drip trays where leaks are likely to occur. • Accidental diesel and hydrocarbon spills must be cleaned up accordingly. • Collect and dispose of polluted soil at registered hazardous waste disposal site.							
11.2.5 POTENTIAL GROUNDWATER CONTAMINATION CAUSED BY CONSTRUCTION ACTIVITIES							
Geo-hydrology	No	Negative	Local	Short term	Moderate	Low	Low
	Yes	Negative	Site	Short Term	Minor	improbable	Low
Mitigation Measures							

Potential impacts of the project	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
• Place drip trays under stationary machinery, only re-fuel machines at the temporary fuelling station, install temporary structures to trap fuel spills at the temporary fuelling station. • Immediately clean oil and fuel spills and dispose of contaminated material (soil, etc.) at licensed sites only. • Equip the site with sufficient ablution facilities. Secure chemical toilets to ensure that they do not blow over in windy conditions. • Do not release any pollutants, including sediment, sewage, cement, fuel, oil, chemicals, hazardous substances, waste water, etc., into the environment. • Compile a procedure for the storage, handling and transport of different hazardous materials and ensure that it is strictly adhered to. • Ensure vehicles and equipment are in good working order and drivers and operators are trained with respect to actions to be taken in the case of a fuel spill or leak. • Ensure that good housekeeping rules are applied.							
11.2.6 OPERATIONAL IMPACTS							
The proposed upgrade of storm water systems will result in contained storm water runoff thus positive environmental impacts are expected. • The operational phase of the proposed development will yield positive impacts on the marine environment as the current state of the system will improve. • The proposed upgrade will result in proper diversion of contaminated storm water away from remaining natural areas; which is a positive impact of high significance. • Compliance to the recommendation of the SWMP (2013) in terms of planning for the 1:50 000 flood line as well as alignment to best practice. • Resolve the current storm water challenges experienced within the Port. The significance of the identified positive impact is rated as 'high'.							

Potential impacts of the project	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Operational	No	Positive	3	4	10	4	68=High
Mitigation measures							
• Proper maintenance plan to ensure effective operation • Regular Compliance Monitoring by the authorisation holder.							

11.3 GENERAL CUMULATIVE IMPACTS

Cumulative impacts in relation to an activity, means the past, present and reasonably foreseeable future impacts of an activity, considered together with the impacts of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities (DEA, 2014 EIA Regulations).

This section provides cumulative impacts ratings associated with the proposed project which include the waste generation, socio-economic, traffic, noise and vibration. It also outlines the mitigation measures of each rated cumulative impacts as follows:

11.3.1 SOCIO-ECONOMIC IMPACT

The proposed containment of storm water will be undertaken within the Port; however it benefits the large oceanic environment.

Aspect	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Socio-economic	**No**	**Positive**	**3**	**2**	**8**	**5**	**65=High**

Corrective Actions	• No mitigation measures required since is a positive impact.

11.3.2 TRAFFIC IMPACT

During the construction phase, increased heavy vehicle traffic should be expected. Without management, such increased traffic loads may negatively impact existing traffic flow. Further unmanaged construction vehicles may decrease road safety for other road users and uncontrolled movement of construction vehicles may result in unnecessary impacts to the environment through vegetation and habitat destruction. The traffic impacts ratings and mitigation measures associated with the proposed project presented in the table below as follows.

Aspect	**Corrective measures**	**Impact rating criteria**					**Significance**
		Nature	**Extent**	**Duration**	**Magnitude**	**Probability**	
Traffic	**No**	**Negative**	1	2	4	3	**21= low**
	Yes	**Negative**	1	2	2	2	**10= low**
Corrective Actions	• The delivery of construction material and equipment should be limited to hours outside peak traffic times (including weekends) prevailing on the surrounding roads where possible; • Existing access roads must be used; and • Delivery vehicles must comply with all traffic laws and bylaws.						

12. UNDERTAKING UNDER OATH OR AFFIRMATION BY THE EAP

In undertaking the draft and final BAR phases of the project the EAP will take into consideration the requirements stipulated in the EIA Regulation of December 2014 as amended, as well as other relevant Acts and Regulations. The EAP hereby confirm that with the information available at the time of preparing this report, the following has been taken into account:

- The correctness of the information provided in the report;
- The inclusion of comments and inputs from stakeholders and Interested and Affected Parties (I&APs); and
- Any information provided by the EAP to the Interested and Affected Parties and any responses by the EAP to comments or inputs made by I&AP.

Refer to **Appendix D** for the Declaration of the EAP.

13. ENVIRONMENTAL IMPACT STATEMENT

The Port of Saldanha is a major industrial port which is of high economic, recreational and ecological importance. To date, development within the Port has significantly altered the physical structure and hydrodynamics, whilst industrial developments and town expansion has negatively impacted ecosystem health. The proposed development site is already moderately disturbed by shipping, pollution (including iron ore dust) and maintenance dredging. Current monitoring programs, specifically the annual State of the Bay monitoring commissioned by the Saldanha Water Quality Trust, should be sufficient to detect negative impacts resulting from the proposed development.

Both positive and negative environmental impacts were assessed, ranging from habitat loss to operational effects. The identified impacts are considered to be low to medium in significance without mitigation and can be reduced to low by implementing the proposed mitigation measures. No negative impacts were rated as 'high', however; high significance impacts with a positive status were identified for the operational phase.

14. IMPACT MANAGEMENT MEASURES IDENTIFIED FROM SPECIALIST REPORTS

Four specialist studies were identified and recommended for this project and they include the following:

- Marine Biodiversity;
- Terrestrial Biodiversity;
- Heritage Impact Assessment; and
- Waste Classification.

Mitigation measures, proposed by the specialists include the following:

- Ensure that stringent waste management practices are in place at all times;
- Maintain high safety standards and employ "good housekeeping" practice that incorporates plans for emergencies;
- Use bunding where possible to contain terrestrial sediment run-off into the marine system, and use drip trays and/or bunding where hydrocarbon (i.e. construction vehicle fuel) leaks are likely to occur;
- Collect and dispose of polluted soil at registered hazardous waste disposal sites;
- Inform all staff about sensitive marine species and the responsible disposal of construction waste;
- Suitable handling and disposal protocols must be clearly explained and sign boarded; and
- Accidental diesel and hydrocarbon spills must be cleaned up accordingly.

15. CONCLUSIONS AND RECOMMENDATIONS

The proposed development entails upgrading of the existing infrastructure within an operational Port, as such; no site alternatives have been identified as this will defeat the purpose of the project. However, two technical alternatives were considered and these include the Full Containment – Zero Discharge and Controlled Discharge alternatives with the latter being the preferred alternative. .

The preferred alternative i.e. the Controlled Discharge alternative considers the feasibility of detainment of storm water runoff for a long period of time in order to reduce peak flow, slow down the runoff, treatment of runoff to improve the effluent quality and discharging the effluent in a controlled manner which is in line with the industry's best practice. The controlled discharge approach is in line with the best practice of storm water management in urban and industrial areas. This approach to the management of storm water would apply to both the large flat open areas consisting of paved or unpaved surfaces such as the stockyard and standing

areas where goods are loaded and offloaded. It is therefore recommended that Alternative 2, the Controlled Discharge alternative be authorised.

Moreover, the Environmental Management Programme (EMPr) has been prepared by the consultant and it will serve as the key reference of the EAPs recommendations jointly with Transnet's policies such as the Construction Environmental Management Plan that is already in place and has been approved by the DEA for several other projects. The EMPr has included measures proposed to mitigate any adverse impacts of the activities and ensure that there is sufficient monitoring. Taking into account the mitigation measures proposed by the specialists as well as those contained in the EMPr, the EAP is of the opinion that the potential impacts posed by the proposed development can be adequately mitigated to prevent detrimental impacts to the environment. It is therefore recommended that the DEA considers the BAR and issues an environmental authorisation to Transnet to proceed with the uupgrade of storm water and environmental systems in the Port of Saldanha

16. REFERENCES

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