The Proposed Landside Infrastructure Development at Berth 203 to 205, Port of Durban, KwaZulu Natal

Environmental Management Programme

July 2016

Final

Prepared for: Transnet

NEMAI CONSULTING

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Amendments Page

Date:	Nature of Amendment	Amendment Number:
11/04/2016	Internal Review	00
13/04/2016	Client Review	01
16/05/16	Draft for Public Review	02
27/06/2016	Amended based on public review	03
12/07/2016	Amended based on client review	04
15/07/2016	Amended on Internal and Client Review	05

Executive Summary

Due to the deepening, lengthening and widening of Berth 203 to 205, Pier 2, Durban Container Terminal (authorised on 21 January 2015), Transnet Port Terminals has recognised the need for new landside infrastructure and facilities to replace facilities that will be demolished on the existing quay walls. The new landside infrastructure proposed by TPT includes the following:

- A new Central Mess and Ablution Facility at Berth 203;
- A new Satellite facility at Berth 205;
- A new North Substation located at Berth 205;
- A new East Substation located south east of Berth 203; and
- Associated infrastructure such as access roads, sewer, stormwater, high mast lighting, tunnels and Close Circuit Television.

The proposed facilities will require excavation of foundations within 100m of an estuary and as such require authorisation in terms of National Environmental Management Act (No 107 of 1998). Furthermore, the excavations for the north and east substations will require dewatering which will result in discharge of underground water into the Bay. Based on this, a Coastal Water Discharge Permit in terms of the National Environmental Management: Integrated Coastal Management Act (No 138 of 11 February 2009) is also required.

Nemai Consulting was appointed by Transnet to undertake the requisite Environmental Authorisation Process for the Proposed Landside Infrastructure Development, Pier 2. As such a Basic Assessment Report in line with GN 982 of 4 December 2014 has been undertaken and includes an assessment of the impacts related to dewatering. As part of this, this document serves as the Environmental Management Programme for the proposed development and aims at ensuring proper implementation of all requisite mitigation measures required during pre-construction, construction and operation.

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List of Abbreviations

dBA	Decibels
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMC	Environmental Management Committee
EMPr	Environmental Management Programme
GN	Government Notice
HCS	Hazardous Chemical Substances
IAPs	Interested and Affected Parties
Km	Kilometre
KZN	KwaZulu-Natal
Mg/l	Milogram per litre
Mg/l	Milligram per litre
MSDS	Material Safety Datasheets
NEM: ICM	The National Environmental Management: Integrated Coastal Management Act (No 24 of 2008)
NEM:WA	The National Environmental Management Waste Act (No 56 of 2008)
NEMA	National Environmental Management Act (No. 107 of 1998)
NHRA	National Heritage Resources Act (No. 25 of 1999)
NWA	The National Water Act (No 36 of 1998)
OHSA	The Occupational Health and Safety Act (No 85 of 1993)
SAHRA	South African Heritage Resources Authority
SANS	South African National Standards
SAPS	South African Police Service
SAWIS	South African Waste Information System
TNPA	Transnet National Port Authority
TSHD	Trailing Suction Hopper Dredger
WMP	Waste Management Plan

List of Definitions

Alternatives	In relation to a proposed activity, alternatives refer to the different means of meeting the general purpose and requirements of the activity, which may include alternatives to: • The property or location where it is proposed to undertake the activity; • The type of activity to be undertaken; • The design or layout of the activity; • The technology to be used in the activity; • The operational aspects of the activity; and • The option of not implementing the activity.
Environment	The biophysical, social, economic, cultural, political and historical context within which people live and within which development takes place.
Environmental impact assessment	Environmental Impact Assessment means a systematic process of identifying, assessing and reporting environmental impacts associated with an activity.
Environmental Management Programme	An environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced.
Estuary	An estuary is a body of surface water which is (a) that is part of a water course that is permanently or periodically open to the sea; (b) in which a rise and fall of the water level as a result of the tides is measurable at spring tides when the water course is open to the sea; or (c) in respect of which the salinity is measurably higher as a result of the influence of the sea (as per the National Environmental Management: Integrated Coastal Management Act, 2008).
Pollution	The introduction of unwanted components into waters, air or soil, usually as result of human activity; e.g. hot water in rivers, sewage in the sea, oil on land.
Temporary storage	Once off storage of waste for a period not exceeding 90 days.

1 DOCUMENT ROADMAP

This document serves as the Environmental Management Programme (EMPr) for the entire Landside Infrastructure project, where Transnet is acting as the project proponent. The EMPr is intended to meet all requirements as stipulated in Government Notice (GN) No.982 (04 December 2014), Appendix 4 and also forms part of the Basic Assessment (BA) process. **Table 1** presents the document's composition in terms of the aforementioned regulatory requirements.

Table 1: EMPr Document Roadmap

Chapter	Title	Correlation with G.N. No. R982	
1.	**Document Roadmap**		
2.	**Introduction**		
3.	**Project Location**		
4.	**Objectives of the EMPr**		
5.	**Scope of the EMPr**		
6.	**Environmental Assessment Practitioners**	1(a)	Details of – (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including curriculum vitae.
7.	**Environmental Governance Framework**		
8.	**Roles & Responsibilities**	1(i)	An indication of the persons who will be responsible for the implementation of the impact management actions contemplated in paragraph (f).
9.	**Project Specifications**		
10.	**Environmental Training & Awareness Creation**	1(m)	An environmental awareness plan describing the manner in which - (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment.
11.	**EMPr Review**		

12.	**Monitoring**	1(g)	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f).
		1(h)	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f).
		1(k)	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f).
13.	**Environmental Activities, Aspects and Impacts**	1(b)	A detailed description of the aspects of the activity that are covered by the final environmental management plan.
		1(c)	A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers.
		1(e)	A description and identification of impact management outcomes required for the aspects contemplated in paragraph (d).
14.	**Management of Environmental Impacts**	1(d)	Information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in a report contemplated by the EIA Regulations, including environmental impacts or objectives in respect of – (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (iv) where relevant, operation activities.
		1(f)	A description of proposed impact management sections, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e.) will be achieved, and must, where applicable, include actions to - (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iv) comply with any applicable provisions of the Act regarding closure, where applicable; and (v) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.
		1(j)	The time periods within which the impact management actions contemplated in paragraph (f) must be implemented.
		1(l)	A programme for reporting on compliance, taking into account the requirements as prescribed by the Regulations.
15.	**References**		

2 INTRODUCTION

2.1 Overview

Due to the deepening, lengthening and widening of Berth 203 to 205, Pier 2, Durban Container Terminal (authorised on 21 January 2015), Transnet Port Terminals (TPT) has recognised the need for new landside infrastructure and facilities to replace facilities that will be demolished on the existing quay walls. The new landside infrastructure proposed by TPT includes the following:

- A new Central Mess and Ablution Facility at Berth 203;
- A new Satellite facility at Berth 205;
- A new North Substation located at Berth 205;
- A new East Substation located south east of Berth 203; and
- Associated infrastructure such as access roads, sewer, stormwater, high mast lighting, tunnels and Close Circuit Television (CCTV).

A locality map is provided in **Figure 1** together with an overview of the location of the various components which is provided in **Figure 2.**

It should be noted that a number of facilities currently occur on the existing Berth 203 to 205. However as mentioned above, due to the deepening, lengthening and widening of Berth 203 to 205, Pier 2, Durban Container Terminal (authorised on 21 January 2015), there is a need for new landside infrastructure and facilities to replace facilities that will be demolished on the existing quay walls. A comparison of the existing facilities and the proposed facilities are provided in **Table 2.**

Table 2: Comparison of Facility Footprints

Facility	Current footprint (m^2)	Proposed Footprint (m^2)
Mess and Ablution Facility(s)	Currently a number of facilities occur (one at each berth). The size of these are as follows: Berth 202- 170 m^2; Berth 203 – 410 m^2; Berth 205 – 360 m^2	1620 m^2
North Substation	Currently one substation occurs: North-east substation – 190 m^2	690 m^2
East Substation		690 m^2
Satellite Staff Facility	N/A	122 m^2

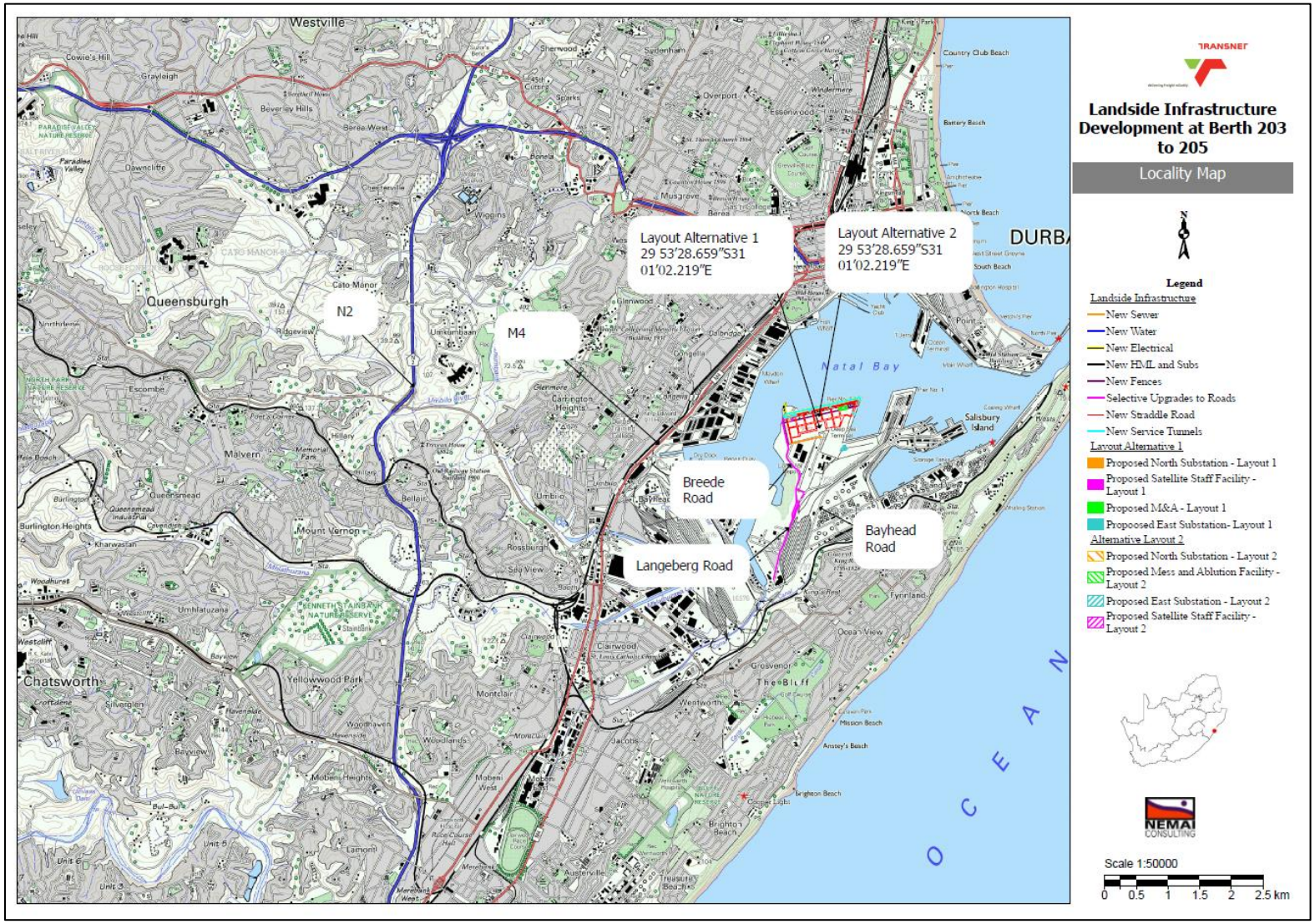

Figure 1: Locality Map

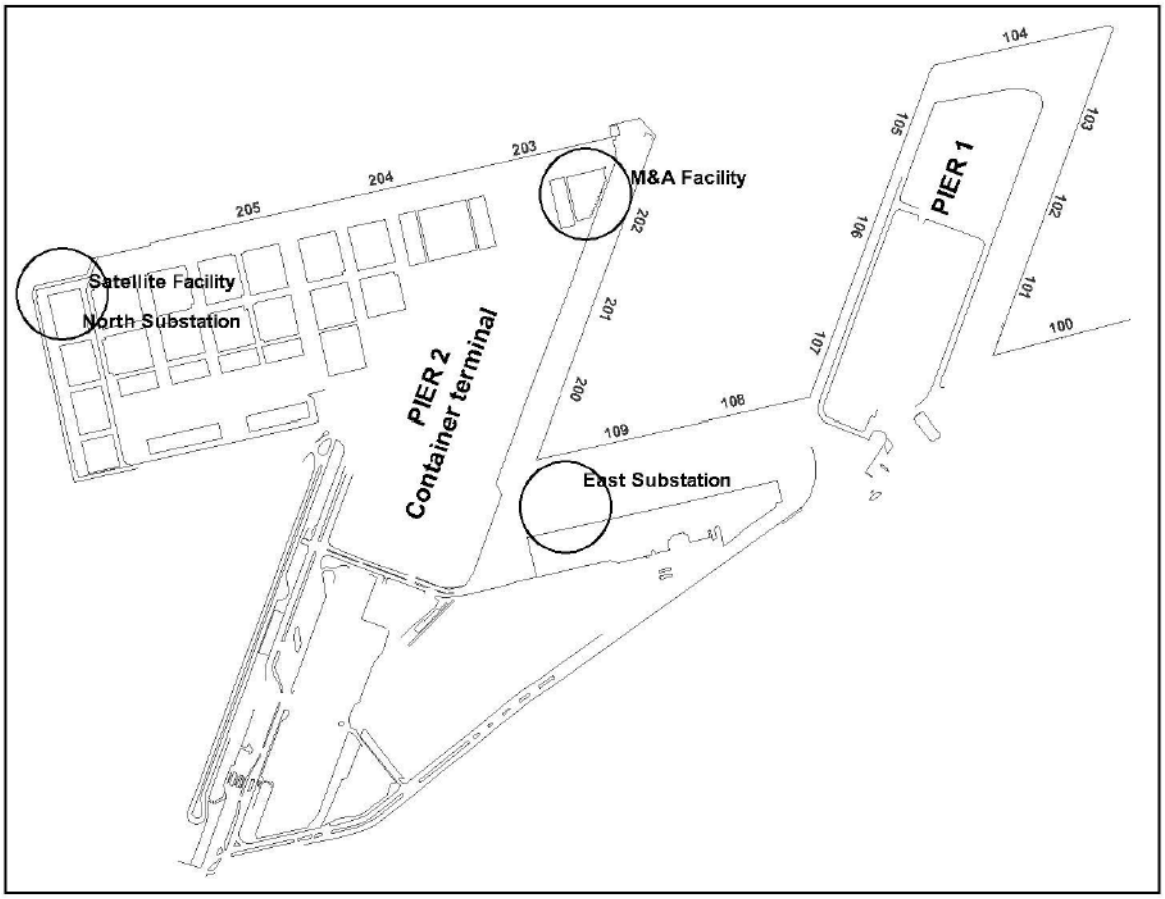

Figure 2: Layout Plan

A description of the various components is provided below.

It should be noted that the drawings provided below of the proposed infrastructure is provided for orientation purposes. A3 drawings are provided in **Appendix C** of the BAR.

2.1.1 Central Mess and Ablution Facility

The proposed new Central Mess and Ablution has been designed as a five storey facility due to the limited site space. The ground storey will provide access to the parking area, HVAC plant room, and entrance lobby. The first and second floors will have locker and ablution facilities, separated for males and females. The mess room will be located on the third storey. Offices will be provided on the forth storey whilst the fifth storey will provide access to the photovoltaic panels on the roof.

Due to the geotechnical conditions and high column loads, the facility will have piled foundations.

In order to ensure the facility is sustainable, a 60 kW Photovoltaic (PV) grid will be installed and will be grid connected. The layout of the PV grid on the roof is indicated in **Figure 3.** In summary, 192 PV panels which cover an area of 384 m^2 will be put in place.

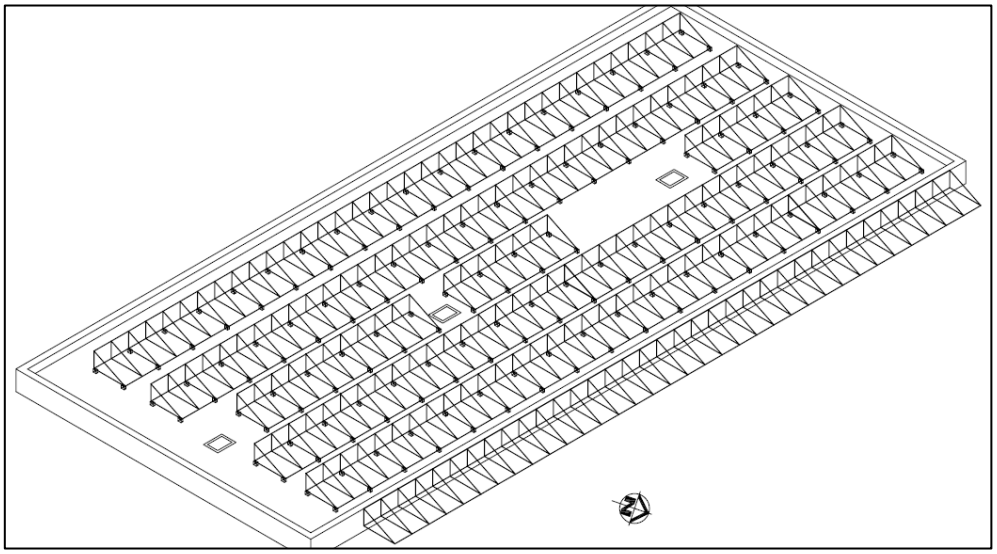

Figure 3 Layout of PV Grid on Roof

In addition, greywater harvesting will also be implemented (approximately 9000 litres per day). The greywater tanks will be located at the Central Mess and Ablution facility and will be closed and stored under cover. Grey water will be used for flushing of toilets as well to irrigate planter boxes in the building.

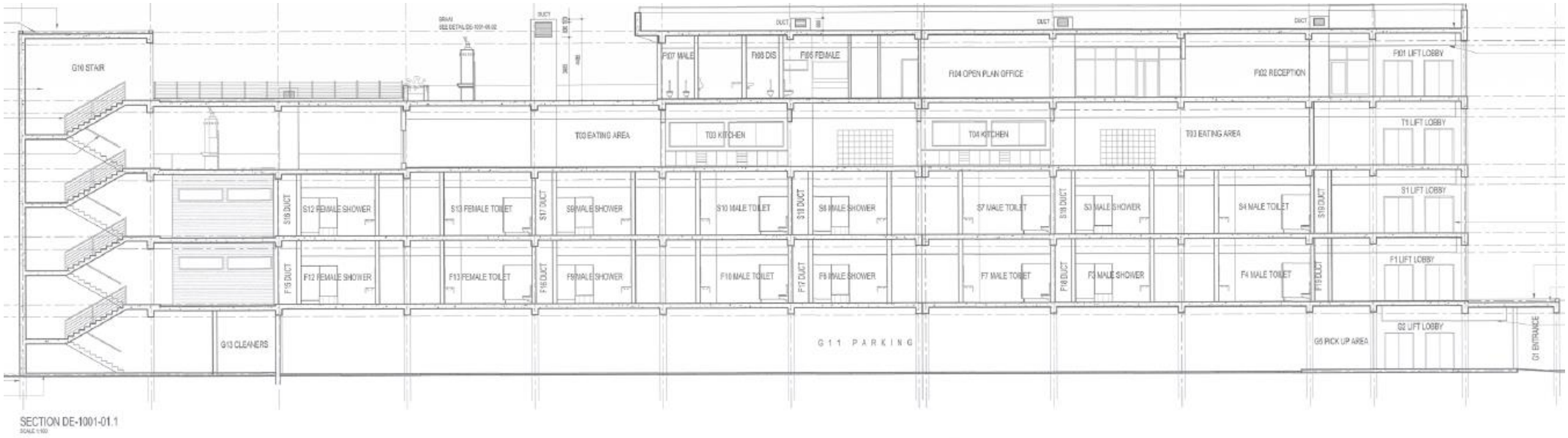

Figure 4: Section - Central Mess and Ablution Facility

2.1.2 Satellite Facility

Due to the limited site space, the proposed building is designed as a two storey facility with male and female ablutions on the ground floor and offices and mess room on the first floor. The facility has been designed as a concrete framed structure incorporating non load bearing brickwork as cladding and partitions. It comprises of a reinforced concrete first floor slab and a roof supported on a concrete ring beam.

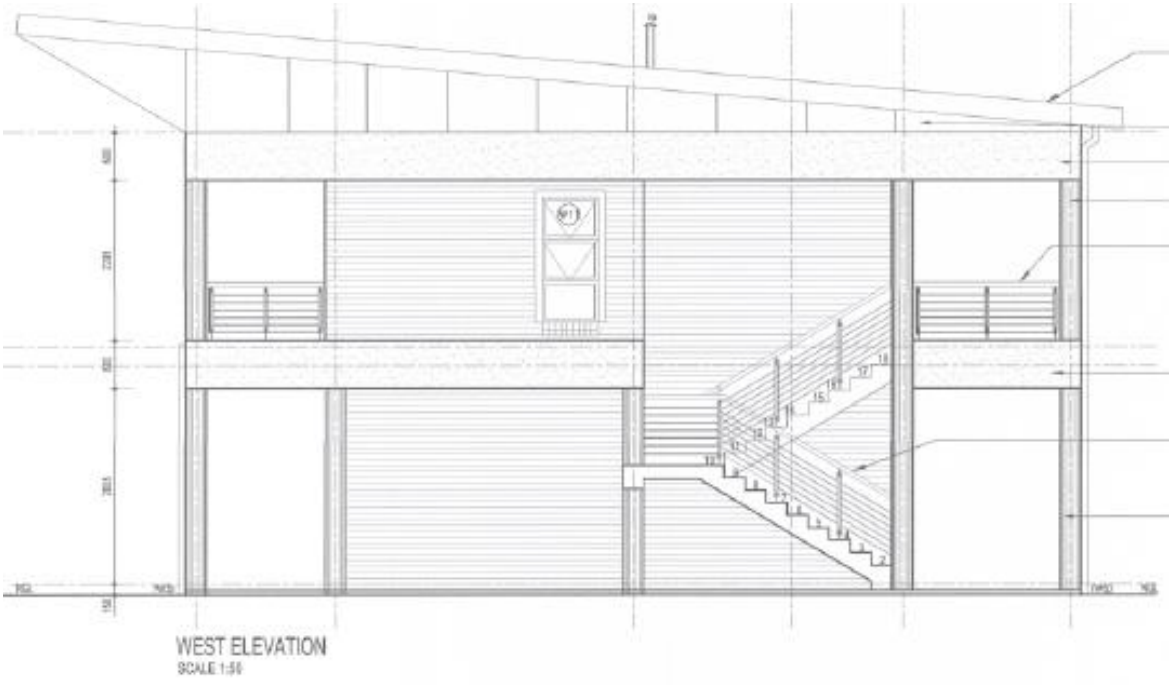

Figure 5: Section - Satellite Facility

2.1.3 North Substation and East Substations

The proposed design for the North and East Substations layouts are the same, but mirrored on the sites with the North Substation occurring just south of Berth 205 and the East Substation occurring south east of Berth 203 (**Figure 2** above).

Due to the limited site space, the proposed Substation buildings have been designed as a three storey facility which include transformer rooms, cable rooms and switchgear rooms. The building will be a concrete framed structure with face brick infill and an aluminium sheeted roof. Two 10m x 6m steel roller shutter doors are provided for the transformer to be moved in and out of the transformer room. The transformers are placed on concrete plinths.

Both the proposed new East and North Substations will house 11kV/400V 630kVA transformers which will be used to supply the terminals operational infrastructure in the vicinity of the substations. The substation will be supplied by medium voltage (MV) supply

fed from the existing 33/11kV Pier 2 Main Substations' 11kV switchboard. A typical section of the North Substation is provided below.

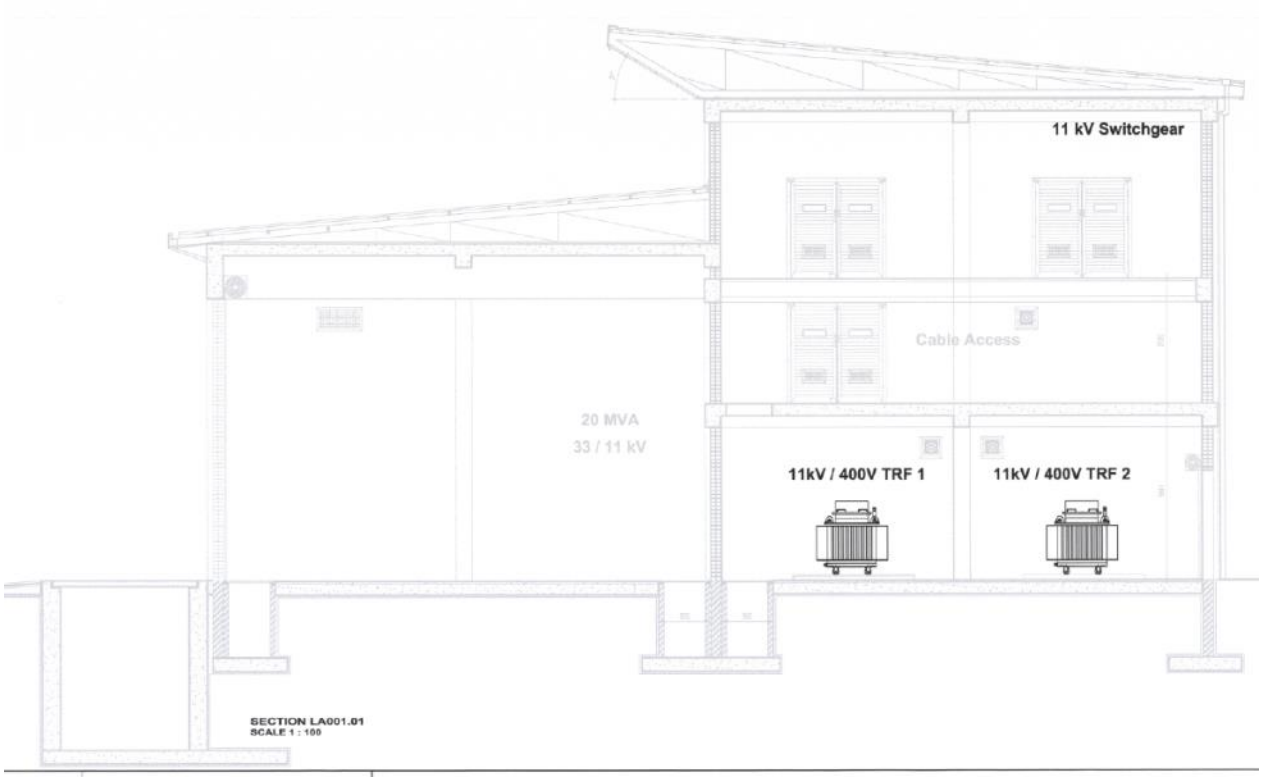

Figure 6: Section – North Substation

2.1.4 Associated Infrastructure

In addition to the above facilities, associated infrastructure will also be put in place and can be summarised as follows:

- **TFR Radio Mast at Berth 203 Staff Facility**: The existing radio equipment on top of the TFR antenna mast pole has been decommissioned. This TFR radio mast pole accommodated an anemometer, decommissioned wireless network equipment and a TPT PTZ camera. This mast pole, with its equipment, shall be taken down and relocated to the new quay wall corner in a similar position to what it is now.
- **New High Mast Lighting System**: New 45m High Mast lights (HML) will be put in place and will receive power through cables installed in tunnels on the cable racks, inside the tunnels and in pipe and chamber from the tunnel to mast foundation. It should be noted that these HMLs will replace the existing HML.
- **Sewer Reticulation**: Full waterborne sanitation was designed in accordance with SANS 10125-2 and the CSIR Guidelines for Human Settlement Planning and Design.

All pipe sizes are 160mm diameter uPVC class 34 with a minimum gradient of 1:120. Vents have been provided at all high points and critical sections. Due to the flat terrain, sewer will drain into the sewer pump station, which will be pumped to municipal sewer connections.

- **Greywater Design:** All water from washing basin and showers will be drained to a Greywater treatment plant. All treated greywater will have to be pumped from the greywater plant's treated storage tanks to individual header tanks that will be positioned at the facility.
- **Ducts and Chambers:** All electrical reticulation will be via pipe and chamber. New Electrical type E6 manholes are to be constructed with 160 diameter Class 34 pipes connecting to the manholes. Data and Communication reticulation will be via pipe and chamber. New Type T1 manholes are to be constructed with 110 diameter Class 34 pipes connecting to the manholes. All sleeves are required to be 800mm below the road, with less than 800mm to be concrete encased.
- **Potable Hot Water**: For the Central Mess and Ablution Facility, potable hot water is required and thus a system shall be implemented which shall combine Heat recovery and Heat pumps.
- **Changes to Existing CCTV, Security and ICT Systems**: The CCTV system on the north quay between berths 203 to 205 has been reconfigured to accommodate the new layout without the need for additional mast poles for PTZ cameras. Existing CCTV cameras monitoring berths 203 to 205 will relocate forward, as required by the new quay wall. These existing PTZ cameras are PTZ 208, PTZ 305 and PTZ 306 and will be removed with their respective mast poles and relocated to their new locations in sync with the civil works. Their role in the CCTV system remains the same; to provide views of operational movements at the berths.
- **Access Roads**: Selective upgrades/repairs of Langeberg Road and Breede Road will be undertaken. These fall below the thresholds indicated in the 2014 EIA Regulations for road expansion/construction. However, part of the road does fall within 100m of the estuary.

2.1.5 Dewatering

The north and east substations will require dewatering for the landside buildings. The required pumping rate required to dewater the excavations are provided below:

- East Substation – approximately 514.04m^3/day; and
- North Substation – approximately 388.60 m^3/day.

This underground water will be discharged from the excavations into the Bay and as such, a Coastal Water Discharge Permit (CWDP) in terms of the National Environmental Management: Integrated Coastal Management Act (No 138 of 11 February 2009) as amended in 2014 is required. The competent authority in regards to the CWDP is the Department of Environmental Affairs (DEA): Oceans and Coasts. Consultation with the Department has taken place telephonically and it has been confirmed that the impacts related to the CWDP must be assessed as part of the Basic Assessment Report. As such, information on the proposed dewatering will also be provided.

The proposed discharged points are provided in **Figures 7** and **8.**

Figure 7: Discharge Point 1

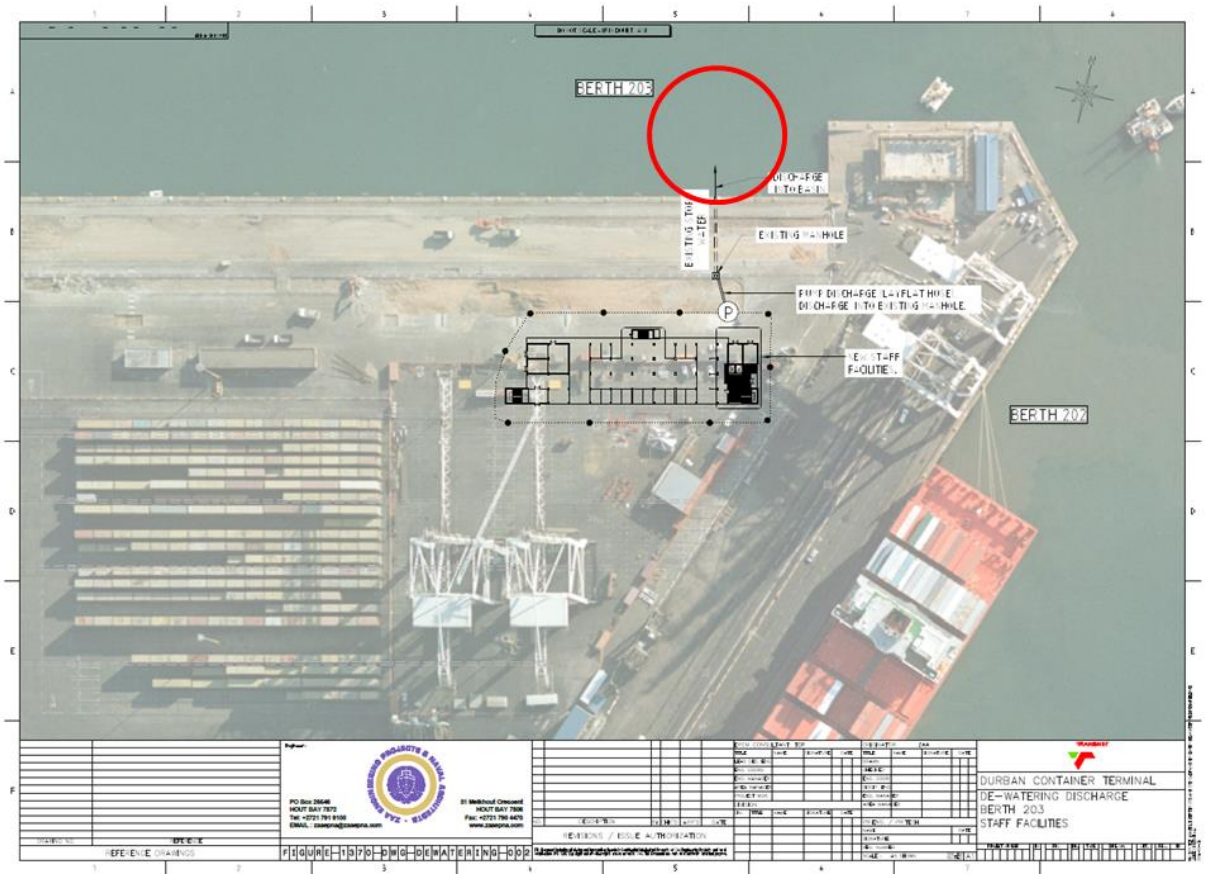

Figure 8: Discharge Point 2

It should be noted that ZAA Engineering Projects and Coastal Architecture has provided a statement regarding the likely water quality of the water that will be discharged from the excavations. It is ZAA's considered opinion that given the proximity of the proposed excavations to the waterline, the water that will be pumped from the excavations during the construction process will be of the same quality as the water within the harbour basin. Piezometer monitoring behind the existing quay wall has indicated that the water table behind the wall corresponds to the water level within the basin, indicating that the water behind the quay wall is sea water that moves into and out of the sand backfill with the tidal movement.

2.1.6 Alternatives

Two layout alternatives have been assessed, namely: Layout Alternative 1 and Layout Alternative 2.

In Layout Alternative 1, the position of the various facilities are on the perimeter of the container stacking areas and have no impact on the flow of straddle carries and operations.

The disadvantage of this alternative from a technical perspective is that the building structures encroach the 100m high water mark (**Figure 9**).

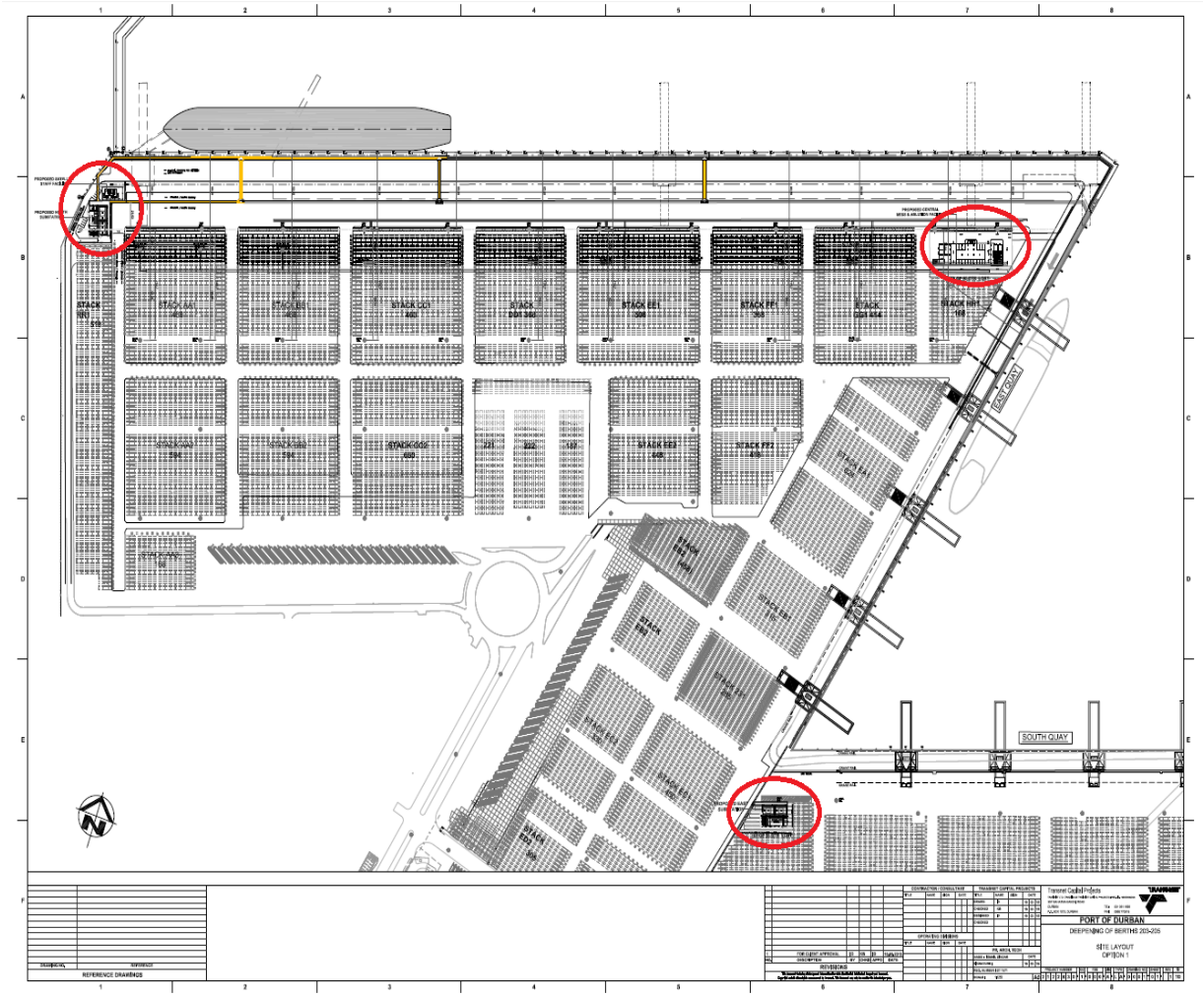

Figure 9: Layout Alternative 1

In Layout Alternative 2, the building structures are surrounded by container stacking areas and thus pose a risk when entering and leaving the facilities. From an operational perspective, this option breaks up the container stacking areas, which is not ideal. The only advantage of this alternative is that the building structures are on the 100m high water mark and therefore does not require a Basic Assessment (**Figure 10**).

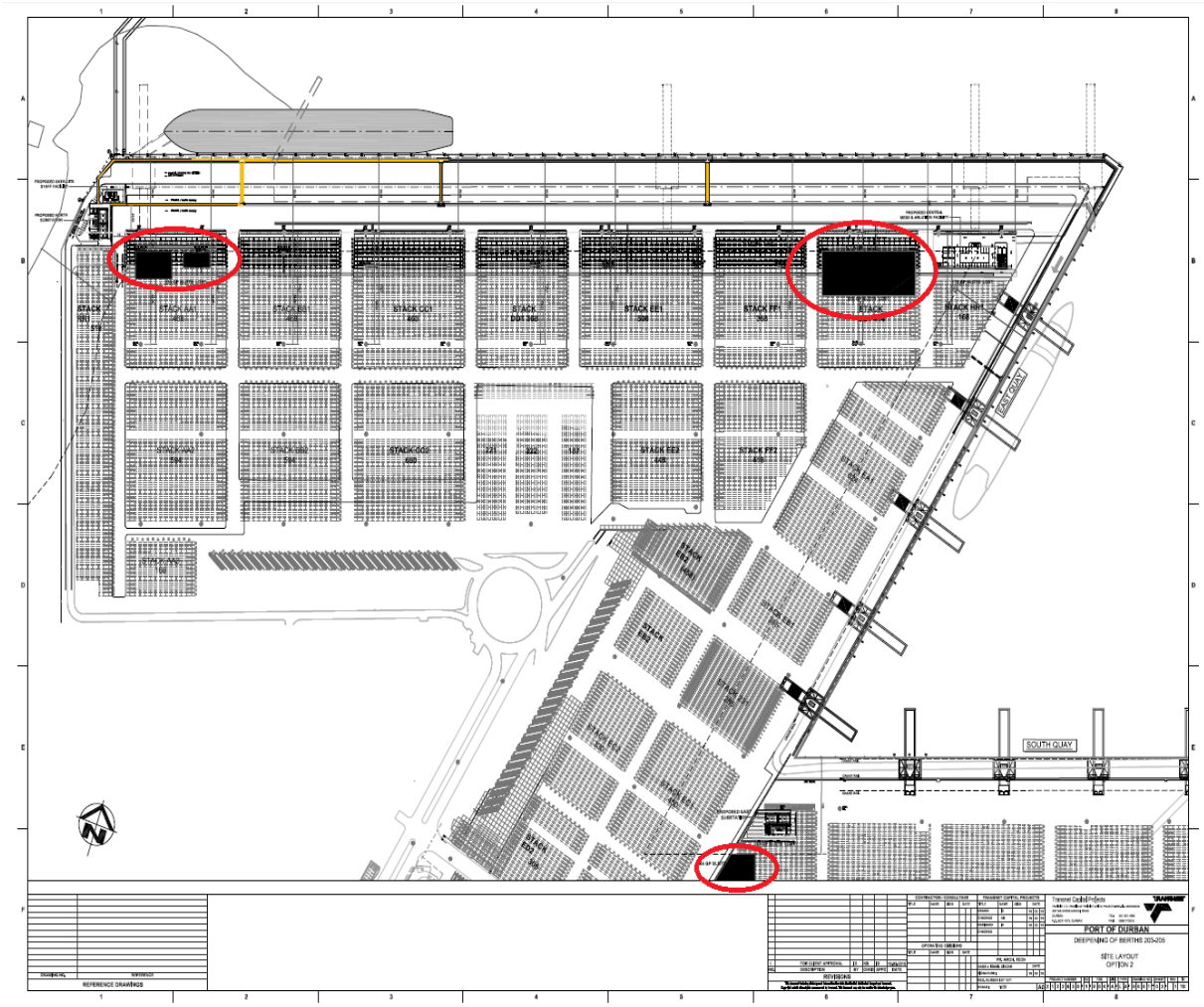

Figure 10: Layout Alternative 2

2.2 Best Practicable Environmental Option

The Best Practicable Environmental Option (BPEO) based on the impact assessment is **Alternative Layout 1** as the various facilities are on the perimeter of the container stacking areas and have no impact on the flow of straddle carries and operations.

3 PROJECT LOCATION

The map below provides the locational scope of the proposed project (**Figure 11**).

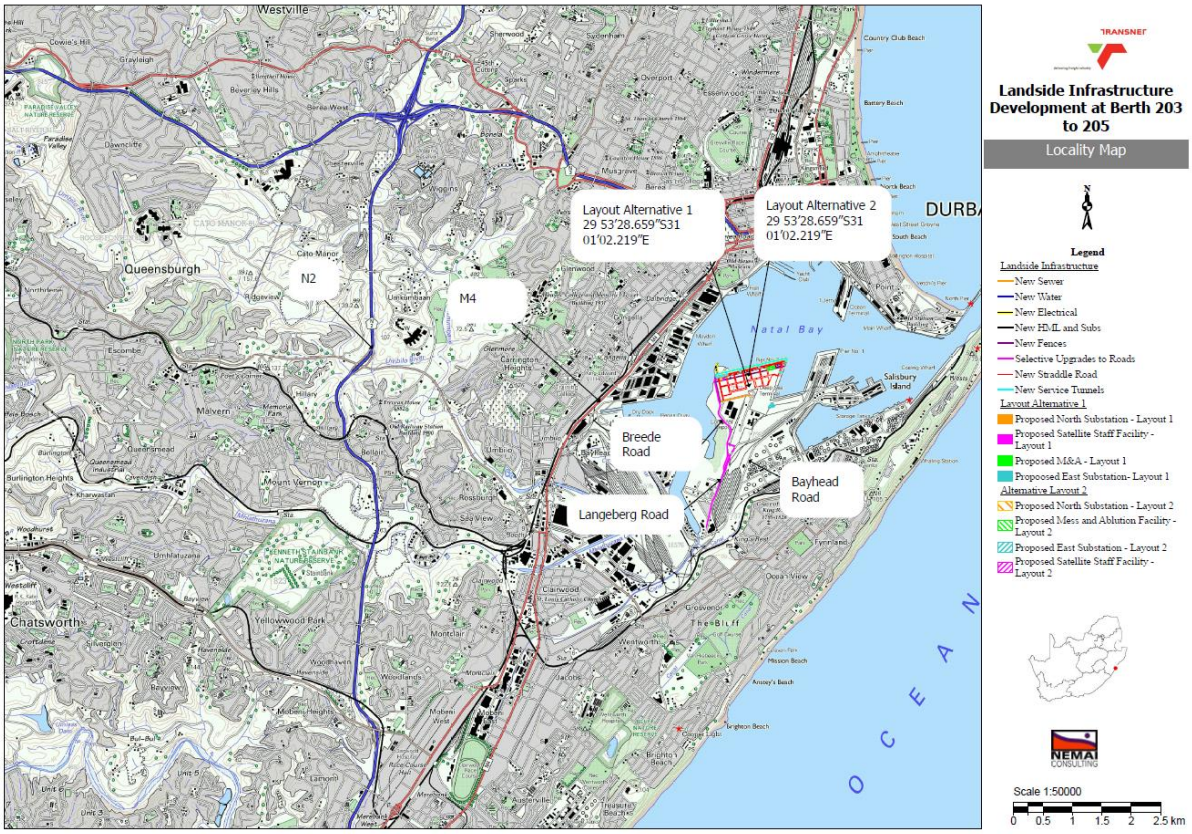

Figure 11: Project Footprint

3.1 Sensitivity

The proposed development occurs on existing berth area which is not sensitive however, the site is adjacent to the Durban Bay Estuary, Bayhead Mangroves and Central Sandbank and thus these sensitive features must be taken into account and all relevant mitigation measures must be implemented.

In order to provide guidance to the project, a sensitivity map is provided in **Figure 12.**

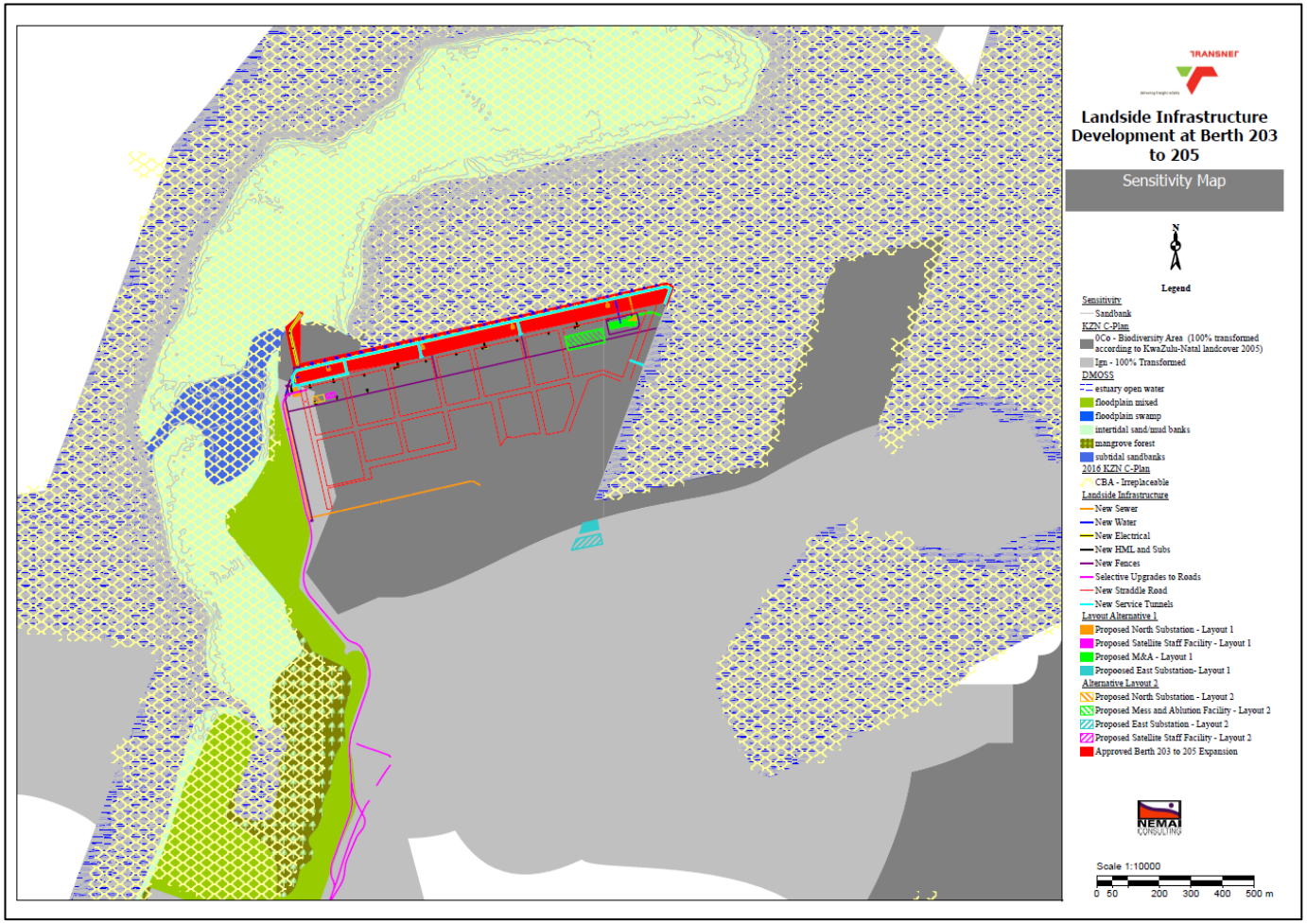

Figure 12: Sensitivity Map

4 OBJECTIVES OF EMPR

The **EMPr** provides performance criteria required to address potential environmental impacts during the Landside Infrastructure project. This Report must be read in conjunction with the BAR and Specialist Studies.

It is one of the goals of Transnet to implement sustainable environmental management practices within the organization. This includes planning, design, construction, operation, restoration, reuse and decommissioning activities. This EMPr is therefore a tool which is used to ensure that this overall goal is achieved.

This EMPr describes the standards specific to the development and incorporates the relevant recommendations of the BAR and other environmental studies.

This EMPr aims to do the following:

- Establish **management objectives** for the Landside Infrastructure Development in order to enhance benefits and minimise adverse environmental impacts;
- Provide **targets** for management objectives, in terms of desired performance;
- Describe **actions** required to achieve management objectives;
- Outline institutional structures and roles required to implement the EMPr; and
- Provide legislative framework.

5 SCOPE OF EMPR

The scope of the **EMPr** is the full Landside Infrastructure Development footprint as detailed in **Section 2**.

6 ENVIRONMENTAL IMPACT PRACTITIONERS

Nemai Consulting was appointed by Transnet as the independent Environmental Assessment Practitioner to undertake the environmental assessment for the proposed Landside Infrastructure Development. The company is an independent, specialist environmental, social development and Occupational Health and Safety (OHS) consultancy, which was founded in December 1999. The company is directed by a team of experienced and capable environmental engineers, scientists, ecologists, sociologists, economists and

analysts. The company has offices in Randburg (Gauteng), Durban (KZN) and Rustenburg (North West Province).

The core members of Nemai Consulting that are involved with preparing the EMPr for the Landside Infrastructure Development are captured in **Table 3** below.

Table 3: EMP Core Team Members

Name	Qualifications	Experience
Ms D. Naidoo	BSc Eng (Chem)	17 years' experience. Prepared EMPs on various projects, including: • Ivory Park Sewerage Network (phases 9 to 14). • Construction and upgrade of the water supply pipeline from Country View Reservoir. • Upgrade of the Helderkruin Reservoir. • Construction of a pump station at Dam 02 - Bushkoppies Waste Water Treatment Works. • Modderfontein Outfall Sewer. • Slangfontein to Mapleton Pipeline.
Ms. V Stippel	MSc (Ecology ,Environment and Conservation)	5 year experience. Prepared EMPrs various projects including • Belfast High Altitude Training Centre. • Asbestos remediation of the P.E. Mainline. • Modimolle Bridge upgrade. Ms Stippel has also been involved in the auditing of the Mooi Mgeni Transfer Sheme Phase 2, Olifants River Water Resources Development Phase 2C Project, Sasol Waste Storage Facilities and Johannesburg City Parks and Zoo.
Ms K. Robertson	MSc (Ecology ,Environment and Conservation)	3 years experience

7 ENVIRONMENTAL LEGAL FRAMEWORK

The Landside Infrastructure Development will be undertaken according to recognised best industry practices and will include measures prescribed within this EMPr. This EMPr shall form part of the contract documents, and informs the Contractor about his duties in the fulfilment of the project objectives, with particular reference to the mitigation of environmental impacts caused by pre-construction activities associated with the project. The Contractor will note that obligations imposed by the EMPr are legally binding in terms of environmental legislation.

All project activities must comply with all relevant South African legislation and regulations. All environmental statutory requirements should be included in the Contractors' conditions. Specific legislation that must be complied with includes, but is not necessarily limited to:

- Constitution of the Republic of South Africa, (No. 108 of 1996);
- National Environmental Management Act (No. 107 of 1998);
- National Water Act (No. 36 of 1998);
- Mineral and Petroleum Resources Development Act (No. 28 of 2002);
- National Environmental Management: Biodiversity Act (No. 10 of 2004);
- National Environmental Management: Waste Act (No. 59 of 2008);
- National Environment Management: Waste Act: Waste Classification and Management Regulation (GN 614 of 10 August 2012);
- National Environmental Management: Waste Act: National Waste Information Regulations (GN 625 of 13 August 2012);
- National Environmental Management: Waste Act: National norms and standards for the storage of waste (GN. 926 of 29 November 2013);
- National Norms and Standards for Disposal of Waste at a Landfill (GN 636 of 23 August 2013);
- National Norms and Standards for the Assessment of Waste for Landfill Disposal (GN 635 of 23 August 2013);
- National Heritage Resources Act (No. 25 of 1999);
- KZN Heritage Act (Act No. 04 of 2008)
- National Veld and Forest Fire Act (No. 101 of 1998);
- National Environmental Management Protected Areas Act (No. 57 of 2003);
- National Environmental Management Air Quality Act (Act No. 39 of 2004);
- Kwazulu-Natal Planning and Development Act (Act No. 06 of 2008);
- KwaZulu-Natal Nature Conservation Management Act (Act No. 09 of 1997);
- Natal Nature Conservation Ordinance 15 of 1974;
- Integrated Coastal Management Act (Act No. 24 of 2008);
- Animal Protection Act (No. 71 of 1962);
- Conservation of Agricultural Resources Act (No. 43 of 1983);
- Hazardous Substances Act (Act No. 15 of 1973);
- Occupational Health and Safety Act (No. 85 of 1993); and
- Explosives Act (No. 15 of 2003).

Additional legal requirements include the following:

- All waste (general and hazardous) generated during the construction may only be disposed of at appropriately licensed sites in terms of National Environmental Management: Waste Act (No. 59 of 2008);
- Hazardous substances must be stored and handled in accordance with the appropriate legislation and standards, which may include the Hazardous Substances Act (Act No. 15 of 1973), the Occupational Health and Safety Act (No. 85 of 1993), relevant associated Regulations, and applicable SABS and international standards; and
- Construction Regulations (2003) published under the Occupational Health and Safety Act (No. 85 of 1993) apply to construction activities including "the moving of earth, clearing of land, the making of an excavation, piling, or any similar type of work". A "health and safety plan" which addresses hazards identified, and includes safe work procedures to mitigate, reduce or control the hazards identified, is required under this Act.

8 ROLES AND RESPONSIBILITIES

A high-level outline of the institutional arrangements for the implementation of the EMPr as well as the conditions of the EA is provided in **Figure 13**.

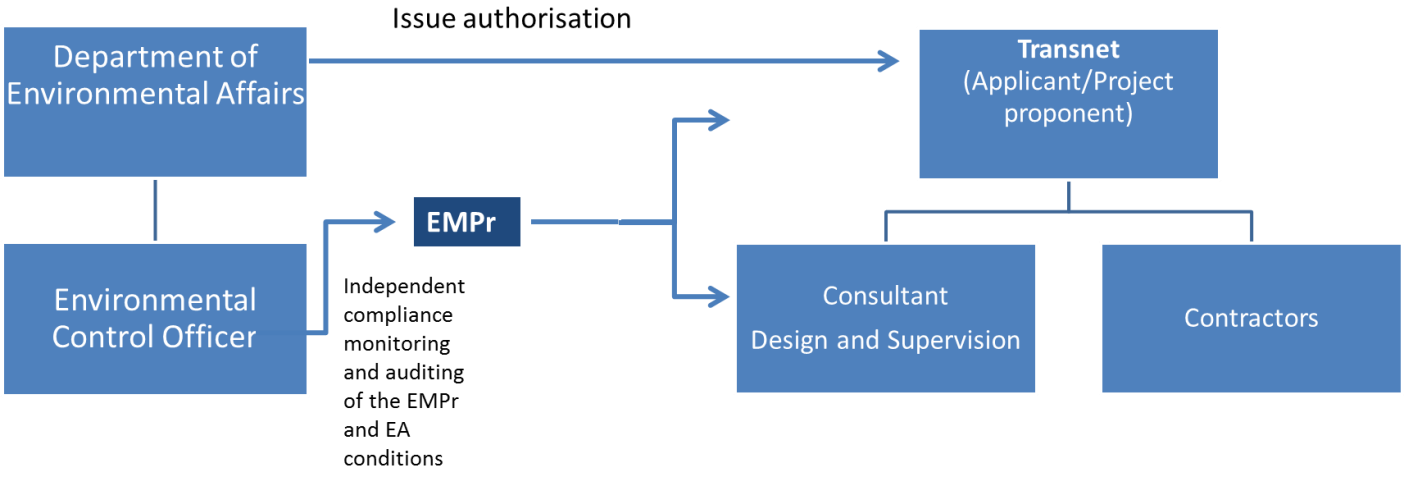

Figure 13: Institutional Arrangements: Roles & Responsibility

8.1 DEA

DEA is the mandated authority in terms of NEMA that determined whether an authorisation could be issued for the project, following a decision-making process conducted as part of the EIA. Conditions are included in the EA, which need to be complied with by the project applicant.

DEA also fulfils a compliance and enforcement role with regards to the EA. The Department may perform random inspections to check compliance.

Amendments may be required to the Landside Infrastructure Development EMPr, based on adaptive management to the site conditions and the technical requirements of the project. These amendments will need to be approved by DEA.

8.2 Transnet

Transnet is the applicant in terms of NEMA. Transnet is also referred to as the project proponent and is ultimately responsible for the development and implementation of the EMPr and ensuring that the conditions in the EA are satisfied. The liability for non-compliance thus rests with Transnet. Within Transnet, there are a number of environmental functions. These include:

8.2.1 Transnet Environmental Manager

The Transnet Environmental Manager will be responsible for ensuring that the EMPr and associated documents or requirements are complied with during construction. Specific tasks include:

- Liaison with authorities;
- Preparation of project specific Project Environmental Standards (PES);
- Tender evaluation, development of environmental criteria and adjudication thereof;
- Review of all reports from the Environmental Specialist/Office, including signing off on Method Statements;
- Conduct all environmental incident enquiries;
- Ensure induction material includes project appropriate environmental issues;
- Approve training programmes and other initiatives;
- Coordinate or facilitate internal environmental audits

8.2.2 Transnet Construction Manager

The Transnet Construction Manager has overall responsibility for environmental management on site which includes the implementation of the EMPr, Environmental

Specifications, permits and licenses. The Construction Manager is supported by the Transnet Environmental Manager. Specific Tasks include:

- Reviewing the monthly reports compiled by the Environmental Officer;
- Identifying the need for remedial measures with regards to the proposed work;
- Communicating directly to the contractors;
- Issuing non-conformance notification to Contractors that do not comply with the requirements of the EMPr and other documents.
- Overseeing of all environmental matters and compliance with all environmental requirements and authorisations; and
- Act as the interface between the ECO, EMC and the other project role players.

8.2.3 Transnet Environmental Specialist

The role of the Transnet Environmental Specialist is similar to that of an Environmental Control Officer (ECO). In this case, an independent ECO will be contracted to undertake the environmental audits however the Environmental Specialist will provide quality assurance with respect to the implementation of the environmental governance framework during construction.

8.2.4 Transnet Environmental Officer

The Transnet Environmental Officer reports to the Transnet Construction Manager and is responsible for conducting the day-to-day tasks required by the EMPr and EA and any other permits or licenses are correctly implemented on the construction site.

The Transnet Environmental Officer will conduct the following tasks:

- Ensure that environmental issues receive adequate attention in the site induction training;
- Prepare and conduct awareness training (e.g. posters, tool box talks, signage);
- Conduct monthly observation and inspections and audits of all work places;
- Monitor the Contractor’s compliance with the EA, EMPr and any permits and licenses on site.
- Conduct monthly observations and environmental audits of all Contractors and Work areas; and
- Ensure that all environmental monitoring programmes are carried out according to protocols and standards.

8.3 Environmental Control Officer

It is recommended that the ECO undertake monthly inspections of the site and at least 6 monthly, full compliance auditing against the EMPr and environmental authorisation. The Audit reports will also be made available to the relevant authorities, on their request.

Further duties of the ECO will be the following:

- Monitoring of compliance with the EMPr and the Project Specification.
- Make recommendations on how to best apply the environmental requirements on site and advise the Project Manager on the site instructions required to facilitate effective environmental compliance.
- Participate in the quality management system by issuing non-conformances when there are areas of the project environmental requirements that are not being met.

8.4 Contractors Environmental Officer

The contractor will also be required to appoint **a suitably qualified Environmental Officer (EO)**. The primary role of the competent EO is to coordinate the environmental management activities of the Contractor on site.

Specific responsibilities of the EO, who will be on site, will include the following:

- Aiding the Contractor to comply with all the project's environmental management requirements;
- Assisting the Contractor in compiling Method Statements;
- Facilitating environmental activities and environmental awareness training of all persons on site;
- Exercise an internal compliance management system on behalf of the Contractor;
- Inspect the site as required to ensure adherence to the management actions of the EMPr and the Method Statements;
- Ensuring that environmental monitoring (air quality, water quality, etc.) is being undertaken;
- Complete Site Inspection Forms on a regular basis;
- Provide inputs to the regular environment report to be prepared by the ECO (as required);
- Liaise with the construction team on issues related to implementation of, and compliance with, the EMP;

- Maintain a record of environmental incidents (spills, impacts, legal transgressions etc) as well as corrective and preventive actions taken; and
- Maintain a public complaints register in which all complaints are recorded, as well as action taken.

In addition, the EO shall ensure compliance with the Project Environmental Specifications, Standard Environmental Specifications and EMPr.

9 PROJECT SPECIFICATIONS

This EMPr focuses more on performance criteria for environmental compliance, whereas the detail on how the project is to meet these performance criteria is provided in the project specification in the form of minimum standards and measures to be implemented by the Contractor. The Contractor shall provide detailed method statements on how the performance criteria will be met, through the application of the specification. These methods are to be reviewed and approved by the Transnet Construction Manager and Environmental Officer to ensure that they are adequate.

The Method Statements must be project- and site specific and should explain in detail the following:

- The proposed activity, setting out the plant, equipment, materials, labour and method the Contractor proposes using to carry out an activity;
- Transportation of the equipment to and from the site;
- How the equipment/material will be moved while on site;
- How and when material will be stored;
- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- Timing and location of the activities;
- Description of the potential positive and negative environmental impacts and how they will be managed;
- Compliance/non-compliance with the Standard Environmental Specification and any other Statutory and best practice standards;
- The necessary mitigation measures that need to be implemented to adequately safeguard the environment, construction workers and the public (where applicable);
- Training of employees;
- Roles and responsibilities;

- Monitoring and reporting requirements; and
- Any other information deemed necessary by the Transnet EO

The Transnet Capital Projects Construction Environmental Management Plan (CEMP) (Section 7.1.3) requires the development of environmental method statements. In addition to the required Environmental method statements contained therein, a number of specific method statements will be required including at least the following:

- Method Statement for Dewatering;
- Method Statement for establishing the construction camp;
- Method Statement with regard to waste and wastewater management;
- Method Statement to show procedures for dealing with possible emergencies that can occur, such as fire and accidental leaks and spillage of carbon fuels and oils;
- Method Statement for dust control;
- Method Statement for the storage and handling of hazardous substances;
- Method Statement for management of concrete and batching plants;
- Method Statement for decommissioning and demolition; and
- Method Statement for rehabilitation of construction footprint.

10 Environmental Awareness Plan

Training aims to create an understanding of environmental management obligations and prescriptive measures governing the execution of the project. It is generally geared towards project team members that require a higher-level of appreciation of the environmental management context and implementation framework for the project.

Awareness creation strives to foster a general attentiveness amongst the construction workforce to sensitive environmental features and an understanding of implementing environmental best practices. The various means of creating environmental awareness may include:

- Induction course for all workers before commencing work which must include training on the implementation and compliance to the EMPr;
- Refresher courses (as and when required);
- Weekly toolbox talks, focusing on particular environmental issues (task and area specific);

- Courses must be provided by suitably qualified persons and in a language and medium understood by the workers. It is noted that Zulu is the dominant language in the area;
- Erect signage and barricading (where necessary) at appropriate points in the construction domain, highlighting sensitive environmental features; and
- Place posters containing environmental information at areas frequented by the construction workers (e.g. eating facilities).

Training and awareness creation will be tailored to the audience, based on their designated roles and responsibilities. Records will be kept of the type of training and awareness creation provided, as well as containing the details of the attendees.

11 EMPr Review

Due to its dynamic nature, the **EMPr** will be reviewed and revised when necessary to ensure continued environmental improvement. Changes to the EMPr shall be required where the existing system:

- Does not make adequate provision for protecting the environment against the Landside Infrastructure Development Project;
- Needs to be modified to meet conditions of statutory approval;
- It is not achieving acceptable environmental performance;
- Requires changes due to the outcome of a monitoring or auditing event or management review; and
- Provides redundant, impracticable or ineffective management measures.

The revised EMPr will be submitted to DEA for approval before implementing the changes on site.

12 Monitoring

Monitoring is required to ensure that the receiving environment at the Landside Infrastructure Development is suitably safeguarded against the identified potential impacts, and to ensure that the environmental management requirements are adequately implemented and adhered to during the execution of the project.

12.1 Baseline Monitoring

Due to the linkages of this project to the Berth 203 to 205 Expansion, baseline monitoring undertaken for the Berth 203 to 205 Expansion will serve as an assessment of the baseline conditions for the landside infrastructure project. This is especially important in regards to the current water quality within the estuary as water in the excavations must be tested prior to discharge into the Bay and must be in line with the baseline water quality.

12.2 Compliance Monitoring and Auditing

It is recommended that the ECO will undertake monthly inspections of the site and at least six-monthly full compliance auditing against the EMPr and EA. The aforementioned reports will be submitted to the Transnet Construction Manager DEA for their records.

In terms of Audits, the ECO will be required to ensure the following:

- All documentation (e.g. audit/monitoring/compliance reports and notifications) required to be submitted to the Department in terms of the EA, must be submitted to the Director: Compliance Monitoring.
- The holder of the EA must submit an environmental audit report to the Department within 30 days of the completion of the construction phase (i.e. within 30 days of site handover) and within 30 days of completion of rehabilitation activities.
- The Environmental Audit Report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the EA conditions as well as the requirements of the approved EMPr.
- Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.

12.3 Water Quality Testing Prior to Dewatering

Once groundwater well points have been installed allowing access to the groundwater, a sample must be sent for testing prior to discharge into the Port;

The Recommended Special effluent limits for physico-chemical properties and organic and inorganic constituents of the effluent as described in Anchor, 2016 must be met;

Should these not be met, dispersion modelling must be undertaken to confirm impacts on the receiving environment.

13 ENVIRONMENTAL ACTIVITIES, ASPECTS, AND IMPACTS

13.1 Project Activities and Environmental Aspects

13.1.1 Project Activities

A summary of the main activities related to the proposed development is provided below.

13.1.1.1 Pre- Construction Phase

During the Pre-construction Phase of the project, the following activities will be undertaken:

- Detailed engineering design;
- Detailed geotechnical investigations;
- Procurement process for Contractors;
- Procurement of other necessary materials;
- Fencing off of construction domain;
- *Set up site camp;*
- *Set up ablutions;*
- *Set up access control, security; signage and lighting;*
- *Establish bulk fuel storage;*
- *Establish material stockpiles;*
- *Storage and Handling of Materials;*
- *Construction employment; and*
- *Set up site camp.*

13.1.1.2 Construction Phase

During the Construction Phase of the project, six key activities are addressed namely:

- Demolition of existing infrastructure on site;
- Excavations;
- Dewatering; and
- Construction of buildings.

13.1.1.3 Operational Phase

During the Operational Phase of the project, the following activities will be undertaken:

- Operation of all supporting facilities and infrastructure;
- Maintenance and management of infrastructure and facilities; and

- On-going consultation with tenants.

13.1.2 Project Aspects

Environmental aspects are regarded as those components of an organisation's activities, products and services that are likely to interact with the environment and cause an impact. The following environmental aspects have been identified for the proposed Landside Infrastructure Development, which are linked to the project activities.

Table 4: Environmental Aspects

Pre-construction
Environmental Aspects
• *Poor construction site planning and layout*
• *No recognition of EMPr in tender document.*
Construction
Environmental Aspects
• *Poor consultation with affected parties*
• *Poor management of access control*
• *Lack of maintenance of access roads*
• *Poor transportation practices*
• *Poor fencing arrangements*
• *Disruptions to existing services*
• *Poor management of dewatering process*
• *Inadequate storage and handling of material*
• *Inadequate storage and handling of hazardous material*
• *Poor maintenance of equipment and plant*
• *Poor management of labour force*
• *Pollution from ablution facilities*
• *Inadequate stormwater management during construction*
• *Inadequate management of construction camp*
• *Poor waste management practices*
• *Wastage of water*
• *Poor management of pollution generation potential*
• *Poor reinstatement and rehabilitation*
• *Working outside the approved project footprint hence incurring impacts not previously assessed.*
Operation
Environmental Aspects
• *Inadequate management of access control*
• *Lack of maintenance*

- *Inadequate management of waste*
- *Inadequate management of stormwater*

13.2 Potential Significant Environmental Impacts

Environmental impacts are the change to the environment resulting from an environmental aspect, whether desirable or undesirable. Refer to **Table 5** for the potential impacts associated with the project.

Table 5: Potential Significant Environmental Impacts

Feature	Potential Impact
Air Quality	• Impacts on air quality due to poor concrete batching • Impacts on air quality due to improper dust management
Archaeological and Cultural Features	• Unearthing of heritage resources. • Work not being stopped immediately.
Avifauna	• Disturbance to Avifauna due to construction practices and impacts such as noise and light,.
Sensitive Features - Bayhead Mangroves Little Lagoon Central Sandbank	• Impacts on the Little Lagoon, Central Sandbank and Bayhead mangroves due to poor water quality. • Impacts on fauna as a result of noise. • Impacts on nursery habitat due to illegal fishing
Durban Bay Estuary	• Impacts to Durban Bay Estuary due to poor management of ablution facilities, poor waste and site management, poor management of the dewatering process and poor housekeeping.
Infrastructure	• Damage to existing infrastructure
Noise	• Increased noise due to construction activities
Socio-economic	• Dissatisfaction with appointment process for local labourers • Nuisance from increase in dust and noise • Influx of people seeking employment and associated impacts • ***Job opportunities**** • ***Use of local goods and services**** • ***Stimulus to local economy****

**** Positive impacts***

13.3 Working Hours

The following working hours for various activities should serve as a guideline only as working hours must be agreed upon with Transnet Construction Manager, so as to minimise disturbance to tenants and land users.

Table 6: Working hours

Landside Activities		
Establish site offices and services	12 hours/day	7 days a week
Demolitions and earthworks	12 hours/day	7 days a week
Return Quay template	12 hours/day	7 days a week
Return Quay pitching and piling	12 hours/day	7 days a week
Return Quay catholic protection	12 hours/day	7 days a week
Return Quay capping beam	12 hours/day	7 days a week
Return Quay paving	12 hours/day	7 days a week
Temporary Sheet piling	12 hours/day	7 days a week
Excavate for stormwater, potable water and sewerage pipelines	12 hours/day	7 days a week
Excavate for tunnels and services	12 hours/day	7 days a week
Shutter, reinforce and pour concrete on capping beam, service tunnels, crane beam, high mast bases, CCTV bases or any other concrete structure	12 hours/day	7 days a week
Drive DCIS piling for crane beam	12 hours/day	7 days a week
Install slot drains and stormwater manholes	12 hours/day	7 days a week
Install sewerage pipeline and pump stations	12 hours/day	7 days a week
Install potable water pipeline	12 hours/day	7 days a week
Install electrical and communication ducts	12 hours/day	7 days a week
Compact and pour concrete paving	12 hours/day	7 days a week
Compact and apply asphalt paving	12 hours/day	7 days a week
Install crane rails, earthing bars	12 hours/day	7 days a week
Install quay furniture including ladders, anchor stop blocks, turn over drums, manhole covers, fire hydrants and tie down anchors	12 hours/day	7 days a week
Road and Stack markings	12 hours/day	7 days a week

14 MANAGEMENT OF ENVIRONMENTAL IMPACTS

14.1 Pre-Construction

General requirements during the pre-construction phase include the following:

- Design to consider and incorporate environmental requirements;
- Define and communicate roles and responsibilities for the implementation of the EMPr;
- Ensure that all structures within the construction area are identified and recorded; and
- Develop and implement an environmental awareness programme.

Specific management measures related to the identified environmental aspects follow.

14.1.1 Coastal Water Discharge Permit (CWDP)	
Management Objective	CWDP is in place prior to dewatering.
Management target	1. No unauthorised, unpermitted or unlicensed activities will take place.

Management Actions	Responsibilities	Monitoring Requirements
Seek permit from DEA: Oceans and Coasts in terms of the National Environmental Management: Integrated Coastal Management Act, 2008 (Act No 24 of 2008) for dewatering into the estuary.	• Transnet to appoint suitably qualified specialists. • Specialists to seek relevant approvals.	• Approvals, permits and licenses to be in place before construction can commence.

14.1.2 Construction Site Planning and Layout	
Management Objective	Planning and layout of construction site is undertaken responsibly to ensure protection of sensitive environmental features.
Management target	1. No impacts to sensitive environmental features as a result of construction site planning and layout.

Management Actions	Responsibilities	Monitoring Requirements
Conduct pre-construction survey of sites to be affected by the construction activities.	• Transnet Construction Manager, Transnet EO and ECO – checking. • Contractor to implement management actions.	• Photographic record of pre-construction survey. • Approved site plan. • Barricading and signage register • Records of awareness creation. • Cargo migration plan.
Temporary Site offices to be constructed on existing paved area.		
Ablution facilities must be located in such a way that they are accessible to the workforce but do not in any way negatively impact Durban Bay Estuary.		
Identify sensitive environmental features (including Little Lagoon, Central Sandbank and Bayhead Mangroves) where special care needs to be taken and implement suitable mitigation measures to safeguard these features (e.g. barricading, signage and awareness creation).		
Contractor to submit a site plan to the Transnet Environmental Manager/Officer for comment. The site plan must be approved by the Transnet Construction Manager prior to the establishment of the site, which aims to identify construction activities, facilities and structures in relation to sensitive environmental features. This plan will serve as a spatial tool that facilitates the		

Management Actions	Responsibilities	Monitoring Requirements
execution of the construction phase with due consideration of sensitive environmental features. The plan must show the following (as relevant): ○ Buildings and structures; ○ Contractors' camp and lay down areas; ○ Site offices; ○ Site laboratories; ○ Batching plants; ○ Roads and access routes including site entry and exit points; ○ Gates and fences; ○ Essential services (permanent and temporary water, electricity and sewage); ○ Rubble and waste rock storage sites; ○ Solid waste storage sites; ○ Site toilets and ablutions; ○ Hazardous waste storage sites; ○ Topsoil stockpiles; ○ Spoil areas; ○ Construction materials stores; ○ Vehicle and equipment stores; ○ Workshops; ○ Wash bays; ○ Fuel stores; ○ Hazardous substance stores; and ○ Any other activities, facilities and structures deemed relevant.		
Authorised construction footprint to be pegged.		
General site camp requirements are as follows: ○ Offices and parking areas; ○ Ablution facilities (including screening);		

Management Actions	Responsibilities	Monitoring Requirements
○ Storage facilities (materials/ equipment/ plant/ Hazardous Chemical Substances/ waste); ○ Workshop; ○ Vehicle and concrete vehicle wash bay; ○ Containment of waste water (general use); ○ Containment of waste water (paint and concrete); and ○ Oil separator.		

14.1.3 Managing Geotechnical Investigations	
Management Objective	Proper management of environmental impacts associated with detailed geotechnical investigations has been undertaken.
Management target	1. No damage to sensitive environmental features (Little Lagoon, Bayhead Mangroves, Central Sandbank).

Management Actions	Responsibilities	Monitoring Requirements
Safe operation of plant and equipment required for geotechnical investigations. Adequate management of domestic and construction waste. Prevent damage to sensitive environmental features.	• Transnet Construction Manager, Transnet EO and ECO - checking. • Geotechnical team to implement actions.	• Waste registers. • Waste Disposal Slips • Incident register. • Daily pre-start checklists.

14.2 Construction

Mitigation measures for all activities during construction are provided below.

The mitigation measures included in the Specialist Studies undertaken as part of the BAR have also been incorporated below.

14.2.1 Legislative and Administrative Requirements	
Management Objective	A well-managed administrative system is in place to ensure all legislative and administrative requirements are met.
Management target	1. All administrative records are available when required. 2. The administrative requirements of the EA and EMPr are met. 3. All requirements of relevant legislation are in place prior to construction.

Management Actions	Responsibilities	Monitoring Requirements
An EA is in place for all activities. A CWDP permit is available for discharging water from excavations into the bay area.	• Transnet to ensure all legislative requirements have been met. • Transnet to inform DEA of non-compliance. • Transnet to ensure all additional reports required by the EA are in place and approved by DEA and/or EMC. • Transnet Construction Manager, Transnet EO and ECO – checking.	• EA for Landside Infrastructure on site. • Approved EMPr on site. • Notification letters regarding any non-compliance with conditions of the EA should be kept on site. • CWDP in place.

14.2.2 Management of Emergency Procedures	
Management Objective	Minimise environmental impacts associated with emergency procedures
Management target	1. Appropriate emergency response aligned with the Port should be in place for all construction activities (dredging, sandbank extension, berth infrastructure construction).

Management Actions	Responsibilities	Monitoring Requirements
Fire - ○ All fire control mechanisms (firefighting equipment) will be routinely inspected by a qualified investigator for efficacy thereof and be approved by local fire services. ○ All staff on site will be made aware of general fire prevention and control methods, and the name of the responsible person to alert to the presence of a fire. ○ Burning of waste is not permitted. ○ Suitable precautions will be taken (e.g. suitable fire extinguishers, water bowsers, welding curtains) when working with welding or grinding equipment. ○ Designated smoking areas should be provided, with special bins for discarding of cigarette butts.	• Transnet Construction Manager, Transnet EO and ECO – checking. • Contractor to implement management actions.	• Appropriate emergency response aligned with the Port • Signage registers. • Incident register. • Spill kit registers. • Environmental awareness training records for spillages and fires.
Accidental Leaks and Spillages - ○ Proper emergency response procedure (as per Transnet ENV – STD – 002 – Rev 02) to be in place for dealing with spill or leaks. ○ Ensure that the necessary materials and		

Management Actions	Responsibilities	Monitoring Requirements
equipment for dealing with spills and leaks are available on site, where practicable. ○ In the event of a hydrocarbon spill, the source of the spillage will be isolated and contained. The area will be cordoned off and secured. ○ The Contractor will ensure that there is always a supply of an appropriate absorbent material readily available to absorb, breakdown and where possible, encapsulate a minor hydrocarbon spillage. ○ All staff on site will be made aware of actions to be taken in case of a spillage. ○ Provide contact details of person to be notified in a case of spillages – signage to be displayed at strategic points within the construction domain (e.g. workshop, fuel storage area, hazardous material containers). ○ Proper emergency response procedure to be in place for dealing with spills and leaks. ○ Section 30 emergency incidents must be reported to the authorities as required by legislation.		

14.2.3 Management of Health and Safety	
Management Objective	A safe working environment for contractors/construction workers and the public is provided.
Management target	1. An approved Health and Safety Plan for all construction activity is in place. 2. No incidents. 3. Compliance with the Occupational Health and Safety Act (Act No. 85 of 1993), Construction Regulations (2003) and other relevant regulations.

Management Actions	Responsibilities	Monitoring Requirements
Appointed Safety Agent. Contractor to submit a Health and Safety Plan, prepared in accordance with the Health and Safety Specification, for approval prior to the commencement of work. Two-Way Radio Systems should be used where cell phone coverage is poor. All construction personal must be clearly identifiable. All employees must also be issued with employee cards for identification purposes. All workers will be supplied with the required Personal Protective Equipment as per the Occupational Health and Safety Act (Act No. 85 of 1993). Fencing and barriers will be in place in accordance with the Occupational Health and Safety Act (Act No. 85 of 1993). Applicable notice boards and hazard warning notices will be put in place and secured. Night hazards will be indicated suitably (e.g. reflectors, lighting, traffic	• Transnet Construction Manager, Transnet EO and ECO – checking that Safety agent is appointed. • Dedicated Occupational Health and Safety system to be implemented by Contractor's Safety Officer. To be monitored and audited by the Client's Safety Agent, in terms of the Construction Regulations (2003). • Contractor to implement management actions.	• Occupational Health and Safety system – checked by Safety Agent. • Safety Agent appointment.

Management Actions	Responsibilities	Monitoring Requirements
signage).		
Maintain access control to prevent access of the public to the construction areas, as far as practicable.		

14.2.4 Environmental Awareness Creation

Management Objective	Environmental awareness creation and training is undertaken throughout the construction phase in order to minimise environmental impacts and ensure compliance to relevant legislation and authorisations.
Management target	1. All workers/employees to undergo specific environmental training focusing on mitigation measures related to all sensitive features. 2. All employees to have completed appropriate environmental training. 3. A record of environmental training undertaken is kept on site.

Management Actions	Responsibilities	Monitoring Requirements
ECO to induct relevant contractor managers at the start of the project. This induction should provide an overview of the authorisation and the EMPr. The environmental awareness training course for management shall include all management and foremen.	• Transnet Construction Manager, Transnet EO and ECO - checking. • ECO to induct contractor managers • Transnet EO to provide material for training to contractor • Contractor to implement management actions.	• Records of environmental training and awareness creation. • Training material. • Training attendance registers.
The Contractor must arrange that all of his employees and those of his sub-contractor go through the project specific environmental awareness training courses before the commencement of construction and as and when new staff or sub-contractors are brought on site. A system must be in place to ensure all new employees have received training.		
All attendees shall remain for the duration of the course and sign an attendance register that clearly indicates participant's names on completion. A copy of the attendance register is to be retained by the Environmental Officer.		

Management Actions	Responsibilities	Monitoring Requirements
The Contractor shall allow for sufficient sessions to train all personnel.		
Subsequent sessions should be run for any new personnel coming onto site;		
A Method Statement with respect to the organisation of these courses shall be submitted.		
Revised training shall be conducted as and when required.		
The environmental awareness training course for site staff and labour shall be presented by the Contractor from material provided by the EO unless otherwise indicated in the Project Specification		
Proof of induction of all staff and sub-contractors will be required to be kept on file		
The environmental training is compulsory for all employees and structured in accordance with their relevant rank, level and responsibility, as well as the Environmental Specification as they apply to the works and site.		
Specific modules should be developed in regards to: • Sensitive areas such as Little Lagoon, Central Sandbank and Bayhead Mangroves; • Heritage; • Dewatering; and • Waste Management.		
Stringent and dedicated control of poaching and illegal fishing by contractor's staff (zero tolerance).		

14.2.5 Site Establishment	
Management Objective	Minimise environmental impacts associated with site establishment.
Management targets	1. No damage to sensitive environmental features during site establishment. 2. No damage to sensitive environmental features during establishment of construction camp. 3. Site layout endorsed by Transnet Construction Manager. 4. No access or encroachment into no-go areas. 5. No justifiable complaints regarding general disturbance and nuisance received from the affected landowners.

Management Actions	Responsibilities	Monitoring Requirements
Locate construction camp in area where sensitive environmental features will not be impacted on. The location should be approved by the Transnet Construction Manager and Transnet EO.	• Transnet Construction Manager, Transnet EO and ECO - checking • Contractor to implement management actions.	• Barricading and signage register. • Proof of approval of site camp by Transnet Construction Manager and Transnet EO. • Access control register (security checkpoint/ visitor's logbook)
Construction camp should be fenced and access control should be exercised.		
Control the movement of all vehicles and plant (including suppliers), such that they remain on designated routes and comply with relevant agreements.		
Minimise noise as much as possible.		
Minimise disturbance from lighting of the construction camp and site. For example, limit the height from which floodlights are fixed, identifying zones and directions of high and low lighting requirements with the focus of the lights being inward, rather than outward, avoid directing the light towards the direction from where it would be most visible, without compromising safety.		

14.2.6 Management of Labour Force	
Management Objective	Proper management of labour force is undertaken to ensure that: ○ There are no security-related issues or disturbance to tenants or landowners outside the Port of Durban. ○ There is optimal use of local labourers. ○ There is no disturbance to sensitive environmental features
Management targets	1. No complaints from landowners or tenants regarding trespassing or misconduct by construction workers. 2. No illegal fishing by labourers. 3. No cutting down of Mangrove vegetation. 4. All unskilled labour to be sourced from local communities. 5. Supplier Development and BBBEE targets of Transnet are met.

Management Actions	Responsibilities	Monitoring Requirements
Supplier development and BBBEE target should be included in contractor documents in line with Transnet's supplier development policy.	• Transnet to ensure that employment targets are included in contracts. • Transnet Construction Manager, Transnet EO and ECO – checking. • Contractor to implement management actions	• Labour-related targets. • Construction worker ID cards
Prevent trespassing of construction workers on private property (outside the Port of Durban) or tenant areas (within the Port of Durban).		
Construction workers to clearly identifiable.		
Machine / vehicle operators shall receive clear instructions to remain within demarcated access routes		

Management Actions	Responsibilities	Monitoring Requirements
and construction areas.		
Designated smoking areas should be provided, with special bins for discarding of cigarette butts.		
Create opportunities for the employment of women as far as possible.		
Where possible use labour-intensive methods of construction.		
Use local labour as far as possible.		

14.2.7 Management of Ablution Facilities

Management Objective	Minimise environmental impacts associated with ablution facilities.
Management targets	1. No environmental contamination associated with ablution facilities. 2. Minimise visual impact associated with ablution facilities.

Management Actions	Responsibilities	Monitoring Requirements
Provide sufficient ablution facilities (e.g. mobile / portable / VIP toilets), which conform to all relevant health and safety standards and codes.	• Transnet Construction Manager, Transnet EO and ECO – checking. • Contractor to implement management actions.	• Maintenance register for ablution facilities. • Disposal certificates.
Ablution facilities must be located in such a way that they are accessible to the workforce but do not in any way negatively impact Durban Bay Estuary.		
A sufficient number of toilets shall be provided to accommodate the number of personnel working in any given area. Toilet facilities supplied by the Contractor for the workers shall occur at a maximum ratio of 1 toilet per 15 workers.		
All temporary / portable / mobile toilets shall be secured to the ground to prevent them from toppling over due to wind or any other cause.		
Ensure utilisation, maintenance and management of toilet, wash and waste facilities.		
The entrances to the toilets will be adequately screened from public view.		
Toilet facilities to be maintained in a hygienic state and serviced regularly.		

Management Actions	Responsibilities	Monitoring Requirements
Toilet paper to be provided.		
The Contractor will ensure that no spillage occurs when the toilets are cleaned or emptied and that a licensed service provider removes the contents from site. Disposal of such waste is only acceptable at a licensed sewerage disposal facility. All disposal slips should be kept on site.		

14.2.8 Waste Management – Avoidance and Reduction	
Management Objective	Reduce the generation of waste by changing behaviours of contractors throughout the Landside Infrastructure Development.
Management target	1. Waste management objectives should be included in all service level agreements/contracts. 2. All contractors to provide feedback on waste reduction and avoidance practices.

Management Actions	Responsibilities	Monitoring Requirements
Avoidance and reduction should be practiced wherever possible. Recommended actions include, but are not limited to • Bulk buying of materials to reduce the volume of packaging required. • Avoidance of materials/items/brands that are heavily packaged, have a short lifespan or are low quality. • Buying items that last longer and can be repaired. • Buying items in refillable containers. • Environmental awareness training should focus on management of waste and all construction workers should be aware of the importance of waste minimisation and avoidance.	• Transnet Construction Manager, Transnet EO and ECO – checking. • Contractor to implement management actions.	• Records of avoidance and reduction • Environmental awareness training – waste.

14.2.9 Waste Management - Re-Use	
Management Objective	Re-use waste generated by the Landside Infrastructure Development thereby resulting in decreased waste disposal volumes.
Management target	3. Waste management objectives should be included in all service level agreements/contracts. 4. All contractors to provide feedback on re-use techniques employed. 5. All waste generated should be separated at the source to facilitate waste re-use.

Management Actions	Responsibilities	Monitoring Requirements
Re-Use should be practiced wherever possible. Recommended actions include: but are not limited to: • Waste generators must segregate wastes into different categories to facilitate the reuse/ Skip/bin or waste receptacle has a signage indicating what can go in it. • Oil drums to be re-used where possible. • Plastic containers should be re-used for storage where possible (i.e. no hazardous containers to be re-used) • Employees should be encouraged to bring re-usable mugs and glasses. • Use of plastic water bottles during meetings should be discouraged. • Where possible, steel should be re-used in the construction of the associated berth infrastructure. • Construction rubble should be re-used for levelling purposes where possible.	• Transnet Construction Manager, Transnet EO and ECO - checking. • Contractor to implement management actions.	• Records of re-use. • Environmental awareness training – waste.

Management Actions	Responsibilities	Monitoring Requirements
Contaminated rubble and hazardous material storage containers from the Straddle Crane Storage Yard **may not be re-used.**		

14.2.10 Waste Management - Recycling	
Management Objective	Waste separation and recycling must be undertaken as part of the Landside Infrastructure Development.
Management target	1. Waste management objectives should be included in all service level agreements/contracts. 2. All waste generated should be separated at the source to facilitate recycling. 3. Separated waste which cannot be re-used should be collected by third party recycling contractors for recycling.

Management Actions	Responsibilities	Monitoring Requirements
Recycling should be practiced whenever waste prevention or reuse is not possible, provided that any such recycling is cost effective, taking into consideration environmental benefits, financial costs and community interests. Potential priority recyclable waste streams include: • Used Oil • Paper • Glass • Tyres • Plastics • Building rubble • Electronic waste. To reduce or avoid the need for sorting after collection, the categories of distinctively marked waste receptacles must be provided in order to receive waste as it is generated.	• Transnet Construction Manager, Transnet EO and ECO - checking. • Contractor to implement management actions.	• Recycling collection slips. • Environmental awareness training – waste. • Recycling bins.

Management Actions	Responsibilities	Monitoring Requirements
These receptacles shall be fitted with a tight cover. All types of waste collection receptacles shall be clearly marked with the type of waste they are receiving.		
Obtain and label recycling containers for office waste, aluminium, steel, glass, ferrous metals, nonferrous metals, waste timber.		
Locate these containers within temporary office buildings and trailers.		
Establish a recycled material collection schedule.		
Arrange full bins to be hauled away.		

14.2.11 Waste Management - Disposal	
Management Objective	Waste generated during the Landside Infrastructure Development to be disposed of at licenced landfills.
Management target	1. Waste management objectives should be included in all service level agreements/contracts. 2. All waste which cannot be reused or recycled should be disposed of at a licenced landfill site.

Management Actions	Responsibilities	Monitoring Requirements
The contractor is responsible for removal of all waste from the site, generated through the contractor's activities. The contractor shall ensure that all waste is removed to an appropriate licenced waste management facilities (the following source may be utilised – www.sawic.org.za). The classification of waste determines the handling methods and the ultimate disposal of the material. The contractor shall manage hazardous waste that are anticipated to be generated by his operations as follows: • Characterise the waste to determine if it is general or hazardous (Use the Appendix 1 of the Norms and Standards for the Classification of Waste for landfill to determine whether additional classification is required). • Obtain and provide an acceptable container with a label. • Place hazardous waste material in the container. • Haul the full container to the licenced and correct disposal site.	• Transnet Construction Manager, Transnet EO and ECO - checking. • Contractor to implement management actions.	• Waste Collection slips. • Waste Disposal Slips. • Transportation permits. • Evidence of waste site inspections. • Contractor's method statement regarding waste management.

Management Actions	Responsibilities	Monitoring Requirements
• Provide documentary evidence of proper disposal of the waste.		
Provide waste skips on site. These skips should be sufficient in number, the skip storage area should be kept clean, skips should be emptied and replaced before overflowing or spillage occurs. Skips should be covered to prevent waste blowing away.		
Vermin / weatherproof bins will be provided in sufficient numbers and capacity to store domestic waste. These bins must be kept closed to reduce odour build-up and emptied regularly to avoid overfilling and other associated nuisances.		
Ensure that solid waste is transported so as to avoid waste spills en-route.		
No waste shall be buried or burned anywhere on the construction site.		
Permits to transport/dispose of waste must be in place.		

14.2.12 Waste Management - General	
Management Objective	Minimal environmental impacts associated with waste.
Management target	1. No littering on construction site. 2. Maintain a clean and tidy construction site. 3. 100% record of all waste generated and disposed at waste disposal facilities. 4. Valid disposal certificates for all waste disposed. 5. Provision of adequate waste containers that are easily accessible and maintained. 6. Waste bins to be removed and cleaned as and when required.

Management Actions	Responsibilities	Monitoring Requirements
Waste management activities must comply with the National Environmental Management: Waste Act (No. 59 of 2008).	• Transnet Construction Manager, Transnet EO and ECO - checking. • Contractor to implement management actions.	• Waste disposal certificates. • Contractor's method statement. • Daily reporting.
Only temporary storage of waste is allowed (once of storage of waste for a period less than 90 days). The volume of material should be limited to less than 100m^3 of general waste and less than 80m^3 of hazardous waste. Should this be exceeded the Norms and Standards for the Storage of Waste will need to be complied with.		
Waste management objectives are included in Service Level Agreements/Contracts.		
Ensure suitable housekeeping.		
The Contractor will ensure that no burying, dumping or burning of waste materials, vegetation, litter or refuse		

Management Actions	Responsibilities	Monitoring Requirements
occurs. All waste will be disposed of at suitable licensed disposal sites, based on the waste type (general versus hazardous).		
The working area and contractor's camp must be cleared of litter on a daily basis.		
Littering shall not be tolerated.		

14.2.13 On-going Consultation with Affected Parties - Construction	
Management Objective	Proper consultation is undertaken with affected parties during construction.
Management targets	1. All complaints and claims to be acknowledged within 5 working days and to be responded to within 10 working days of receipt, unless additional information and / or clarification are required. 2. No deviations from agreements made with tenants and land users.

Management Actions	Responsibilities	Monitoring Requirements
Existing Transnet communication channels need to be duly respected and adhered to. Complaints or liaisons with landowners with regard to environmental aspects, compensation or disturbance to activities, must be recorded, reported to the correct person and a record of the response is to be entered in the complaints register. List of all tenants' details within 100m of the site so that they can be notified in the event of an emergency.	• Transnet Construction Manager, Transnet EO and ECO - checking. • Contractor to implement management actions.	• Evidence of ongoing consultation (minutes, newsletters) • Responses to complaints. • List of tenants.

14.2.14 Management of Environmental Monitoring	
Management Objective	Water quality monitoring is undertaken to ensure that the Recommended Special effluent limits for physico-chemical properties and organic and inorganic constituents are met
Management target	1. Water quality monitoring undertaken prior to discharge. 2. Discharged water meets the Recommended Special effluent limits for physico-chemical properties and organic and inorganic constituents

Management Actions	Responsibilities	Monitoring Requirements
Water quality monitoring to be undertaken groundwater prior to discharge of this water into the Bay. The Recommended Special effluent limits for physico-chemical properties and organic and inorganic constituents of the effluent as described in Anchor, 2016 must be met prior to dewatering. Should these not be met, dispersion modelling must be undertaken to confirm impacts on the receiving environment.	• Transnet to appoint suitable specialists for water quality monitoring • Transnet Construction Manager, Transnet EO and ECO – checking. • Contractor to implement management actions.	• Specialist appointments • Monitoring results

14.2.15 Management of Storage and Handling of Hazardous and Non-Hazardous Material	
Management Objective	Effective and safe management of hazardous and non-hazardous materials on site, in order to minimise the impact of materials on the environment.
Management target	1. No pollution due to handling, use and storage of non-hazardous or hazardous material. 2. In the event of a spill, appropriate containment, clean up and disposal of material.

Management Actions	Responsibilities	Monitoring Requirements
Non-hazardous materials to be suitably stored to prevent environmental contamination and visual impacts. Storage requirements to be determined based on chemical qualities of material and Material Safety Data Sheets (MSDS).	• Transnet Construction Manager, Transnet EO and ECO - checking. • Contractor to implement management actions.	• MSDS register. • Site plan. • Signage register. • Training register. • Disposal certificates. • Site plan. • Names and numbers of cleaning companies on site. • HCS registers. • Incident register
Where required, stored Non-hazardous materials to be protected from rain and run-off to avoid environmental contamination.		
Non-hazardous materials to be appropriately transported to avoid environmental contamination. Loose loads (e.g. sand, stone chip, refuse, paper and cement) to be covered.		
Suitable remedial measures, depending on the nature of the contaminant and the receiving environment, to be instituted for spillages.		
Non-hazardous materials to be suitably used to prevent environmental contamination.		
Hazardous and non-hazardous material storage areas must be located in such a way that they do not negatively affect Durban Bay Estuary. They should be located on existing hard surfaces. If possible, storage		

Management Actions	Responsibilities	Monitoring Requirements
areas should be located 100m from the edge of the estuary water line.		
Adequate signage of non-hazardous storage areas must be place.		
Hazardous substances must be stored and handled in accordance with the appropriate legislation and standards, which include the Hazardous Substances Act (Act No. 15 of 1973), the Occupational Health and Safety Act (No. 85 of 1993), relevant associated Regulations, and applicable SANS and international standards.		
Storage and use of hazardous materials will be strictly controlled to prevent environmental contamination, and must adhere to the requirements stipulated on the MSDS.		
Staff that will be handling hazardous materials must be trained to do so.		
Any hazardous materials (apart from fuel) must be stored within a lockable store with a sealed floor. Suitable ventilation to be provided.		
All storage tanks containing hazardous materials must be placed in bunded containment areas with impermeable surfaces. The bunded area must be able to contain 110% of the total volume of the stored hazardous material.		
MSDSs, which contain the necessary information pertaining to a specific hazardous substance, must be present for all hazardous materials stored on the site.		
In the event of spillages of hazardous substances the appropriate clean up and disposal measures are to be		

Management Actions	Responsibilities	Monitoring Requirements
implemented.		
Hazardous materials will be disposed of at appropriately registered sites or handed to registered hazardous waste disposal facilities for disposal / recycling.		
Proper and timeous notification of any pollution incidents associated with hazardous materials.		
Where required, stored material to be protected from rain and run-off to avoid environmental contamination.		
A lockable and roofed structure must be erected on an impermeable surface (e.g. concrete slab) for storing materials, equipment, chemicals etc.		
All storage facilities including bund walls must be inspected for leaks and corrosion on a regular basis.		
The accidental or negligent spillage of any fuels or hazardous substances must be cleaned up immediately using the most appropriate methodologies, equipment and materials.		
The contractor must ensure that necessary materials and equipment are available on site to deal with spills of any hazardous materials present.		
Spill contingency plans must include the procedure to distinguish between spills which can be cleaned up by the contractor and those that require specialist input. The name and contact numbers of various clean up companies must be posted and visible at the construction camp and site office.		
The ECO and Transnet EO must be notified of any spills.		
Hazardous Chemical Substances (HCS) containers and equipment (e.g. pumps/ generators) to be placed inside		

Management Actions	Responsibilities	Monitoring Requirements
drip trays when used temporarily on site		
HCS to be stored in a designated facility which must meet the following requirements: • Earthed; • Fire extinguisher must be present; and • Relevant signage to be displayed: o No Smoking/ No open flames; o Hazardous Chemical Substance Store; o Type of HCS (e.g. Diesel); o Maximum contents volume; o Fire extinguisher.		

14.2.16 Management of Workshop and Equipment	
Management Objective	Minimal environmental impacts associated with the management of workshops and equipment.
Management target	1. No environmental contamination associated with workshops and equipment use.

Management Actions	Responsibilities	Monitoring Requirements
Maintenance of equipment and vehicles is not allowed at the construction site. Faulty equipment must be removed from site and repaired at a workshop.	• Transnet Construction Manager, Transnet EO and ECO – checking. • Contractor to implement management actions.	• Evidence of spillages. • Training register. • Water quality testing results. • Waste disposal slips. • Emergency spill kit registers. • Oil separator checks.
No washing of plant outside of designated wash bay		
A designated vehicle wash bay must be put in place and must meet the following requirements: • Must have an impermeable surface. • Must have drainage measures in place to direct contaminated water towards the oil separator. • Quality of water to be tested prior to release. If not safe then contaminated water must be disposed of as hazardous waste at a licensed waste disposal facility. Safe disposal certificates to be obtained from the final disposal facility. • Emergency spill kit.		
A designated concrete wash bay's must be used for washing of concrete mixers etc.		
Drip trays will be provided for the stationary plant and for the "parked" plant.		
All vehicles and equipment will be kept in good working order and serviced regularly. Leaking equipment will be repaired immediately or removed from the site.		
Suitable storage and disposal of hydraulic fluids and		

Management Actions	Responsibilities	Monitoring Requirements
other vehicle oils.		

14.2.17 Management of Pollution Generation Potential	
Management Objective	Ensure that all possible causes of pollution are mitigated as far as possible to minimise impacts to the surrounding environment (Durban Bay Estuary). Minimise risk of pollution. Prevent polluted water from entering the marine environment. Minimise noise disturbance to surrounding areas

Management target	1. No complaints regarding pollution.
	2. No measurable signs of pollution.
	3. Dust fallout -
	a. Fenceline sites = Industrial Band (600 to 1200 mg/m^2/day);
	b. Community sites = Residential Band (< 600 mg/m^2/day);
	c. Comply with ASTM D1739; SANS 1929, SANS 69.
	4. Particulate matter (PM_{10}) -
	a. 24 hr = 120 µg/m^3 (more than four times a year);
	b. Annual = 50 µg/m^3;
	c. Comply with the National Ambient Air Quality Standards.
	5. Noise -
	a. Comply with SANS 10103:2008 when in areas within audible distance of residents or tenants, OHSAS requirements and baseline noise levels.

Management Actions	Responsibilities	Monitoring Requirements
Noise - ○ The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or tenants. ○ Construction activities should not increase noise levels to more than 7db above the current	• Transnet Construction Manager, Transnet EO and ECO - checking. • Contractor to implement management actions. • Contractor to conduct environmental monitoring for air quality (dust and PM_{10}), noise	• Incident register. • Review periodic results from environmental monitoring (water quality, air and dust PM_{10}, noise).

Management Actions	Responsibilities	Monitoring Requirements
ambient noise levels. ○ No amplified music will be allowed on the site. The use of radios, tape recorders, compact disc players, television sets etc. will not be permitted unless at a level that does not serve as an intrusion to adjacent land-owners or tenants. ○ The Contractor will take preventative measures (e.g. screening, muffling, timing and pre-notification of affected parties) to minimise complaints regarding noise and vibration nuisances from sources such as power tools. ○ All equipment to be properly maintained to reduce unnecessary noise and must be kept in proper working order. **<u>Dust</u> -** ○ Appropriate dust suppression measures or temporary stabilising mechanisms to be used when dust generation is unavoidable (e.g. dampening with water, chemical soil binders, straw, brush packs, chipping), particularly during prolonged periods of dry weather. Dust suppression to be undertaken for all bare areas, including stockpile areas etc. ○ Speed limits to be strictly adhered to. ○ The Contractor will take preventative measures to minimise complaints regarding dust nuisances (e.g. screening, dust control, timing, pre-notification of affected parties).	and water quality.	

Management Actions	Responsibilities	Monitoring Requirements
Lights - ○ Prior to construction the position and type of lighting will be planned to ensure unnecessary light pollution will be eliminated. ○ All lighting installed on site must not lead to unacceptable light pollution to the surrounding community and natural environment (e.g. use of down-lighters).		
Erosion - ○ The construction camp, site offices, ablution facilities and storage areas must all be established on existing paved or concrete areas to prevent any erosion.		
Cement and Concrete Batching - ○ Cement mixing to take place on an impervious surface (e.g. plastic or cement mixing pit). ○ Batching operations to take place in a designated area, which will be kept clean at all times. ○ Batching operations to take place in a designated area which is 100m away from the edge of Durban Bay Estuary. ○ Separation of clean and dirty water from batching plant. ○ Contaminated water will not be discharged to the environment. ○ Unused cement bags will be stored in an area not exposed to the weather and packed neatly to prevent hardening or leakage of cement.		

Management Actions	Responsibilities	Monitoring Requirements
○ Used cement bags will be stored so as to prevent windblown dust and potential water contamination. Used bags will be disposed of adequately. ○ Concrete transportation will not result in spillage. ○ Cleaning of equipment and flushing of mixers should not result in pollution, with all contaminated wash water entering the waste water collection system. ○ To prevent spillage onto roads, ready mix trucks will rinse off the delivery shoot into a suitable sump prior to leaving the site. ○ Suitable screening and containment will be in place to prevent windblown contamination from cement storage, mixing, loading and batching operations. ○ All contaminated water and fines from exposed aggregate finishes will be collected and stored in sumps and will be adequately disposed of. ○ All visible remains of excess concrete will be physically removed on completion of the plastering or concrete pouring and disposed of in an acceptable manner.		
Waste Water - ○ The contractor is to ensure that clean run-off water is diverted away from potentially contaminated areas of the Camp. ○ Contaminated liquids and soil from the site must be disposed of at a permitted disposal site.		

Management Actions	Responsibilities	Monitoring Requirements
○ All waste water and contaminated run-off must be dealt with accordingly.		

14.2.18 Management of Electrical Services	
Management Objective	Ensure electrical services are not impacted or disrupted during construction.
Management target	1. No unplanned disruption to electrical services to tenants and land users around the Port. 2. No impact to electrical services outside the construction footprint. 3. Any electrical substations or services which are decommissioned during the upgrade must be adequately re-commissioned before project handover.

Management Actions	Responsibilities	Monitoring Requirements
Ethekwini's Electricity main records (1 Jeff Taylor Crecsent) must be consulted prior to commencement of activities to determine the exact location of electrical services.	• Transnet Construction Manager, Transnet EO and ECO – checking. • Contractor to implement management actions.	• Contractor's method statement. • Electrical records • Proof of consultation with Ethekwini's Electricity main records.

14.2.19 Management of Avifauna	
Management Objective	Minimal disturbance to avifauna occurs during the Landside Infrastructure Development
Management target	1. Minimal disturbance to avifauna

Management Actions	Responsibilities	Monitoring Requirements
Noise - ○ Noise should be minimised as far as possible. ○ The Contractor will take preventative measures to minimise noise and vibration nuisances from sources such as power tools. ○ All equipment to be properly maintained to reduce unnecessary noise and must be kept in proper working order.	• Transnet Construction Manager, Transnet EO and ECO - checking. • Contractor to implement management actions.	• Contractors method statement. • Evidence of environmental awareness training
Lights - ○ Prior to construction the position and type of lighting will be planned to ensure unnecessary light pollution will be eliminated. ○ All lighting installed on site must not lead to unacceptable light pollution to the natural environment (e.g. use of down-lighters).		
Stringent and dedicated control of poaching through environmental awareness training and zero tolerance to poaching by contractors' staff.		
Photographs/posters of protected and sensitive avifauna species must be displayed in the construction camp to heighten awareness. It should be noted that Birdlife Port Natal has offered to assist in the provision of posters.		

14.2.20 Management of Durban Bay Estuary including Little Lagoon, Central Sandbank and Bayhead Mangroves*	
Management Objective	Durban Bay, Little Lagoon, Central Sandbank and Bayhead Mangroves are protected and incur minimal negative indirect impact to water quality from construction activities including the discharge of water from excavations.
Management target	1. Access to the Bayhead Mangroves and Little Lagoon is restricted and controlled. 2. Contractors and workers are aware of the importance and sensitivity of the Little Lagoon and Bayhead Mangroves. 3. Environmental awareness programme to highlight the importance of the Little Lagoon, Durban Bay Estuary, Central Sandbank and Bayhead Mangroves. 4. Minimal impact to water quality through construction activities including dewatering. 5. No felling of Mangroves for illegal fires. 6. No illegal fishing. 7. Water quality to remain within acceptable ranges, as determined through baseline monitoring.

Management Actions	Responsibilities	Monitoring Requirements
• **<u>Water quality – general</u>** ○ Diffuse pollution sources to be managed to prevent pollution of the Estuary and all spillages should be cleaned out thoroughly to prevent contamination of surface run off. ○ Ablution facilities must be located in such a way that they are accessible to the workforce but do not in any way negatively impact Durban Bay Estuary. ○ Ensure proper storage of material (including fuel, paint) that could cause water pollution. ○ Ensure proper storage and careful handling of hazardous substances with spill prevention materials at hand.	• Transnet Construction Manager, Transnet EO and ECO - checking. • Contractor to implement management actions. • Contractor to conduct environmental monitoring for air quality (dust and PM_{10}), noise and water quality.	• Incident register. • Review periodic results from environmental monitoring (water quality, air and dust PM_{10}, noise). • Monitoring results prior to dewatering.

Management Actions	Responsibilities	Monitoring Requirements
○ Barges and dredging machinery to be maintained to prevent any oil and diesel pollution during waterside construction activities. ○ Spill management method statements for in situ concrete works to be developed) to ensure adequate management of any spills. ○ Ensure all water quality and pollution general mitigation measures are adhered to. ○ Adequate environmental awareness to ensure construction labourers do not pollute Durban Bay Estuary.		
Water quality monitoring to be undertaken on water in excavations prior to discharging of the water into the Bay. The Recommended Special effluent limits for physico-chemical properties and organic and inorganic constituents of the effluent as described in Anchor, 2016 must be met prior to dewatering. Should these not be met, dispersion modelling must be undertaken to confirm impacts on the receiving environment.		

** Note – The project construction footprint does not impact on the Central Sandbank, Little Lagoon or Bayhead Mangroves. However, due to their ecological importance, special mitigation measures are provided to ensure no indirect impacts.*

14.2.21 Management of Archaeological and Cultural Features	
Management Objective	*Archaeological and cultural resources are not moved or damaged unless with prior approval from Amafa aKwaZulu-Natali.**
Management target	1. *No archaeological and cultural resources or graves to be damaged during construction*.*

Management Actions	Responsibilities	Monitoring Requirements
Should any heritage remains be exposed during excavations or any actions on the site, these must be immediately reported to the Transnet Construction Manager, EO and ECO as well as the provincial heritage authority, in accordance with the applicable legislation.	• Proponent - acquire permits (if required). • Transnet Construction Manager, Transnet EO and ECO - checking. • Contractor to implement management actions.	• Incident reports • Contractor's method statements • Permits (if required) • Notification of heritage authorities (f required)
The contractors and workers should be notified that archaeological sites might be exposed during the construction activities.		
Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer and Transnet and contractor EO and Transnet Construction Manager shall be notified as soon as possible;		
All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the ECO will advise the necessary actions to be taken;		
Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site.		

Management Actions	Responsibilities	Monitoring Requirements
Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the NHRA (Act No. 25 of 1999), Section 51. (1).		
A person or entity, e.g. Transnet Construction Manager/Relevant Transnet official, should be tasked to take responsibility for any heritage sites that may be uncovered. This person must take responsibility to contact the heritage practitioner to assess any sites uncovered during the project.		
Permits to be obtained in terms of the KZN Heritage Act (Act No. 04 of 2008) if heritage resources are to be impacted on and for the removal of graves.*		
Exhumation and relocation of graves once families and affected communities have been consulted and permission received for relocation. All cultural practices in terms of removal of graves as requested by family / community to be complied with.*		
Under no circumstances may any heritage material be destroyed or removed from site.*		
Should any remains be found on site that is potentially human remains, the South African Police Service should also be contacted.*		

*Note: *Buildings at Landside Infrastructure were built less than 60 years ago and no heritage resources were identified at the quay walls however, the heritage specialist noted that heritage may be uncovered during construction.*

14.2.22 Management of Road Upgrades/Repairs	
Management Objective	Selective road repairs have no impact on sensitive environmental features such as the Bayhead mangroves.
Management target	1. Selective road repairs to occur within existing road footprint. 2. No impact to Bayhead mangroves.

Management Actions	Responsibilities	Monitoring Requirements
Selective repairs (involving infilling of potholes and compacting) to Langeberg Road and Breede Road to be limited to the existing road footprint.	• Transnet Construction Manager, Transnet EO and ECO - checking. • Contractor to implement management actions.	• Contractor's method statements • Review periodic results from environmental monitoring (dust and noise). • Traffic management measures.
Noise - ○ Noise to be kept at a minimum. ○ The Contractor will take preventative measures to minimise complaints regarding noise and vibration nuisances from sources such as power tools. ○ All equipment to be properly maintained to reduce unnecessary noise and must be kept in proper working order.		
Dust - ○ Appropriate dust suppression measures or temporary stabilising mechanisms to be used when dust generation is unavoidable (e.g. dampening with water, chemical soil binders, straw, brush packs, chipping), particularly during prolonged periods of dry weather. Dust suppression to be undertaken for all bare areas, including stockpile areas etc. ○ Speed limits to be strictly adhered to.		

Management Actions	Responsibilities	Monitoring Requirements
○ The Contractor will take preventative measures to minimise complaints regarding dust nuisances (e.g. screening, dust control, timing, pre-notification of affected parties).		
Stringent and dedicated control of poaching through environmental awareness training and zero tolerance to poaching by contractors' staff.		
Photographs/posters of protected and sensitive species occurring in mangroves must be displayed in the construction camp to heighten awareness.		
Traffic safety measures (e.g. traffic warning signs, flagmen) to be implemented.		
Speed limit of 40km/h on public roads and 30 km/h on other roads within the Port to be adhered to.		
The movement of any vehicles and/or personnel outside of designated working areas will not be permitted.		
Access roads to be maintained in a suitable condition.		

14.2.23 Management of Reinstatement and Rehabilitation	
Management Objective	Adequate reinstatement and rehabilitation of construction areas.
Management target	3. Complete site cleanup. 4. Reinstate and rehabilitate areas disturbed by construction activities.

Management Actions	Responsibilities	Monitoring Requirements
After the construction phase, the landside infrastructure construction area must be reinstated to the same or better condition than it was prior to construction.	• Transnet Construction Manager, Transnet EO and ECO - checking. • Contractor to implement management actions.	• Contractors' spill contingency plans. • Reinstatement and rehabilitation sign off documents. • Waste disposal slips. • Incident register.
Clear and completely remove from site all construction plant, equipment, storage containers, temporary fencing, temporary services, and fixtures.		
Ensure that all access roads utilised during construction are returned to a usable state and/or a state no worse than prior to construction.		
Clear the site of all inert waste and rubble, including surplus rock, foundations and batching plant aggregates. After the material has been removed, the site shall be re-instated and rehabilitated to a level equal to or better than prior to construction.		
Load and haul excess spoil and inert rubble to dump sites indicated/approved by the Transnet Construction Manager.		
Remove from site all domestic waste and dispose of in the approved manner at a registered waste disposal site.		

Management Actions	Responsibilities	Monitoring Requirements
Remove from site all pollution containment structures.		
Remove from site all temporary sanitary infrastructure and waste water disposal systems. Take care to avoid leaks, overflows and spills and dispose of any waste in the approved manner.		
Control invasive plant species and noxious weeds by means of extraction, cutting or other approved methods if required.		
Establish further specifications for maintenance.		

14.3 Operation

The operational phase activities related to the Landside Infrastructure include management of office and staff, management of waste, maintenance of infrastructure and management of facilities including the greywater system.

14.3.1 General Environmental Management

Note that where any activity and aspect associated with the operational phase of the project coincides with the receiving environment and activities of the construction phase (see Section 14.1), the same management requirements will apply.

14.3.2 Greywater Management

The following mitigation measures apply to the management of the greywater system which will be in place.

- All measures must be taken to prevent any contamination which could impact on soil, surface and groundwater during leaks and ruptures.
- The grey water system should include fail-safes to divert grey water to municipal system should the system fail due to a malfunction.
- During commissioning, the grey water system should be tested to any and all requirements of SANS 10252 and SANS 10400 with reference to waste water piping and storage.

14.3.3 Waste Management

The proposed development will result in waste generation during the operational phase. The waste minimisation hierarchy must be practiced where possible. The following is recommended:

- Avoidance and reduction should be practiced wherever possible. Recommended actions include: but are not limited to
    - Bulk buying of materials to reduce the volume of packaging required.
    - Avoidance of materials/items/brands that are heavily packaged, have a short lifespan or are low quality.
    - Buying items that last longer and can be repaired.
    - Buying items in refillable containers.

  - Environmental awareness training should focus on management of waste and all construction workers should be aware of the importance of waste minimisation and avoidance.

- Re-Use should be practiced wherever possible. Recommended actions include: but are not limited to:
  - Waste generators must segregate wastes into different categories to facilitate the reuse/ Skip/bin or waste receptacle has a signage indicating what can go in it.
  - Oil drums to be re-used where possible.
  - Plastic containers should be re-used for storage where possible (i.e. no hazardous containers to be re-used)
  - Employees should be encouraged to bring re-usable mugs and glasses.
  - Use of plastic water bottles during meetings should be discouraged.
  - Where possible, steel should be re-used in the construction of the associated berth infrastructure.
  - Construction rubble should be re-used for levelling purposes where possible.
  - Recycling should be practiced whenever waste prevention or reuse is not possible, provided that any such recycling is cost effective, taking into consideration environmental benefits, financial costs and community interests.
- Recycling should be undertaken where possible.
  - To reduce or avoid the need for sorting after collection, the categories of distinctively marked waste receptacles must be provided in order to receive waste as it is generated.
  - These receptacles shall be fitted with a tight cover.
  - All types of waste collection receptacles shall be clearly marked with the type of waste they are receiving.
- The contractor is responsible for removal of all waste from the site, generated through the contractor's activities. The contractor shall ensure that all waste is removed to an appropriate licenced waste management facilities (the following source may be utilised – www.sawic.org.za).

- The classification of waste determines the handling methods and the ultimate disposal of the material. The contractor shall manage hazardous waste that are anticipated to be generated by his operations as follows:
    - Characterise the waste to determine if it is general or hazardous (Use the Appendix 1 of the Norms and Standards for the Classification of Waste for landfill to determine whether additional classification is required).
    - Obtain and provide an acceptable container with a label.
    - Place hazardous waste material in the container.
    - Inspect the container on a regular basis.
    - Haul the full container to the licenced and correct disposal site.
    - Provide documentary evidence of proper disposal of the waste.
    - Provide waste skips on site. These skips should be sufficient in number, the skip storage area should be kept clean, skips should be emptied and replaced before overflowing or spillage occurs. Skips should be covered to prevent waste blowing away.
    - Vermin / weatherproof bins will be provided in sufficient numbers and capacity to store domestic waste. These bins must be kept closed to reduce odour build-up and emptied regularly to avoid overfilling and other associated nuisances.
    - Ensure that solid waste is transported so as to avoid waste spills en-route.
    - No waste shall be buried or burned anywhere on the construction site.
    - Permits to transport/dispose of waste must be in place.
- Only temporary storage of waste is allowed (once of storage of waste for a period less than 90 days). The volume of material should be limited to less than 100m^3 of general waste and less than 80m^3 of hazardous waste. Should this be exceeded the Norms and Standards for the Storage of Waste will need to be complied with.
- Waste management objectives are included in Service Level Agreements/Contracts.
- Ensure suitable housekeeping. .
- No burying, dumping or burning of waste materials, vegetation, litter or refuse shall occurs. All waste will be disposed of at suitable licensed disposal sites, based on the waste type (general versus hazardous).
- Littering shall not be tolerated.
- Greywater must be properly treated to ensure no odour nuisance.

14.3.4 Water Conservation

During operation, there will be an increased water requirement which will be met through the current water services. However, water saving techniques have been taken into account in the design of the development as all water form washing basin and showers at the Central Mess and Ablution Facility will be drain to a Grewater treatment plant. The system shall comprise of two sets of tanks, the first shall be greywater storage tanks and the second set shall be processed water storage tanks and shall be able to process 9000 litres of greywater per day.

Other general mitigation measures include the following:

- Ensure that water is used sparingly.
- Repair leaks timeously.
- Proper management and maintenance of the greywater system.

14.3.5 Energy Efficiency

During operation, there will be an increased electrical requirement which will be met through the current electrical services. However, in order to reduce this impact, a number of energy efficiency mechanism has been taken into account in the design:

Central Mess and Ablution Facility:

- A high efficiency chiller is used for air-conditioning which provides economical operation. The chiller includes multiple scroll compressors that permits exact matching of the cooling capacity to the load. The chiller is equipped with variable speed condenser fans and pumps which allow the unit to operate at high part load efficiencies. At 75% load capacity the unit operates with an efficiency (kW/kW) of 3.28 which increases to 4.26 at 20%. This is important as the facility will not always be full to designed maximum capacity due to the shift changes.
- All pumps are equipped with variable speed drives which allow the pump characteristics to be matched to the load required. This allows for the most efficient usage of energy.
- The ventilation system and the air-conditioning controls are integrated with the Building Management System (BMS). Each occupied space is also equipped with occupancy sensors which allow the BMS to shut off systems that are not needed thereby saving energy. In a facility where people are only utilising certain of the areas

after a shift change this is especially important as a lot of energy could be wasted if the systems are run continuously.

- The hot water system utilises the heat from the air-conditioning to pre-heat the water in a heat recovery loop. This is an extremely efficient way to utilise the heat which would otherwise be wasted. The system also uses heat pumps instead of electric water heaters to supplement the heat recovery. Heat pumps are 70% more efficient than electric water heaters and thus save 70% of the energy that would have been consumed by the electric heaters. The heat pumps also utilise multiple parallel scroll compressors which allow the unit to operate with very high part load efficiencies.
- All pipework, fittings and storage tanks for chilled or hot water shall be insulated to prevent losses of energy.
- Passenger lifts are rated A-classification in the Energy Efficiency Classes. This is achieved through utilising regenerative drives which uses approximately 30% less energy than normal motors as well as LED lighting which uses very little energy.
- The electrical lighting design has been catered for the Energy savings light fittings to light up the central mess and ablution.

Satellite Staff Facility:

- An inverter in an air conditioner is used to control the speed of the compressor motor to drive variable refrigerant flow in an air conditioning system to control the conditioned-space temperature.
- The benefits of an inverter air conditioning compared with a noninverter air conditioning include:
    - At least 30% - 50% cheaper to run as it consumes less power;
    - Far quicker to achieve desired temperature;
    - The start-up time is reduced by 30%;
    - No temperature fluctuations, maximising comfort level; and
    - No voltage peaks from compressor.

North and East Substations

- Use of Variable Refrigerant Volume as it is more energy efficient with lower operating costs.
- Utilization of Led lighting and occupational sensors.

14.3.6 High Mast Lighting

As the proposed new high mast lighting has been designed to take into account minimising light pollution, no mitigation measures are required. However, as per the design, the 15 new high mast lights should be 45m tall and should not have stabilising lines.

14.3.7 PV System

In addition to the above mentioned energy efficiency measures described above, PV renewable energy will also be installed.

A 60kW PV grid connected systems will be put in place. The PV system will be fully grid connected and will only disconnect from grid and supply local LV distribution boards in event of total load loss “Load shedding”.

This PV system should be installed at the Central Mess and Ablution facilities as per the design in order to improve sustainability at the berths and decrease reliance on coal power.

In addition, in order to ensure that the system does not result in injury to avifauna, bird deterrents should be installed around the PV panels.

15 REFERENCES

Anchor Environmental, 2016. Marine and Estuarine Impact Assessment for the Proposed Landside Infrastructure Development, Port of Durban, KZN.

Maitland, V. 2016. Heritage Impact Assessment for the Proposed Landside Infrastructure Development, Port of Durban, KZN.

Nemai Consulting, 2016. Basic Assessment Report for the Proposed Landside Infrastructure Development, Port of Durban, KZN.

APPENDIX H

DETAILS OF EAP AND EXPERTS

1 Personal Particulars

Position:	Senior Environmental Assessment Scientist
Profession:	Environmental Management
Date of Birth:	30 August 1984
Name of Firm:	Nemai Consulting
Name of Staff:	Vanessa Stippel
Nationality:	South African
Membership of Professional Societies	Professional Member of South African Institute of Ecologists and Environmental Scientists (SAIE&ES)

2 Education:

M. Sc. Ecology, University of the Witwatersrand, South Africa, 2013

3 Employment Record:

2011 – Present Environmental Scientist, Nemai Consulting

4 Selected Consultancies

4.1 Environmental Impact Assessments and Basic Assessments

2011 Environmental Assessment Practitioner, Basic Assessment and Waste License Application for the proposed remediation of 600km of asbestos contaminated land on Transnet Properties – Group A (Port Elizabeth to De Aar), South Africa.

2011 Environmental Assessment Practitioner, Scoping and EIA for the proposed High Altitude Training Facility in Mpumalanga; South Africa.

2011 Environmental Assessment Practitioner, Basic Assessment for the proposed establishment of a resort on portion 43 of Farm Donkerhoek 312 JQ, North West Province, South Africa.

2012 Environmental Assessment Practitioner, Waste License Application for Sasol Chemical Industries, South Africa.

2012 Environmental Assessment Practitioner, Scoping and EIA for the Proposed Natref Clean Fuels II, South Africa.

2012 Environmental Assessment Practitioner, Scoping and EIA for Deepening, Lengthening and Widening of Berth 203 to 205, Pier 2, Container Terminal, Port of Durban, South Africa.

2013 Environmental Assessment Practitioner, Scoping and EIA for the proposed new Hennops Wastewater Treatment Works (WWTWs), South Africa.

2013 Environmental Assessment Practitioner, Scoping and EIA for the Upgrade of the Sunderland Wastewater Treatment Works, South Africa.

2013 Environmental Assessment Practitioner, Scoping and EIA for the proposed Rustenburg Waste Treatment Facility, South Africa.

2014 Environmental Assessment Practitioner Scoping and EIA for the proposed Syferfontein Mixed Use Housing Development, South Africa.

2015 Environmental Assessment Practitioner Basic Assessment for the Proposed Pomona Estates Housing Development;

2015 Environmental Assessment Practitioner Basic Assessment for the Proposed Esther Park Housing Development, South Africa.

2015 Environmental Assessment Practitioner Scoping and EIA for the Proposed Esselen Park Integrated Housing Development, South Africa.

2015 Environmental Assessment Practitioner Scoping and EIA for the proposed Relocation of Bloemfontein Zoo, South Africa.

2015 Environmental Assessment Practitioner Basic Assessment for the Proposed Ledig Water Supply Project, South Africa.

4.2 Environmental Monitoring and Auditing

2012 Junior Auditor, Environmental Audit of the Mooi Mgeni Transfer Scheme – Phase 2, South Africa.

2013 Senior Auditor, Environmental Audit of the Orange River Water Resource Development Project –Phase 2c, South Africa.

2012 - Environmental Control Officer – Joe Slovo Low Level Bridge, Modimolle, South Africa.

2014 – Senior Auditor, Technical Audit of the Sasol Chemical Industries and Sasol Mining Waste Storage Facilities; Sasolburg, South Africa.

2015. Junior Auditor, Update of the Johannesburg City Parks and Zoo Legal Register and Legal Compliance Audit, South Africa.

4.3 Social Impact Assessments

2012 Project Leader, Social Impact Assessment for the Nkomati Anthracite Mine, Mpumalanga, South Africa.

4.4 Strategic Planning

2012-2015 Project Leader, Boskop Dam Resource Management Plan (RMP) and Business Plan (BP), South Africa.

2012-2015 Project Leader, Midmar Dam Resource Management Plan (RMP) and Business Plan (BP), South Africa.

2012-2015 Project Leader, Craigieburn Dam Resource Management Plan (RMP) and Business Plan (BP), South Africa.

2012-2015 Project Leader, Vanderkloof Dam Resource Management Plan (RMP) and Business Plan (BP), South Africa.

2012-2015 Project Leader, Theewaterskloof Dam Resource Management Plan (RMP) and Business Plan (BP), South Africa.

2012-2015 Project Leader, Vygeboom Dam Resource Management Plan Update (RMP) and Business Plan (BP), South Africa.

2012-2015 Project Leader, Pongolapoort Dam Resource Management Plan Update (RMP) and Business Plan (BP), South Africa.

2012-2015 Project Leader, Inanda Dam Resource Management Plan Update (RMP) and Business Plan (BP), South Africa.

2012-2015 Project Leader, Hazelmere Dam Resource Management Plan Update (RMP) and Business Plan (BP), South Africa.

2012-2015 Project Leader, Grootdraai Dam Resource Management Plan (RMP) and Business Plan (BP), South Africa.

2012-2015 Project Leader, Gariep Dam Resource Management Plan (RMP) and Business Plan (BP), South Africa.

2012-2015 Project Leader, Voelvlei Dam Resource Management Plan (RMP) and Business Plan (BP), South Africa.

2012-2015 Project Leader, Wriggleswade Dam Resource Management Plan (RMP) and Business Plan (BP), South Africa.

2012-2015 Project Leader, Vaal Dam Resource Management Plan (RMP) and Business Plan (BP), South Africa.

2012-2015 Project Leader, Allemanskraal Dam Resource Management Plan (RMP) and Business Plan (BP), South Africa.

2012-2015 Project Leader, Greater Brandvlei Dam Resource Management Plan (RMP) and Business Plan (BP), South Africa.

2012-2015 Project Leader, Mthatha Dam Resource Management Plan (RMP) and Business Plan (BP), South Africa.

2013 Project team member, Mapungubwe Culture Landscape Environmental Management Framework, South Africa.

2014 Project Leader, Dr Kenneth Kaunda District Environmental Management Framework, South Africa.

2015 Project Leader, uMzinyathi District Municipality Environmental Management Framework, South Africa.

4.5 Research

Water Research Council Backyard Dwellers report

Crouch, N.R., Williams. V.L., Edwards, T.J. and Brueton, V.J. 2010. *Drimia cooperi* in Kwa-Zulu Natal and the Ethnomedicinal trade. *Bothalia.* 40(1): 75-78.

Williams, V.L., Raimondo, D., Crouch, N.R., Cunningham, A.B., Scott-Shaw, C.R., Lötter, M., Ngwenya, A.M., Brueton, V.J. and Mills, L. 2009a. *Boophone disticha*. In: Raimondo, D., von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. and Manyama, P.A. eds. 2009. Red List of South African Plants 2009. *Strelitzia 25.* South African National Biodiversity Institute, Pretoria

Williams, V.L., Raimondo, D., Crouch, N.R., Cunningham, A.B., Scott-Shaw, C.R., Lötter, M., Ngwenya, A.M., Brueton, V.J. and Mills, L. 2009b. *Crinum bulbispermum*. In: Raimondo, D., von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C.,

Kamundi, D.A. and Manyama, P.A. eds. 2009. Red List of South African Plants 2009. *Strelitzia 25.* South African National Biodiversity Institute, Pretoria

Williams, V.L., Raimondo, D., Crouch, N.R., Cunningham, A.B., Scott-Shaw, C.R., Lötter, M., Ngwenya, A.M., Brueton, V.J. and Mills, L. 2009c. *Crinum buphanoides*. In: Raimondo, D., von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. and Manyama, P.A. eds. 2009. Red List of South African Plants 2009. *Strelitzia 25.* South African National Biodiversity Institute, Pretoria

Williams, V.L., Raimondo, D., Crouch, N.R., Cunningham, A.B., Scott-Shaw, C.R., Lötter, M., Ngwenya, A.M., Brueton, V.J. and Mills, L. 2009d. *Crinum macowannii*. In: Raimondo, D., von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. and Manyama, P.A. eds. 2009. Red List of South African Plants 2009. *Strelitzia 25.* South African National Biodiversity Institute, Pretoria

Williams, V.L., Raimondo, D., Crouch, N.R., Cunningham, A.B., Scott-Shaw, C.R., Lötter, M., Ngwenya, A.M., Brueton, V.J. and Mills, L. 2009d. *Crinum moorei*. In: Raimondo, D., von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. and Manyama, P.A. eds. 2009. Red List of South African Plants 2009. *Strelitzia 25.* South African National Biodiversity Institute, Pretoria

Williams, V.L., Raimondo, D., Crouch, N.R., Cunningham, A.B., Scott-Shaw, C.R., Lötter, M., Ngwenya, A.M., Brueton, V.J. and Mills, L. 2009e. *Crinum stuhlmannii*. In: Raimondo, D., von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. and Manyama, P.A. eds. 2009. Red List of South African Plants 2009. *Strelitzia 25.* South African National Biodiversity Institute, Pretoria

Williams, V.L., Raimondo, D., Crouch, N.R., Cunningham, A.B., Scott-Shaw, C.R., Lötter, M., Ngwenya, A.M., Brueton, V.J. and Mills, L. 2009f. *Drimia altissima*. In: Raimondo, D., von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. and Manyama, P.A. eds. 2009. Red List of South African Plants 2009. *Strelitzia 25.* South African National Biodiversity Institute, Pretoria

Williams, V.L., Raimondo, D., Crouch, N.R., Cunningham, A.B., Scott-Shaw, C.R., Lötter, M., Ngwenya, A.M., Brueton, V.J. and Mills, L. 2009g. *Drimia delagoensis*. In: Raimondo, D., von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. and Manyama, P.A. eds. 2009. Red List of South African Plants 2009. *Strelitzia 25.* South African National Biodiversity Institute, Pretoria

Williams, V.L., Raimondo, D., Crouch, N.R., Cunningham, A.B., Scott-Shaw, C.R., Lötter, M., Ngwenya, A.M., Brueton, V.J. and Mills, L. 2009h. *Drimia elata*. In: Raimondo, D., von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. and Manyama, P.A. eds. 2009. Red List of South African Plants 2009. *Strelitzia 25.* South African National Biodiversity Institute, Pretoria

Williams, V.L., Raimondo, D., Crouch, N.R., Cunningham, A.B., Scott-Shaw, C.R., Lötter, M., Ngwenya, A.M., Brueton, V.J. and Mills, L. 2009i. *Drimia robusta*. In: Raimondo, D., von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. and Manyama, P.A. eds. 2009. Red List of South African Plants 2009. *Strelitzia 25.* South African National Biodiversity Institute, Pretoria

Williams, V.L., Raimondo, D., Crouch, N.R., Cunningham, A.B., Scott-Shaw, C.R., Lötter, M., Ngwenya, A.M., Brueton, V.J. and Mills, L. 2009l. *Urginea epigea*. In: Raimondo, D., von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. and Manyama, P.A. eds. 2009. Red List of South African Plants 2009. *Strelitzia 25.* South African National Biodiversity Institute, Pretoria

5 Languages:

English - excellent speaking, reading, and writing.

PERSONAL DATA

Name	Dhanashree Naidoo
Date of Birth	1973-03-27
Nationality	South African
Qualification	BSc Chemical Eng
Profession	Environmental Eng
Professional Registration	IAIA,ECSA, SAMEA

EMPLOYMENT RECORD

1995-1998 Eskom
1998-1999 Bergman Ingerop
1999- To Date Nemai Consulting

EXPERIENCE RECORD PERTINTENT TO REQUIRED SERVICE

(A) EIA's, SIA's and EMPs'

1. Project Managed and facilitated Public Participation on the Berths 203 to 205 EIA Expansion Programme. This is the only infill project in the Port of Durban in the last 10 years.
2. The uMkhomazi Water Project Phase 1 - Raw Water Component. Project Manager of the EIA for the proposed uMkhomazi Water Project. This includes a dam and associated infrastructure on the raw water side.
3. nCwabeni Dam - Project Manager of the EIA for the construction of a new raw water supply dam in Ugu in southern KwaZulu Natal.
4. Mhlabatshane Dam EIA - Project Manager of the EIA which covered the construction of a new 20m high bulk rural water supply dam in southern KwaZulu Natal. The project included the EIA for the associated Water Treatment Works.
5. The uMkhomazi Water Project Phase 1 - Raw Water Component - Project Manager of the EIA for the proposed uMkhomazi Water Project. This includes a Water Treatment Works and associated infrastructure on for the potable water side.
6. Mokolo Crocodile Water Augmentation Project, Project Manager of the EIA for the heavy engineering pipelines and water transfer scheme, Limpopo Province
7. Anderson Dinaledi Transmission Line - Project Manager of the EIA and public participation for a 80 km transmission line, with alternatives, through a the Magaliesburg Nature Conservation Area.
8. High Altitude Training Facility – Project Manager of the EIA and public participation for an international high altitude training facility in Mpumalanga. The project included access roads, WTW, WWTW and relocation of protected species. The development was designed around Green Building principles.
9. FET Colleges – Project Manager for the EIA and public participation for 16 FET Colleges around the country. This is a SIP and is a fast tracked project hence the company understands the pressure and need of presidential projects. Included are many waste licences and WULA's.

10. Resource Management Plans for 15 governement water works. Project Manager for the development of these RMPs which covered reservoirs such as the Vaal, Midmar, Loskop, Craigieburn and Hazelemere Dams.
11. Neptune Poseidon Transmission Line, Eastern Cape - Project Manager of the EIA and public participation for a 320 km transmission line, with alternatives, from East London to Fort Beaufort in the Eastern Cape
12. Performed all EIAs and prepared EMPs for Johannesburg Water sanitation and water supply capital projects for 2003-2007 financial years. Projects for which authorization was sought include expansions to Waste Water Treatment Works, outfall sewer pipelines, bulk and reticulation pipelines and pump stations. Over 50 EIA completed over this period.
13. Boksburg Cason Pipeline –Completed detailed EIA for the construction of a 53 km pipeline.
14. EIA for the Northern Waste Water Treatments Works, Unit 5, 50 Ml/day capacity.
15. Total Gas holding facilities, Senegal – Completed Environmental Impact Assessment Study for the existing infrastructure as well as a new gas sphere.
16. EIA and SIA for 180km transmission line for Eskom.
17. EIA, SIA and EMP for 280km long transmission line for Eskom.
18. EIA for Casino Development in Queenstown. Involved details Social Impact Assessment study of the project on the community and EIA because the casino is to be located in the De Lange Nature Reserve.
19. EIA for Cast Iron Pipe Factory in Pretoria. Was successful in getting the Client, Stanton from the UK, an exemption on the project.
20. EIA and EMP for pipeline for Hartbeespoortdam Local Town Council
21. EIA, EMP and SIA for Maputo Corridor
22. EIA and EMP for water reticulation project in Piet Gouws.
23. I was employed by the Inspectorate Division in Gauteng for the period from January 2000 to March 2000 as a Senior Environmental Officer.
24. EMP and social survey for the Witbank to Maputo Toll road on the Mozambican side.
25. EIA and EMP for R600 000 000 project funded by the DBSA for a 1000km long Fibre Optic Communication Line in Mozambique. The Client is TDM and the project starts in Beira in the North and runs to Maputo in the South. The entire project is in accordance to ISO 14001 standards. This was the first project of its kind in Mozambique.

(B) WASTE SECTOR

Project Details
Construction of a 50 Ml/day treatment unit (Unit 5) including sedimentation tanks, BNR activated sludge treatment and chemical dosing facility at Northern WWTW, for Johannesburg Water.
Remediation of Fine Ash 1 and 2 /Coarse Ash Dump/ Venco Capillary Break for Infrachem, a division of Sasol
Scoping/EA and IWWMP for the disposal, treatment and re-use of Fine Ash 3, 4 and 5 at Sasol.
IWWMP for the disposal of gypsum for Infrachem.
EIA and IWWMP for the storage of Hazardous Waste Material for Merisol.
BA and IWWMP for the storage of Chlor Vinyls Brine Sludge for Sasol Polymers.
BA and IWWMP for the storage of Wax Catalyst Storage for Sasal Wax.
BA and IWWMP for the storage of Solvents Catalyst Store for Sasol Solvents.
BA and IWWMP for the disposal of asbestos waste for Transnet.

Project Details
Increase in sludge treatment capacity including new lime dosing plant at Northern Works WWTW, for Johannesburg Water.
Construction of sewerage pump station in Alveda Park, for Inframax.
Construction of thickeners at the Goudkoppies WWTW, for Johannesburg Water.
Expansion of the maturation ponds at the Bushkoppies WWTW, for Johannesburg Water.
Expansion of the Olifantsvlei WWTW, for Johannesburg Water, for Johannesburg Water.
Emergency dam and pump station at the Olifantsvlei WWTW, for Johannesburg Water.
Bruma Lake Desilting combined waste licence.
N-S Strengthening Combined Applications.
Henley on Klip landfill application
Walkeville landfill closure application.
Groethoek Hosptital medical waste storage
Transwerk asbestos removal and disposal application
Rehabilitation of Transnet rail infrastructure of asbestos waste
News Clydedales spoilt material waste dump
Kwa Themba landfill closure application
IWMP for the Bojanala Platinum District Municipality
Frances Baard IWMP
Thabo Mofutsanyane District Municipality IWMP
Motheo District Municipality IWMP
Lejweleputswa District Municipality IWMP
Naledi Local Municipality IWMP
Mantsopa Local Municipality IWMP
North West Provincial IWMP
Illegal Waste Minimisation Implementation Strategy
EPWP Waste Management Strategy
Generic Waste Management Contract for Municipalities
Soweto Waste Clean-up Programmes
Midvaal IWMP

(B) WATER SECTOR RELATED PROJECTS

1) Developed Provincial Water Sector Plan Guideline.
2) Developed concept paper on Water for Growth and Development.
3) Developed checklists for EDSS.
4) Developed monitoring and auditing guidelines.
5) Input on SDMS.
6) Input on 2nd Edition CEIMP.
7) Compiled Resource Management Plans for 5 Dams

(C) ENVIRONMENTAL AUDITING AND REPORTING

1) Completed an environmental and safety audit for the decommissioning of the Grootvlei Power Station.
2) Completed an environmental and safety audit for the decommissioning of the Camden Power Station.
3) Completed an environmental audit for the decommissioning of the Komati Power Station.
4) Completed an environmental and safety audit for the Total Bottling Plant in Dakar, Senegal.
5) Completed the verification of the Rand Water Environmental Report for 2001.
6) Completed an environmental report for the Pindamondagaba development in Brazil.
7) Completed environmental auditing of all landfills in Gauteng for the provincial government.

(D) ENVIRONMENTAL ENGINEERING

1) Environmental design review of the Naphta Tar Extraction Plant at Sasol.
2) Environmental design review of the upgrade of certain process at Sapref plant.
3) Environmental design of the Total Gas Bottling Plant in Senegal.

(E) AIR, WATER AND SOIL MONITORING AND CONTROL

1) Catchment Study. Determine the impact of raw sewage in the Elands River Catchment area on the Valkopdam.
2) Catchment Study: Impact of defunct mines on water quality in the Loskopdam catchment.
3) Water quality analysis for the Jukskei and the Klipspruit Catchment.
4) Soil and Ground water monitoring, quality control and remediation measures for Collect-a-can site in Vanderbylpark. The soil was highly contaminated with various inorganic chemicals.
5) Soil, water and air quality analysis for chemical spill at the Eskom Phalaborwa sub-station site. The polluting agents were essentially phosphates.
6) Air emission control management at Eskom Power Stations. Monitoring plans were implemented to assess air emission from the stacks. Various cleaning technologies were investigated.
7) Air emission analysis at the Cast Iron Pipe Factory in Pretoria. Review and compared smelter technologies. This formed part of the EIA study for the construction of a new plant; however, the study did include review of air emission monitoring on the existing plant. This was a requirement from CAPCO.
8) Scale Inhibitors: Study done in conjunction with the CSIR to determine the impact of the use of scale inhibitors at Eskom Power Stations on water quality.
9) Air, water and soil analysis at the Total Senegal Plant. Did trial studies of dispersion tests at the plant in order to satisfy the French Environmental Legislation.
8) Kendal Power Station Water Balance – Prepared software package to monitor water usage and effluent use at the station.
10) Simunye Return to Service (RTS) Report – Performed feasibility and environmental study and made recommendations on process water, effluent and stormwater management, cooling water system, chemical dosing systems, and air emission control and sewerage treatment system for Grootvlei Power Station.
11) Environmental Review – Responsible for interpreting ground and surface water analysis in accordance with the drinking water standards as set out by the DWAF within Eskom

(E) RESEARCH PROJECTS (in conjunction with various institutions)

1) Hydrogen Research – Engaged in research associated with the novel approach of handling and venting contaminated hydrogen mixtures.
2) Scale Inhibitors – Used regressional test analysis to determine whether the generic approach to scale prevention within Eskom was possible and the environmental effect on the ash dams of dosing scale inhibitors.
3) Hydrogen Venting – Responsible for performing all calculations associated with the venting of hydrogen air mixtures. Reviewed and commented on hydrogen handling specification/standard. Completed extensive literature surveys locally and internationally.

4) Fire Protection – Part of design team responsible for novel approach to conveyor belt protection. Wrote software package to predict effects of water droplet sizes on extinguishing fires. Completed extensive literature surveys locally and internationally.
5) Crystallisation Modelling – Extensively involved in the modelling of the growth of calcium sulphate crystals, optimisation of crystallisation processes and investigating the effects of various parameters on the growth of crystals.
6) Completed literature search on public participation in water related projects in third and first world countries.

(G) RISK ASSESSMENTS

1) Total Gas holding facilities, Senegal – Completed Risk Assessment Study for the existing infrastructure as well as a new gas sphere and bottling plant. The study was done in accordance to the French Legislation.
2) Contingency Plans for Simunye Power Station – Compiled document presenting the various contingency plans, in the event of an environmental disaster, for the different decommissioned stations. The report was aimed at satisfying the needs and requirements set by the DWAF and DEAT. Focused on HAZOP analysis and pollution control from a design point of view.
3) Risk and Environmental Impact Assessment and Integrated Environmental Management – Reviewed and commented on numerous RIA's, EIA's and IEM's for the various Eskom stations.
4) Prepared oil spill contingency plans for Eskom wide power stations.

(H) CLIMATE CHANGE

1) Climate change adaptation strategy for the City of Johannesburg with special focus on water infrastructure.
2) Berths 203 – 205 expansion – Climate Change Study to determine the impacts of sea level rise and extreme weather conditions on the design of the new berths in the Port of Durban.
3) Climate Change Study to determine the impacts on the water sector for DWS Study included in the Growth and Development Programme.
4) Factored in climate change implications on 10 EIA Studies.

Queries: Kristy Robertson
☎ +27 11 781 1730
🖷 +27 11 781 1731
✉ kristyr@nemai.co.za

1 Personal Particulars

Proposed Position:	Environmental Assessment Practitioner
Profession:	Environmental Management
Date of Birth:	11 October 1989
Name of Firm:	Nemai Consulting
Name of Staff:	Kristy Robertson
Years with Firm/Entity:	2 Year and 07 Months
Nationality:	South African
Membership of Professional Societies	IAIA Affiliated

2 Education:

M. Sc. Environmental Sciences, WITWATERSRAND, South Africa, 2013.

B. Sc (Hons) Zoology, WITWATERSRAND, South Africa, 2011.

B. Sc Zoology, WITWATERSRAND, South Africa, 2008 - 2010.

Planet GIS Conversion Training Version 3 to 4 Certificate of Attendance, TOTAL GEO-SPATIAL INFORMATION SOLUTIONS, South Africa, 2014.

3 Employment Record:

2013 - Present Environmental Consultant, Nemai Consulting:

Compilation of Scoping and Environmental Impact Assessments, Basic Assessments and Water Use Licenses.

4 Selected Consultancies

4.1 Basic Assessments

2013 – JDA Rea Vaya BRT Alexandra Bus Depot in Alexandra, Gauteng (*Environmental Authorisation in Progress*).

2013 – JDA Rea Vaya BRT Avalon Bus Depot in Avalon, Gauteng (*Environmental Authorisation in Progress*).

2013 – JDA Rea Vaya BRT Selby Bus Depot in Selby, Gauteng (*Environmental Authorisation in Progress*).

2013 – Construction of the GRP bypass line in the Caledon River region in Bloemfontein, Free State.

2013 – Construction of a 20ML Reservoir and associated 300 ℓ/S pump station and 10.585km, 700mm diameter pipeline from Wallmansthal Reservoir to Baviaanspoort Reservoir, Tshwane, Gauteng.

2013 – Upgrade of Albert Luthuli Drive in eMbalenhle Township, Govan Mbeki Municipality, Mpumalanga.

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🖷 +27 11 781 1731
✉ kristyr@nemai.co.za

2013 – Development of Further Education Training College (FET) in Aliwal North, Eastern Cape.

2013 – Development of Further Education Training College (FET) in Balfour. Mpumalanga.

2013 – Development of Further Education Training College (FET) in Graaff-Reinet, Eastern Cape.

2013 – Development of Further Education Training College (FET) in Sterkspruit FET College, Eastern Cape.

2013 – Development of Further Education Training College (FET) in Ngqungqushe, Eastern Cape.

2014 – Construction of a 1.2km water supply pipeline and a 200mm scour pipeline in Lenasia South, Gauteng.

2014 – Proposed replacement of the existing Anthea Nancefield outfall sewer line in Soweto, Gauteng.

2014 – Proposed construction of a water pipeline in Mountain View, City of Johannesburg Metropolitan Municipality in Gauteng.

2014 – Proposed installation of a water pipeline in Diepsloot, Gauteng.

2014 – Proposed upgrade of Bramley View pipeline, Gauteng.

2014 – Upgrade of the Rand Water Mapleton Pump Station, Gauteng.

2014 – Upgrade of the Golden Harvest Drug and Rehabilitation Centre, Randburg, Gauteng.

2014 – Construction of a pedestrian bridge at Kya Sands informal settlement, Gauteng.

2014 – Construction of a new sludge pipeline, 1.45km in length and 800mm in diameter, at Panfontein Pumping Station in the Midvaal Local Municipality, Gauteng.

2014 – Proposed Lerome Bulk Water Supply Scheme, North West (*Environmental Authorisation in Progress*).

2014 – Construction of a 500mm Ø steel Inlet Trunkmain to Hammarsdale High Level Reservoir, KwaZulu-Natal (*Environmental Authorisation in Progress*).

2014 – Augmentation of water supply to the Maphephetheni and Mgangeni areas, KwaZulu-Natal (*Environmental Authorisation in Progress*).

2014 – Associated Infrastructure, Vulamehlo Cross Border Water Scheme, Harry Gwala District Municipality, KwaZulu-Natal (*Environmental Authorisation in Progress*).

2015 – Proposed replacement of the existing Ivory Park sewer pipeline in Ivory Park, Gauteng.

2015 – Proposed replacement of water pipelines in Jukskei Park, Gauteng.

2015 – Proposed upgrade of sewer outfall pipeline in Diepkloof, Gauteng.

2015 – Proposed upgrade of Dekema sewer outfall pipeline in Alberton, Gauteng (*Environmental Authorisation in Progress*).

2015 – Proposed upgrade of SAB Huntersfield sewer outfall pipeline in Alberton, Gauteng (*Environmental Authorisation in Progress*).

2015 – 100Ml Rand Water Bronberg Reservoir (*Environmental Authorisation in Progress*).

Queries: Kristy Robertson
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🖷 +27 11 781 1731
✉ kristyr@nemai.co.za

4.2 Scoping and Environmental Impact Assessments

2013 – Rustenburg Medical Waste Treatment Facility, North West.

2013 – Proposed K154 Road Upgrade in Midvaal Municipality, Gauteng.

2014 – Proposed Brandkop Mixed Use Development in Bloemfontein, Free State (*Environmental Authorisation in Progress*).

2014 – Construction of Mtwalume Dam, Vulamehlo Cross Border Water Scheme, Harry Gwala District Municipality, KwaZulu-Natal (*Environmental Authorisation in Progress*).

4.3 Water Use License Applications

2013 – Rand Water Palmiet to Klipfontein O6 Pipeline, Gauteng.

2013 – Construction of the GRP bypass line in the Caledon River region in Bloemfontein, Free State.

2013 – Upgrade of Albert Luthuli Drive in eMbalenhle Township, Govan Mbeki Municipality, Mpumalanga.

2013 – Development of Further Education Training College (FET) in Balfour. Mpumalanga.

2013 – Development of Further Education Training College (FET) in Sterkspruit FET College, Eastern Cape.

2014 – Proposed replacement of the existing Anthea Nancefield outfall sewer line in Soweto, Gauteng.

2014 – Proposed construction of a water pipeline in Mountain View, City of Johannesburg Metropolitan Municipality in Gauteng.

2014 – Proposed installation of a water pipeline in Diepsloot, Gauteng.

2014 – Development of the Cosmo City Fire Station, Gauteng.

2014 – Upgrade of the Rand Water Mapleton Pump Station, Gauteng.

2014 – Construction of a 500mm Ø steel Inlet Trunkmain to Hammarsdale High Level Reservoir, KwaZulu-Natal.

2014– Augmentation of water supply to the Maphephetheni and Mgangeni areas, KwaZulu-Natal.

2015 – Proposed replacement of the existing Ivory Park sewer pipeline in Ivory Park, Gauteng.

2015 – Proposed replacement of water pipelines in Jukskei Park, Gauteng.

2015 – Proposed upgrade of sewer outfall pipeline in Diepkloof, Gauteng.

2015 – 100Ml Rand Water Bronberg Reservoir.

2015 – Vaal Gamagara Pipeline, Northern Cape.

4.4 Public Participation Experience

- Compiling Public Participation documents.

Queries: Kristy Robertson
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🖷 +27 11 781 1731
✉ kristyr@nemai.co.za

- Public Notification: Placement of site notices, newspaper adverts and handing out documents to Interested and Affected Parties.
- Public Meetings.

4.5 Geographic information Systems (GIS) Experience

- Mapping, Spatial Analysis, and Aerial Environmental Sensitivity Screening.
- Advanced experience using Planet 4 GIS.

4.6 Section 24(G) Applications

2014 – Replacement of J8 Shamrock Road Leeuwpoort pipeline near Germiston, Gauteng.

2014 – Upgrade of sewerage pipeline in the Bloubosspruit in Kibler Park, City of Johannesburg Metropolitan Municipality, Gauteng.

2014 – Upgrade of Driefontein Wastewater Treatment Works, City of Johannesburg Metropolitan Municipality, Gauteng.

5 Languages:

English - excellent speaking, reading, and writing

Afrikaans - fair speaking, reading, and writing

APPENDIX I

SPECIALIST'S DECLARATION OF INTEREST

Appendix I1: Estuarine Specialist Declaration

Appendix I2: Heritage Specialist Declaration

APPENDIX I

Appendix I1: Estuarine Specialist Declaration

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	12/12/20/ or 12/9/11/L
NEAS Reference Number:	DEA/EIA
Date Received:	

Application for integrated environmental authorisation and waste management licence in terms of the-

(1) National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014; and

(2) National Environmental Management Act: Waste Act, 2008 (Act No. 59 of 2008) and Government Notice 921, 2013

PROJECT TITLE

Proposed Landside Infrastructure Development at Berth 203 to 205, Port of Durban, KwaZulu-Natal.

Specialist:	Barry Clark		
Contact person:	Barry Clark		
Postal address:	8 Steenberg House, Silverwood Close, Tokai		
Postal code:	7945	Cell:	0823730521
Telephone:	0217013420	Fax:	0217015280
E-mail:	barry@anchorenvironment		
Professional affiliation(s) (if any)	SACNASP Ecological Science & Zoological Science 400021/05		

Project Consultant:	Nemai Consulting		
Contact person:	Vanessa Stippel		
Postal address:	PO Box 1673, Sunnighill		
Postal code:	2157	Cell:	0761289126
Telephone:	0117811730	Fax:	0117811731
E-mail:	vanessas@nemai.co.za		

4.2 The specialist appointed in terms of the Regulations_

I, Barry Clark , declare that --

General declaration:

I act as the independent specialist in this application;
I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
I declare that there are no circumstances that may compromise my objectivity in performing such work;
I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
I will comply with the Act, Regulations and all other applicable legislation;
I have no, and will not engage in, conflicting interests in the undertaking of the activity;
I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
all the particulars furnished by me in this form are true and correct; and
I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

Anchor Environmental Consultants (Pty) Ltd

Name of company (if applicable):

15 April 2016

Date:

APPENDIX I

Appendix I2: Heritage Specialist Declaration

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	12/12/20/ or 12/9/11/L
NEAS Reference Number:	DEA/EIA
Date Received:	

Application for integrated environmental authorisation and waste management licence in terms of the-

(1) National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014; and

(2) National Environmental Management Act: Waste Act, 2008 (Act No. 59 of 2008) and Government Notice 921, 2013

PROJECT TITLE

Proposed Landside Infrastructure Development at Berth 203 to 205, Port of Durban, KwaZulu-Natal.

Specialist:	Maritime Archaeology		
Contact person:	Vanessa Maitland		
Postal address:	61 Chelsea Drive, Durban North		
Postal code:	4051	Cell:	082 490 4066
Telephone:	031 563 2417	Fax:	-
E-mail:	finfin@telkomsa.net		
Professional affiliation(s) (if any)	ASAPA		

Project Consultant:	Nemai Consulting		
Contact person:	Vanessa Stippel		
Postal address:	PO Box 1673, Sunnighill		
Postal code:	2157	Cell:	0761289126
Telephone:	0117811730	Fax:	0117811731
E-mail:	vanessas@nemai.co.za		

4.2 The specialist appointed in terms of the Regulations

I, Vanessa Maitland, declare that -

General declaration:

I act as the independent specialist in this application;
I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
I declare that there are no circumstances that may compromise my objectivity in performing such work;
I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
I will comply with the Act, Regulations and all other applicable legislation;
I have no, and will not engage in, conflicting interests in the undertaking of the activity;
I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
all the particulars furnished by me in this form are true and correct; and
I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

ACHA

Name of company (if applicable):

13-04-2013

Date:

APPENDIX J

ADDITIONAL INFORMATION

Appendix J1: ZAA Letter

Appendix J2: Application Form

Appendix J3: DWS Letter

Appendix J4: Dewatering Volumes

Appendix J5: Dewatering Method Statement

Appendix J6: Geotechnical Assessment

APPENDIX J1

ZAA Letter Regarding Dewatering

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F: +27 (0) 21 790 4470
E: ZAAEPNA@ZAAEPNA.COM
WWW.ZAAENGINEERING.COM

PO BOX 26546
HOUT BAY
SOUTH AFRICA
7872

31 MELKHOUT CRESCENT
HOUT BAY
CAPE TOWN
7806

ZAA ENGINEERING PROJECTS & NAVAL ARCHITECTURE (PTY) LTD

23 February 2016

Our Ref/1370-2016.02.23-lett-TCP-Dewatering

Transnet Capital Projects
Project Manager
Pier 2, Berth Deepening

Dear Paris

DEEPENING OF BERTHS 203 TO 205 – DEWATERING OF EXCAVATION DURING ABLUTION AND SUBSTATION CONSTRUCTION

TCP has requested ZAA provide a statement on the dewatering of the excavations during the construction of the Substation (205 end), the Satellite Ablution Facility (205 end) and the Mess and Ablution Facility (203 end) for the berth deepening project. Note that the design of these facilities falls outside of ZAA's scope of works and is currently being undertaken by TCP Engineering.

It is ZAA's considered opinion that given the proximity of the proposed excavations to the waterline, the water that will be pumped from the excavations during the construction process will be of the same quality as the water within the harbour basin. Piezometer monitoring behind the existing quay wall has indicated that the water table behind the wall corresponds to the water level within the basin, indicating that the water behind the quay wall is sea water that moves into and out of the sand backfill with the tidal movement.

ZAA recommends that testing of the water be undertaken during the construction period and should this water be found to be of a worse quality than the basin water, a plume discharge study be undertaken to establish the effects of the discharge into the basin.

Figures 1370-Dewater-001 and 1370-Dewater-002 showing likely discharge points for the dewatering operations at Berths 205 and 203 respectively are attached to this letter.

Kind Regards

For ZAA Engineering Projects and Naval Architecture (Pty) Ltd

John Zietsman

Dr John Zietsman Pr Eng.

Director

Attachment 1 – Figure 1370-Dewater-001

Attachment 2 – Figure 1370-Dewater-002

DRAWING NUMBER

DO NOT SCALE - IF IN DOUBT, ASK

Engineers

ZAA ENGINEERING PROJECTS & NAVAL ARCHITECTS

PO Box 26546
HOUT BAY 7872
Tel: +2721 791 9100
EMAIL : zaaepna@zaaepna.com

31 Melkhout Crescent
HOUT BAY 7806
Fax: +2721 790 4470
www.zaaepna.com

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE

REVISIONS / ISSUE AUTHORIZATION

EPCM CONSULTANT: TCP				ORIGINATOR: ZAA			
TITLE	NAME	SIGNATURE	DATE	TITLE	NAME	SIGNATURE	DATE
LEAD DES. ENG.				DRAWN			
ENG. COORD.				CHECKED			
ENG. MANAGER				ENG. COORD.			
AREA MANAGER				DISCIP. ENG.			
PROJECT MGR.				ENG. MANAGER			
DIVISION				AREA MANAGER			
DIV.	TITLE	NAME	SIGNATURE DATE				
				PR.ENG. / PR.TECH.			
				NAME		DATE	
				SIGNATURE			
				REG. NUMBER			
				SCALE : AS SHOWN		OR AS NOTED	A1

TRANSNET

DURBAN CONTAINER TERMINAL

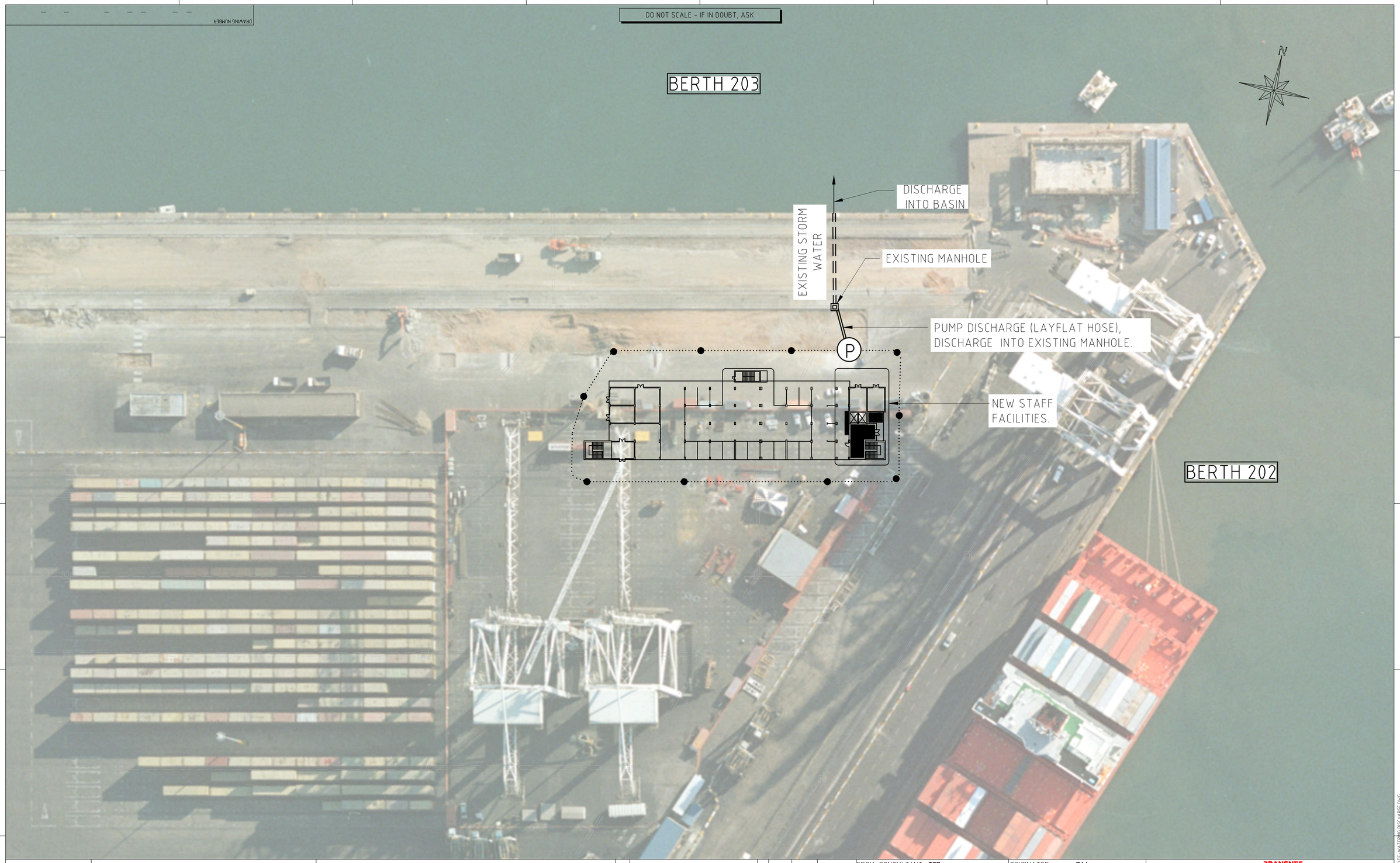
DE-WATERING DISCHARGE BERTH 205 SUB-STATION AND ABLUTION FACILITIES

PROJECT NUMBER	DV	FBS	DIS.	TYPE	ORG NO.	SHT.	REV.	ID

DRAWING NO.	REFERENCE
REFERENCE DRAWINGS	FIGURE-1370-DWG-DEWATERING-001

DRAWING NUMBER

DO NOT SCALE - IF IN DOUBT, ASK



DRAWING NO.	REFERENCE
REFERENCE DRAWINGS	

Engineers

ZAA ENGINEERING PROJECTS & NAVAL ARCHITECTS

PO Box 26546
HOUT BAY 7872
Tel: +2721 791 9100
EMAIL : zaaepna@zaaepna.com

31 Melkhout Crescent
HOUT BAY 7806
Fax: +2721 790 4470
www.zaaepna.com

FIGURE 1370 DWG DEWATERING 002

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE

REVISIONS / ISSUE AUTHORIZATION

EPCM CONSULTANT: TCP				ORIGINATOR: ZAA			
TITLE	NAME	SIGNATURE	DATE	TITLE	NAME	SIGNATURE	DATE
LEAD DES. ENG.				DRAWN			
ENG. COORD.				CHECKED			
ENG. MANAGER				ENG. COORD.			
AREA MANAGER				DISCIP. ENG.			
PROJECT MGR.				ENG. MANAGER			
DIVISION				AREA MANAGER			
DIV. TITLE	NAME	SIGNATURE	DATE				
				PR.ENG. / PR.TECH.			
				NAME			DATE
				SIGNATURE			
				REG. NUMBER			
				SCALE : AS SHOWN			OR AS NOTED A1

TRANSNET

DURBAN CONTAINER TERMINAL

DE-WATERING DISCHARGE
BERTH 203
STAFF FACILITIES

PROJECT NUMBER	DV	FBS	DIS.	TYPE	DRG NO.	SHT.	REV.	ID

D:\1370 TCP\108 FEL 3 BERTHS 203 AND 205\Z-DRAWINGS\DWGS\DE-WATERING DISCHARGE.DWG
ALICE SIKUTSHWA
2016-02-23

APPENDIX J2

Application Form

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

APPLICATION FORM FOR ENVIRONMENTAL AUTHORISATION

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), (the Act) and the Environmental Impact Assessment Regulations, 2014 the Regulations)

PROJECT TITLE

Landside Infrastructure Development at Berth 203 to 205, Port of Durban, KwaZulu Natal

Kindly note that:

1. This application form is current as of 08 December 2014. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority.

2. The application must be typed within the spaces provided in the form. The sizes of the spaces provided are not necessarily indicative of the amount of information to be provided. Spaces are provided in tabular format and will extend automatically when each space is filled with typing.

3. Where applicable **black out** the boxes that are not applicable in the form.

4. The use of the phrase "not applicable" in the form must be done with circumspection. Should it be done in respect of material information required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the Regulations.

5. This application must be handed in at the offices of the relevant competent authority as determined by the Act and Regulations.

6. No faxed or e-mailed applications will be accepted. An electronic copy of the signed application form must be submitted together with two hardcopies (one of which must contain the original signatures).

7. Unless protected by law, all information filled in on this application form will become public information on receipt by the competent authority. Any interested and affected party should and shall be provided with the information contained in this application on request, during any stage of the application process.

8. Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report and declaration of interest of the specialist must also be submitted.

9. Proof of payment must accompany this application. The application will not be processed without proof of payment unless one of the exclusions provided for the Fee Regulations (Fees for consideration and processing of applications for environmental authorisations and amendments thereto Government Notice No.141, published on 28 February 2014) is applicable AND such information in section 1 of this application form has been confirmed by this Department.

Departmental Details

The application must be addressed to the Chief Directorate: Integrated Environmental Authorisations at:

Postal address:
Department of Environmental Affairs
Attention: Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia
Pretoria

Queries must be addressed to the contact below:

Tel: 012 399 9372
E-mail: EIAAdmin@environment.gov.za

Please note that this form must be copied to the relevant provincial environmental department/s.

View the Department's website at http://www.environment.gov.za/ for the latest version of the documents.

1. **PROOF OF PAYMENT**

Applicants are required to tick the appropriate box below to indicate that either proof of payment is attached or that, in the applicant's view, an exclusion applies. Proof and a motivation for exclusions must be attached to this application form in **Appendix 1**.

Proof of payment attached as **Appendix 1** ☐

Exclusion applies ☑

An applicant is excluded from paying fees if:

The activity is a community based project funded by a government grant; or
The applicant is an organ of state.

TYPE OF EXCLUSION	Tick where applicable. Proper motivation must be attached to the application
The activity is a community based project funded by a government grant	
The applicant is an organ of state	☑

Please see Appendix 1 for proof that Transnet Port Terminals is an organ of state is excluded from paying the application fee.

FEE AMOUNT	Fee
Application for an environmental authorisation for which basic assessment is required in terms of the Environmental Impact Assessment Regulations	R2 000
Application for an environmental authorisation, for which S&EIR is required in terms of the Environmental Impact Assessment Regulations	R10 000

Department of Environmental Affairs' details for the payment of application fees:

Payment Enquiries:
Tel: 012 399 9119
Email: eiafee@environment.gov.za

Banking details:
ABSA Bank
Branch code: 632005
Account number: 1044 2400 72
Current account
Reference number : Reference number to be provided in the specific format indicating centre point coordinates of site in decimal degrees to 5 or 6 decimal places: latitude/longitude
eg. -33.918861/18.423300

Proof of payment must accompany the application form: Indicate reference number below.

Tax exemption status:
Status: Tax exempted

Reference number: ……

2. PROJECT DESCRIPTION

Please provide a **detailed** description of the project.

Due to the deepening, lengthening and widening of Berth 203 to 205, Pier 2, Durban Container Terminal (authorised on 21 January 2015), Transnet Port Terminals (TPT) has recognised the need for new landside infrastructure and facilities to replace facilities that will be demolished on the existing quay walls. The new landside infrastructure proposed by TPT includes the following:

- A new Central Mess and Ablution Facility at Berth 203;
- A new Satellite facility at Berth 205;
- A new North Substation located at Berth 205;
- A new East Substation located south east of Berth 203; and
- Associated infrastructure such as access roads, sewer, stormwater, high mast lighting, tunnels and Close Circuit Television (CCTV).

A description of the various components is provided below. Please note that the drawings provided below are for orientation purposes. A3 copies of all design drawings are included in the Draft Basic Assessment Report (BAR). A locality map is provided in Figure 1 together with an overview of the location of the various components which is provided in **Figure 2.**

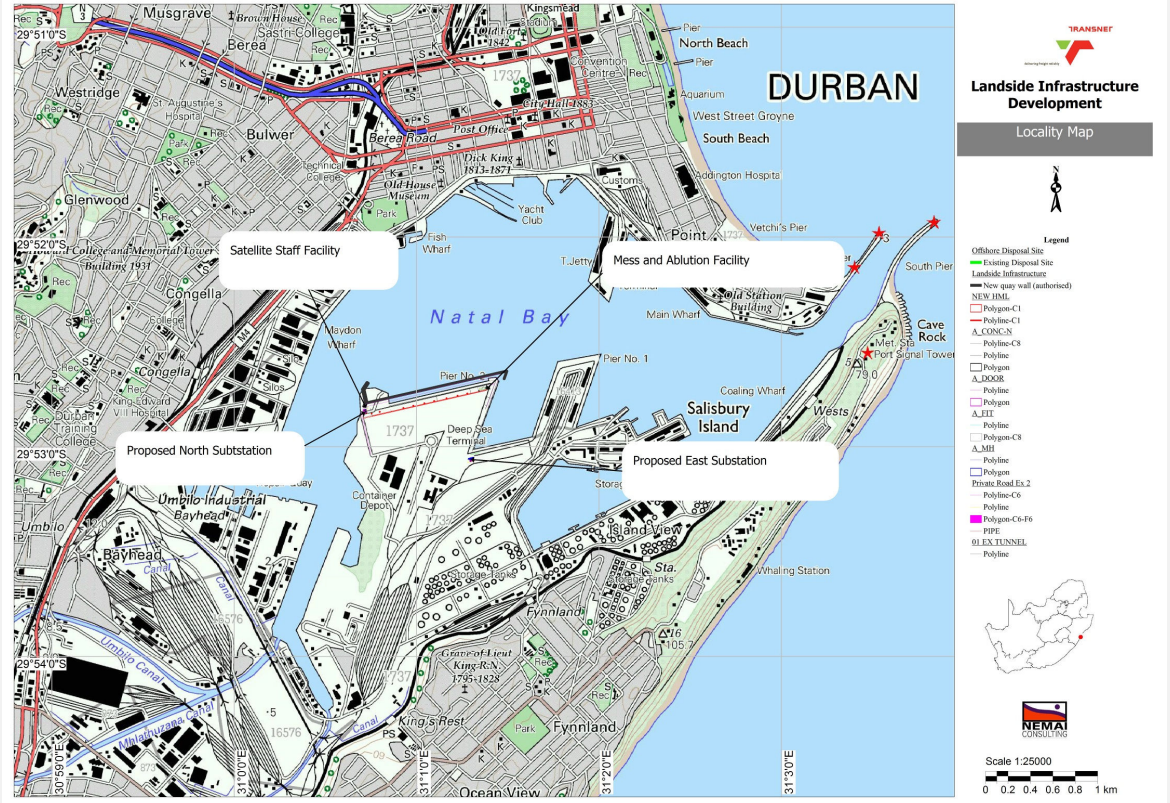


Figure 1: Locality Map

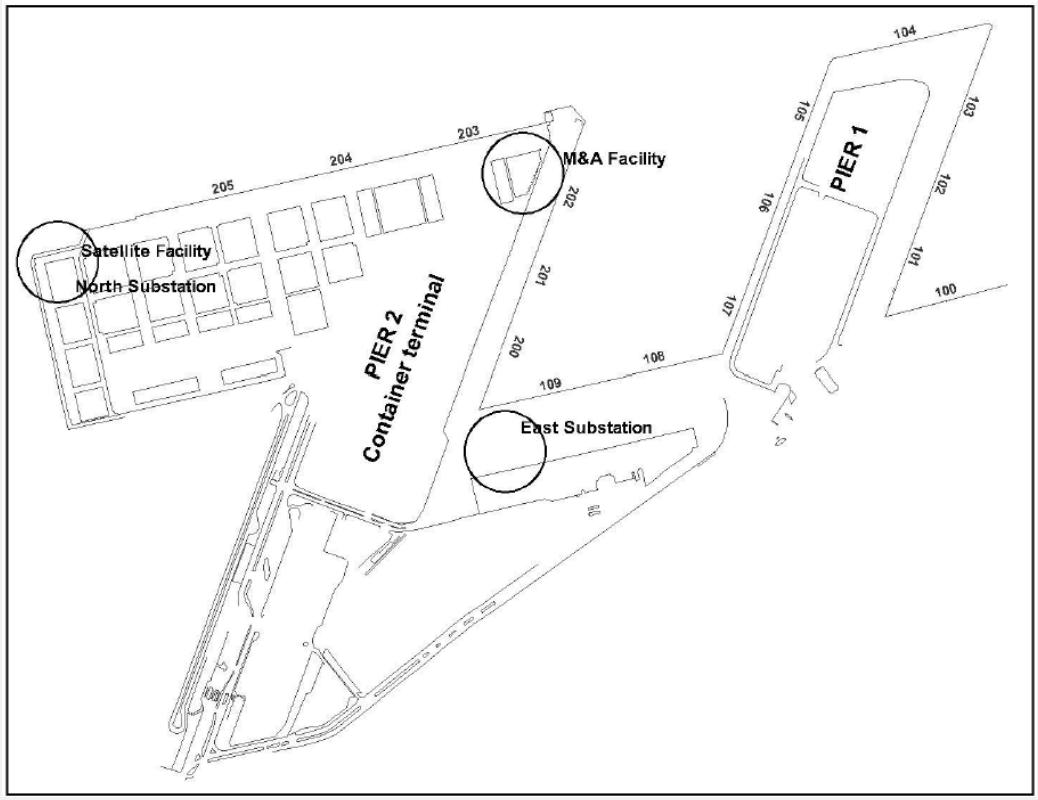


Figure 2: Layout Plan

Central Mess and Ablution Facility

The proposed new Central Mess and Ablution has been designed as a five storey facility due to the limited site space. The ground storey will provide access to the parking area, HVAC plant room, and entrance lobby. The first storey will access to the male locker rooms and ablutions. Female and male locker rooms and ablutions will be located on the second storey. The mess room will be located on the third storey. Offices will be provided on the forth storey whilst the fifth storey will provide access to the photovoltaic panels on the roof.

Due to the geotechnical conditions and high column loads, the facility will have piled foundations.

In order to ensure the facility is sustainable, a 60 kW Photovoltaic (PV) grid will be installed and will be grid connected. In addition, greywater harvesting will also be implemented (approximately 9000 litres per day).

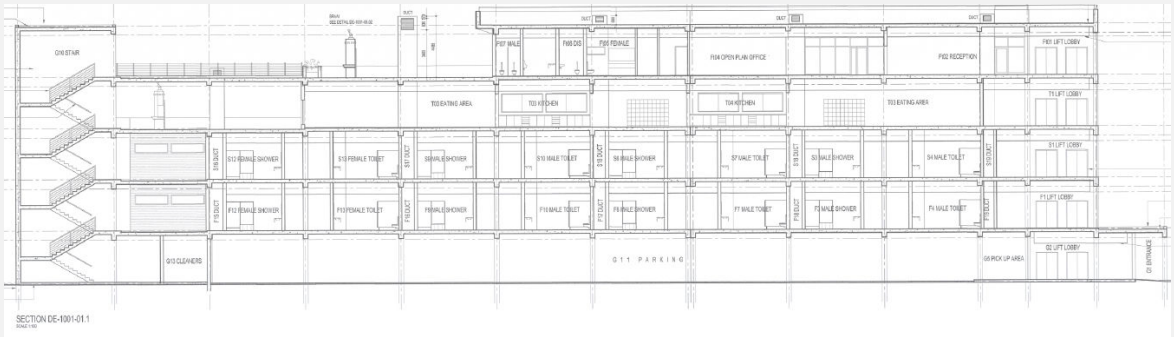


Figure 3: Section - Central Mess and Ablution Facility

Satellite Facility

Due to the limited site space, the proposed building is designed as a two storey facility with male and female ablutions on the ground floor and offices and mess room on the first floor. The facility has been designed as a concrete framed structure incorporating non load bearing brickwork as cladding and partitions. It comprises of

a reinforced concrete first floor slab and a roof supported on a concrete ring beam.

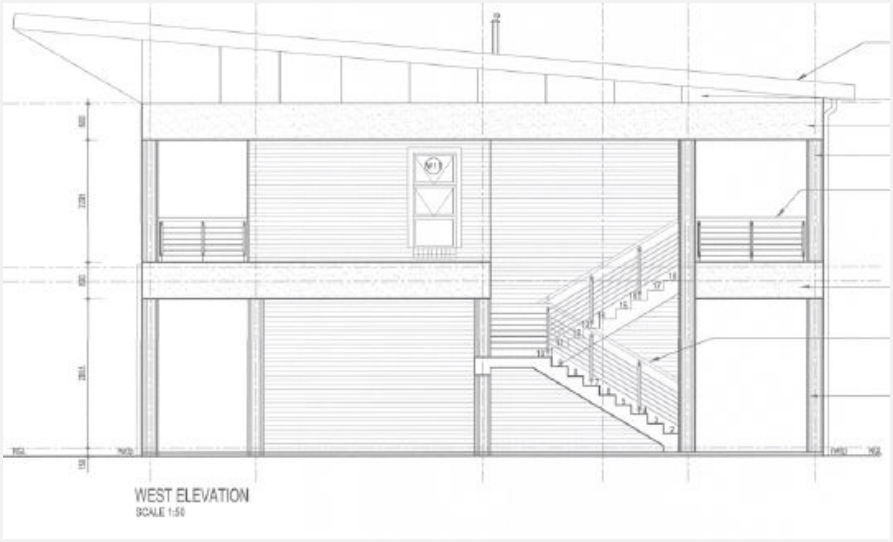


Figure 4: Section - Satellite Facility

North Substation and East Substations

The proposed design for the North and East Substations layouts are the same, but mirrored on the sites with the North Substation occurring just south of Berth 205 and the East Substation occurring south east of Berth 203 (**Figure 2** above).

Due to the limited site space, the proposed Substation buildings have been designed as a three storey facility. The ground storey will provide access to the transformer rooms and switchgear room. The first storey will provide access to the cable room and the second storey will provide access to the switchgear room. The building will be a concrete framed structure with face brick infill and an aluminium sheeted roof. Two 10m x 6m steel roller shutter doors are provided for the transformer to be moved in and out of the transformer room. The transformers are placed on concrete plinths.

Both the proposed new East and North Substations will house 11kV/400V 630kVA transformers which will be used to supply the terminals operational infrastructure in the vicinity of the substations. The substation will be supplied by medium voltage (MV) supply fed from the existing 33/11kV Pier 2 Main Substations' 11kV switchboard. A typical section of the North Substation is provided below.

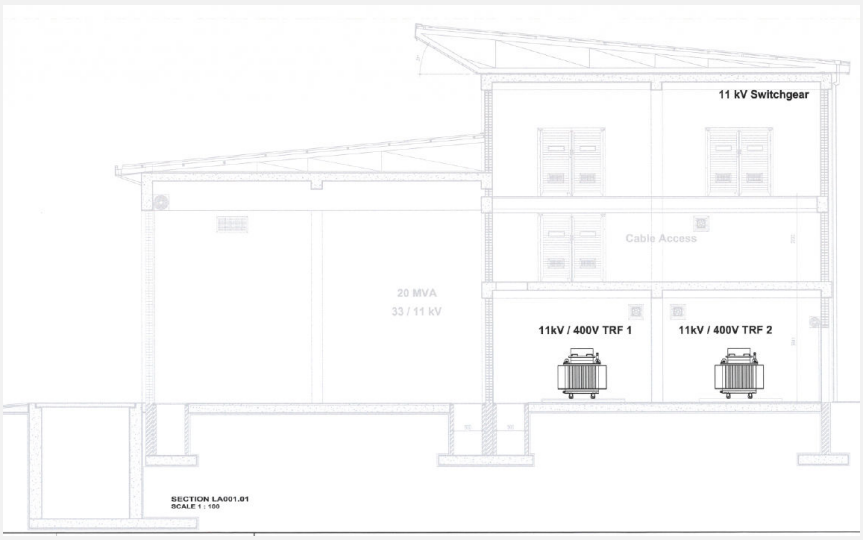


Figure 5: Section – North Substation

Associated Infrastructure

In addition to the above facilities, associated infrastructure will also be put in place and can be summarised as follows:

- **TFR Radio Mast at Berth 203 Staff Facility**: The existing radio equipment on top of the TFR antenna mast pole has been decommissioned. This TFR radio mast pole accommodated an anemometer, decommissioned wireless network equipment and a TPT PTZ camera. This mast pole, with its equipment, shall be taken down and relocated to the new quay wall corner in a similar position to what it is now.
- **New High Mast Lighting System**: New 45m High Mast lights (HML) will be put in place and will receive power through cables installed in tunnels on cable racks inside the tunnels and in pipe and chamber from the tunnel to the mast foundation.
- **Sewer Reticulation**: Full waterborne sanitation was designed in accordance with SANS 10125-2 and the CSIR Guidelines for Human Settlement Planning and Design. All pipe sizes are 160mm diameter uPVC class 34 with a minimum gradient of 1:120. Vents have been provided at all high points and critical sections. Due to the flat terrain, sewer will drain into thesewer pump station, which will pump to municipal sewer connections.
- **Grey water Design:** All water from washing basin and showers will be drained to a Grey Water treatment plant. All treated greywater will have to be pumped from the greywater plant's treated storage tanks to individual header tanks that will be positioned at the facility.
- **Ducts and Chambers:** All electrical reticulation will be via pipe and chamber. New Electrical type E6 manholes are to be constructed with 160 dia. Class 34 pipes connecting to the manholes. Data and Communication reticulation will via pipe and chamber. New Type T1 manholes are to be constructed with 110 diameter Class 34 pipes connection the manholes. All sleeves are required to be 800mm below the road, less than 800mm to be concrete encased.
- **Potable Hot Water**: For the Central Mess and Ablution Facility, potable hot water is required and thus a system shall be implemented which shall combine Heat recovery and Heat pumps.
- **Changes to Existing CCTV, Security and ICT Systems**: The CCTV system on the north quay between berths 203 to 205 has been reconfigured to accommodate the new layout without the need for additional mast poles for PTZ cameras. Existing CCTV cameras monitoring berths 203 to 205 will relocate forward, as required by the new quay wall. These existing PTZ cameras are PTZ 208, PTZ 305 and PTZ 306 and will be removed with their respective mast poles and relocated to their new locations in sync with the civil works. Their role in the CCTV system remains the same; to provide views of operational movements at the berths.
- **Access Roads:** Selective upgrades of Langeberg Road and Breede Road will be undertaken. These fall below the thresholds indicated in the 2014 EIA Regulations. These upgrades include compacting of the road surface and infill of potholes.

Dewatering

The north and east substations will require dewatering for the landside buildings. The required pumping rate required to dewater the excavations are provided below:

- East Substation – approximately 514.04m^3/day; and
- North Substation – approximately 388.60m^3/day.

Does the project form part of any of the Strategic Infrastructure Projects (SIPs) as described in the National Development Plan, 2011?	YES ✓	

If YES, please indicate which SIPs are applicable in **Appendix 2**. You are also required to provide confirmation of SIP applications from the relevant sector representative which must be attached in **Appendix 2.**

The Landside Infrastructure development forms part of the Deepening of Berth 203 to 205 which forms part of **SIP 2- Durban -Free State - Gauteng Logistics and Industrial Corridor.**

Please indicate which sector the project falls under by crossing out the relevant block in the table below:

Table 1

Green economy + "Green" and energy-saving industries		Greenfield transformation to urban or industrial form (including mining)	
Infrastructure – electricity (generation, transmission & distribution)		Biodiversity or sensitive area related activities	
Oil and gas		Mining value chain	
Biofuels		Potential of metal fabrication capital & transport equipment – arising from large public investments	
Nuclear		Boat building	
Basic services (local government) – electricity and electrification		Manufacturing – automotive products and components, and medium and heavy commercial vehicles	
Basic services (local government) – area lighting		Manufacturing – plastics, pharmaceuticals and chemicals	
Infrastructure – transport (ports, rail and road)	✓	Manufacturing – clothing textiles, footwear and leather	
Basic services (local government access roads)		Forestry, paper, pulp and furniture	
Basic services (local government) – public transport		Business process servicing	
Infrastructure – water (bulk and reticulation)		Advanced materials	
Basic services (local government) – sanitation		Aerospace	
Basic services (local government) – waste management		Basic services (local government) – education	
Basic services (local government) water		Basic services (local government) – health	
Agricultural value chain + agro-processing (linked to food security and food pricing imperatives)		Basic services (local government) - housing	
Infrastructure – information and communication technology		Basic services (local government) security of tenure	
Tourism + strengthening linkages between cultural industries and tourism		Other	
Basic services (local government) – public open spaces and recreational facilities			

Table 2

Does the listed activity/ies applied for form part of a larger project which is not a listed activity itself e.g. a road that is a listed activity that is needed to access a drilling site where the drilling does not constitute a listed activity.		NO ✓
If indicated yes above, please provide a brief description on how the activity/ies relate to the larger project that forms part there of:		

Please note that whilst the Landside Infrastructure project does not form part of a larger project that is not a listed activity itself, it is linked to an existing larger project namely the Berth 203 to 205 Expansion which was authorised by the Department of Environmental Affairs in 21 January 2015.

3. GENERAL INFORMATION

Applicant name:	TRANSNET PORT TERMINALS (TPT)		
Registration number (if applicant is a company)	1990/000900/06		
Trading name (if any)	Transnet SOC		
Responsible person name (If the applicant is a company):	Raymond van Rooyen		
Applicant/ Responsible person ID number:	7301195109082		
Responsible position, e.g. Director, CEO, etc.:	Executive Manager SHEQ		
Physical address:	South Tower Kingsmead Office Park, Stalwart Simelane Street, Durban, 4001		
Postal address:	P.O.Box 10124, Marine Parade Durban		
Postal code:	4065	Cell:	0835003986
Telephone:	031 3088052	Fax:	0866309632
E-mail:	raymond.vanrooyen@transnet.net	BBBEE status	Level 2

Provincial Authority:	KwaZulu Natal Department of Economic Development, Tourism & Environmental Affairs		
Contact person:	Yugeshni Govender		
Postal address:	Private Bag X54321, Durban		
Postal code:	4000	Cell:	082 921 9340
Telephone:	031 302 2868	Fax:	031 302 2824
E-mail:	yugeshni.govender@kzndae.gov.za		

Local municipality	eThekwini Municipality		
Contact person:	Ms Chumisa Thengwa		
Postal address:	PO Box 680, Durban		
Postal code:	4000	Cell:	071 8503414
Telephone:	031 311 75 17	Fax:	031 311 7134
E-mail:	chumisa.thengwa@durban.gov.za		

In instances where there is more than one local authority involved, please attach a list of those local authorities with their contact details as **Appendix 3**.

There is only one local authority involved and therefore Appendix 3 is not applicable.

Landowner:	Transnet National Port Authority (TNPA)		
Contact person:	The Port Manager – Moshe Motlohi		
Postal address:	PO Box 1027, Durban		
Postal code:	4000	Cell:	083 288 8908
Telephone:	031-361 8795	Fax:	0867547557
E-mail:	Moshe.Motlohi@transnet.net		

In instances where there is more than one landowner, please attach a list of those landowners with their contact details as **Appendix 4**. If the applicant is not the owner or person in control of the land, proof of

notice to the landowner or person in control of the land on which the activity is to be undertaken must be submitted in **Appendix 4**.

Identified Competent Authority to consider the application:	Department of Environmental Affairs (DEA)
Reason(s) in terms of S 24C of NEMA 1998 as amended	The applicant, TPT, is a parastatal company and as such applications for Environmental Authorisation should be directed to DEA as per the requirements of the National Environmental Management Act (No 107 of 1998) as amended by National Environmental Management Laws Second Amendment Act 30 of 2013 - Gazette No. 37170, No. 1019, dated 18 December 2013. Commencement date of sections 3, 4, 5 and 14: 18 December 2014. Section 24C (2): The Minister must be identified as the competent authority in terms of subsection (1), unless otherwise agreed to in terms of section 24C(3), if the activity: (*d) is undertaken, or is to be undertaken, by—* *(iii) a statutory body, excluding any municipality, performing an exclusive competence of the national sphere of government*.

4. ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP) INFORMATION

EAP:	Vanessa Stippel		
Professional affiliation/registration:	Professional member of the Southern African Institute of Ecologists and Environmental Scientists Company is IAIA Affiliated		
Contact person (if different from EAP):	[redacted]		
Company:	Nemai Consulting		
Physical address:	147 Bram Fisher Drive, Ferndale		
Postal address:	PO Box 1673, Sunninghill		
Postal code:	2157	Cell:	0761289126
Telephone:	0117811730	Fax:	0117811731
E-mail:	vanessas@nemai.co.za		

If an EAP has not been appointed please ensure that an independent EAP is appointed as stipulated by Regulation 12 of GN R.982, dated December 2014, prior to the commencement of the process.
The declaration of independence and the Curriculum Vitae (indicating the experience with environmental impact assessment and the relevant application processes) of the EAP must also be submitted to the Department.

The Declaration of the EAP and curriculum vitae is included in **Appendix 9.**

5. SITE DESCRIPTION

Provide a detailed description of the site involved in the application.

Province	KwaZulu-Natal
District Municipality	eThekwini Metropolitan Municipality
Local Municipality	
Ward number(s)	Ward 32
Nearest town(s)	Durban
Farm name(s) and number(s)	Kings Flats No. 16344

Portion number(s)	Remaining Portion

SG 21 Digit Code(s)
(If there are more than 4, please attach a list with the rest of the codes as **Appendix 5**)

N	0	F	U	0	0	0	0	0	0	0	1	6	3	4	4	0	0	0	0	0
1		2		3				4								5				

Are there any other applications for Environmental Authorisation on the same property?	YES ✓
If YES, please indicate the following:	
Competent Authority	DEA
Reference Number	NEAS REF NO: DEA/EIA/0000988/2012; DEA REF NO: 14/12/16/3/3/2/275
Project Name	Deepening, Lengthening and Widening of Berth 203 to 205, Pier 2, Container Terminal, Port of Durban
Please provide details of the steps taken to ascertain this information:	
TNPA, as the landowner of the affected property, was consulted and it was confirmed that the only other authorisation on the property is the Deepening, Lengthening and Widening of Berth 203 to 205.	

6. ACTIVITIES TO BE AUTHORISED

For an application for authorisation that involves more than one listed activity that, together, make up one development proposal, all the listed activities pertaining to this application must be indicated.

Detailed description of listed activities associated with the project	
Listed activity as described in GN R 983, 984 and 985	Description of project activity that triggers listed activity
e.g. GN R.983 Item XX(x): The development of bridge exceeding 100 square metres in size within a watercourse	***e.g. A bridge measuring 110 square metres will be constructed within the watercourse***
GNR 983, Activity 19 (iii) The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from- (i) a watercourse; (ii) the seashore; or (iii) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater but excluding where such infilling, depositing , dredging, excavation, removal or moving- (a) will occur behind a development setback; (b) is for maintenance purposes	The construction of landside infrastructure including the following: • A new Central Mess and Ablution Facility at Berth 203; • A new Satellite facility at Berth 205; • A new North Substation located at Berth 205; • A new East Substation located south east of Berth 203; and • Associated infrastructure such as access roads, sewer, stormwater, high mast lighting, tunnels and Close Circuit Television (CCTV). Will involve the excavation of more than 5 cubic metres of material which occurs within 100m of Durban Bay Estuary.

	undertaken in accordance with a maintenance management plan; or (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies.	

Please note that any authorisation that may result from this application will only cover activities specifically applied for. Co-ordinate points indicating the location of each listed activity must be provided with the relevant report (i.e. either BAR or EIR).

Please provide a project map indicating any sensitive areas (e.g. critical biodiversity area, World Heritage Site, etc.) overlaid by the study area in **Appendix 6**.

Please see Appendix 6 for a Sensitivity Map of the area.

A project schedule, indicating the different phases and timelines of the project, must be attached as **Appendix 7**.

Please see Appendix 7 for the Project Schedule.

7. PUBLIC PARTICIPATION

Provide details of the public participation process proposed for the application as required by Regulation 41(2) of GN R .982, dated December 2014.

Public Participation undertaken for the proposed Landside Infrastructure Development will be undertaken in line with Section 41 (2) of GN 982 of 4 December 2014.

The landowner of the affected properties is Transnet and thus no landowner notification is required or will take place.

An Interested and Affected Party (IAP) database will be compiled and will include all registered IAPs from the Berth 203 to 205 Expansion EIA. Stakeholders such as the Wildlife and Environment Society of South Africa (WESSA), Coastwatch, South Durban Community Environmental Alliance (SDCEA), Earthlife and UKZN Civil Society will thus be included. In addition, Departments such as the Department of Mineral Resources, KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA), Department of Water and Sanitation (DWS), eThekwini Metropolitan Municipality, Ezemvelo KZN Wildlife will also be included.

Background Information Documents (BIDs) will be compiled and will include a project description and background as well as information of the Environmental Authorisation process. One advert will be placed in a local newspaper to notify IAPs of the project and provide all IAPs with 30 days to register. BIDs will also be emailed, faxed, or hand delivered to IAPs. In addition, 10 site notices will be placed Port of Durban.

All registered IAPs will then be notified by email, fax or SMS of the public review of the Draft Basic Assessment Report (BAR). The BAR will be available for review for 30 days at the Seafarers Club. A public meeting will also be held to present the findings of the BAR.

8. OTHER AUTHORISATIONS REQUIRED

LEGISLATION	AUTHORISATION REQUIRED		APPLICATION SUBMITTED	
SEMAs				
National Environmental Management: Air Quality Act		NO		

		✓	
National Environmental Management: Biodiversity Act		NO ✓	
National Environmental Management: Integrated Coastal Management Act	YES ✓		NO ✓
National Environmental Management: Protected Areas Act		NO ✓	
National Environmental Management: Waste Act		NO ✓	
National legislation			
Mineral Petroleum Development Resources Act		NO ✓	
National Water Act		NO ✓	
National Heritage Resources Act		NO ✓	
Others: Please specify		NO ✓	

If authorisation is necessary in terms of the National Environmental Management: Waste Act, please contact the Department for guidance on the **Integrated Permitting System**.

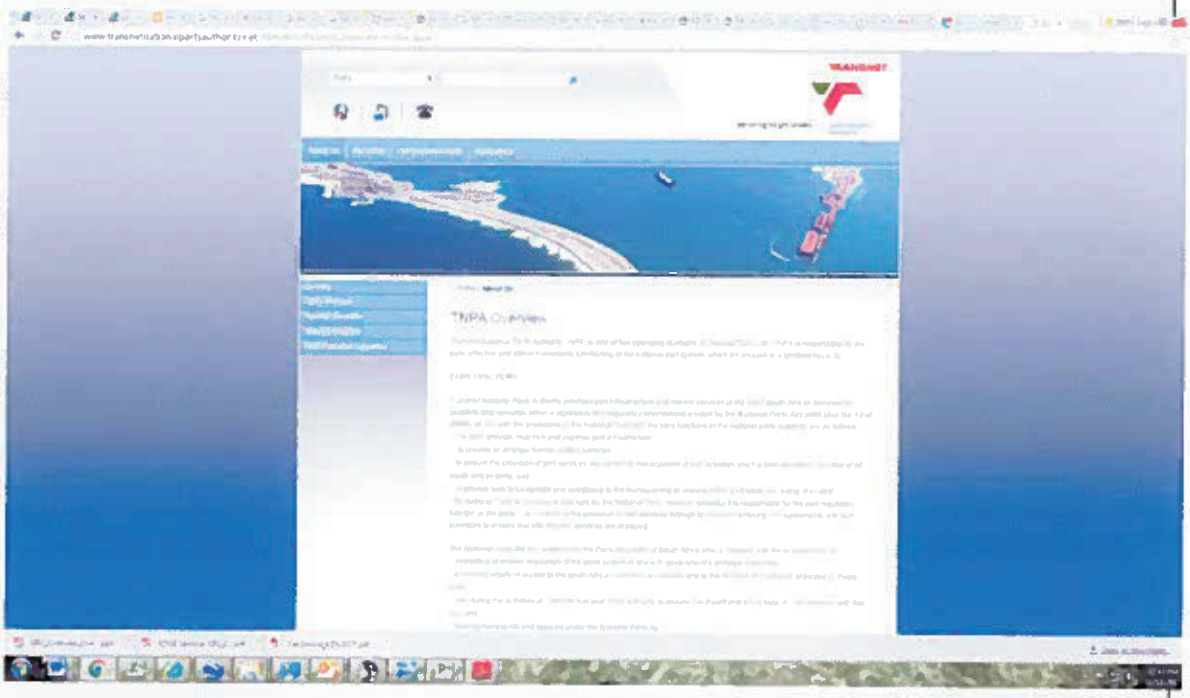
Please note that a Coastal Water Discharge Permit (CWDP) will be required from the Oceans and Coast Branch of the DEA.

9. LIST OF APPENDICES

		SUBMITTED	
Appendix 1	Proof of Payment		NO ✓
Appendix 1	Strategic Infrastructure Projects	YES ✓	
Appendix 2	List of Local Municipalities (with contact details)		N/A ✓
Appendix 3	List of land owners (with contact details) and proof of notification of land owners.		NO ✓
Appendix 4	List of SGIDs		N/A ✓
Appendix 5	Project map	YES ✓	
Appendix 6	Project schedule	YES ✓	
Appendix 7	Declaration of Applicant	YES ✓	
Appendix 9	Declaration of EAP	YES ✓	

APPENDIX 1
PROOF OF PAYMENT/ MOTIVATION FOR EXCLUSION

TNPA is an operating division of Transnet SOC Ltd which is a Parastatal company,.TNPA is responsible for the safe, effective and efficient economic functioning of the national port system, which it manages in a landlord capacity. Please see the following TNPA overview obtained from http://www.transnetnationalportsauthority.net/AboutUS/Pages/Corporate-Profile.aspx



APPENDIX 2
STRATEGIC INFRASTRUCTURE PROJECTS

SIP 1: Unlocking the northern mineral belt with Waterberg as the catalyst

- Unlock mineral resources
- Rail, water pipelines, energy generation and transmission infrastructure
- Thousands of direct jobs across the areas unlocked
- Urban development in Waterberg - first major post-apartheid new urban centre will be a "green" development project
- Rail capacity to Mpumalanga and Richards Bay
- Shift from road to rail in Mpumalanga
- Logistics corridor to connect Mpumalanga and Gauteng.

SIP 2: Durban-Free State-Gauteng logistics and industrial corridor

- Strengthen the logistics and transport corridor between SA's main industrial hubs
- Improve access to Durban's export and import facilities
- Integrate Free State Industrial Strategy activities into the corridor
- New port in Durban
- Aerotropolis around OR Tambo International Airport.

SIP 3: South-Eastern node & corridor development

- New dam at Mzimvubu with irrigation systems
- N2-Wild Coast Highway which improves access into KwaZulu-Natal and national supply chains
- Strengthen economic development in Port Elizabeth through a manganese rail capacity from Northern Cape
- A manganese sinter (Northern Cape) and smelter (Eastern Cape)
- Possible Mthombo refinery (Coega) and transshipment hub at Ngqura and port and rail upgrades to improve industrial capacity and performance of the automotive sector.

SIP 4: Unlocking the economic opportunities in North West Province

- Acceleration of investments in road, rail, bulk water, water treatment and transmission infrastructure
- Enabling reliable supply and basic service delivery
- Facilitate development of mining, agricultural activities and tourism opportunities
- Open up beneficiation opportunities in North West Province.

SIP 5: Saldanha-Northern Cape development corridor

- Integrated rail and port expansion
- Back-of-port industrial capacity (including an IDZ)
- Strengthening maritime support capacity for oil and gas along African West Coast
- Expansion of iron ore mining production and beneficiation.

SIP 6: Integrated municipal infrastructure project

Develop national capacity to assist the 23 least resourced districts (19 million people) to address all the maintenance backlogs and upgrades required in water, electricity and sanitation bulk infrastructure. The road maintenance programme will enhance service delivery capacity thereby impacting positively on the population.

SIP 7: Integrated urban space and public transport programme

Coordinate planning and implementation of public transport, human settlement, economic and social infrastructure and location decisions into sustainable urban settlements connected by densified transport corridors. This will focus on the 12 largest urban centres of the country, including all the metros in South Africa. Significant work is underway on urban transport integration.

SIP 8: Green energy in support of the South African economy
Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP2010) and support bio-fuel production facilities.

Indicate capacity in MW:

SIP 9: Electricity generation to support socioeconomic development
Accelerate the construction of new electricity generation capacity in accordance with the IRP2010 to meet the needs of the economy and address historical imbalances. Monitor implementation of major projects such as new power stations: Medupi, Kusile and Ingula.

Indicate capacity in MW:

SIP 10: Electricity transmission and distribution for all
Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development.
Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.

SIP 11: Agri-logistics and rural infrastructure
Improve investment in agricultural and rural infrastructure that supports expansion of production and employment, small-scale farming and rural development, including facilities for storage (silos, fresh-produce facilities, packing houses); transport links to main networks (rural roads, branch train-line, ports), fencing of farms, irrigation schemes to poor areas, improved R&D on rural issues (including expansion of agricultural colleges), processing facilities (abattoirs, dairy infrastructure), aquaculture incubation schemes and rural tourism infrastructure.

SIP 12: Revitalisation of public hospitals and other health facilities
Build and refurbish hospitals, other public health facilities and revamp 122 nursing colleges. Extensive capital expenditure to prepare the public healthcare system to meet the requirements of the National Health Insurance (NHI) system. The SIP contains major builds for 6 hospitals.

SIP 13: National school build programme
A national school build programme driven by uniformity in planning, procurement, contract management and provision of basic services. Replace inappropriate school structures and address basic service backlog and provision of basic services under the Accelerated School Infrastructure Delivery Initiative (ASIDI). In addition, address national backlogs in classrooms, libraries, computer labs and admin buildings. Improving the learning environment will strengthen outcomes especially in rural schools, as well as reduce overcrowding.

SIP 14: Higher education infrastructure
Infrastructure development for higher education, focusing on lecture rooms, student accommodation, libraries and laboratories, as well as ICT connectivity. Development of university towns with a combination of facilities from residence, retail to recreation and transport. Potential to ensure shared infrastructure such as libraries by universities, FETs and other educational institutions. Two new universities will be built - in Northern Cape and Mpumalanga.

SIP 15: Expanding access to communication technology
Provide for broadband coverage to all households by 2020 by establishing core Points of Presence (POPs) in district municipalities, extend new Infraco fibre networks across provinces linking districts, establish POPs and fibre connectivity at local level, and further penetrate the network into deep rural areas.
While the private sector will invest in ICT infrastructure for urban and corporate networks, government will co-invest for township and rural access, as well as for e-government, school and

health connectivity. The school roll-out focus is initially on the 125 Dinaledi (science and maths-focussed) schools and 1525 district schools. Part of digital access to all South Africans includes TV migration nationally from analogue to digital broadcasting.
SIP 16: SKA & Meerkat SKA is a global mega-science project, building an advanced radio-telescope facility linked to research infrastructure and high-speed ICT capacity and provides an opportunity for Africa and South Africa to contribute towards global advanced science projects.
SIP 17: Regional integration for African cooperation and development Participate in mutually beneficial infrastructure projects to unlock long-term socio-economic benefits by partnering with fast growing African economies with projected growth ranging between 3% and 10%. The projects involving transport, water and energy also provide competitively-priced, diversified, short and medium to long-term options for the South African economy where, for example, electricity transmission in Mozambique (Cesul) could assist in providing cheap, clean power in the short-term whilst Grand Inga in the DRC is long-term. All these projects complement the Free Trade Area (FTA) discussions to create a market of 600 million people in South, Central and East Africa.
SIP 18: Water and sanitation infrastructure A 10-year plan to address the estimated backlog of adequate water to supply 1.4m households and 2.1m households to basic sanitation. The project will involve provision of sustainable supply of water to meet social needs and support economic growth. Projects will provide for new infrastructure, rehabilitation and upgrading of existing infrastructure, as well as improve management of water infrastructure.

TRANSNET

14 April 2016

Ms Milicent Solomons
Director: Strategic Infrastructure Development
Department of Environmental Affairs
Environment House
473 Steve Biko Road
Arcadia
Pretoria

Dear Ms Solomons

CONFIRMATION OF PROJECT UNDER THE SIP 2 PORTFOLIO

I hereby confirm that the project described below is part of the SIP2 portfolio. Kindly prioritize the processing of its Environmental Authorization accordingly.

Main Project Title	Durban Container Terminal Berth Deepening
Sub-Project Description	Landside Infrastructure Development at Berth 203 to 205, Port of Durban, KwaZulu Natal forming part of the Berth Deepening, Lengthening and Widening project / Port Expansion Projects.
DEA Reference Number	14/12/16/3/3/2/275
SIP Number	2

Sincerely

Irvindra Naidoo
SIP-2 Coordinator
14/4/2016

Transnet SOC Ltd
Registration Number
1990/000900/30

Carlton Centre
150 Commissioner
Street
Johannesburg
2001

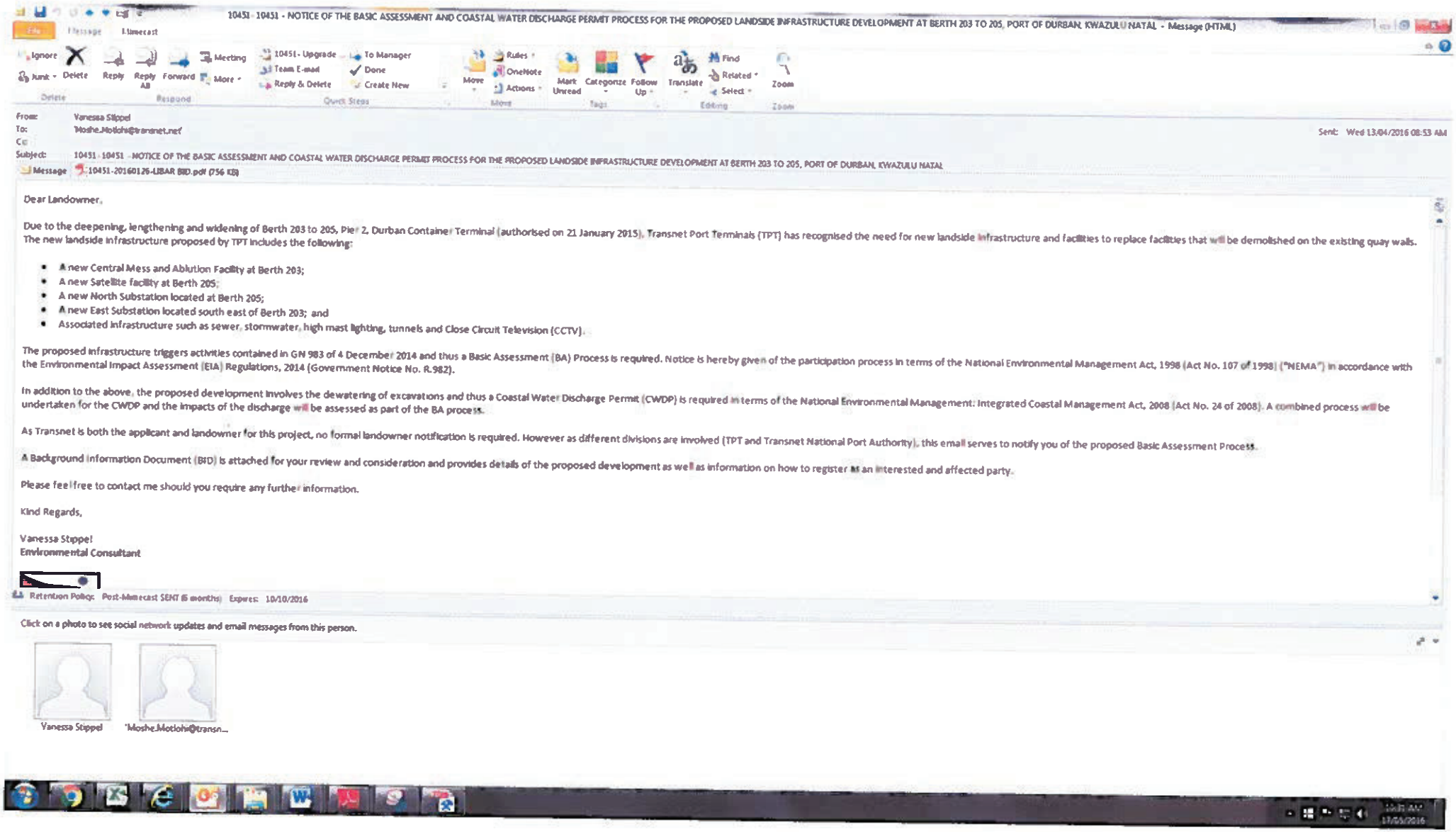
P.O. Box 72501
Parkview, Johannesburg
South Africa, 2122
T +27 11 308 3001
F +27 11 308 2638

APPENDIX 3 (IF APPLICABLE)
LIST OF LOCAL MUNICIPALITIES

Not Applicable

APPENDIX 4
LIST OF LAND OWNERS
PROOF OF NOTIFICATION OF LAND OWNERS

Transnet is the applicant and landowner. Proof of notification is therefore not required. However as separate divisions of Transnet are involved (namely TCP and TNPA), proof of notification has been included.



10451 - 10451 - NOTICE OF THE BASIC ASSESSMENT AND COASTAL WATER DISCHARGE PERMIT PROCESS FOR THE PROPOSED LANDSIDE INFRASTRUCTURE DEVELOPMENT AT BERTH 203 TO 205, PORT OF DURBAN, KWAZULU NATAL - Message (HTML)

File | Message | Timecast

Ignore | Junk | Delete | Reply | Reply All | Forward | Meeting | More | 10451 - Upgrade | Team E-mail | Reply & Delete | To Manager | Done | Create New | Move | Rules | OneNote | Actions | Mark Unread | Categorize | Follow Up | Translate | Find | Related | Select | Zoom

Delete | Respond | Quick Steps | Move | Tags | Editing | Zoom

From: Vanessa Stippel
To: 'Moshe.Motloh@transnet.net'
Cc:
Subject: 10451 - 10451 - NOTICE OF THE BASIC ASSESSMENT AND COASTAL WATER DISCHARGE PERMIT PROCESS FOR THE PROPOSED LANDSIDE INFRASTRUCTURE DEVELOPMENT AT BERTH 203 TO 205, PORT OF DURBAN, KWAZULU NATAL
Sent: Wed 13/04/2016 08:53 AM

Message | 10451-20160126-LIBAR BID.pdf (756 KB)

Dear Landowner,

Due to the deepening, lengthening and widening of Berth 203 to 205, Pier 2, Durban Container Terminal (authorised on 21 January 2015), Transnet Port Terminals (TPT) has recognised the need for new landside infrastructure and facilities to replace facilities that will be demolished on the existing quay walls. The new landside infrastructure proposed by TPT includes the following:

- A new Central Mess and Ablution Facility at Berth 203;
- A new Satellite facility at Berth 205;
- A new North Substation located at Berth 205;
- A new East Substation located south east of Berth 203; and
- Associated infrastructure such as sewer, stormwater, high mast lighting, tunnels and Close Circuit Television (CCTV).

The proposed infrastructure triggers activities contained in GN 983 of 4 December 2014 and thus a Basic Assessment (BA) Process is required. Notice is hereby given of the participation process in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA") in accordance with the Environmental Impact Assessment (EIA) Regulations, 2014 (Government Notice No. R.982).

In addition to the above, the proposed development involves the dewatering of excavations and thus a Coastal Water Discharge Permit (CWDP) is required in terms of the National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008). A combined process will be undertaken for the CWDP and the impacts of the discharge will be assessed as part of the BA process.

As Transnet is both the applicant and landowner for this project, no formal landowner notification is required. However as different divisions are involved (TPT and Transnet National Port Authority), this email serves to notify you of the proposed Basic Assessment Process.

A Background Information Document (BID) is attached for your review and consideration and provides details of the proposed development as well as information on how to register as an interested and affected party.

Please feel free to contact me should you require any further information.

Kind Regards,

Vanessa Stippel
Environmental Consultant

Retention Policy: Post-Mimecast SENT (6 months) Expires: 10/10/2016

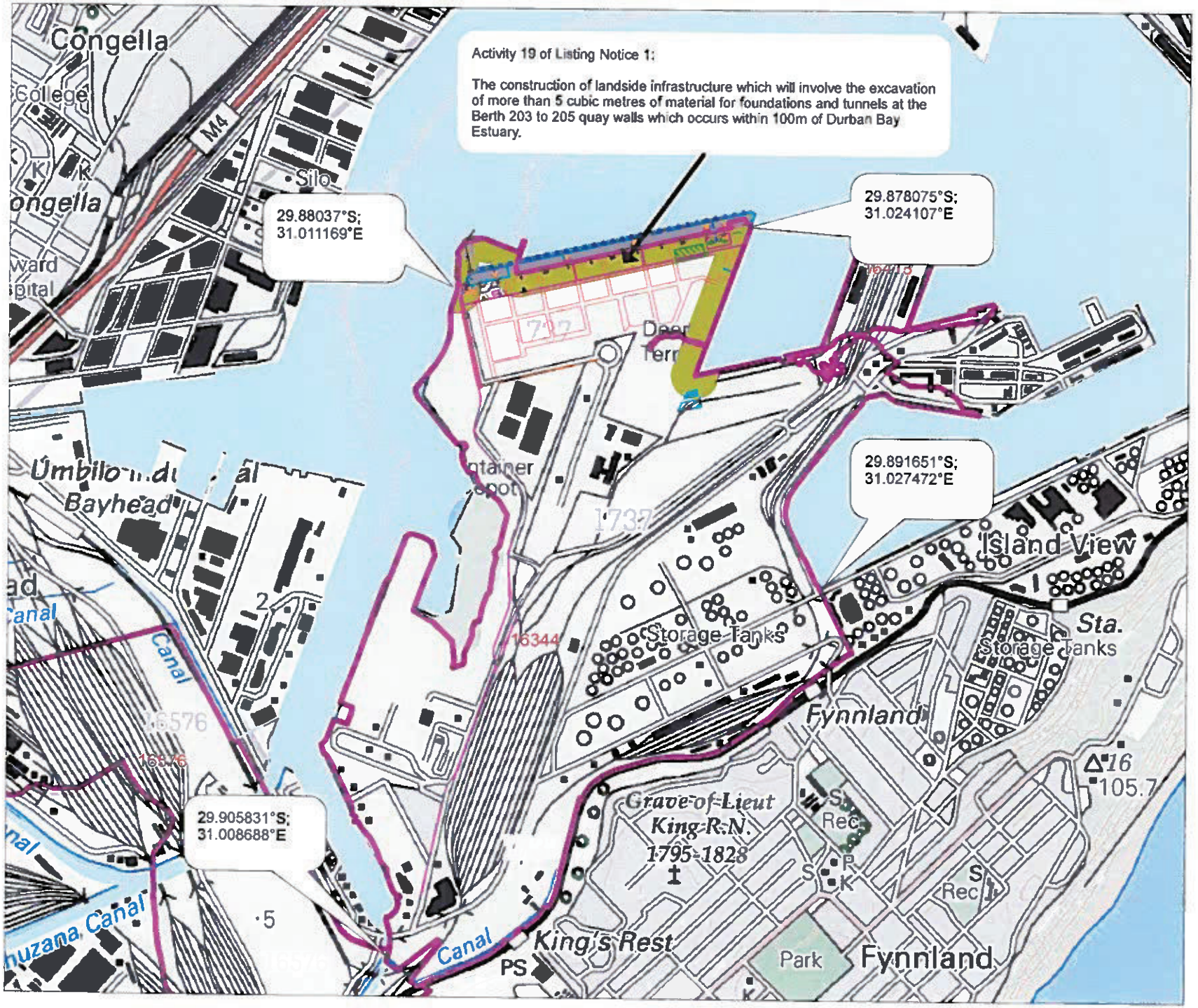
Click on a photo to see social network updates and email messages from this person.

Vanessa Stippel | 'Moshe.Motloh@transn...

APPENDIX 5 (IF APPLICABLE)
LIST OF SGIDS

Not applicable

APPENDIX 6
PROJECT MAP



Landside Infrastructure Development at Berth 203 to 205

Listed Activities and Coordinates

Legend

Sensitivity
- 100m buffer
- DMOSS Estuary Sandbank

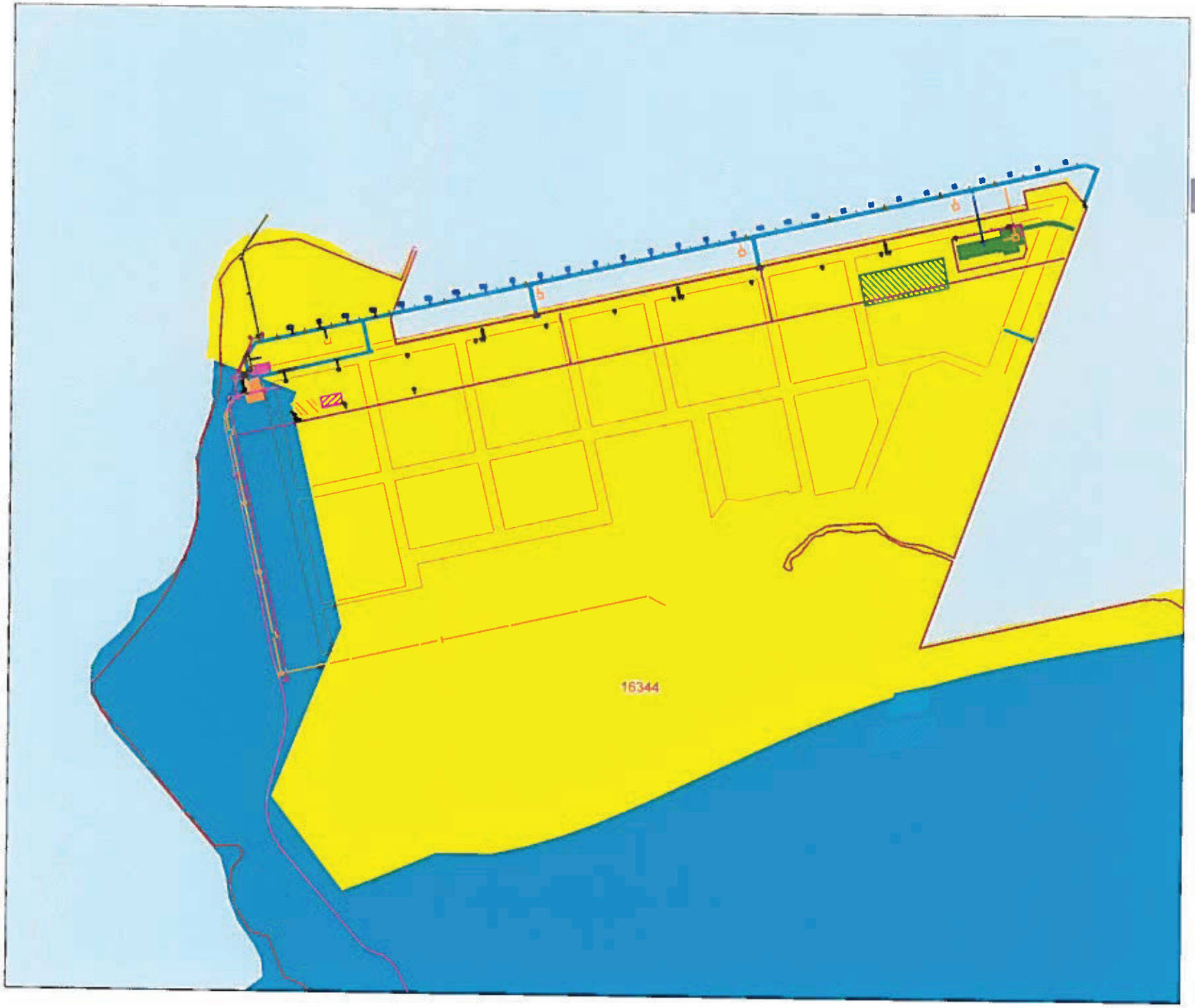
Landside Infrastructure
- New Sewer
- New Water
- New Electrical
- New HML and Subs
- New Fences
- Selective Upgrades to Roads
- New Straddle Road
- New Service Tunnels

Layout Alternative 1
- Proposed North Substation - Layout 1
- Proposed Satellite Staff Facility - Layout 1
- Proposed M&A - Layout 1
- Propoosed East Substation- Layout 1

Alternative Layout 2
- Proposed North Substation - Layout 2
- Proposed Mess and Ablution Facility - Layout 2
- Proposed East Substation - Layout 2
- Proposed Satellite Staff Facility - Layout 2
- Farm Portion
- Approved Berth 203 to 205 Expansion

Scale 1 15000

0 75 300 450 600 750 m



Landside Infrastructure Development at Berth 203 to 205

Sensitivity Map

N

Legend

- Farm Portion

Sensitivity:

KZN C Plan

- 0Co
- Ign
- DMOSS Estuary
- Sandbank

Landside Infrastructure

- New Sewer
- New Water
- New Electrical
- New HML and Subs
- New Fences
- Selective Upgrades to Roads
- New Straddle Road
- New Service Tunnels

Layout Alternative 1

- Proposed North Substation - Layout 1
- Proposed Satellite Staff Facility - Layout 1
- Proposed M&A - Layout 1
- Proposed East Substation- Layout 1

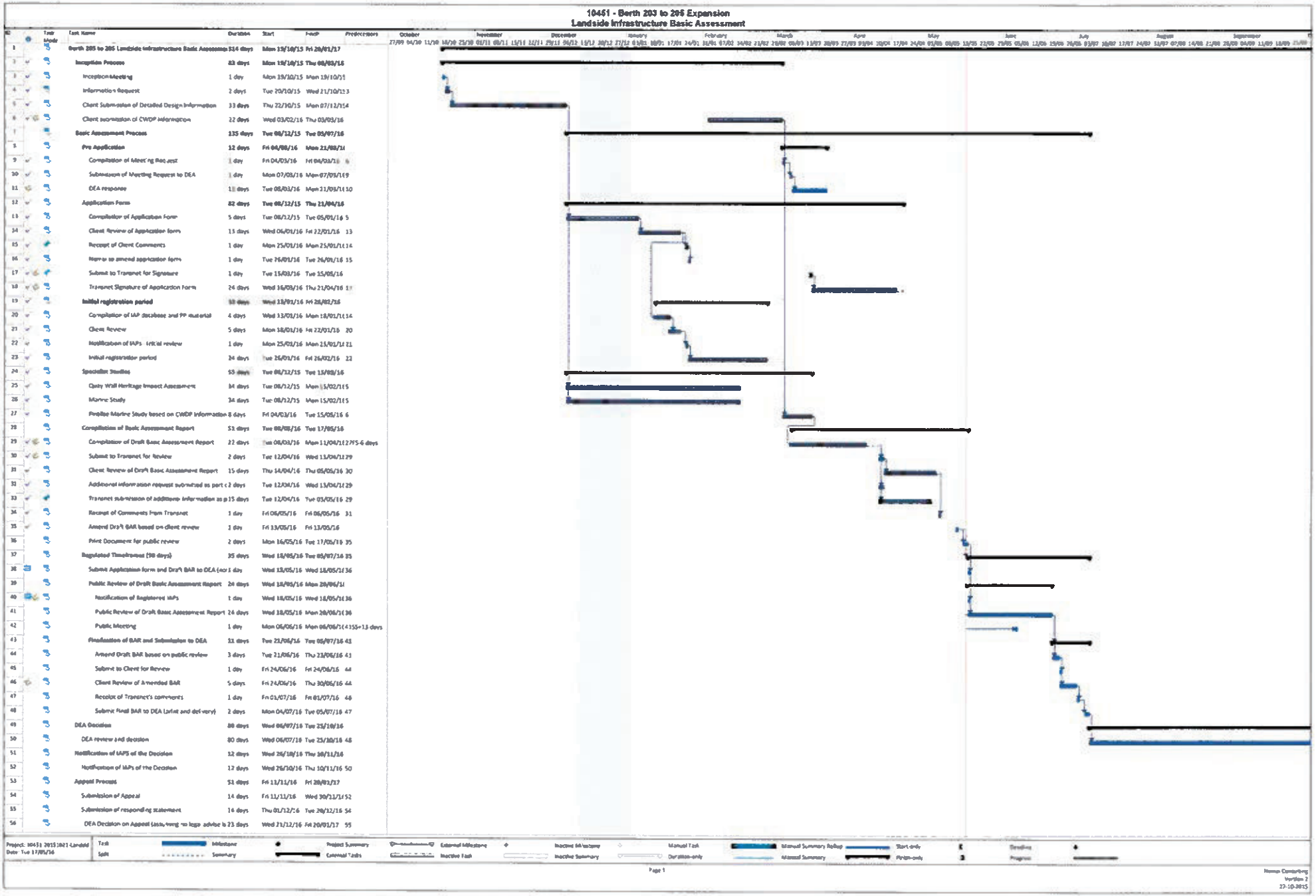
Alternative Layout 2

- Proposed North Substation - Layout 2
- Proposed Mess and Ablution Facility - Layout 2
- Proposed East Substation - Layout 2
- Proposed Satellite Staff Facility - Layout 2

Scale 1:5000

0 25 100 150 200 250 m

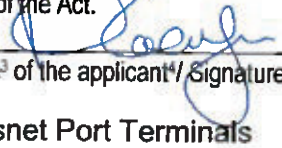
APPENDIX 7
PROJECT SCHEDULE


10451 - Berth 203 to 205 Expansion
Landside Infrastructure Basic Assessment

APPENDIX 8
DECLARATION OF THE APPLICANT

I, Raymond van Rooyen declare that I -

- am, or represent[1], the applicant in this application;
- have appointed / will appoint (delete that which is not applicable) an environmental assessment practitioner to act as the independent environmental assessment practitioner for this application / will obtain exemption from the requirement to obtain an environmental assessment practitioner[2];
- will provide the environmental assessment practitioner and the competent authority with access to all information at my disposal that is relevant to the application;
- will be responsible for the costs incurred in complying with the Regulations, including but not limited to –
  - costs incurred in connection with the appointment of the environmental assessment practitioner or any person contracted by the environmental assessment practitioner;
  - costs incurred in respect of the undertaking of any process required in terms of the Regulations;
  - costs in respect of any fee prescribed by the Minister or MEC in respect of the Regulations;
  - costs in respect of specialist reviews, if the competent authority decides to recover costs; and
  - the provision of security to ensure compliance with conditions attached to an environmental authorisation, should it be required by the competent authority;
- will ensure that the environmental assessment practitioner is competent to comply with the requirements of the Regulations and will take reasonable steps to verify that the EAP
  - know the Act and the regulations, and how they apply to the proposed development
  - know any applicable guidelines
  - perform the work objectively, even if the findings do not favour the applicant
  - disclose all information which is important to the application and the proposed development
  - have expertise in conducting environmental impact assessments
  - complies with the Regulations
- will inform all registered interested and affected parties of any suspension of the application as well as of any decisions taken by the competent authority in this regard;
- am responsible for complying with the conditions of any environmental authorisation issued by the competent authority;
- hereby indemnify the Government of the Republic, the competent authority and all its officers, agents and employees, from any liability arising out of the content of any report, any procedure or any action which the applicant or environmental assessment practitioner is responsible for in terms of these Regulations;
- will not hold the competent authority responsible for any costs that may be incurred by the applicant in proceeding with an activity prior to obtaining an environmental authorisation or prior to an appeal being decided in terms of these Regulations;
- will perform all other obligations as expected from an applicant in terms of the Regulations;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature[3] of the applicant[4] / Signature on behalf of the applicant:

Transnet Port Terminals

Name of company (if applicable):

Date:

07/04/2016

[1] If this is signed on behalf of the applicant, proof of such authority from the applicant must be attached.
[2] If exemption is obtained from appointing an EAP, the responsibilities of an EAP will automatically apply to the person conducting the environmental impact assessment in terms of the Regulations.
[3] Only original signatures will be accepted. No scanned, copied or faxed signatures will be accepted.
[4] If the applicant is a juristic person, a signature on behalf of the applicant is required as well as proof of such authority. An EAP may not sign on behalf of an applicant.

TRANSNET

8 February 2016

Department of Environmental Affairs

Private Bag X 447

Pretoria

0001

Dear Sir / Madam

Re: **Delegation of Authority –**
Responsibility for overseeing the Basic Assessment Process for
The Development of Landside Infrastructure on Berth 203 to 205, Port of Durban

In my capacity as General Manager Risk, Safety, Security & Corporate Affairs, I Zeph Ndlovu wish to declare that Raymond van Rooyen, Executive Manager SHEQ (ID 7301195109082), will be the authorised official overseeing the Environmental Basic Assessment Process for the Development of Landside Infrastructure on Berth 203 to 205, Port of Durban, on behalf of Transnet Port Terminals (TPT).

Yours Sincerely,

Zeph Ndlovu
General Manager Risk, Safety, Security & Corporate Affairs

A division of
Transnet SOC Ltd
Registration Number 1990/000900/30

Kingsmead Office Park
Stalwart Simelane Street
Durban 4001

PO Box 10124
Marine Parade, Durban
South Africa 4056

www.transnet-tpt.net

Tel +27 31 308 8333

APPENDIX 9
DECLARATION OF THE EAP

I, Vanessa Sorrel declare that –

General declaration:

- I act as the independent environmental practitioner in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting environmental impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in regulation 8 of the Regulations when preparing the application and any report relating to the application;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;
- I will keep a register of all interested and affected parties that participated in a public participation process; and
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not
- all the particulars furnished by me in this form are true and correct;
- will perform all other obligations as expected from an environmental assessment practitioner in terms of the Regulations; and
- I realise that a false declaration is an offence in terms of regulation 48 of the Regulations and is punishable in terms of section 24F of the Act.

Disclosure of Vested Interest (delete whichever is not applicable)

- I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations;
- ~~I have a vested interest in the proposed activity proceeding, such vested interest being:~~

Signature of the environmental assessment practitioner:

Name of company: Nemai Consulting

Date: 18-05-2016

APPENDIX J3

DWS Letter

water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

KwaZulu-Natal

P.O. Box 1018, Durban, 4000. 88 Joe Slovo Street, Durban 4000. Tel: (031) 336-2700 Fax: (031) 305 9915.
Website: www.dwa.gov.za

Enq : Ms NPS Mdlalose
Fax : 031 305 9915
File : 16/2/7/ U20M/A1

Tel : 031 336 2889
Date : 07 October 2015
@ : mdlalosen2@dwa.gov.za

Transnet Capital Projects

Email: Gugulethu.Buthelezi@transnet.net

ATTENTION: Ms G. Buthelezi

Dear Madam

RE: DEEPENING OF BERTHS AT THE DURBAN HARBOUR, TRANSNET.

A meeting held between Transnet Capital Projects and the Department of Water and Sanitation (DWS) on the 29th September 2015 at the DWS Offices has references:

1. The purpose of the meeting was to discuss projects that Transnet proposes to undertake that may trigger water uses and require authorisations.
2. This Department confirms that the project, deepening of berths (which may include removal of influx sea water during construction) in the Port of Durban do not require authorisation from the DWS.
3. The applicant must note that the above does not absolve the applicant from compliance with all other relevant legislation.

Please do not hesitate to contact this Office should you have any queries.

Yours faithfully,

***for* Acting CEO: Pongola to Mzimkulu Proto-CMA**
Mr. S.O. Naidoo
Deputy Director
Date: 18/10/2015

APPENDIX J4

Dewatering Volumes

BERTH DEEPENING -EAST SUBSTATION

$$Q = \frac{\pi K (h_1^2 - h_2^2)}{\ln(\frac{R}{r_c})}$$

Q=	pumping rate required to dewater the excavation (m^3/day)	41.52825	m^3/day
K=	hydraulic conductivity (m/s)	0.00005	m/s
h1=	height of the static water table	4.91	m
h2=	height that water table must be lowered to in order to keep excavation dry	3	m
*R=	radius of fully developed cone depression	125	m
rc=	equivalent radius of an equivalent circular well	24.10714	m

$$r_c = \sqrt{\frac{ab}{\pi}}$$

a	54.5	m	L=	46
b	33.5	m	B=	25

where a and b are the length and breadth of the excavation

Q= 0.001442 m^3/sec

41.52825 m^3/day

ASSUME BED ROCK	7	m BELOW GL
DEPTH OF WT	2.09	m BELOW GL
LOWER THE WT TO	4	m BELOW GL

*MEASURED FROM GOOGLE EARTH (FROM SITE TO NEAREST WATER BODY)

BERTH DEEPENING -NORTH SUBSTATION

$$Q = \frac{\pi K (h_1^2 - h_2^2)}{\ln(\frac{R}{r_c})}$$

Q=	pumping rate required to dewater the excavation (m^3/day)	48.98958	m^3/day
K=	hydraulic conductivity (m/s)	0.00005	m/s
h1=	height of the static water table	5.91	m
h2=	height that water table must be lowered to in order to keep excavation dry	4	m
*R=	radius of fully developed cone depression	140	m
rc=	equivalent radius of an equivalent circular well	24.37958	m

$$r_c = \sqrt{\frac{ab}{\pi}}$$

a	48.5	m	L=	40
b	38.5	m	B=	30

where a and b are the length and breadth of the excavation

Q= 0.001701 m^3/sec

48.98958 m^3/day

ASSUME BED ROCK	8	m BELOW GL
DEPTH OF WT	2.09	m BELOW GL
LOWER THE WT TO	4	m BELOW GL

*MEASURED FROM GOOGLE EARTH (FROM SITE TO NEAREST WATER BODY)

Generic Method Statement for dewatering works for the Durban Container Terminal landside Infrastructure

Introduction

The location for the construction of the Landside facilities (Mess & Ablutions, Sub Stations and Satelite Ablution facility) indicates that the groundwater level is about 2.09 metres below surface level.

To facilitate a safe, dry and stable working environment the groundwater flow into the area will need to be controlled prior to the commencement of the excavations.

There are two main types of groundwater control namely:

- Cut Off Walls
- Dewatering techniques

There are a wide range of groundwater control methods however, the preferred method will depend on a number of variables such as geology, hydrogeology, space and environmental constraints of the site.

The final decision for groundwater control will be taken by the contractor.

Purpose and scope

The purpose of this generic method statement is to explain the procedure on how to undertake dewatering at the site/s without compromising health & Safety and the environment.

All dewatering must be done as per the required specification/s and approved drawing/s.

Procedure

Dewatering Techniques

Dewatering techniques consists of the installation of groundwater well points installed alongside the trench to be excavated to a predetermined depth below the groundwater.

Initial preparation

1. Notify Transnet Port Terminals (TPT) of the dewatering activity that will take place and of access routes that may be closed during the dewatering process.
2. Agree on alternative access routes with TPT and the project management team
3. Cordon off the area that will be dewatered.
4. Protect any structure/s that may be affected by the dewatering activity caused by settlement and hazards created by dewatering.
5. Pre-drilling and high pressure water jetting will be carried out prior to the installation of the well point.
6. A filter media will be inserted around intake points of the well/s to act as barrier against fines and prevent choking of well points.
7. The well points are spaced at intervals to obtain an efficient draw down.

8. The header pipe shall be connected to well points placed at 1 meter centers or as determined by the appointed contractor with sufficient depth to ensure that lowering of the water table shall be carried out from a level not less than 1 meter below the excavation bottom.
9. A typical example of a dewatering system is depicted in Figure 1 and Figure 2 hereunder.
10. Each well point is connected with a flexible hose which is connected with quick release couplings to a ring main header pipeline as depicted in Figure 2.
11. Strategically located valves are installed in the ring main and each well point is fitted with an isolation valve.
12. This allows for the balancing of the dewatering system i.e. valves can be opened and closed to regulate and balance the dewatering process.

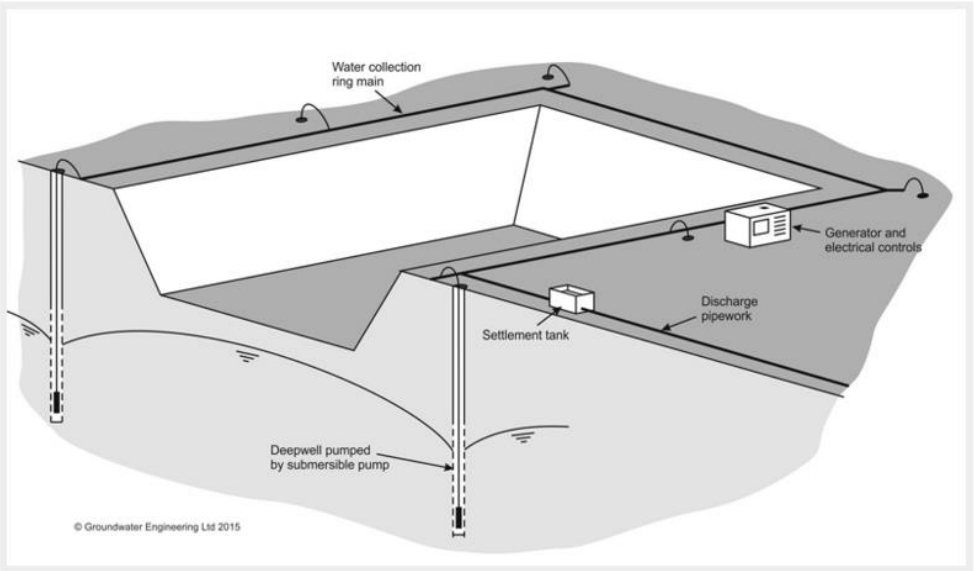


Figure 1 Typical Dewatering System (Courtesy Groundwater Engineering - http://www.groundwatereng.com/dewatering-techniques)

Figure 2. Well points connected with quick release couplings to a ring main header pipeline and pump

13. The ring main header is connected to a single pump or a number of pumps depending on the size of the excavation and pumping rate.
14. The pumps draw the water down and the dewatering system is regulated to control the dewatering flow rate. A typical water pump is depicted in Figure 3.
15. The groundwater being extracted will more than likely pass through a sediment trap before being discharged into the bay.
16. Operate the dewatering system on a continuous basis (24 hours per day) until the structured beneath the static water table level has been constructed and until written authorization to cease dewatering.
17. The water being pumped from the excavations will be discharged via the existing storm water system into the bay as depicted in Figures 4 & 5 hereunder.
18. The water being discharged into the bay will be visually monitored as described in the Environmental Management Plan.

Figure 3. Typical Dewatering Pump

Safety

1. All work shall comply with the safety procedures and/or instructions as set out in Project Safety Plan.
2. Personal Protective Equipment (PPE) shall be worn by all the contractor's staff .
3. All operatives shall undergo safety and environmental induction training before accessing the site.
4. Tool box talk shall be conducted as prescribed in the Project Safety Plan

Materials - Tools and Equipment – To be determined by appointed contractor

1. Centrifugal Vacuum assisted pumps
2. Header pipes with fittings
3. Water tank/s
4. Settlement tank
5. Drilling machine
6. Well points
7. High pressure water jetting pump

8. Flexible hose for discharge

References

Approved Contractor's Drawings

Figure 4 Discharge Point for dewatering

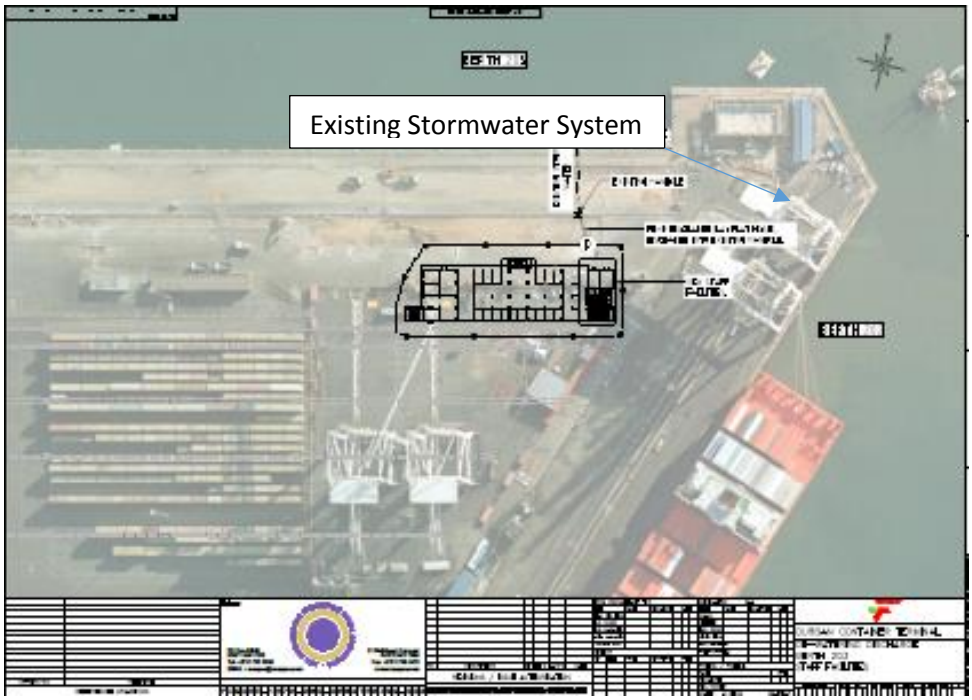


Figure 5 Discharge Point for dewatering

APPENDIX J5

Dewatering Method Statement

APPENDIX J6

Geotechnical Assessment

TRANSNET SOC LTD

FEASIBILITY STUDY (FEL 3) FOR THE DEEPENING OF BERTHS 203 TO 205 PORT OF DURBAN

GEOTCHNICAL EVALUATION FOR THE NEW WORKERS FACILITIES AND SUBSTATIONS

ZAA 1370 | RPT | 036 REV B

30 October 2015

T: +27 (0) 21 791 9100
F: +27 (0) 21 790 4470
E: ZAAEPNA@ZAAEPNA.COM
WWW.ZAAENGINEERING.COM

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HOUT BAY
CAPE TOWN
7806

ZAA
ENGINEERING PROJECTS &
NAVAL ARCHITECTURE (PTY) LTD

REVISIONS					
REV	**DATE**	**DESCRIPTION**	**DESIGNED BY**	**CHECKED BY**	**APPROVED BY**
A	4 March 2013	For information	AH	RAB	JZ
B	30 October 2015	For Information	JZ/AH/MB	MC	JZ

AUTHORISATION			
AUTHORISED BY	**NAME**	**SIGNATURE**	**DATE**
DIRECTOR	J ZIETSMAN	John Zietsman	30 October 2015

CONTENTS

1.0 INTRODUCTION

Transnet Projects (TCP) are undertaking the structural and geotechnical design of the new workers facilities and substations for the Berth Deepening project at Pier 2 in the Port of Durban.

This report consolidates the exploratory borehole data that has been extracted from various reports and issued to TCP for information. The reports from which this information has been extracted are as follows:

(i) Moore Spence Jones – Transnet Projects – Port of Durban Berth Deepening Feasibility Study; Factual Geotechnical Reports for Phase 1, Phase 2, Phase 3. Reference: 07-395R06Rev0; 07-395R07Rev0; 07-395R08Rev0; 6 May 2009.

(ii) ZAA Engineering Projects and Naval Architecture (Pty) Ltd – Transnet Soc. LTD Feasibility study (FEL 3) for the Deepening of Berths 203 to 205, Port of Durban, Final Geotechnical Report, ZAA-1370-RPT-017 Rev B, March 2013.

The exploratory borehole logs and DCP data from these two reports are contained in Annexure 2. A single DCP has been carried out at the facility at Berth 205, the results of which are presented in Annexure 3.

2.0 SOIL CONDITIONS

2.1 Berths 202/203

Likely soil conditions are a medium dense fine to medium grained SAND (Hydraulic fill) with shell fragments. The relative density of the sand is expected to be uniform across the sites and generally increase with depth.

Soft gravelly sandy CLAY was observed in BD-BHL301 from ground level to 1.5 m.

2.2 Berth 205

Likely soil conditions are a medium dense fine to medium grained SAND (Hydraulic fill) with pebbles and shell fragments. The relative density of the sand is expected to be uniform across the sites and generally increase with depth.

The DCP result indicated unusually dense conditions due to the presence of gravely fill near the ground surface. The loose material and gravel near ground level must be removed during the preparation of the new foundations.

3.0 FOUNDATION FOOTING DESIGN

The foundation design is being carried out by TCP.

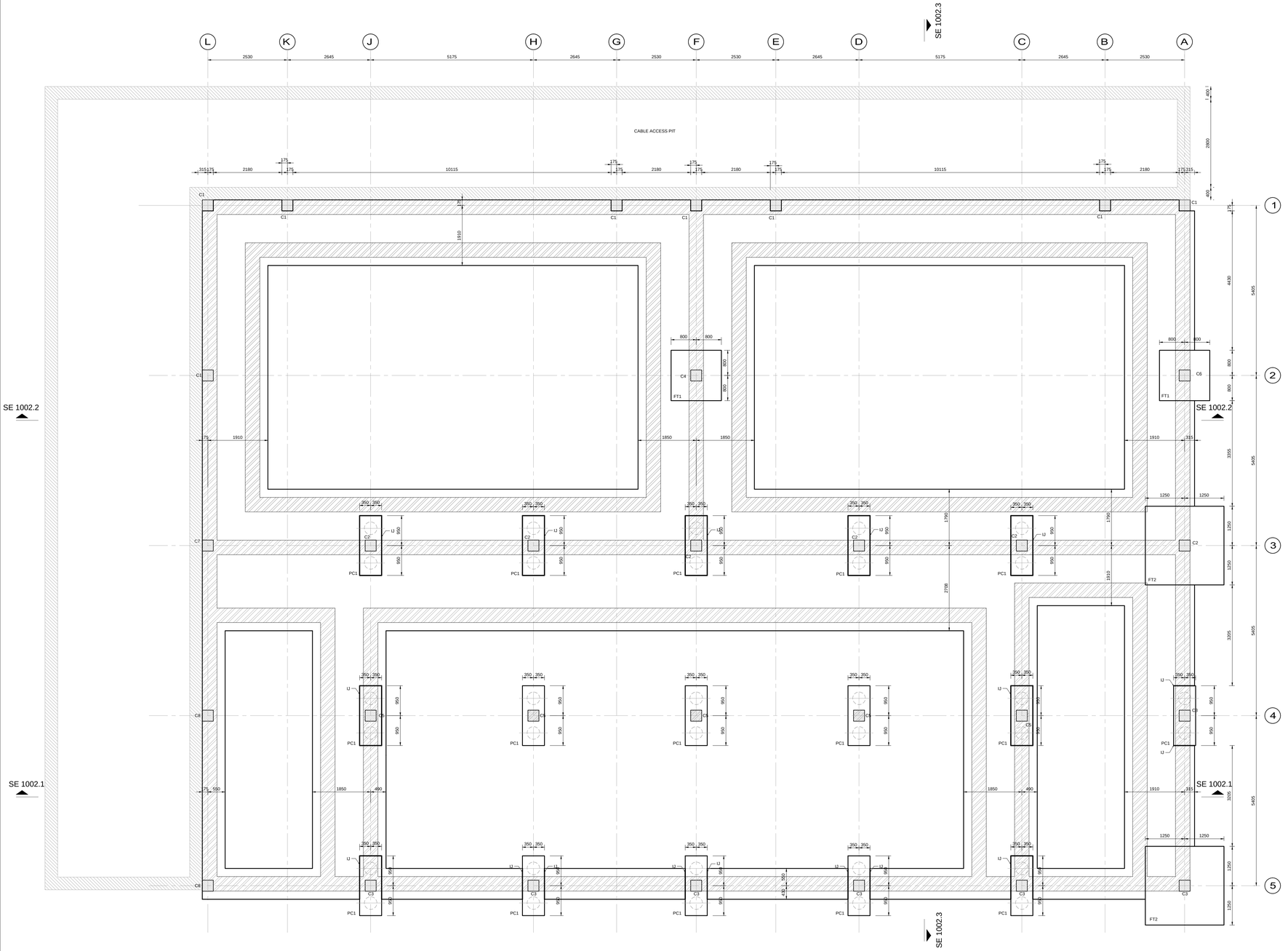
4.0 CONCLUSIONS AND RECOMMENDATIONS

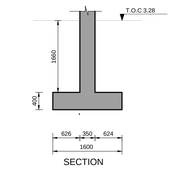
4.1 Conclusion

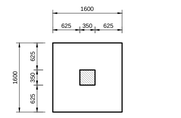
The soil conditions expected at Berth 203 and 205 site locations are medium dense sand. The relative density of the sand is expected to be uniform across the sites and generally increase with depth.

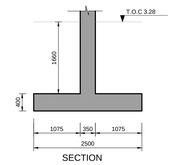
ANNEXURES

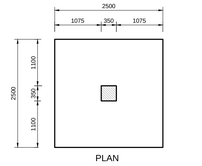
ANNEXURE 1 - NEW WORKERS FACILITIES AND SUBSTATIONS LOCALITY DRAWINGS.

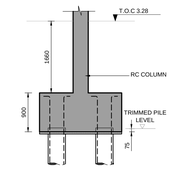


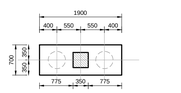


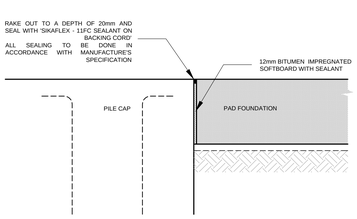












FOUNDATION LAYOUT FOR BUILDING

SCALE 1:50

NOTE:
REFER TO CIVIL DRAWINGS
FOR SETTING OUT

LEGEND:
IJ - ISOLATION JOINT

FOUNDATION TYPE FT1
1 : 50

FOUNDATION TYPE FT2
1 : 50

TYPICAL ELEVATION
OF PILE CAP PC1
1 : 50

PILE CAP = 1900 x 700 x 900 Dp
R. C. COLUMN = 350 x 350

PILE CAP PC1
20 NO. OF
1 : 50

ISOLATION JOINT DETAILS
SCALE 1:10

DRAWING NO.	REFERENCE

REFERENCE DRAWINGS

General

This drawing to be read in conjunction with all relevant architects and engineers drawings.

Dimensions must not be scaled or assumed. After notification, discrepancies or missing dimensions will be corrected in writing by the engineer.

Levels shown to foundations are provisional and will be finalised by the engineer on site.

Foundations have been designed for a permissible bearing pressure of 150 KN/m²

Reinforcement shall comply with SABS 920 and be bent to SABS 82.

Symbols :
R = Mild steel bars with characteristic strength of 250 MPa..
Y = Hot rolled or cold worked high yield steel bars with characteristic strength of 450 MPa.
(Only reinforcement fabricated under the SABS mark shall be deemed to comply with SABS requirements).

Concrete (where applicable the following shall apply)

All concrete work shall conform with the latest amended issue of :
SABS 1200 : Standard Specification for concrete and
SABS 0100 : The structural use of concrete.

A set of six cubes must be made for every fifty cubic meter (or portion thereof) of concrete poured on a specific day, 3 of the cubes must be tested at seven days, and the balance must be available for testing at 28 days.
The test results are to be submitted to the engineers immediately and should any problems be anticipated no shuttering is to be stripped until further notice from the engineer.

All concrete shall be vibrated according to specification. All concrete must be cured continuously for seven days after pouring and effectively protected against dehydration.

Shuttering and propping may only be struck after thelapse of the following times:
(Ordinary Portland Cement in normal weather conditions)

Position of Shuttering Props	Striking Time Days
Beam side walls & unloaded columns	2
Slab soffits without removal of slab props	4
Beam soffits without removal of props	7
Props unloaded slabs	10
Props unloaded beams	14

Beams and slabs must be poured with the following cambers.

Beam or Slab Element	Camber
Cantilever beams and slabs	Span/150
Other beams and slabs	Span/400

Concrete strengths are specified in terms of clauses in SABS 1200.
For the various elements they are as follows

Structural Element	Concrete Grade
Blinding	15
Bases/footings	30
Beams / Slabs	30
Walls	30
Columns	30

The structure has been designed for the following imposed floor loads:

Structure	Loading(kN/m²)
Live Load	5.0

Concrete cover to reinforcement (in mm) - Unless Otherwise Specified

Bases/footings	- 50	Strap beams	- 50
Pilecap (top and sides)	- 50	Columns	- 50
Pilecap (bottom)	- 75	Beams	- 50
Ground beams	- 50	Slab (top steel)	- 50
Retaining walls (earth face)	- 50	Slab (bottom steel)	- 50

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
0A	ISSUED FOR TENDER	PM	ML	ML	15-06-2015

REVISIONS

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OPERATING DIVISIONS

TITLE	NAME	SIGN	DATE
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TRANSNET CAPITAL PROJECTS

TITLE	NAME	SIGN	DATE
DRAWN	PM		04 06 15
CHECKED	ML		
DESIGNED	PM		14 04 15
CHECKED	ML		
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PR.ENG. / PR.TECH./PR. ARCH
NAME M. LETSIE DATE
SIGNATURE
REG. NUMBER 201270051
SCALE : NOTED A0

Transnet Capital Projects TRANSNET LTD
(TRADING AS TRANSNET CAPITAL PROJECTS) : REG. NO. 1990/000900/30
237 MAHATMA GANDHI ROAD
POINT, DURBAN TEL. 031 361 1696
BOX 38163, DURBAN FAX. 086 677 0815

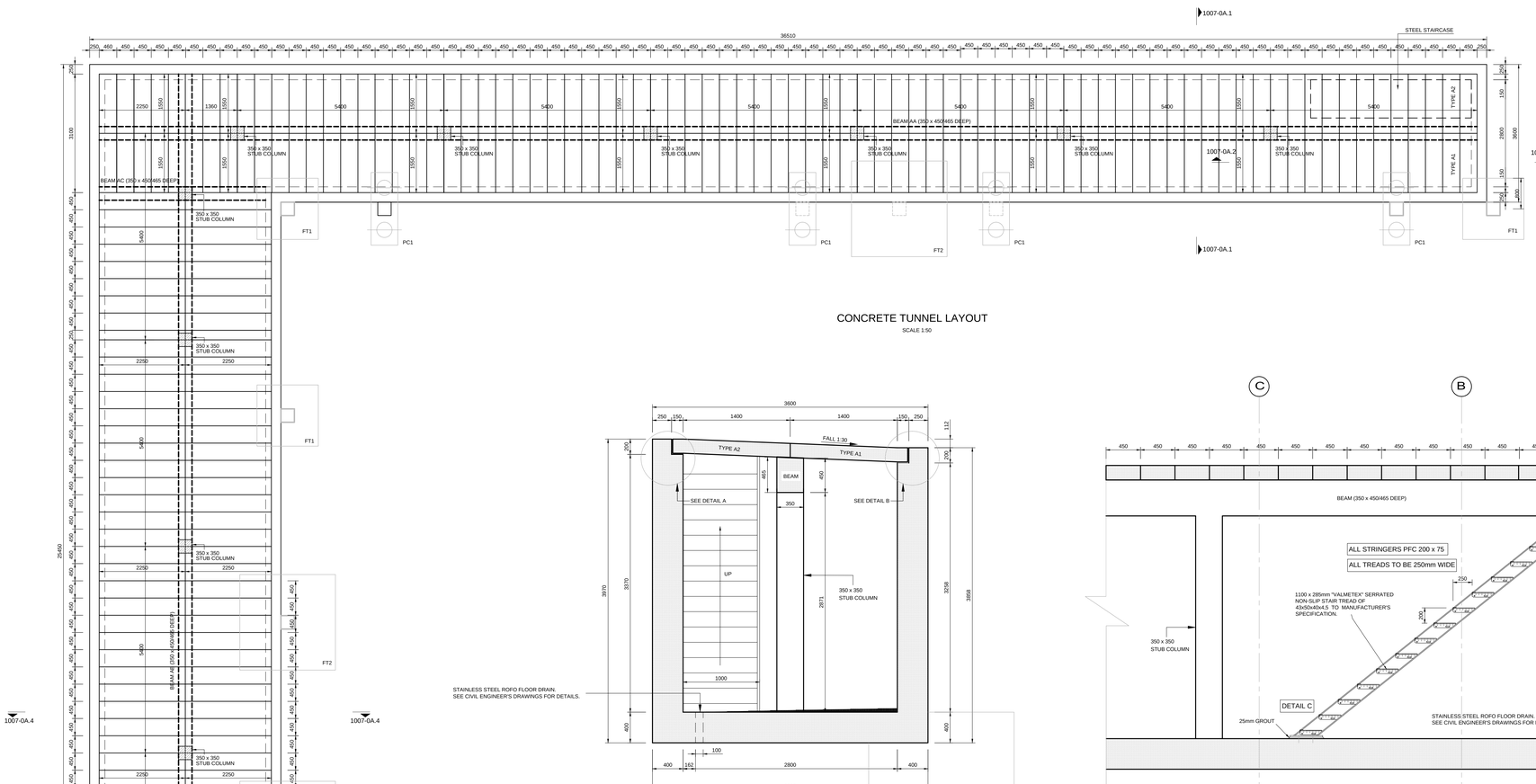
PORT OF DURBAN

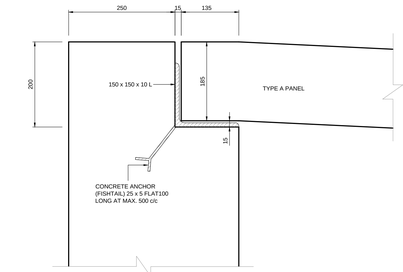
DEEPENING OF BERTHS 203 TO 205

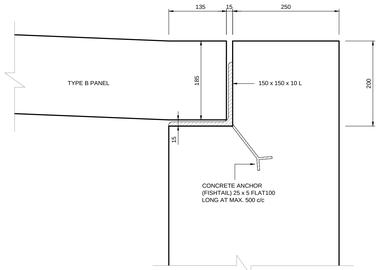
NORTH SUB-STATION

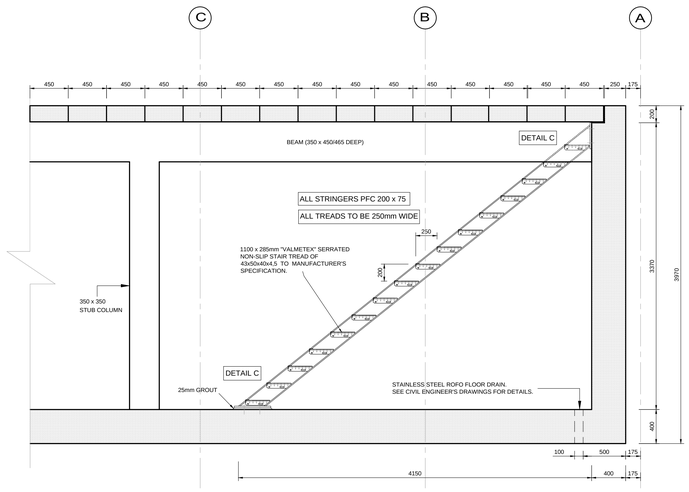
BUILDING FOUNDATION LAYOUT

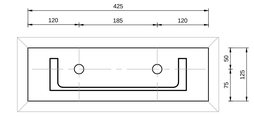
PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
2 1 2 2 8 3 0	1	0 0 1	S	L A	1 0 0 0	0 1	0 A	PM

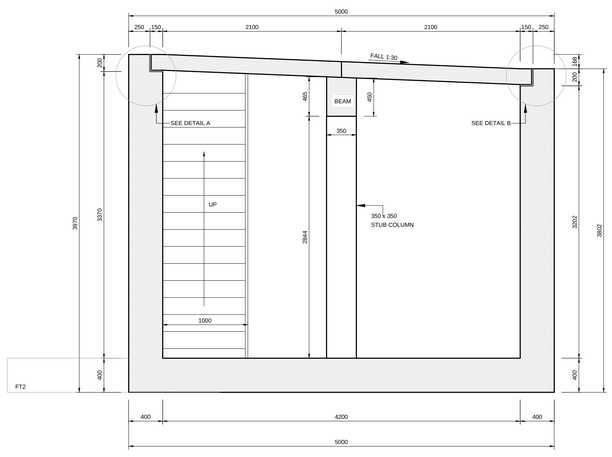


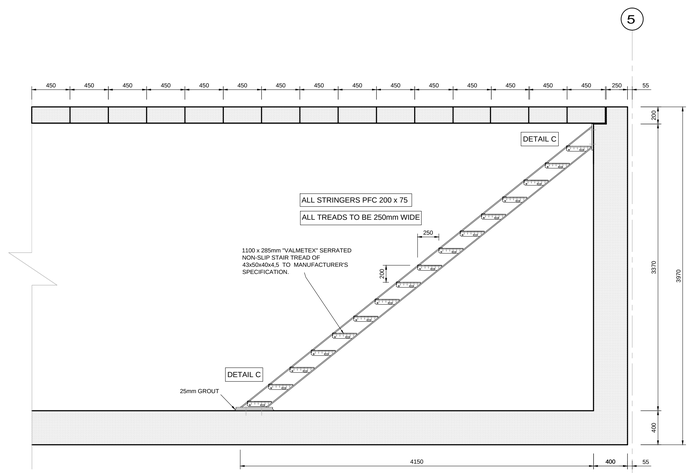


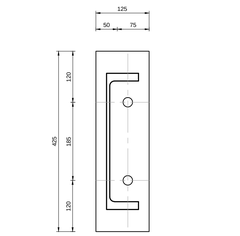












CONCRETE TUNNEL LAYOUT
SCALE 1:50

1007-0A.1
1:25

1007-0A.2
SCALE 1:25

1007-0A.4
SCALE 1:25

1007-0A.3
SCALE 1:25

DETAIL A
SCALE 1:5

DETAIL B
SCALE 1:5

DETAIL C

BASE PLATE	425 x 125 x 20mm MS
STRINGER	PFC 200 x 75
BOLTS	2 No. M20 HSL H.D ANCHORS
WELD	6mm FILLET

BASE PLATE DETAIL FOR STAIRCASE STRINGER
1 : 5

DETAIL D

BASE PLATE	425 x 125 x 20mm MS
STRINGER	PFC 200 x 75
BOLTS	2 No. M20 CHEMICAL ANCHORS
WELD	6mm FILLET

BASE PLATE DETAIL FOR STAIRCASE STRINGER
1 : 5

DRAWING NO.	REFERENCE

REFERENCE DRAWINGS

General

This drawing to be read in conjunction with all relevant architects and engineers drawings.

Dimensions must not be scaled or assumed. After notification, discrepancies or missing dimensions will be corrected in writing by the engineer.

Levels shown to foundations are provisional and will be finalised by the engineer on site.

Foundations have been designed for a permissible bearing pressure of 100 KN/m²

Reinforcement shall comply with SABS 920 and be bent to SABS 82.

Symbols :
R = Mild steel bars with characteristic strength of 250 MPa..
Y = Hot rolled or cold worked high yield steel bars with characteristic strength of 450 MPa.
(Only reinforcement fabricated under the SABS mark shall be deemed to comply with SABS requirements).

Concrete (where applicable the following shall apply)

All concrete work shall conform with the latest amended issue of :
SABS 1200 : Standard Specification for concrete and
SABS 0100 : The structural use of concrete.

A set of six cubes must be made for every fifty cubic meter (or portion thereof) of concrete poured on a specific day, 3 of the cubes must be tested at seven days, and the balance must be available for testing at 28 days.
The test results are to be submitted to the engineers immediately and should any problems be anticipated no shuttering is to be stripped until further notice from the engineer.

All concrete shall be vibrated according to specification. All concrete must be cured continuously for seven days after pouring and effectively protected against dehydration.

Shuttering and propping may only be struck after thelapse of the following times:
(Ordinary Portland Cement in normal weather conditions)

Position of Shuttering Props	Striking Time Days
Beam side walls & unloaded columns	2
Slab soffits without removal of slab props	4
Beam soffits without removal of props	7
Props unloaded slabs	10
Props unloaded beams	14

Beams and slabs must be poured with the following cambers.

Beam or Slab Element	Camber
Cantilever beams and slabs	Span/150
Other beams and slabs	Span/400

Concrete strengths are specified in terms of clauses in SABS 1200.
For the various elements they are as follows

Structural Element	Concrete Grade
Blinding	15
Bases/footings	30
Beams / Slabs	30
Walls	30
Columns	30

The structure has been designed for the following imposed floor loads:

Structure	Loading(kN/m²)
Live Load	1.5

Concrete cover to reinforcement (in mm) - Unless Otherwise Specified

Bases/footings	- 50	Strap beams	- 50
Pilecap (top and sides)	- 50	Columns	- 50
Pilecap (bottom)	- 75	Beams	- 50
Ground beams	- 50	Slab (top steel)	- 50
Retaining walls (earth face)	- 50	Slab (bottom steel)	- 50

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
0A	ISSUED FOR TENDER	PM	ML	ML	15-06-2015

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OPERATING DIVISIONS

TITLE	NAME	SIGN	DATE

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TITLE	NAME	SIGN	DATE
DRAWN	PM		
CHECKED	ML		
DESIGNED	EM		
CHECKED	ML		

PR.ENG. / PR.TECH./PR. ARCH
NAME M. LETSIE
DATE
SIGNATURE
REG. NUMBER 201270051
SCALE : NOTED
A0

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BOX 38163, DURBAN FAX. 086 677 0815

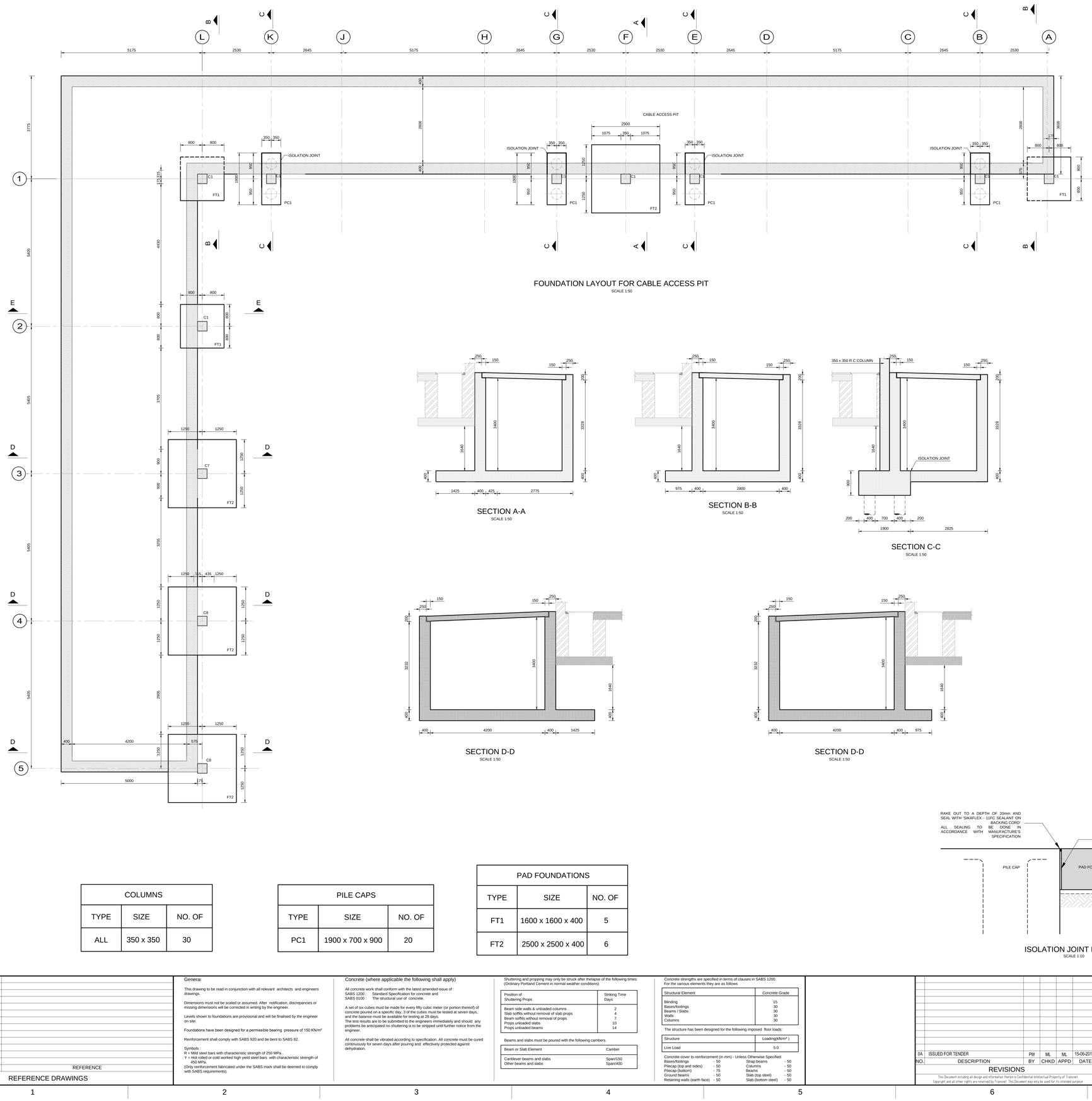
PORT OF DURBAN

DEEPENING OF BERTHS 203 TO 205

NORTH SUB-STATION

CABLE ACCESS PIT LAYOUT AND DETAILS

PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
2122830	1	001	S	LA	1007	01	0A	PM



FOUNDATION LAYOUT FOR CABLE ACCESS PIT
SCALE 1:50

SECTION A-A
SCALE 1:50

SECTION B-B
SCALE 1:50

SECTION C-C
SCALE 1:50

SECTION D-D
SCALE 1:50

SECTION D-D
SCALE 1:50

FOUNDATION TYPE FT1
1 : 50

FOUNDATION TYPE FT2
1 : 50

TYPICAL ELEVATION
OF PILE CAP PC1
1 : 50

PILE CAP = 1900 x 700 x 900 Dp
R. C. COLUMN = 350 x 350

PILE CAP PC1
20 NO. OF
1 : 50

NOTE: PILES TO BE DESIGNED BY SUPPLIER

ISOLATION JOINT DETAILS
SCALE 1:10

NOTE:
REFER TO CIVIL DRAWINGS
FOR SETTING OUT

COLUMNS		
TYPE	SIZE	NO. OF
ALL	350 x 350	30

PILE CAPS		
TYPE	SIZE	NO. OF
PC1	1900 x 700 x 900	20

PAD FOUNDATIONS		
TYPE	SIZE	NO. OF
FT1	1600 x 1600 x 400	5
FT2	2500 x 2500 x 400	6

DRAWING NO.	REFERENCE

REFERENCE DRAWINGS

General

This drawing to be read in conjunction with all relevant architects and engineers drawings.

Dimensions must not be scaled or assumed. After notification, discrepancies or missing dimensions will be corrected in writing by the engineer.

Levels shown to foundations are provisional and will be finalised by the engineer on site.

Foundations have been designed for a permissible bearing pressure of 150 KN/m²

Reinforcement shall comply with SABS 920 and be bent to SABS 82.

Symbols :
R = Mild steel bars with characteristic strength of 250 MPa..
Y = Hot rolled or cold worked high yield steel bars with characteristic strength of 450 MPa.
(Only reinforcement fabricated under the SABS mark shall be deemed to comply with SABS requirements).

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SABS 0100 : The structural use of concrete.

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(Ordinary Portland Cement in normal weather conditions)

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Props unloaded beams	14

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Cantilever beams and slabs	Span/150
Other beams and slabs	Span/400

Concrete strengths are specified in terms of clauses in SABS 1200.
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Structural Element	Concrete Grade
Blinding	15
Bases/footings	30
Beams / Slabs	30
Walls	30
Columns	30

The structure has been designed for the following imposed floor loads:

Structure	Loading(kN/m²)
Live Load	5.0

Concrete cover to reinforcement (in mm) - Unless Otherwise Specified

Bases/footings	- 50	Strap beams	- 50
Pilecap (top and sides)	- 50	Columns	- 50
Pilecap (bottom)	- 75	Beams	- 50
Ground beams	- 50	Slab (top steel)	- 50
Retaining walls (earth face)	- 50	Slab (bottom steel)	- 50

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
0A	ISSUED FOR TENDER	PM	ML	ML	15-06-2015

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TRANSNET CAPITAL PROJECTS

TITLE	NAME	SIGN	DATE
DRAWN	PM		04 06 15
CHECKED	ML		
DESIGNED	EM		23 04 15
CHECKED	ML		
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REG. NUMBER 201270051
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TRANSNET

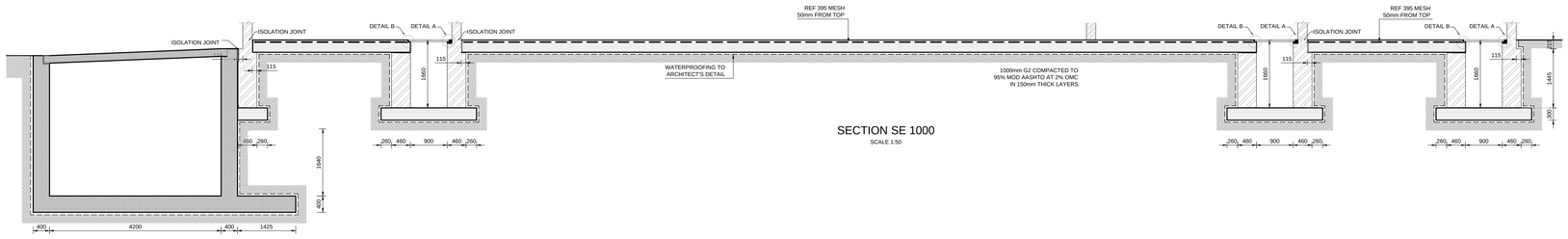
PORT OF DURBAN

DEEPENING OF BERTHS 203 TO 205

NORTH SUB-STATION

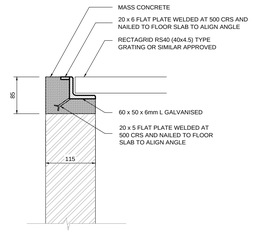
CABLE ACCESS PIT FOUNDATION LAYOUT

PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
2122830	1	001	S	LA	1008	01	0A	PM



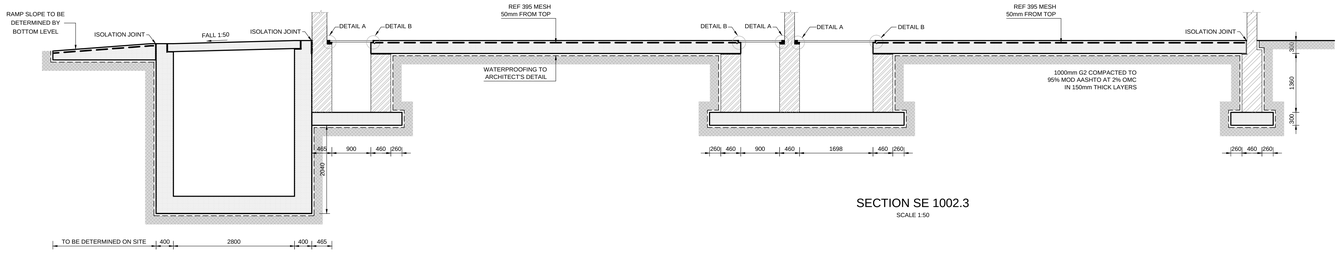
SECTION SE 1000

SCALE 1:50



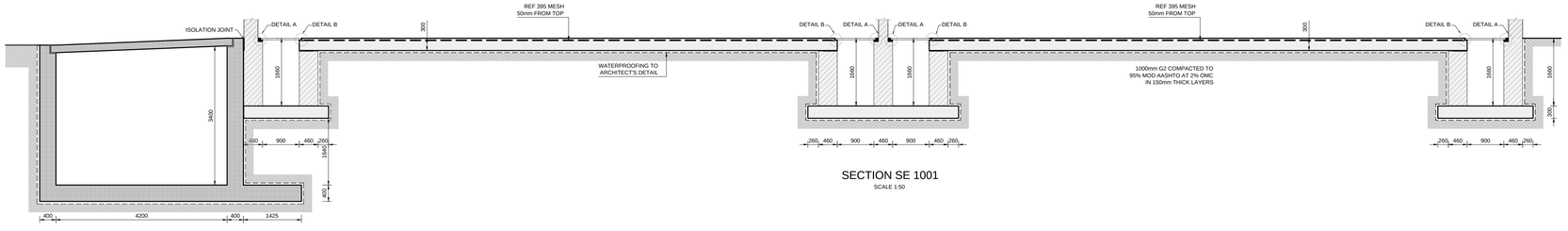
DETAIL A

1 : 5



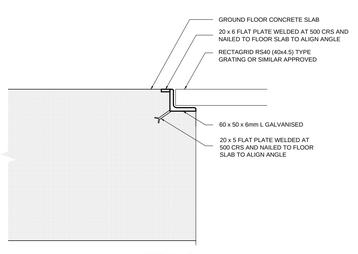
SECTION SE 1002.3

SCALE 1:50



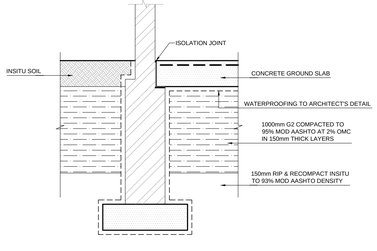
SECTION SE 1001

SCALE 1:50



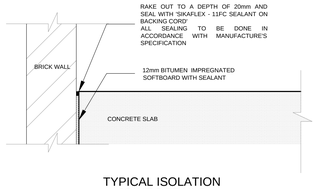
DETAIL B

1 : 5



LAYER WORK AT FOUNDATION LEVEL

SCALE 1:25



TYPICAL ISOLATION JOINT DETAILS

SCALE 1:10

DRAWING NO. | REFERENCE

REFERENCE DRAWINGS

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Pilecap (bottom)	- 75	Beams	- 50
Ground beams	- 50	Slab (top steel)	- 50
Retaining walls (earth face)	- 50	Slab (bottom steel)	- 50

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
0A	ISSUED FOR TENDER	PM	ML	ML	15-06-2015

REVISIONS

CONTRACTOR / CONSULTANT			
TITLE	NAME	SIGN	DATE

OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE
DRAWN	PM		02 06 15
CHECKED	ML		
DESIGNED	PM		04 05 15
CHECKED	ML		

PR.ENG. / PR.TECH./PR. ARCH	
NAME	M. LETSIE
SIGNATURE	
REG. NUMBER	201270051
SCALE :	NOTED

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TRADING AS TRANSNET CAPITAL PROJECTS) : REG. NO. 1990/000900/30
237 MAHATMA GANDHI ROAD
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TEL. 031 361 1696
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TRANSNET

PORT OF DURBAN

DEEPENING OF BERTHS 203 TO 205 NORTH SUB-STATION

BUILDING FOUNDATION SECTIONS

PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
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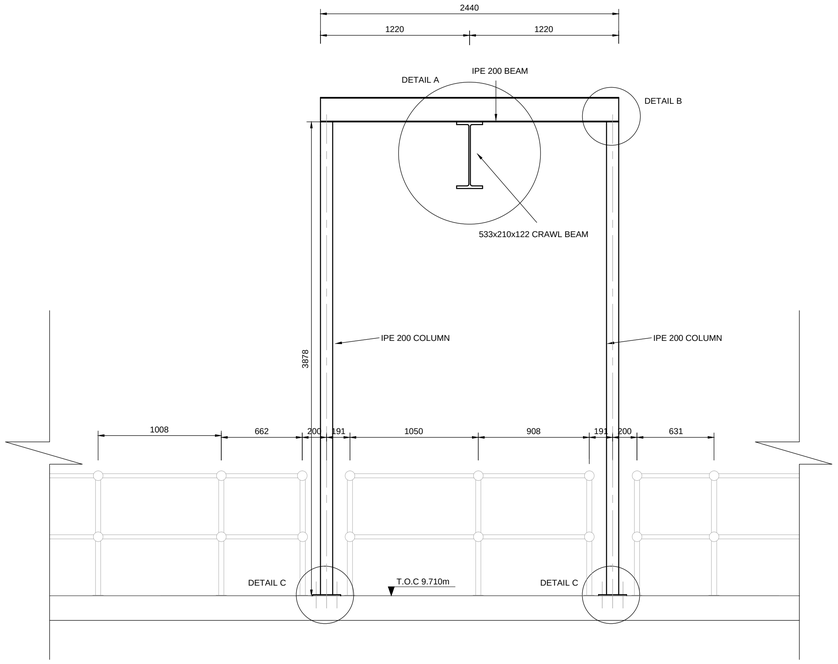
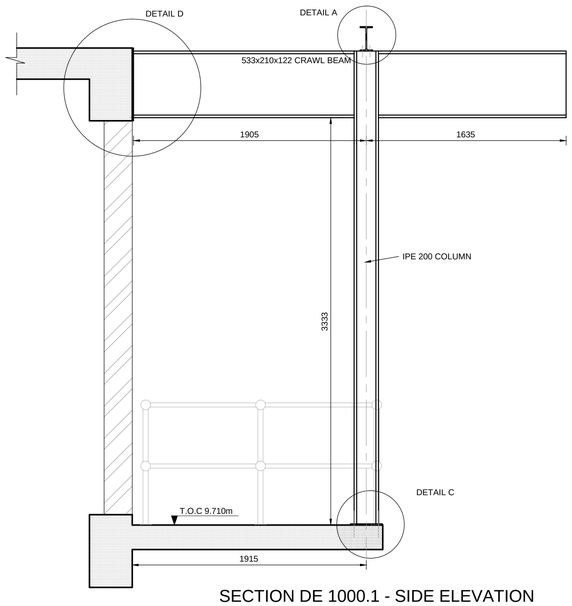


SECTION DE 1000.1 - FRONT ELEVATION

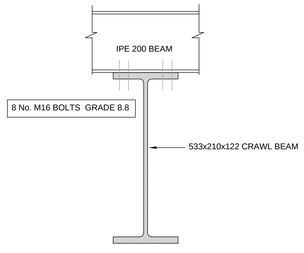
SCALE 1:25



SECTION DE 1000.1 - SIDE ELEVATION

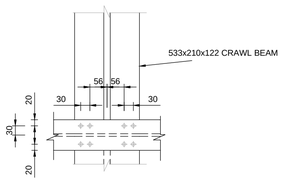
SCALE 1:25

END PLATE	230 x 260 x 10mm STEEL PLATE
BOLTS	4 No. M16 BOLTS GRADE 8.8
WELDS	6mm FILLET



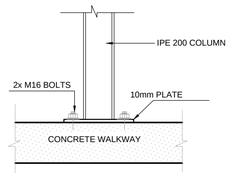
DETAIL A: ELEVATION

SCALE 1:10



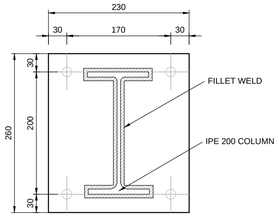
DETAIL A: PLAN

SCALE 1:10



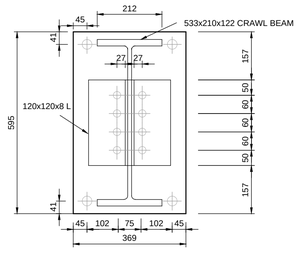
DETAIL C: ELEVATION

SCALE 1:10



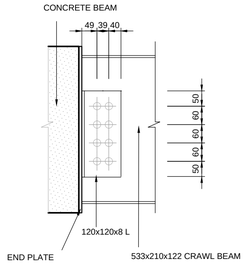
DETAIL C: PLAN

SCALE 1:5



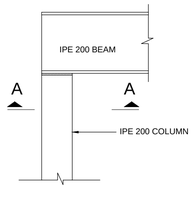
DETAIL D: FRONT ELEVATION

SCALE 1:10



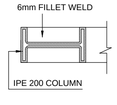
DETAIL D: SIDE ELEVATION

SCALE 1:10



DETAIL B: ELEVATION

SCALE 1:10



SECTION A-A DETAILS

SCALE 1:10

General

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Foundations have been designed for a permissible bearing pressure of 150 KN/m²

Reinforcement shall comply with SANS 920 and be bent to SANS 282.

Symbols :
R = Mild steel bars with characteristic strength of 250 MPa..
Y = Hot rolled or cold worked high yield steel bars with characteristic strength of 450 MPa.
(Only reinforcement fabricated under the SABS mark shall be deemed to comply with SABS requirements).

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SANS 10100 : The structural use of concrete.

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Position of Shuttering Props	Striking Time Days
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Slab soffits without removal of slab props	4
Beam soffits without removal of props	7
Props unloaded slabs	10
Props unloaded beams	14

Beams and slabs must be poured with the following cambers.

Beam or Slab Element	Camber
Cantilever beams and slabs	Span/150
Other beams and slabs	Span/400

Concrete strengths are specified in terms of clauses in SANS 1200.
For the various elements they are as follows

Structural Element	Concrete Grade
Blinding	15
Bases/footings	30
Beams / Slabs	30
Walls	30
Columns	30

The structure has been designed for the following imposed floor loads:

Structure	Loading(kN/m²)
Live Load	5.0

Concrete cover to reinforcement (in mm) - Unless Otherwise Specified

Bases/footings	- 50	Strap beams	- 50
Pilecap (top and sides)	- 50	Columns	- 50
Pilecap (bottom)	- 75	Beams	- 50
Ground beams	- 50	Slab (top steel)	- 50
Retaining walls (earth face)	- 50	Slab (bottom steel)	- 50

DRAWING NO.	REFERENCE
.	.

REFERENCE DRAWINGS

NOTES

1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.

2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
0A	ISSUED FOR TENDER	PM	ML	ML	15-06-2015

REVISIONS

CONTRACTOR / CONSULTANT			
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NAME	M. LETSIE	DATE
SIGNATURE		
REG. NUMBER	201270051	
SCALE :	NOTED	A1

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PORT OF DURBAN

DEEPENING OF BERTHS 203 TO 205

EAST SUB STATION

CRAWL BEAM DETAILS

PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
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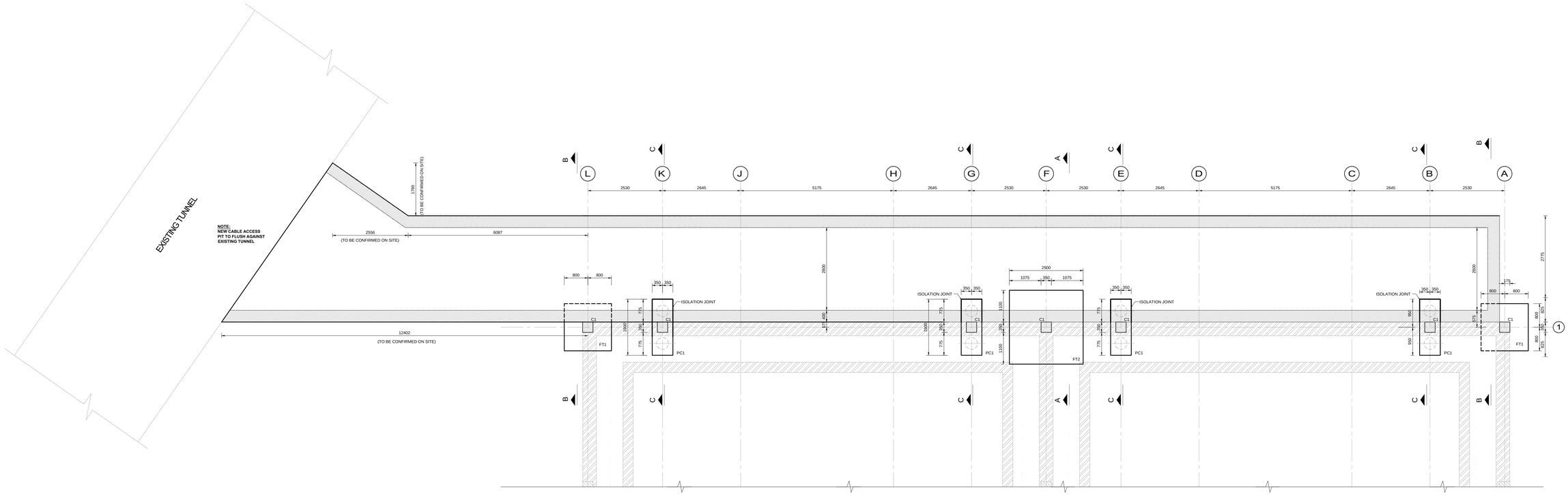

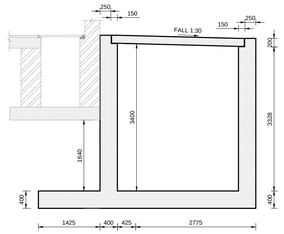

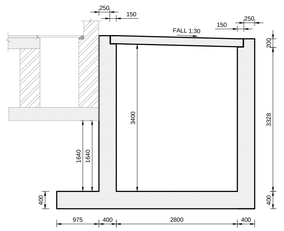

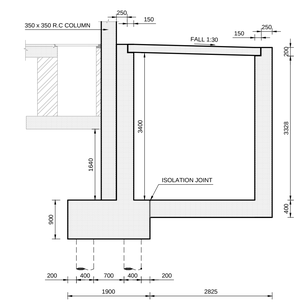

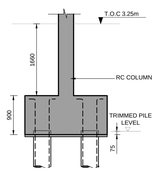

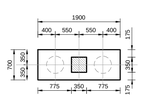

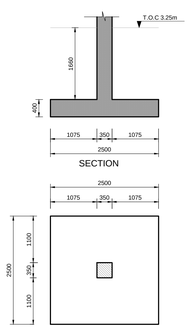

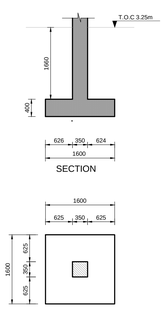

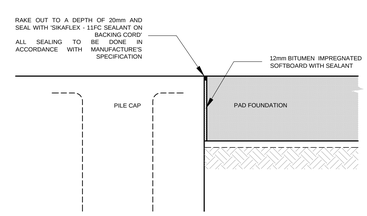

FOUNDATION LAYOUT FOR
CABLE ACCESS PIT
SCALE 1:50

SECTION A-A
SCALE 1:50

SECTION B-B
SCALE 1:50

SECTION C-C
SCALE 1:50

NOTE:
REFER TO CIVIL DRAWINGS
FOR SETTING OUT

TYPICAL ELEVATION
OF PILE CAP PC1
1 : 50

PILE CAP = 1900 x 700 x 900 Dp
R. C. COLUMN = 350 x 350

PILE CAP PC1
20 NO. OF
1 : 50

NOTE: **PILES TO BE DESIGNED BY SUPPLIER**

SECTION

PLAN

FOUNDATION TYPE FT2
1 : 50

SECTION

PLAN

FOUNDATION TYPE FT1
1 : 50

ISOLATION JOINT DETAILS
SCALE 1:10

DRAWING NO.	REFERENCE

REFERENCE DRAWINGS

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Ground beams	- 50	Slab (top steel)	- 50
Retaining walls (earth face)	- 50	Slab (bottom steel)	- 50

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
0A	ISSUED FOR TENDER	PM	ML	ML	15-06-2015

REVISIONS

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CHECKED	ML		
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TRANSNET

PORT OF DURBAN

DEEPENING OF BERTHS 203 TO 205

EAST SUB-STATION

CABLE ACCESS PIT FOUNDATION LAYOUT

PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
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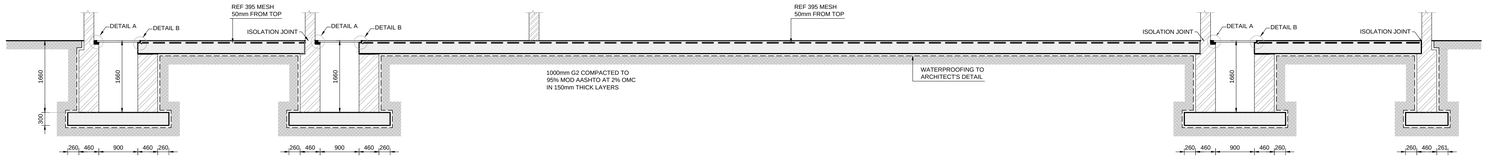

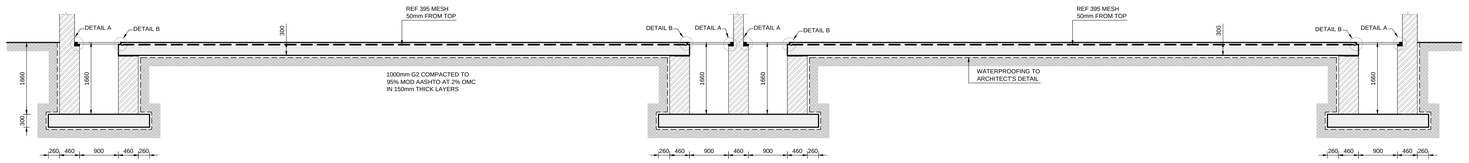

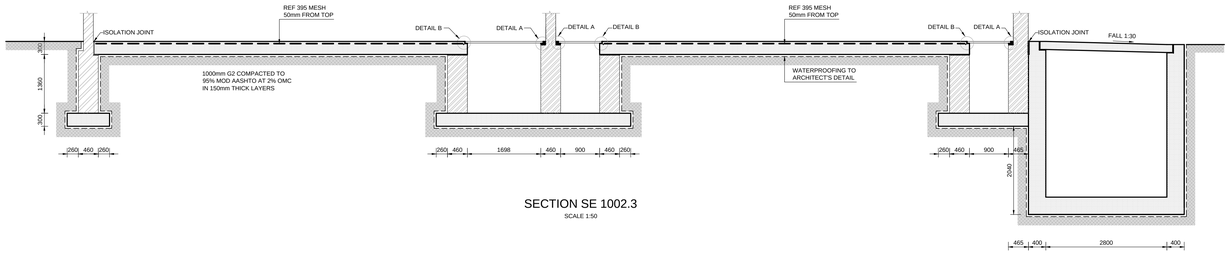

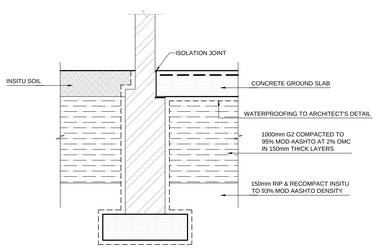

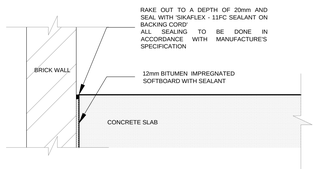

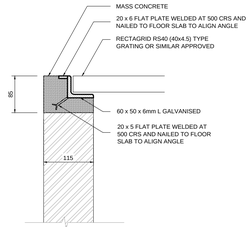

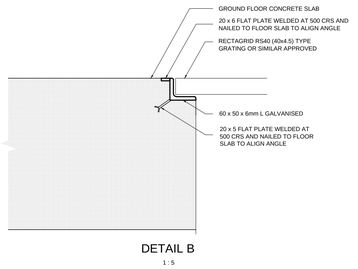

SECTION SE 1002.1

SCALE 1:50

SECTION SE 1002.2

SCALE 1:50

SECTION SE 1002.3

SCALE 1:50

DETAIL A

1 : 5

DETAIL B

1 : 5

LAYER WORK AT FOUNDATION LEVEL

SCALE 1:25

TYPICAL ISOLATION
JOINT DETAILS

SCALE 1:10

DRAWING NO.	REFERENCE

REFERENCE DRAWINGS

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NO.	DESCRIPTION	BY	CHKD	APPD	DATE
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NAME	M. LETSIE	
SIGNATURE		
REG. NUMBER	201270051	
SCALE :	NOTED	A0

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TRANSNET

PORT OF DURBAN

DEEPENING OF BERTHS 203 TO 205

EAST SUB-STATION

BUILDING FOUNDATION SECTIONS

PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
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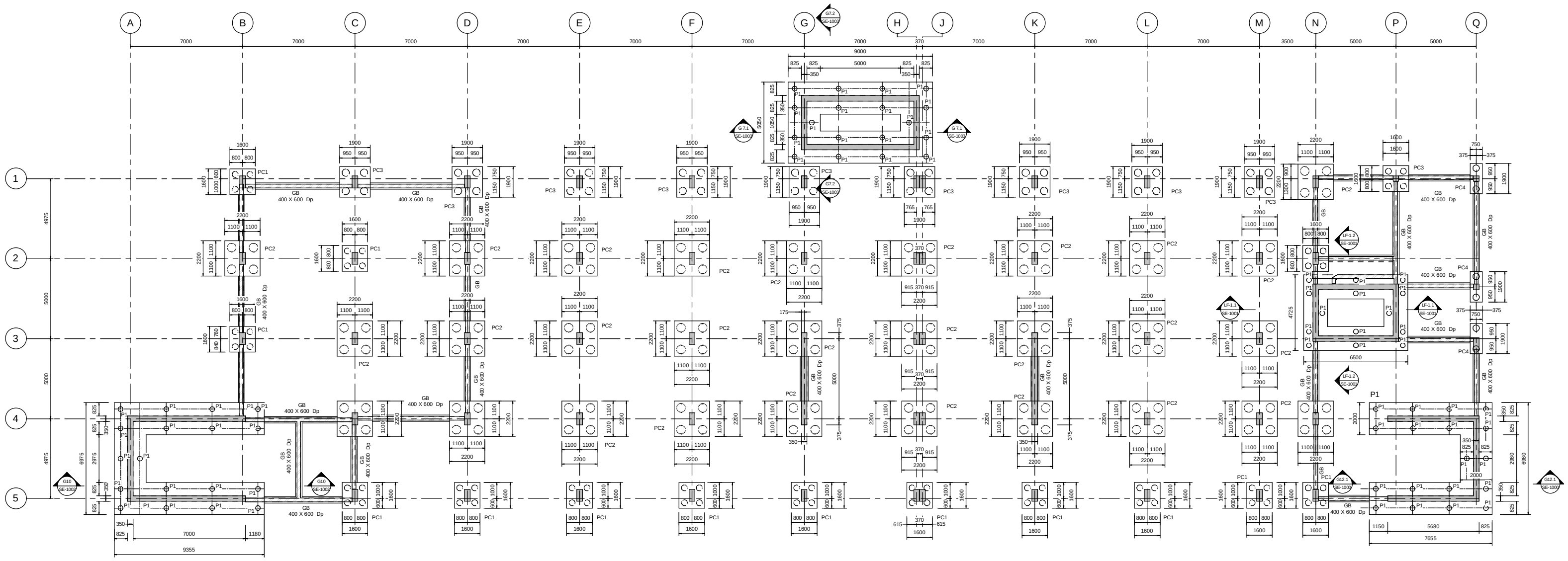
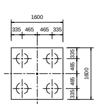


Foundation Layout

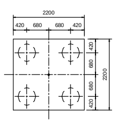
SCALE : 1 : 100



Pile Diameter = 300
Pile Cap Depth = 700

PC 1

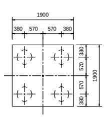
SCALE : 1 : 50



Pile Diameter = 400
Pile Cap Depth = 950

PC 2

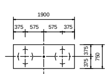
SCALE : 1 : 50



Pile Diameter = 450
Pile Cap Depth = 900

PC 3

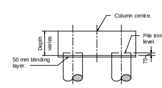
SCALE : 1 : 50



Pile Diameter = 450
Pile Cap Depth = 1250

PC 4

SCALE : 1 : 50



Pile cap typical elevation

SCALE : 1 : 50

Pile Cap schedule		
Description	Type Mark	Pile Load
250 Dia	P1	650.00 kN
1600 x 1600 x 700 Dp	PC1	2400.00 kN
2200 x 2200 x 750 Dp	PC2	4800.00 kN
1900 x 1900 x 900 Dp	PC3	3600.00 kN
1900 x 750 x 900 Dp	PC4	1600.00 kN

NOTE:
LEVEL 0.000 = LEVEL 3.793

Legend

TOC	Top of concrete	CJ	Construction joint
TOP	Top of paving	SJ	Saw cut joint
TOW	Top of wall	MJ	Movement joint
U/S	Upstand concrete	IJ	Isolation joint
RWP	Rainwater pipe	FB	Full bore outlet
X	Denotes 350 x 350 Columns above		

ADDITIONAL NOTES :

ALL DEVIATIONS FROM ENGINEER'S DRAWING TO BE CONFIRMED BY ENGINEER PRIOR TO CONSTRUCTION

ALL DRAINAGE AND WATERPROOFING TO ARCHITECT'S DETAIL

ALL FOUNDATION DEPTHS TO BE DETERMINED BY ENGINEER ON SITE.

FOUNDATIONS NOT TO ENCROACH OVER BOUNDARY

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ARCHITECT'S DRAWING

BARS ARE TO BE CUT/BENT TO SUIT ON SITE

BARS MARKED B-ADD TO BE PLACED FIRST.
(B1-ADD INDICATES BOTTOM 1 ADDITIONAL)
(B2-ADD INDICATES BOTTOM 2 ADDITIONAL)

ABBREVIATIONS USED :
EF - each face   NF - near face
FF - far face   T - Top
B - bottom   EW - each way
ABR - alternate bars reversed
ABS - alternate bars staggered

ALL EXPOSED CONCRETE SLABS AND BEAMS BEARING ON BRICKWORK TO HAVE A SLIP JOINT MADE UP OF 2 SHEETS OF 3mm THICK MASONITE WITH SMOOTH FACES ABUTTING EACH OTHER AT TOP OF BRICK-CONCRETE INTERFACE.

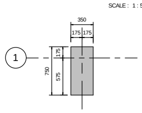
MIN. LAP LENGTH = 45 x BAR DIAMETER

ALL BRICKWORK TO HAVE A MIN. COMP. STRENGTH OF 14MPA

ALL NON-LOAD BEARING BRICKWORK SHALL HAVE A 10mm GAP AT SLAB SOFFIT LEVEL TO BE CHAULKED LATER.

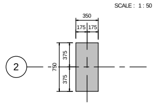
A BLINDING LAYER (50 MM MAX.) TO BE PROVIDED

COVER BLOCKS TO BE PROVIDED



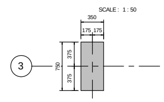
Column Settingout Along Gridline 1

SCALE : 1 : 25



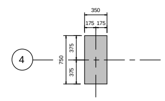
Column Settingout Along Gridline 2

SCALE : 1 : 25



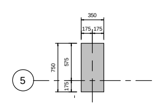
Column Settingout Along Gridline 3

SCALE : 1 : 25



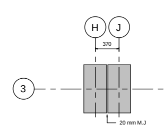
Column Settingout Along Gridline 4

SCALE : 1 : 25



Column Settingout Along Gridline 5

SCALE : 1 : 25



Columns Movement Joint

SCALE : 1 : 25

DRAWING NO.	REFERENCE
LA-1008-01-0A	Roof Plinth Setting Out
SE-1003-01-0A	Plans and Sections Through G7 Stair
SE-1004-01-0A	Plans and Sections Through G12 Stair
SE-1002-01-0A	Plans and Sections Through G10 Stair
SE-1001-01-0A	Sections Through Lift Shaft
LA-1007-01-0A	Roof Layout
LA-1006-01-0A	4th Floor Layout
LA-1005-01-0A	3rd Floor Layout
LA-1004-01-0A	2nd Floor Layout
LA-1003-01-0A	1st Floor Layout
LA-1002-01-0A	Surface bed layout
LA-1001-01-0A	Foundation Layout

REFERENCE DRAWINGS

General

This drawing to be read in conjunction with all relevant architects and engineers drawings.

Dimensions must not be scaled or assumed. After notification, discrepancies or missing dimensions will be corrected in writing by the engineer.

Levels shown to foundations are provisional and will be finalised by the engineer on site.

Foundations have been designed for a permissible bearing pressure of 50 KN/m²

Reinforcement shall comply with SANS 920 and be bent to SANS 282.

Symbols :
R = Mild steel bars with characteristic strength of 250 MPa..
Y = Hot rolled or cold worked high yield steel bars with characteristic strength of 450 MPa.
(Only reinforcement fabricated under the SANS mark shall be deemed to comply

Concrete (where applicable the following shall apply)

All concrete work shall conform with the latest amended issue of :
SANS 1200 : Standard Specification for concrete and
SANS 10100 : The structural use of concrete.

A set of six cubes must be made for every fifty cubic meter (or portion thereof) of concrete poured on a specific day, 3 of the cubes must be tested at seven days, and the balance must be available for testing at 28 days.
The test results are to be submitted to the engineers immediately and should any problems be anticipated no shuttering is to be stripped until further notice from the

All concrete shall be vibrated according to specification. All concrete must be cured continuously for seven days after pouring and effectively protected against dehydration.

Shuttering and propping may only be struck after thelapse of the following times:
(Ordinary Portland Cement in normal weather conditions)

Position of Shuttering Props	Striking Time Days
Beam side walls & unloaded columns	2
Slab soffits without removal of slab props	4
Beam soffits without removal of props	7
Props unloaded slabs	10
Props unloaded beams	14

Beams and slabs must be poured with the following cambers.

Beam or Slab Element	Camber
Cantilever beams and slabs	Span/150
Other beams and slabs	Span/400

Concrete strengths are specified in terms of clauses in SANS 1200.
For the various elements they are as follows

Structural Element	Concrete Grade
Blinding	15
Bases/footings	30
Beams / Slabs	30
Walls	30
Columns	30

The structure has been designed for the following imposed floor loads:

Structure	Loading(kN/m²)
Live Load	4

Concrete cover to reinforcement (in mm)
Unless Otherwise Specified

Bases/footings	-	50
Pilecap (top and sides)	-	50
Pilecap (bottom)	-	75
Ground beams	-	50
Retaining walls (earth face)	-	50
Strap beams	-	50
Columns	-	50
Beams	-	50
Slab (top steel)	-	50
Slab (bottom steel)	-	50

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
0A	ISSUED FOR TENDER	TIM	AP	PM	15-06-2015

REVISIONS

CONTRACTOR / CONSULTANT

TITLE	NAME	SIGN	DATE

OPERATING DIVISIONS

TITLE	NAME	SIGN	DATE

TRANSNET CAPITAL PROJECTS

TITLE	NAME	SIGN	DATE
DRAWN	TIM		04 05 15
CHECKED	AP		04 05 15
DESIGNED	AP		04 05 15
CHECKED	PM		04 05 15

PR.ENG. / PR.TECH./PR. ARCH
NAME P MAHARAJ DATE
SIGNATURE
REG. NUMBER 200970238
SCALE : NOTED A0

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237 MAHATMA GANDHI ROAD
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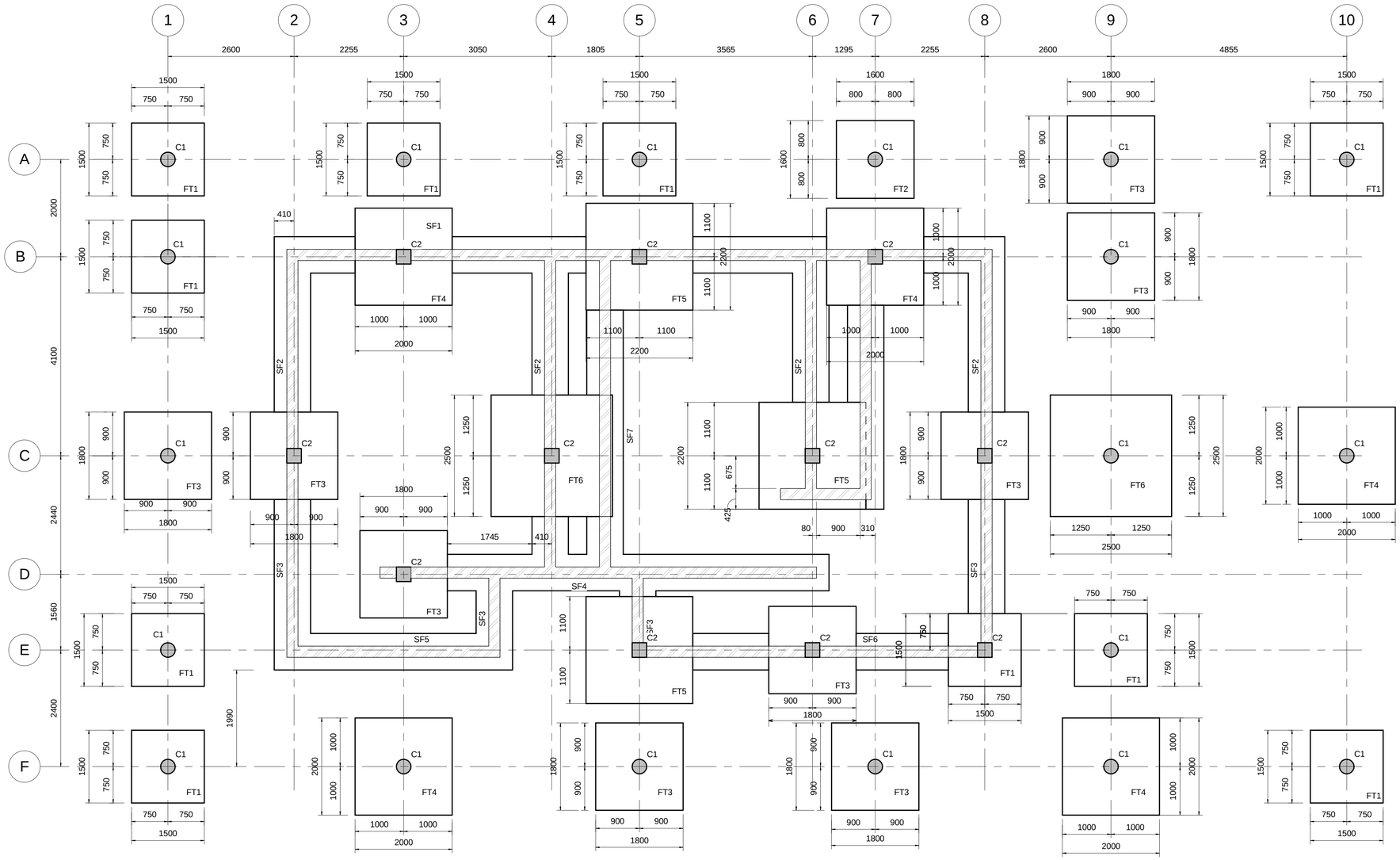
PORT OF DURBAN

DEEPENING OF BERTHS 203 TO 205
CENTRALISED MESS AND ABULUTION FACILITY

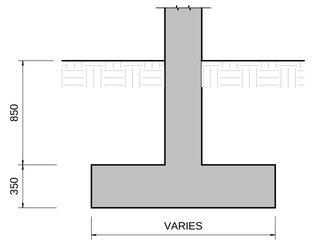
FOUNDATION LAYOUT

PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
2122830	1	003	S	LA	1001	01	0A	TD



FOUNDATION LAYOUT

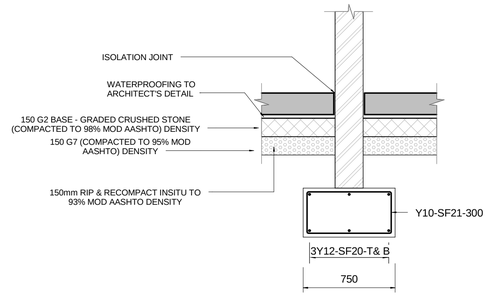
SCALE : 1 : 50



TYPICAL SECTION THROUGH BASES

SCALE : 1 : 25

NOTE
BRICKWORK ABOVE STRIP FOOTINGS TO BE BE REINFORCED WITH BRICKFORCE EVERY COURSE FOR THE FIRST FIVE COURSES AND EVERY THIRD COURSE THEREAFTER



SECTION THROUGH 230 BRICKWORK

SCALE : 1 : 25

NOTE:
LEVEL - 0.000 = 3.36

Legend

TOC	Top of concrete	CJ	Construction joint
TOP	Top of paving	SJ	Saw cut joint
TOW	Top of wall	MJ	Movement joint
USC	U/S concrete	IJ	Isolation joint
RWP	Rainwater pipe	FB	Full bore outlet

General

This drawing to be read in conjunction with all relevant architects and engineers drawings.

Dimensions must not be scaled or assumed. After notification, discrepancies or missing dimensions will be corrected in writing by the engineer.

Levels shown to foundations are provisional and will be finalised by the engineer on site.

Foundations have been designed for a permissible bearing pressure of 150 KN/m²

Reinforcement shall comply with SANS 920 and be bent to SANS 282.

Symbols :
R = Mild steel bars with characteristic strength of 250 MPa..
Y = Hot rolled or cold worked high yield steel bars with characteristic strength of 450 MPa.
(Only reinforcement fabricated under the SANS mark shall be deemed to comply

Concrete (where applicable the following shall apply)

All concrete work shall conform with the latest amended issue of :
SANS 1200 : Standard Specification for concrete and
SANS 10100 : The structural use of concrete.

A set of six cubes must be made for every fifty cubic meter (or portion thereof) of concrete poured on a specific day, 3 of the cubes must be tested at seven days, and the balance must be available for testing at 28 days.
The test results are to be submitted to the engineers immediately and should any problems be anticipated no shuttering is to be stripped until further notice from the engineer.

All concrete shall be vibrated according to specification. All concrete must be cured continuously for seven days after pouring and effectively protected against dehydration.

Shuttering and propping may only be struck after the lapse of the following times:
(Ordinary Portland Cement in normal weather conditions)

Position of Shuttering Props	Striking Time Days
Beam side walls & unloaded columns	2
Slab soffits without removal of slab props	4
Beam soffits without removal of props	7
Props unloaded slabs	10
Props unloaded beams	14

Beams and slabs must be poured with the following cambers.

Beam or Slab Element	Camber
Cantilever beams and slabs	Span/150
Other beams and slabs	Span/400

Concrete strengths are specified in terms of clauses in SANS 1200.
For the various elements they are as follows

Structural Element	Concrete Grade
Blinding	15
Bases/footings	30
Beams / Slabs	30
Walls	30
Columns	30

The structure has been designed for the following imposed floor loads:

Structure	Loading(kN/m²)
Live Load	4

Concrete cover to reinforcement (in mm) - Unless Otherwise Specified

Concrete cover to reinforcement (in mm) - Unless Otherwise Specified

Bases/footings	-	50	Strap beams	-	50
Pilecap (top and sides)	-	50	Columns	-	50
Pilecap (bottom)	-	75	Beams	-	50
Ground beams	-	50	Slab (top steel)	-	50
Retaining walls (earth face)	-	50	Slab (bottom steel)	-	50

ADDITIONAL NOTES :

ALL DEVIATIONS FROM ENGINEER'S DRAWING TO BE CONFIRMED BY ENGINEER PRIOR TO CONSTRUCTION

ALL DRAINAGE AND WATERPROOFING TO ARCHITECT'S DETAIL

ALL FOUNDATION DEPTHS TO BE DETERMINED BY ENGINEER ON SITE.

FOUNDATIONS NOT TO ENCROACH OVER BOUNDARY

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ARCHITECT'S DRAWING

BARS ARE TO BE CUT/BENT TO SUIT ON SITE

BARS MARKED B-ADD TO BE PLACED FIRST.
(B1-ADD INDICATES BOTTOM 1 ADDITIONAL)
(B2-ADD INDICATES BOTTOM 2 ADDITIONAL)

ABBREVIATIONS USED :

EF - each face
FF - far face
B - bottom
ABR - alternate bars reversed
ABS - alternate bars staggered
NF - near face
T - Top
EW - each way

ALL EXPOSED CONCRETE SLABS AND BEAMS BEARING ON BRICKWORK TO HAVE A SLIP JOINT MADE UP OF 2 SHEETS OF 3mm THICK MASONITE WITH SMOOTH FACES ABUTTING EACH OTHER AT TOP OF BRICK-CONCRETE INTERFACE.

MIN. LAP LENGTH = 45 x BAR DIAMETER

ALL BRICKWORK TO HAVE A MIN. COMP. STRENGTH OF 14MPA

ALL NON-LOAD BEARING BRICKWORK SHALL HAVE A 10mm GAP AT SLAB SOFFIT LEVEL TO BE CHAULKED LATER.

A BLINDING LAYER (50 MM MAX.) TO BE PROVIDED

COVER BLOCKS TO BE PROVIDED

ALL EXPOSED SHARP CORNERS TO BE CHAMFERED 25mm.

DRAWING NO.	REFERENCE
2122830-1-004-S-SE-1000	SECTIONS
2122830-1-004-S-DE-1000	STAIRCASE 1 CONCRETE LAYOUT AND DETAILS
2122830-1-004-S-DE-1003	ROOF LAYOUT AND DETAILS
2122830-1-004-S-DE-1002	FIRST FLOOR LAYOUT AND DETAILS
2122830-1-004-S-DE-1001	SURFACE BED LAYOUT, SECTIONS AND DETAILS

REFERENCE DRAWINGS

NOTES

1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.

2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
OA	ISSUED FOR TENDER	TM	SS	PM	12-06-15

REVISIONS

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
.	.		. . .	DRAWN	TM		
.	.		. . .	CHECKED	SS		
.	.		. . .	DESIGNED	TM		
.	.		. . .	CHECKED	PM		
.	.		. . .	.			
				.			
OPERATING DIVISIONS				.			
TITLE	NAME	SIGN	DATE				
.	.		. . .	PR.ENG. / PR.TECH./PR. ARCH			
.	.		. . .	NAME	T MUDAU		DATE
.	.		. . .	SIGNATURE			
.	.		. . .	REG. NUMBER	201430310		
.	.		. . .	SCALE :	.	A1	

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PORT OF DURBAN

DEEPENING OF BERTH 203 TO 205
SATELLITE STAFF FACILITY

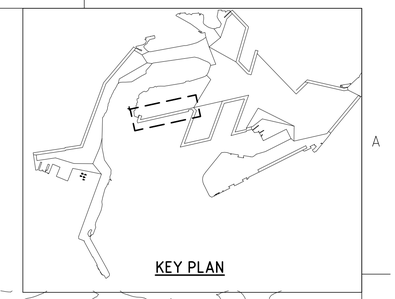
FOUNDATION : LAYOUT AND DETAILS

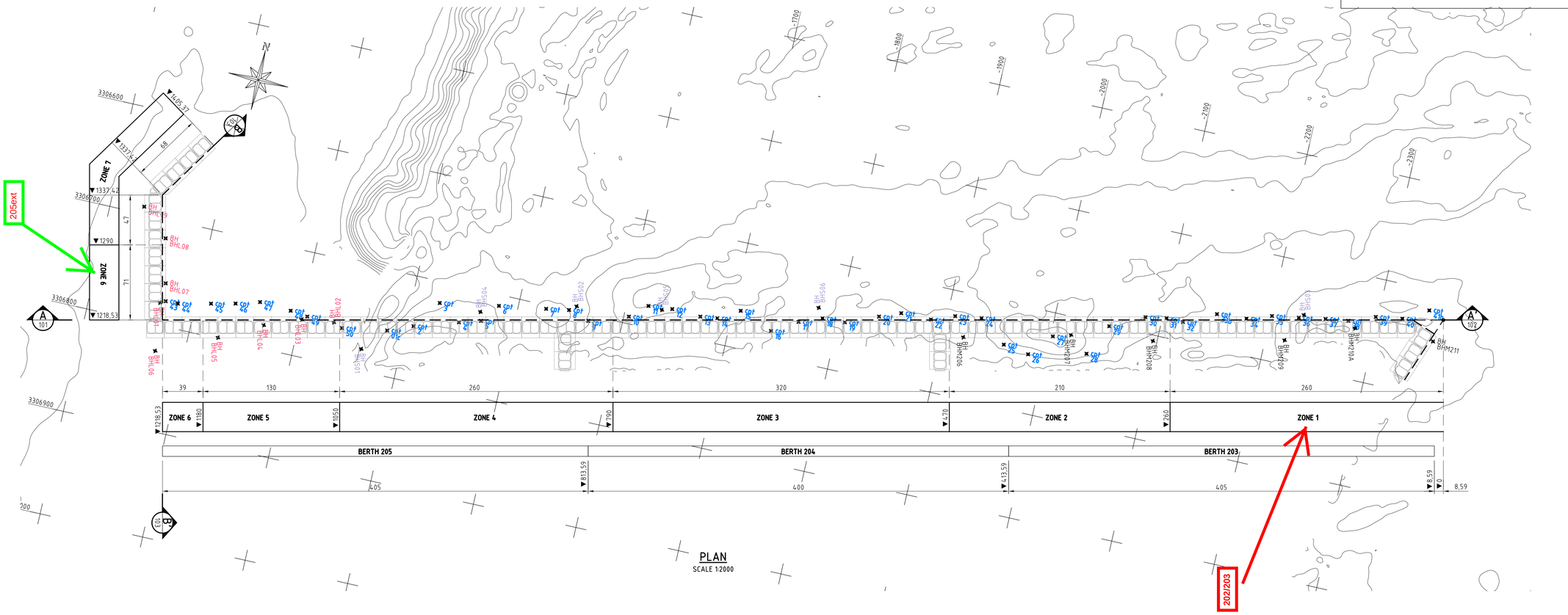
PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
2122830-1	004	S	L	A	1000	01	O	A	TD

ANNEXURE 2 -EXPLORATORY BOREHOLE LOGS

DRAWING NUMBER

DO NOT SCALE - IF IN DOUBT, ASK





PLAN
SCALE 1:2000

LEGEND

BHM 206	MSJ MARINE BOREHOLE	2009 INVESTIGATION
BHL 05	LAND BOREHOLE	2012 INVESTIGATION
BHS 03	MARINE BOREHOLE	2012 INVESTIGATION
BHM 206-211		
BHL 01-09		
BHS 01-06		
CPT 01-50		

0m 100m 200m 300m 400m

DRAWING NO.	REFERENCE
1370-DWG-104	GEOLOGICAL LONG SECTION B-B' WITH SPT RESULTS
1370-DWG-103	GENERALISED GEOLOGICAL LONG SECTION B-B'
1370-DWG-102	RELATIVE DENSITY AND CONSISTENCY SECTION
1370-DWG-101	GEOLOGICAL LONG SECTION A-A'

REFERENCE DRAWINGS

Engineers
ZAA ENGINEERING PROJECTS & NAVAL ARCHITECTS
PO Box 26546
HOUT BAY 7872
Tel: +2721 791 9100
EMAIL : zaaepna@zaaepna.com
31 Melkhout Crescent
HOUT BAY 7806
Fax: +2721 790 4470
www.zaaepna.com

1370-DWG-100-AB1 A

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE
AB1	AS BUILT	WV	DB	JZ	13-02-22
3	FOR CONSTRUCTION	WV	JZ	JZ	12-02-28
2	FOR CONSTRUCTION	WV	JZ	JZ	12-02-20
1	FOR CONSTRUCTION	WV	JZ	JZ	12-02-08
0	FOR CONSTRUCTION	WV	JZ	JZ	12-02-06

REVISIONS / ISSUE AUTHORIZATION

EPCM CONSULTANT: TCP				ORIGINATOR: ZAA			
TITLE	NAME	SIGNATURE	DATE	TITLE	NAME	SIGNATURE	DATE
LEAD DES. ENG.				DRAWN	WV		13 02 12
ENG. COORD.				CHECKED	DB		13 02 12
ENG. MANAGER				ENG. COORD	WV		13 02 12
AREA MANAGER				DISCIP. ENG.			
PROJECT MGR.				ENG. MANAGER			
DIVISION				AREA MANAGER			
DIV.	TITLE	NAME	SIGNATURE DATE	PR.ENG. / PR.TECH.			
				NAME	J. ZIETSMAN		DATE
				SIGNATURE			13 02 12
				REG. NUMBER	760293		
				SCALE :			OR AS NOTED A1

TRANSNET

DURBAN CONTAINER TERMINAL
BERTH 203-205 DEEPENING
GEOTECHNICAL INVESTIGATION
CPTU AND BOREHOLE POSITIONS

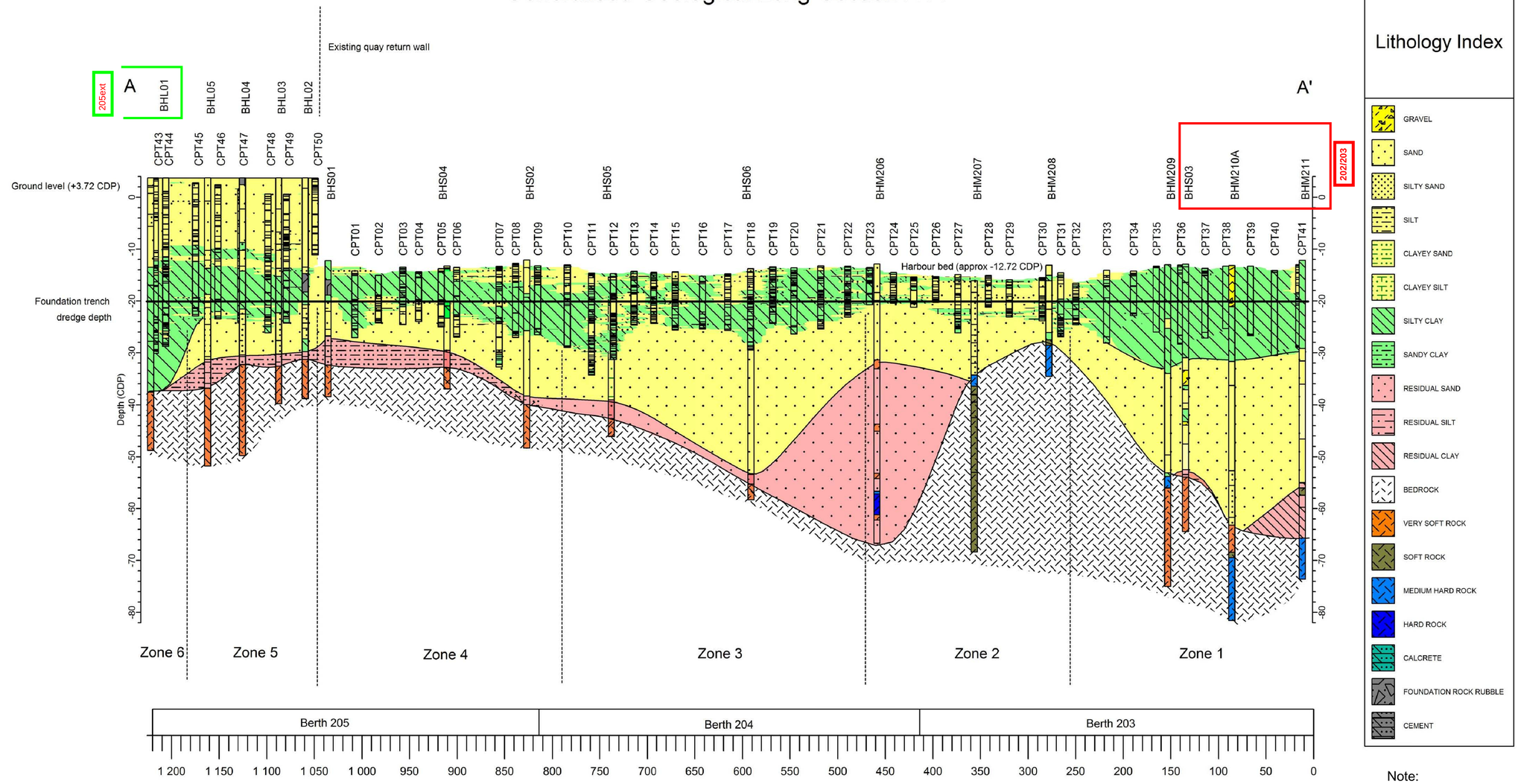
PROJECT NUMBER	DV	FBS	DIS	TYPE	DRG. NO.	SHT.	REV.	ID

D:\1370 TCP 408 FEL 3 BERTHS 203 AND 205\Z-DRAWINGS\DWGS\1370-DWG-100 AB1 01-104.DWG
WILLIE VAN WYK
2013-04-22

DRAWING NUMBER

DO NOT SCALE - IF IN DOUBT, ASK

Generalised Geological Long-Section A-A'



Lithology Index

- GRAVEL
- SAND
- SILTY SAND
- SILT
- CLAYEY SAND
- CLAYEY SILT
- SILTY CLAY
- SANDY CLAY
- RESIDUAL SAND
- RESIDUAL SILT
- RESIDUAL CLAY
- BEDROCK
- VERY SOFT ROCK
- SOFT ROCK
- MEDIUM HARD ROCK
- HARD ROCK
- CALCRETE
- FOUNDATION ROCK RUBBLE
- CEMENT

Note:
BHM 206 did not intersect bedrock

1370–DWG–100	CPTU AND BOREHOLE POSITIONS
DRAWING NO.	REFERENCE

REFERENCE DRAWINGS

Engineers

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Fax: +2721 790 4470
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1370-DWG-101-P00 A

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE
P00	FOR APPROVAL	AH	DB	JZ	13/02/18

REVISIONS / ISSUE AUTHORIZATION

EPCM CONSULTANT: TCP				ORIGINATOR: ZAA			
TITLE	NAME	SIGNATURE	DATE	TITLE	NAME	SIGNATURE	DATE
LEAD DES. ENG.				DRAWN	TB		12/02/18
ENG. COORD.				CHECKED	DB		13/02/18
ENG. MANAGER				ENG. COORD	WV		13/02/18
AREA MANAGER				DISCIP. ENG.			
PROJECT MGR.				ENG. MANAGER			
DIVISION				AREA MANAGER			
DIV. TITLE	NAME	SIGNATURE	DATE	PR.ENG. / PR.TECH.			
				NAME	J. ZIETSMAN		DATE
				SIGNATURE			13/02/18
				REG. NUMBER	760293		
				SCALE :	OR AS NOTED		A1

TRANSNET

DURBAN CONTAINER TERMINAL

BERTH 203–205 DEEPENING
GEOTECHNICAL INVESTIGATION
GENERALISED GEOLOGICAL
LONG SECTION A–A'

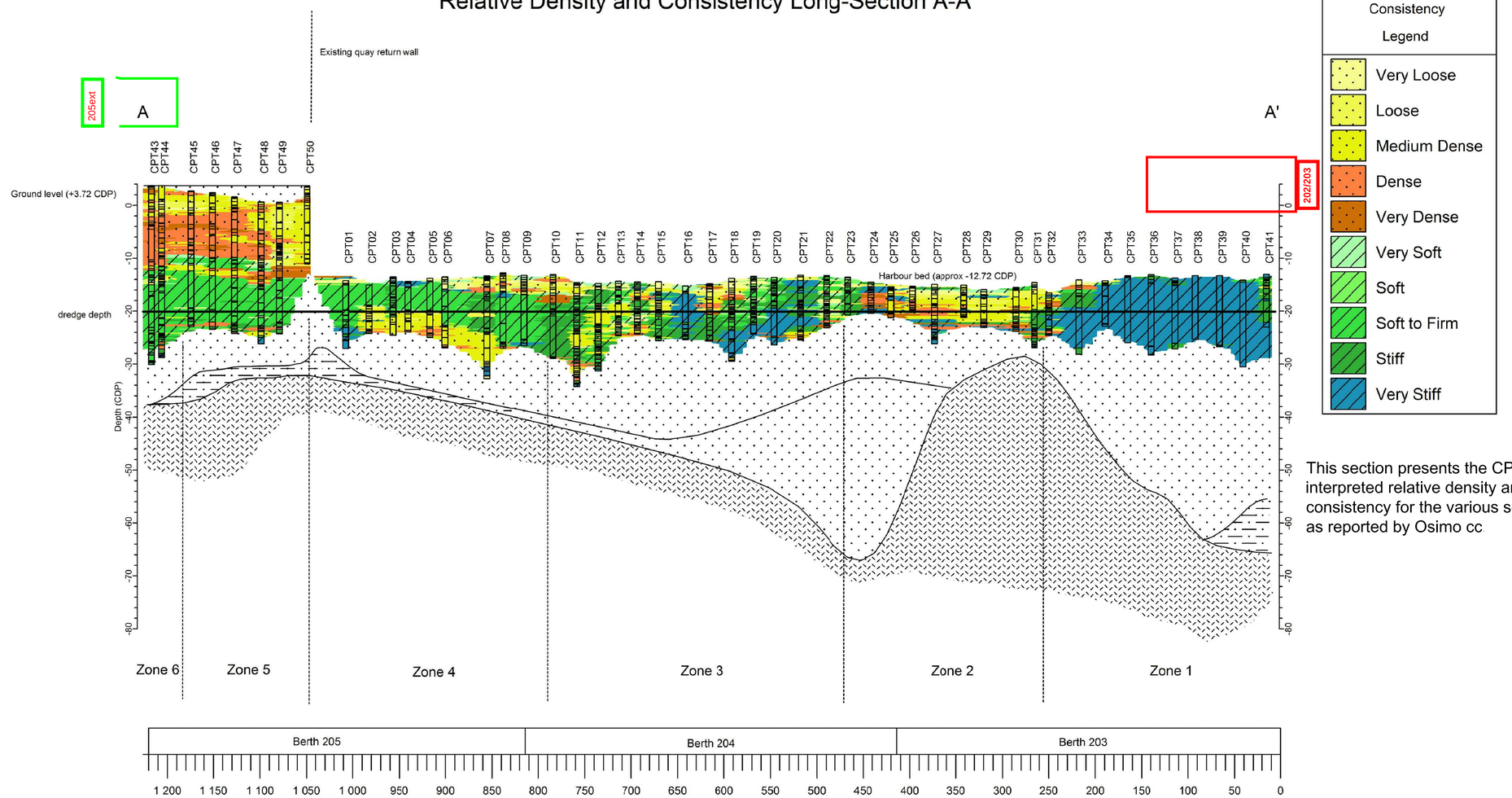
PROJECT NUMBER	DV.	FBS	DIS.	TYPE	ORG. NO.	SHT.	REV.	ID
G 1370	TCP	408	FEL	3	BERTHS 203 AND 205	Z-		

G:\1370 TCP 408 FEL 3 BERTHS 203 AND 205\Z-DRAWINGS\DWGS\1370-DWG-100_101-103-P00B.DWG
WILLIE VAN WYK
2019-04-22

DRAWING NUMBER

DO NOT SCALE - IF IN DOUBT, ASK

Relative Density and Consistency Long-Section A-A'



Relative Density / Consistency Legend

- Very Loose
- Loose
- Medium Dense
- Dense
- Very Dense
- Very Soft
- Soft
- Soft to Firm
- Stiff
- Very Stiff

This section presents the CPTu interpreted relative density and consistency for the various soils as reported by Osimo cc

1370–DWG–100	CPTU AND BOREHOLE POSITIONS
DRAWING NO.	REFERENCE

REFERENCE DRAWINGS

Engineers

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1370-DWG-102-P00 A

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE
P00	FOR APPROVAL	AH	DB	JZ	13/02/18

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AREA MANAGER			
PROJECT MGR.			
DIVISION			
DIV. TITLE	NAME	SIGNATURE	DATE

ORIGINATOR: ZAA			
TITLE	NAME	SIGNATURE	DATE
DRAWN	TB		12/02/18
CHECKED	DB		13/02/18
ENG. COORD	WV		13/02/18
DISCIP. ENG.			
ENG. MANAGER			
AREA MANAGER			
PR.ENG. / PR.TECH.			
NAME	J. ZIETSMAN		DATE
SIGNATURE			13/02/18
REG. NUMBER	760293		
SCALE :	OR AS NOTED	A1	

TRANSNET

DURBAN CONTAINER TERMINAL

BERTH 203–205 DEEPENING
RELATIVE DENSITY AND
CONSISTENCY LONG SECTION A–A'

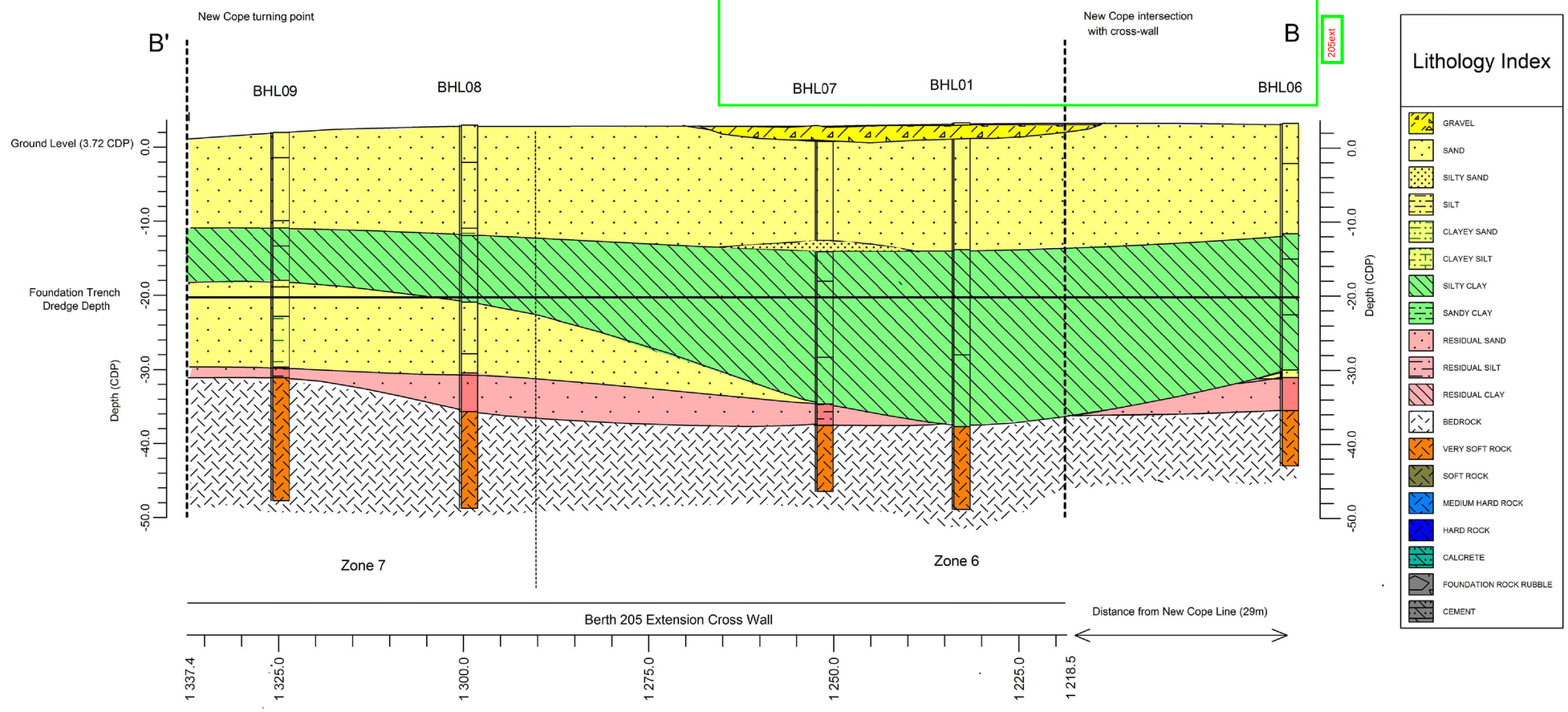
PROJECT NUMBER	DV	FBS	DIS	TYPE	DRG NO.	SHT	REV	ID

D:\1370 TCP 40B FEL 3 BERTHS 203 AND 205\Z-DRAWINGS\DWGS\1370-DWG-100_101-103-P00B.DWG
WILLIE.YAN.WYK
2019-04-22

DRAWING NUMBER

DO NOT SCALE - IF IN DOUBT, ASK

Generalised Geological Long-Section B-B'



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- CALCRETE
- FOUNDATION ROCK RUBBLE
- CEMENT

1370-DWG-100	CPTU AND BOREHOLE POSITIONS
DRAWING NO.	REFERENCE

REFERENCE DRAWINGS

Engineers

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www.zaaepna.com

1370-DWG-103-P00 A

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE
P00	FOR APPROVAL	AH	DB	JZ	13/02/18

REVISIONS / ISSUE AUTHORIZATION

EPCM CONSULTANT: TCP

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ENG. MANAGER			
AREA MANAGER			
PROJECT MGR.			
DIVISION			

ORIGINATOR: ZAA

TITLE	NAME	SIGNATURE	DATE
DRAWN	TB		12 02 18
CHECKED	DB		13 02 18
ENG. COORD	WV		13 02 18
DISCIP. ENG.			
ENG. MANAGER			
AREA MANAGER			
PR.ENG. / PR.TECH.			
NAME	J. ZIETSMAN		DATE
SIGNATURE			13 02 18
REG. NUMBER	760293		
SCALE :	OR AS NOTED		A1

TRANSNET

DURBAN CONTAINER TERMINAL
BERTH 203–205 DEEPENING
BERTH 205 EXTENSION CROSS WALL
GENERALISED GEOLOGICAL LONG SECTION B–B'

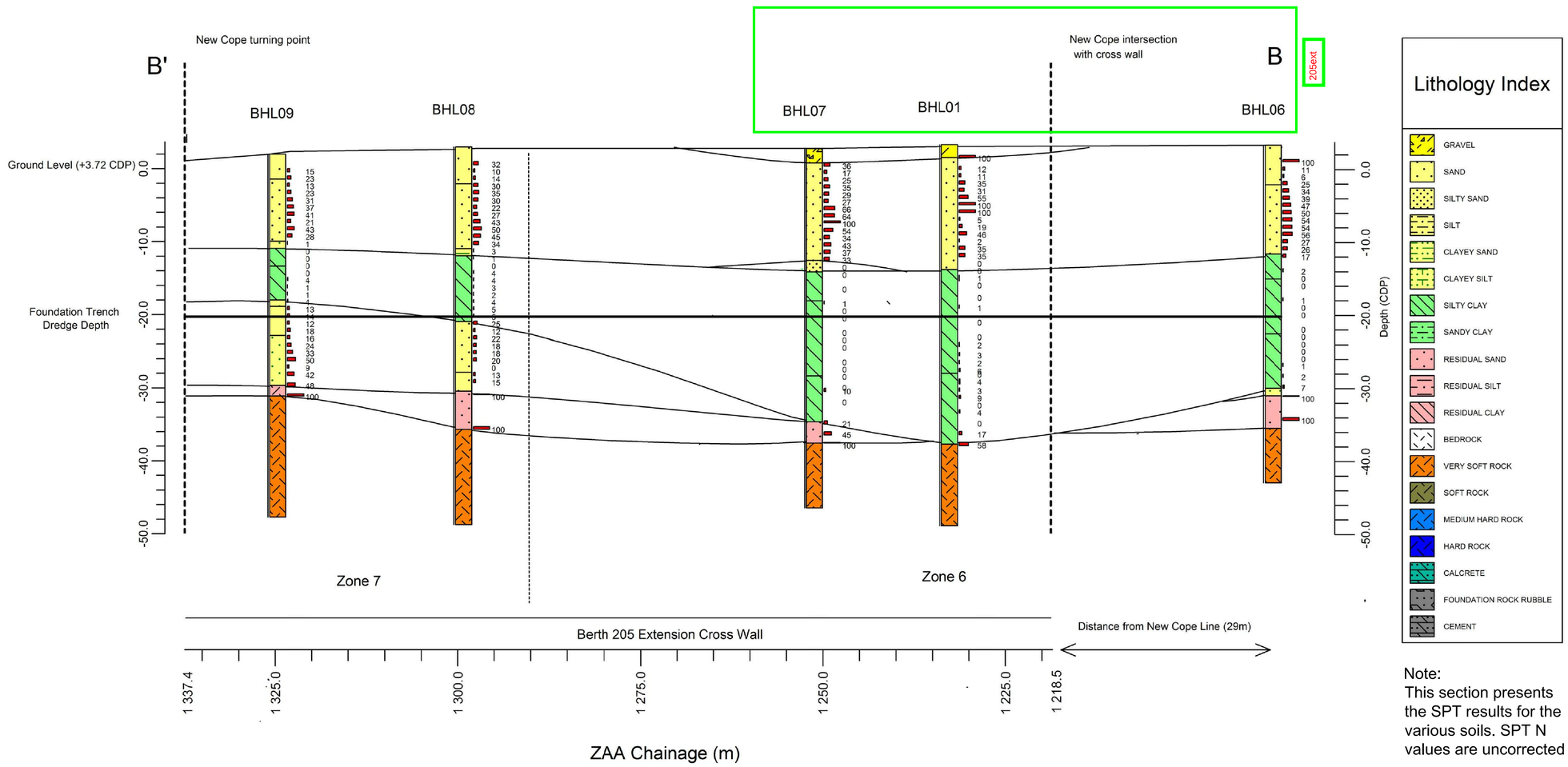
PROJECT NUMBER	DV.	FBS	DIS.	TYPE	ORG. NO.	SHT.	REV.	ID
0.1370	TCP	408	FEL.	3	BERTHS 203 AND 205	LZ	DRAWINGS	DWGS

D:\1370_TCP_408_FEL_3_BERTHS_203_AND_205\LZ_DRAWINGS\DWGS\1370-DWG-100_101-C03-P00B.DWG
WILLIE VAN WYK
2019-04-22

DRAWING NUMBER

DO NOT SCALE - IF IN DOUBT, ASK

Generalised Geological Long-Section B-B' with SPT N Values



Lithology Index

- GRAVEL
- SAND
- SILTY SAND
- SILT
- CLAYEY SAND
- CLAYEY SILT
- SILTY CLAY
- SANDY CLAY
- RESIDUAL SAND
- RESIDUAL SILT
- RESIDUAL CLAY
- BEDROCK
- VERY SOFT ROCK
- SOFT ROCK
- MEDIUM HARD ROCK
- HARD ROCK
- CALCRETE
- FOUNDATION ROCK RUBBLE
- CEMENT

Note:
This section presents the SPT results for the various soils. SPT N values are uncorrected

1370–DWG–100	CPTU AND BOREHOLE POSITIONS
DRAWING NO.	REFERENCE

REFERENCE DRAWINGS

Engineers

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1370-DWG-104-P00 A

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE
P00	FOR APPROVAL	AH	DB	JZ	13/02/18

REVISIONS / ISSUE AUTHORIZATION

EPCM CONSULTANT: TCP

TITLE	NAME	SIGNATURE	DATE
LEAD DES. ENG.			
ENG. COORD.			
ENG. MANAGER			
AREA MANAGER			
PROJECT MGR.			
DIVISION			

DIV.	TITLE	NAME	SIGNATURE	DATE

ORIGINATOR: ZAA

TITLE	NAME	SIGNATURE	DATE
DRAWN	TB		12/02/18
CHECKED	DB		13/02/18
ENG. COORD	WV		13/02/18
DISCIP. ENG.			
ENG. MANAGER			
AREA MANAGER			

PR.ENG. / PR.TECH.

NAME	DATE
J. ZIETSMAN	
SIGNATURE	13/02/18
REG. NUMBER 760293	
SCALE : OR AS NOTED	A1

TRANSNET

DURBAN CONTAINER TERMINAL
BERTH 203–205 DEEPENING
BERTH 205 EXTENSION CROSS WALL GEOLOGICAL SECTION WITH SPT RESULTS

PROJECT NUMBER	DV	FBS	DIS	TYPE	DRG NO.	SHT	REV	IO
1370	TCP	L08	FEL	3	BERTHS 203 AND 205	Z-		

D:\1370 TCP L08 FEL 3 BERTHS 203 AND 205\Z-DRAWINGS\DWGS\1370-DWG-100_101-C03-P00B.DWG
WILLIE VAN WYK
2019-02-22

205ext

ZAA Engineering Projects & Naval Architecture (Pty) Ltd

Project

PORT OF DURBAN BERTH DEEPENING

Berths 203 to 205

Sandy Materials		Clayey Materials	
Descriptions	**SPT N**	**Descriptions**	**SPT N**
Very loose	<5	Very Soft	<2
Loose	5-10	Soft	2-4
Medium dense	10-30	Firm	4-8
Dense	30-50	Stiff	8-15
Very dense	>50	Very Stiff	15-30

Borehole No. 1370 BHL01

Start Date	2012/03/19	**End Date**	2012/03/25
Project No:	1370 - DCT	**Orientation:**	Vertical
Location:	Berth 205 extension	**Elevation:**	+3.72 CDP
Logged By:	MAS Baleta	**Coordinates:**	X: -1177.1076
Drilling -	Fairbrother		Y: 3306779.016
Contractor:	Geotechnical Engineering CC		**Page 1 of 2**

Elev. (CDP)	Run Elev. (CDP)	Material / Core Recovery %	RQD %	FF (J/m)	Method & Sample	SPT Value 'N'	SPT 'N' Bar Graph (0 – 100)	Lithology	General Description	Remarks	Depth (m below platform)
3.00	2.220	-	-	-	WB				(3.72, 1.93) Slightly moist, light brown-grey, cohesionless, loose (estimate), Medium SAND with minor gravel fill and shell fragments (<1mm). Imported, SAND FILL.		0.00
2.00	1.925	78	-	-	SPT	N=R				+1.925 CDP: Approximate FILL / IN SITU contact	1.00
1.00	0.720	-	-	-	WB				(1.93, -13.53) Moist to Wet, pale yellow-brown to light grey, cohesionless, generally medium dense (locally very or dense), thickly bedded, medium to Fine SAND. Transported, fluvial-lacustrine / estuarine-lagoonal deposits. (Many shell fragments in upper portions).		2.00
	0.270	47	-	-	SPT	N=12					3.00
0.00	-0.280	-	-	-	WB						4.00
	-0.730	33	-	-	SPT	N=11					5.00
-1.00	-1.280	-	-	-	WB						6.00
	-1.730	78	-	-	SPT	N=35					7.00
-2.00	-2.280	-	-	-	WB						8.00
	-2.730	67	-	-	SPT	N=31				-3.280 to -5.655 CDP: Cohesionless, very dense, clayey Fine SAND.	9.00
-3.00	-3.280	-	-	-	WB						10.00
	-3.730	73	-	-	SPT	N=55					11.00
-4.00	-4.280	-	-	-	WB						12.00
	-4.580	100	-	-	SPT	N=R					13.00
-5.00	-5.280	-	-	-	WB						14.00
	-5.655	88	-	-	SPT	N=R					15.00
-6.00	-6.280	-	-	-	WB						16.00
	-6.730	29	-	-	SPT	N=5					17.00
-7.00	-7.280	-	-	-	WB						18.00
	-7.730	-	-	-	SPT	N=19					19.00
-8.00	-8.280	-	-	-	WB						20.00
	-8.730	67	-	-	SPT	N=46					21.00
-9.00	-9.280	-	-	-	WB						22.00
	-9.730	22	-	-	SPT	N=2					23.00
-10.00	-10.280	-	-	-	WB						24.00
	-10.730	78	-	-	SPT	N=35					25.00
-11.00	-11.280	-	-	-	WB						26.00
	-11.730	73	-	-	SPT	N=35					27.00
-12.00	-12.280	-	-	-	WB						28.00
	-12.730	67	-	-	SPT	N=0					29.00
-13.00	-13.280	-	-	-	WB						30.00
	-13.880	100	-	-	SPT	N=0			(-13.53, -27.78) Very moist, dark grey, cohesive, very soft, silty CLAY with minor & isolated nodules & shell fragments. Transported, fluvial-lacustrine / estuarine-lagoonal deposits.		31.00
-14.00	-14.280	-	-	-	WB						
	-15.080	44	-	-	SPT	N=1					
-15.00		-	-	-	WB						
	-16.080	75	-	-	SPT	N=0					
-16.00		-	-	-	WB						
	-16.880	86	-	-	SHELBY S01						
-17.00	-17.680	-	-	-	SPT	N=0					
			-	-							
-18.00	-18.380	86	-	-	SHELBY S02						
	-18.830	-	-	-	SPT	N=1					
-19.00	-19.480	-	-	-	SHELBY (n/s)						
-20.00	-20.380	-	-	-	SHELBY (n/s)						
-21.00	-21.380	-	-	-	SPT	N=0					
	-21.780	-	-	-	WB						
-22.00	-22.380	60	-	-	SHELBY S03						
	-22.830	133	-	-	SPT	N=0					
-23.00			-	-							
	-23.480	92	-	-	SHELBY S04						
-24.00	-24.080	100	-	-	SPT	N=2					
		-	-	-	WB						
	-24.880	75	-	-	SHELBY S05						
-25.00	-25.330	133	-	-	SPT	N=3					
			-	-							
-26.00	-25.980	92	-	-	SHELBY S06						
	-26.430	133	-	-	SPT	N=2					
-27.00	-27.080	92	-	-	SHELBY S07						
	-27.530	111	-	-	SPT	N=6					

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ZAA Project Number: 1370

Client Project Number: M-2122830-408

Client: Transnet
Project: PORT OF DURBAN BERTH DEEPENING
Berths 203 to 205
Borehole No.: 1370 BHL01

205ext

ZAA Engineering Projects & Naval Architecture (Pty) Ltd

Project

PORT OF DURBAN BERTH DEEPENING

Berths 203 to 205

Sandy Materials		Clayey Materials	
Descriptions	**SPT N**	**Descriptions**	**SPT N**
Very loose	<5	Very Soft	<2
Loose	5-10	Soft	2-4
Medium dense	10-30	Firm	4-8
Dense	30-50	Stiff	8-15
Very dense	>50	Very Stiff	15-30

Borehole No. 1370 BHL01

Start Date	2012/03/19	**End Date**	2012/03/25
Project No:	1370 - DCT	**Orientation:**	Vertical
Location:	Berth 205 extension	**Elevation:**	+3.72 CDP
Logged By:	MAS Baleta	**Coordinates:**	X: -1177.1076
Drilling -	Fairbrother		Y: 3306779.016
Contractor:	Geotechnical Engineering CC		**Page 2 of 2**

Elev. (CDP)	Run Elev. (CDP)	Material / Core Recovery %	RQD %	FF (J/m)	Method & Sample	SPT Value 'N'	SPT 'N' Bar Graph (0 – 100)	Lithology	General Description	Remarks	Depth (m below platform)
		-	-	-	WB						
-28.00	-28.230	86	-	-	SPT	N=0					
	-28.780	100	-	-	TNW						
-29.00	-29.230	71	-	-	SPT	N=4					
	-29.780	80	-	-	TNW						
-30.00	-30.230	100	-	-	SPT	N=3					
	-30.780	-	-	-	WB						
-31.00	-31.230	-	-	-	SPT	N=9					
	-31.780	-	-	-	WB						
-32.00	-32.380	58	-	-	SPT	N=0					
	-32.780	-	-	-	WB						
-33.00	-33.230	111	-	-	SPT	N=4					
-34.00	-34.280	95	-	-	TNW				(-27.78, -37.53) Very moist, dark grey, cohesive, very soft, silty CLAY alternating with sandy clay horizons. Transported, fluvial-lacustrine / estuarine-lagoonal deposits.		32.00
	-34.730	122	-	-	SPT	N=0					
-35.00	-35.780	-	-	-	WB						33.00
-36.00	-36.230	100	-	-	SPT	N=17					34.00
-37.00	-37.280	-	-	-	WB						35.00
	-37.730	89	-	-	SPT	N=58					36.00
-38.00	-38.280	-	-	-	WB						37.00
-39.00	-39.780	99 / 83	77	5	NWD4				(-37.53, -48.78) Dark brownish Olive-Green, moderately to highly weathered, closely to widely fractured, VERY SOFT ROCK, interbedded SILTSTONE and MUDSTONE. Cretaceous St. Lucia Formation. No definitive primary fabric with poorly defined bedding as coarser horizons grade into finer horizons. Joint surfaces are planar, smooth, no fill, sub-horizontal at irregular spacing (50-300mm), sub-vertical joints are conspicuous. Note the presence of fossil shells and imprints associated with, but not confined to, hard calcrete layers.		38.00
-40.00											39.00
-41.00	-41.280	79 / 79	63	5	TNW.DT						40.00
-42.00	-42.780	62 / 60	47	5	NWD4						41.00
-43.00	-44.280	51 / 46	37	5	TNW.DT						42.00
-44.00	-45.780	65 / 43	31	4	NWD4						43.00
-45.00	-47.280	93 / 89	77	3	TNW.DT						44.00
-46.00	-48.780	85 / 85	85	3	NWD4					END OF BOREHOLE (-48.78 CDP / 52.50 mbgl)	45.00
-47.00											46.00
-48.00											47.00
											48.00
											49.00
											50.00
											51.00
											52.00

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ZAA Project Number: 1370

Client Project Number: M-2122830-408

Client: Transnet
Project: PORT OF DURBAN BERTH DEEPENING
Berths 203 to 205
Borehole No.: 1370 BHL01

205ext

ZAA Engineering Projects & Naval Architecture (Pty) Ltd

Project

PORT OF DURBAN BERTH DEEPENING

Berths 203 to 205

Sandy Materials		Clayey Materials	
Descriptions	**SPT N**	**Descriptions**	**SPT N**
Very loose	<5	Very Soft	<2
Loose	5-10	Soft	2-4
Medium dense	10-30	Firm	4-8
Dense	30-50	Stiff	8-15
Very dense	>50	Very Stiff	15-30

Borehole No. 1370 BHL06

Start Date	2012/07/02	**End Date**	2012/07/07
Project No:	1370 - DCT	**Orientation:**	Vertical
Location:	Berth 205 extension	**Elevation:**	+3.630 CDP
Logged By:	MAS Baleta	**Coordinates:**	X: -1172.0
Drilling -	Fairbrother		Y: 3306824.2
Contractor:	Geotechnical Engineering CC		**Page 1 of 2**

Elev. (CDP)	Run Elev. (CDP)	Material / Core Recovery %	RQD %	FF (J/m)	Method & Sample	SPT Value 'N'	SPT 'N' Bar Graph (0 – 100)	Lithology	General Description	Remarks	Depth (mbgl)
3.00	1.630	-	-	-	WB				(3.63, -1.82) Slightly moist to moist, light brown grey, cohesionless, generally medium dense (locally loose or very dense), layered, fine Medium SAND with pebbles and shell fragments. Imported, SAND FILL.		0.00
2.00	1.330	90	-	-	SPT	N=R					1.00
1.00	0.630	-	-	-	WB						2.00
	0.180	58	-	-	SPT	N=11					3.00
0.00	-0.370	-	-	-	WB						4.00
	-0.820	53	-	-	SPT	N=6					5.00
-1.00	-1.370	-	-	-	WB						
	-1.820	53	-	-	SPT	N=25			(-1.82, -11.37) Moist, grey, cohesionless, medium dense to very dense, layered, medium Fine SAND with subordinate slightly clayey layers. Transported, fluvial-lacustrine / estuarine-lagoonal deposits.	-1.820 CDP: Approximate FILL / IN SITU contact	6.00
-2.00	-2.370	-	-	-	WB						
	-2.820	58	-	-	SPT	N=34					7.00
-3.00	-3.370	-	-	-	WB						
	-3.820	60	-	-	SPT	N=39					8.00
-4.00	-4.370	-	-	-	WB						
	-4.820	73	-	-	SPT	N=47					9.00
-5.00	-5.370	-	-	-	WB						
	-5.820	73	-	-	SPT	N=50					10.00
-6.00	-6.370	-	-	-	WB						
	-6.820	64	-	-	SPT	N=54					11.00
-7.00	-7.370	-	-	-	WB						
	-7.820	67	-	-	SPT	N=54					12.00
-8.00	-8.370	-	-	-	WB						
	-8.820	67	-	-	SPT	N=56					13.00
-9.00	-9.370	-	-	-	WB						
	-9.820	49	-	-	SPT	N=27					14.00
-10.00	-10.370	-	-	-	WB						
	-10.820	51	-	-	SPT	N=26					15.00
-11.00	-11.370	-	-	-	WB						
	-11.820	91	-	-	SPT	N=17			(-11.37, -14.82) Slightly moist, dark brown grey, cohesive, very soft, layered, silty sandy CLAY. Transported, fluvial-lacustrine / estuarine-lagoonal deposits.		16.00
-12.00	-12.370	-	-	-	WB						
	-12.970	100	-	-	Shelby S01						17.00
-13.00	-13.370	-	-	-	WB						
	-13.820	67	-	-	SPT	N=2					18.00
-14.00	-14.370	-	-	-	WB						
	-14.820	73	-	-	SPT	N=0			(-14.82, -22.37) Slightly moist, dark brown grey, cohesive, very soft, silty CLAY with intermittent & isolated nodules and shell fragments. Transported, fluvial-lacustrine / estuarine-lagoonal deposits.		19.00
-15.00	-15.370	-	-	-	WB						
	-15.820	60	-	-	SPT	N=0					20.00
-16.00	-16.370	-	-	-	WB						
	-16.970	100	-	-	Shelby S02						21.00
-17.00	-17.370	-	-	-	WB						
	-17.820	89	-	-	SPT	N=1					22.00
-18.00	-18.370	-	-	-	WB						
	-18.820	84	-	-	SPT	N=0					23.00
-19.00	-19.370	-	-	-	WB						
	-19.820	82	-	-	SPT	N=0					24.00
-20.00	-20.370	-	-	-	WB						
	-20.970	100	-	-	Shelby S03						25.00
-21.00	-21.370	-	-	-	WB						
	-21.820	100	-	-	SPT	N=0					26.00
-22.00	-22.370	-	-	-	WB						
	-22.820	91	-	-	SPT	N=0			(-22.37, -29.82) Slightly moist, dark brown grey, cohesive, very soft, layered, silty sandy CLAY with clayey fine sand. Transported, fluvial-lacustrine / estuarine-lagoonal deposits.		27.00
-23.00	-23.370	-	-	-	WB						
	-23.820	89	-	-	SPT	N=0					28.00
-24.00	-24.370	-	-	-	WB						
	-24.820	84	-	-	SPT	N=0					29.00
-25.00	-25.370	-	-	-	WB						
	-25.820	100	-	-	SPT	N=0					30.00
-26.00	-26.370	-	-	-	WB						
	-26.820	58	-	-	SPT	N=1					31.00
-27.00	-27.870	-	-	-	WB						
-28.00	-28.320	100	-	-	SPT	N=2					32.00

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ZAA Project Number: 1370

Client Project Number: M-2122830-408

Client: Transnet
Project: PORT OF DURBAN BERTH DEEPENING
Berths 203 to 205
Borehole No.: 1370 BHL06

205ext

ZAA Engineering Projects & Naval Architecture (Pty) Ltd

Project

PORT OF DURBAN BERTH DEEPENING

Berths 203 to 205

Sandy Materials		Clayey Materials	
Descriptions	**SPT N**	**Descriptions**	**SPT N**
Very loose	<5	Very Soft	<2
Loose	5-10	Soft	2-4
Medium dense	10-30	Firm	4-8
Dense	30-50	Stiff	8-15
Very dense	>50	Very Stiff	15-30

Borehole No. 1370 BHL06

Start Date	2012/07/02	**End Date**	2012/07/07
Project No:	1370 - DCT	**Orientation:**	Vertical
Location:	Berth 205 extension	**Elevation:**	+3.630 CDP
Logged By:	MAS Baleta	**Coordinates:**	X: -1172.0
Drilling -	Fairbrother		Y: 3306824.2
Contractor:	Geotechnical Engineering CC		**Page 2 of 2**

Elev. (CDP)	Run Elev. (CDP)	Material / Core Recovery %	RQD %	FF (J/m)	Method & Sample	SPT Value 'N'	SPT 'N' Bar Graph (0 – 100)	Lithology	General Description	Remarks	Depth (mbgl)
-29.00	-29.370	-	-	-	WB						33.00
	-29.820	78	-	-	SPT	N=7			(-29.82, -30.87) Moist, dark brown grey, slightly cohesive, loose, clayey SAND with some shell fragments. Transported, fluvial-lacustrine / estuarine-lagoonal deposits.		
-30.00	-30.870	-	-	-	WB						34.00
-31.00	-31.090	67	-	-	SPT	N=R			(-30.87, -35.37) Slightly moist, olive green brown, cohesionless, very dense, fine sandy SILT. Residual, St Lucia Fm.	-31.070 to -32.370 CDP: Highly weathered, very soft rock, St. Lucia Fm.	35.00
-32.00	-32.370	62	12	8	NWD4						36.00
		-	-	-	SPT	N=R					
-33.00	-33.870	7	-	-	NWD4						37.00
-34.00	-34.245	69	-	-	SPT	N=R					38.00
-35.00	-35.370	-	-	-	WB						39.00
-36.00	-36.870	73 / 65	35	11	NWD4				(-35.37, -42.87) Dark brownish Olive-Green, moderately to highly weathered, closely to widely fractured, VERY SOFT ROCK, interbedded SILTSTONE and MUDSTONE. Cretaceous St. Lucia Formation. No definitive primary fabric with poorly defined bedding as coarser horizons grade into finer horizons. Joint surfaces are planar, smooth, no fill, sub-horizontal at irregular spacing (50-300mm), sub-vertical joints are conspicuous. Note the presence of fossil shells and imprints associated with, but not confined to, hard concretionary layers.		40.00
-37.00	-38.370	80 / 77	72	7	NWD4						41.00
-38.00	-39.870	100 / 83	63	8	NWD4						42.00
-39.00	-41.370	100 / 99	89	10	NWD4						43.00
-40.00	-42.870	100 / 89	73	11	NWD4					END OF BOREHOLE (-42.870 CDP / 46.50 mbgl)	44.00
-41.00											45.00
-42.00											46.00

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ZAA Project Number: 1370

Client Project Number: M-2122830-408

Client: Transnet
Project: PORT OF DURBAN BERTH DEEPENING
Berths 203 to 205
Borehole No.: 1370 BHL06

205ext

ZAA Engineering Projects & Naval Architecture (Pty) Ltd

Project

PORT OF DURBAN BERTH DEEPENING

Berths 203 to 205

Sandy Materials		Clayey Materials	
Descriptions	**SPT N**	**Descriptions**	**SPT N**
Very loose	<5	Very Soft	<2
Loose	5-10	Soft	2-4
Medium dense	10-30	Firm	4-8
Dense	30-50	Stiff	8-15
Very dense	>50	Very Stiff	15-30

Borehole No. 1370 BHL07

Start Date	2012/06/26	**End Date**	2012/07/01
Project No:	1370 - DCT	**Orientation:**	Vertical
Location:	Berth 205 extension	**Elevation:**	+3.180 CDP
Logged By:	MAS Baleta	**Coordinates:**	X: -1168.0
Drilling -	Fairbrother		Y: 3306760.4
Contractor:	Geotechnical Engineering CC		**Page 1 of 2**

Elev. (CDP)	Run Elev. (CDP)	Material / Core Recovery %	RQD %	FF (J/m)	Method & Sample	SPT Value 'N'	SPT 'N' Bar Graph (0 – 100)	Lithology	General Description	Remarks	Depth (mbgl)
3.00											0.00
2.00	1.18	-	-	-	PX				(3.18, 1.18) Slightly moist, light brown grey, cohesionless, loose (estimate), clast supported, Coarse GRAVEL with fine medium sand. Imported, GRAVEL FILL.		1.00
1.00	0.73	64	-	-	SPT	N=36			(1.18, -12.27) Slightly moist to moist, lighty brown grey, cohesionless, medium dense to very dense, Fine SAND with shell fragments. Transported, fluvial-lacustrine / estuarine-lagoonal deposits.	1.180 CDP: Approximate FILL / IN SITU contact	2.00
	0.18	-	-	-	WB						
0.00	-0.27	51	-	-	SPT	N=17					3.00
	-0.82	-	-	-	WB						
-1.00	-1.27	53	-	-	SPT	N=25					4.00
	-1.82	-	-	-	WB						
-2.00	-2.27	69	-	-	SPT	N=35					5.00
	-2.82	-	-	-	WB						
-3.00	-3.27	76	-	-	SPT	N=29					6.00
	-3.82	-	-	-	WB						
-4.00	-4.27	78	-	-	SPT	N=27					7.00
	-4.82	-	-	-	WB						
-5.00	-5.27	60	-	-	SPT	N=66					8.00
	-5.82	-	-	-	WB						
-6.00	-6.27	44	-	-	SPT	N=64					9.00
	-6.82	-	-	-	WB						
-7.00	-7.045	98	-	-	SPT	N=R					10.00
	-7.82	-	-	-	WB						
-8.00	-8.27	69	-	-	SPT	N=54					11.00
	-8.82	-	-	-	WB						
-9.00	-9.27	80	-	-	SPT	N=34					12.00
	-9.82	-	-	-	WB						
-10.00	-10.27	69	-	-	SPT	N=43					13.00
	-10.82	-	-	-	WB						
-11.00	-11.27	47	-	-	SPT	N=37					14.00
	-11.82	-	-	-	WB						
-12.00	-12.27	76	-	-	SPT	N=33					15.00
	-12.82	-	-	-	WB				(-12.27, -13.82) Slightly moist, dark brown grey, slightly cohesive, very loose, clayey silty SAND, Transported, fluvial-lacustrine / estuarine-lagoonal deposits.		16.00
-13.00	-13.27	87	-	-	SPT	N=0					
	-13.82	-	-	-	WB						17.00
-14.00	-14.27	111	-	-	SPT	N=0			(-13.82, -17.82) Slightly moist, dark brown grey, cohesive, very soft, friable, silty sandy CLAY with intermittent shell fragments and nodules. Transported, fluvial-lacustrine / estuarine-lagoonal deposits.		
	-14.82	-	-	-	WB						18.00
-15.00	-15.42	n/s	-	-	Shelby S01						
	-15.82	-	-	-	WB						19.00
-16.00	-16.27	89	-	-	SPT	N=0					
	-16.82	-	-	-	WB						20.00
-17.00	-17.42	100	-	-	Shelby S02						
	-17.82	-	-	-	WB						21.00
-18.00	-18.27	84	-	-	SPT	N=1			(-17.82, -28.12) Slightly moist, dark brown grey, cohesive, very soft, silty CLAY with intermittent & isolated nodules and shell fragments. Transported, fluvial-lacustrine / estuarine-lagoonal deposits.		
	-18.82	-	-	-	WB						22.00
-19.00	-19.27	89	-	-	SPT	N=0					
	-19.82	-	-	-	WB						23.00
-20.00	-20.27	93	-	-	SPT	N=0					
	-20.82	-	-	-	WB						24.00
-21.00	-21.42	100	-	-	Shelby S03						
	-21.82	-	-	-	WB						25.00
-22.00	-22.27	100	-	-	SPT	N=0					
	-22.82	-	-	-	WB						26.00
-23.00	-23.27	78	-	-	SPT	N=0					
	-23.82	-	-	-	WB						27.00
-24.00	-24.27	98	-	-	SPT	N=0					
	-24.82	-	-	-	WB						28.00
-25.00	-25.42	100	-	-	Shelby S04						
	-25.82	-	-	-	WB						29.00
-26.00	-26.27	93	-	-	SPT	N=0					
	-26.82	-	-	-	WB						30.00
-27.00	-27.27	89	-	-	SPT	N=0					
	-27.82	-	-	-	WB						31.00
-28.00	-28.27	89	-	-	SPT	N=0					
	-29.32	-	-	-	WB				(-28.12, -34.44) Slightly moist, dark brown grey, cohesive, very soft, silty sandy CLAY.		32.00

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ZAA Project Number: 1370

Client Project Number: M-2122830-408

Client: Transnet
Project: PORT OF DURBAN BERTH DEEPENING
Berths 203 to 205
Borehole No.: 1370 BHL07

205ext

ZAA Engineering Projects & Naval Architecture (Pty) Ltd

Project

PORT OF DURBAN BERTH DEEPENING

Berths 203 to 205

Sandy Materials		Clayey Materials	
Descriptions	**SPT N**	**Descriptions**	**SPT N**
Very loose	<5	Very Soft	<2
Loose	5-10	Soft	2-4
Medium dense	10-30	Firm	4-8
Dense	30-50	Stiff	8-15
Very dense	>50	Very Stiff	15-30

Borehole No. 1370 BHL07

Start Date	2012/06/26	**End Date**	2012/07/01
Project No:	1370 - DCT	**Orientation:**	Vertical
Location:	Berth 205 extension	**Elevation:**	+3.180 CDP
Logged By:	MAS Baleta	**Coordinates:**	X: -1168.0
Drilling -	Fairbrother		Y: 3306760.4
Contractor:	Geotechnical Engineering CC		**Page 2 of 2**

Elev. (CDP)	Run Elev. (CDP)	Material / Core Recovery %	RQD %	FF (J/m)	Method & Sample	SPT Value 'N'	SPT 'N' Bar Graph (0 – 100)	Lithology	General Description	Remarks	Depth (mbgl)
	-29.77	38	-	-	SPT	N=0			Transported, fluvial-lacustrine / estuarine-lagoonal deposits.		33.00
-30.00	-30.27	n/s	-	-	SPT	N=10					
-31.00	-31.32	-	-	-	WB						34.00
	-31.77	96	-	-	SPT	N=0					35.00
-32.00	-32.82	-	-	-	WB						
-33.00	-33.42	n/s	-	-	Shelby S05						36.00
-34.00	-34.32	-	-	-	WB						37.00
	-34.77	82	-	-	SPT	N=21			(-34.44, -37.40) Slightly moist, olive green brown, cohesionless, medium dense to very dense, clayey fine sandy SILT. Residual, St Lucia Fm.		38.00
-35.00	-35.82	-	-	-	WB						
-36.00	-36.27	36	-	-	SPT	N=45					39.00
-37.00	-37.32	-	-	-	WB						40.00
	-37.54	93	-	-	SPT	N=R			(-37.40, -46.32) Dark brownish Olive-Green, moderately to highly weathered, closely to widely fractured, VERY SOFT ROCK, interbedded SILTSTONE and MUDSTONE. Cretaceous St. Lucia Formation. No definitive primary fabric with poorly defined bedding as coarser horizons grade into finer horizons. Joint surfaces are planar, smooth, no fill, sub-horizontal at irregular spacing (50-300mm), sub-vertical joints are conspicuous. Note the presence of fossil shells and imprints associated with, but not confined to, hard concretionary layers.		41.00
-38.00	-38.82	67 / 67	58.246	6	NWD4						
-39.00	-40.32	96 / 87	68.000	11	NWD4						42.00
-40.00	-41.82	90 / 73	69.333	10	NWD4						43.00
-41.00	-43.32	23 / 3	-	-	NWD4					-41.520 to -43.320 CDP: Residual rock	44.00
-42.00	-44.82	70 / 70	51.333	5	NWD4						45.00
-43.00	-46.32	90 / 81	41.333	12	NWD4					-44.620 to -44.252 CDP: Calcrete lens END OF BOREHOLE (-46.320 CDP / 49.50 mbgl)	46.00
-44.00											47.00
-45.00											48.00
-46.00											49.00

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ZAA Project Number: 1370

Client Project Number: M-2122830-408

Client: Transnet
Project: PORT OF DURBAN BERTH DEEPENING
Berths 203 to 205
Borehole No.: 1370 BHL07

ZAA Engineering Projects & Naval Architecture (Pty) Ltd

Project

PORT OF DURBAN BERTH DEEPENING

Berths 203 to 205

Sandy Materials		Clayey Materials	
Descriptions	**SPT N**	**Descriptions**	**SPT N**
Very loose	<5	Very Soft	<2
Loose	5-10	Soft	2-4
Medium dense	10-30	Firm	4-8
Dense	30-50	Stiff	8-15
Very dense	>50	Very Stiff	15-30

Borehole No. 1370 BHS03

Start Date	2012/07/06	**End Date**	2012/07/15
Project No:	1370 - DCT	**Orientation:**	Vertical
Location:	Berth 203, Bollard 41	**Elevation:**	+3.060 CDP
Logged By:	MAS Baleta	**Coordinates:**	X: -2230.81
Drilling -	Fairbrother		Y: 3306549.663
Contractor:	Geotechnical Engineering CC		**Page 1 of 2**

Elev. (CDP)	Run Elev. (CDP)	Material / Core Recovery %	RQD %	FF (J/m)	Method & Sample	SPT Value 'N'	SPT 'N' Bar Graph 0 100	Lithology	General Description	Remarks	Depth (m below platform)
-13.00	-13.440	-	-	-	Casing				(-12.92, -13.44) Harbour Floor Sediments No sample recovered. Assumed to be very soft unconsolidated MUD.	-12.920 mCDP; Sea Floor	16.00
	-13.890	100	-	-	SPT	N=14					
-14.00	-14.440	-	-	-	WB						17.00
	-14.890	100	-	-	SPT	N=10					
-15.00	-15.440	110	-	-	TNW						18.00
	-15.890	100	-	-	SPT	N=10					
-16.00	-16.440	50	-	-	TNW				(-13.44, -30.94) Slightly moist, dark brown grey, cohesive, stiff to hard but predominantly very stiff, friable (between -13.44 & -16.89), expansive, silty CLAY with intermittent shell fragments and nodules. Transported, fluvial-lacustrine / estuarine-lagoonal deposits.		19.00
	-16.890	111	-	-	SPT	N=17					
-17.00	-17.440	100	-	-	TNW						20.00
	-17.890	111	-	-	SPT	N=18					
-18.00	-18.440	100	-	-	TNW						21.00
	-18.940	-	-	-	WB						
-19.00	-19.390	111	-	-	SPT	N=13					22.00
	-19.940	100	-	-	TNW						
-20.00	-20.390	100	-	-	SPT	N=15					23.00
	-20.940	100	-	-	TNW						
-21.00	-21.505	100	-	-	Shelby S01						24.00
	-21.955	100	-	-	SPT	N=10					
-22.00	-22.940	60	-	-	TNW						25.00
	-23.505	100	-	-	Shelby S02						
-23.00	-23.955	111	-	-	SPT	N=16					26.00
-24.00	-24.940	65	-	-	TNW						27.00
	-25.505	100	-	-	Shelby S03						
-25.00	-25.955	111	-	-	SPT	N=15					28.00
-26.00	-26.940	60	-	-	TNW						29.00
	-27.505	100	-	-	Shelby S04						
-27.00	-27.955	100	-	-	SPT	N=32					30.00
-28.00	-28.940	60	-	-	TNW						31.00
	-29.505	100	-	-	Shelby S05						
-29.00	-29.955	100	-	-	SPT	N=12					32.00
-30.00	-30.940	50	-	-	TNW					Gradational contact, downward coarsening from -28.94 to -30.94 CDP	33.00
-31.00		100	-	-	Shelby				(-30.94, -33.39) Slightly moist, dark brown grey, cohesionless, very dense, bedded, coarse to Medium SAND with subordinate clayey fine sand. Transported, fluvial-lacustrine / estuarine-lagoonal deposits.		34.00
	-31.940	-	-	-	WB						
-32.00		100	-	-	SPT	N=R					35.00
	-32.940	-	-	-	WB						
-33.00	-33.390	89	-	-	SPT	N=50				-32.940 to -33.160 CDP: Clayey Fine SAND	36.00
-34.00	-34.640	-	-	-	Casing Sunk				(-33.39, -36.32) Moist to very moist, brown grey speckled orange & white, cohesionless, medium dense to dense, bedded, medium coarse sandy Fine GRAVEL with sand and clay layers. Transported, fluvial-lacustrine / estuarine-lagoonal deposits.	Wash bore drilling (WB) concentrates gravel sized material	37.00
	-34.940	-	-	-	WB						
-35.00	-35.390	89	-	-	SPT	N=46				-34.940 to -35.340 CDP: Medium SAND	38.00
	-35.940	-	-	-	WB						
-36.00	-36.390	60	-	-	SPT	N=21			(-36.32, -37.06) Slightly moist, dark brown grey, cohesive, very stiff, layered, silty sandy CLAY with sand and gravel seams. Transported, fluvial-lacustrine / estuarine-lagoonal deposits.	-36.190 to -36.320 CDP: Medium SAND	39.00
	-36.940	-	-	-	WB						
-37.00	-37.390	78	-	-	SPT	N=59					40.00
-38.00	-39.440	-	-	-	Casing Sunk				(-37.06, -39.82) Moist, brown & orange brown, cohesionless, very loose (assumed) to very dense, bedded, Fine SAND with clayey fine sand . Transported, fluvial-lacustrine / estuarine-lagoonal deposits.	Casing sank under own weight. Assume very loose conditions.	41.00
-39.00	-39.890	78	-	-	SPT	N=25					42.00
-40.00	-40.440	-	-	-	WB				(-39.82, -40.77) Moist, dark brown grey, cohesionless, dense, layered, Fine SAND with minor gravel seams. Transported, fluvial-lacustrine / estuarine-lagoonal deposits.		43.00
	-40.890	100	-	-	SPT	N=40					
-41.00	-41.940	87	-	-	TNW				(-40.77, -43.24) Slightly moist, dark brown grey, cohesive, very stiff, friable, expansive, clayey fine sand to silty CLAY with nodules. Transported, fluvial-lacustrine / estuarine-lagoonal.		44.00
-42.00	-42.390	100	-	-	SPT	N=19					45.00
-43.00	-43.440	87	-	-	TNW						46.00
	-43.890	100	-	-	SPT	N=4			(-43.24, -47.54) Slightly moist, brown grey with layers of orange brown & green brown,	-43.240 to -43.890 CDP: Fine GRAVEL	
-44.00											47.00

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ZAA Project Number: 1370

Client Project Number: M-2122830-408

Client: Transnet
Project: PORT OF DURBAN BERTH DEEPENING
Berths 203 to 205
Borehole No.: 1370 BHS03

ZAA Engineering Projects & Naval Architecture (Pty) Ltd

Project

PORT OF DURBAN BERTH DEEPENING

Berths 203 to 205

Sandy Materials		Clayey Materials	
Descriptions	**SPT N**	**Descriptions**	**SPT N**
Very loose	<5	Very Soft	<2
Loose	5-10	Soft	2-4
Medium dense	10-30	Firm	4-8
Dense	30-50	Stiff	8-15
Very dense	>50	Very Stiff	15-30

Borehole No. 1370 BHS03

Start Date	2012/07/06	**End Date**	2012/07/15
Project No:	1370 - DCT	**Orientation:**	Vertical
Location:	Berth 203, Bollard 41	**Elevation:**	+3.060 CDP
Logged By:	MAS Baleta	**Coordinates:**	X: -2230.81
Drilling -	Fairbrother		Y: 3306549.663
Contractor:	Geotechnical Engineering CC		**Page 2 of 2**

Elev. (CDP)	Run Elev. (CDP)	Material / Core Recovery %	RQD %	FF (J/m)	Method & Sample	SPT Value 'N'	SPT 'N' Bar Graph (0 – 100)	Lithology	General Description	Remarks	Depth (m below platform)
-45.00		-	-	-	Casing Sunk				cohesionless, medium dense to very dense, layered, coarse Medium SAND with subordinate fine gravel & fine sand layers. Transported, fluvial-lacustrine / estuarine-lagoonal.	Casing sank under own weight. Assume very loose conditions.	48.00
-46.00	-46.440										49.00
	-46.890	89	-	-	SPT	N=13					
-47.00	-47.440	-	-	-	WB						50.00
	-47.815	88	-	-	SPT	N=R			(-47.54, -52.64) Moist, light brown grey, cohesionless, very dense, bedded, clayey fine sand & medium sand and Coarse SAND. Transported, fluvial-lacustrine / estuarine-lagoonal.		
-48.00											51.00
-49.00		-	-	-	Casing Sunk					Casing sank under own weight. Assume very loose conditions.	52.00
-50.00	-50.940										53.00
-51.00	-51.165	100	-	-	SPT	N=R					54.00
		-	-	-	WB						
-52.00	-52.440										55.00
	-52.740	83	-	-	SPT	N=R					
-53.00		-	-	-	WB				(-52.64, -53.94) Slightly moist, olive green brown, cohesionless, very dense, fine sandy SILT. Residual, St Lucia Fm.		56.00
-53.940											
-54.00		65 / 58	52	4	NWD4				(-53.94, -64.44) Dark brownish Olive-Green, moderately to highly weathered but predominantly highly weathered, closely to widely fractured, VERY SOFT ROCK, interbedded SILTSTONE and MUDSTONE. Cretaceous St. Lucia Formation. No definitive primary fabric with poorly defined bedding as coarser horizons grade into finer horizons. Joint surfaces are planar, smooth, no fill, sub-horizontal at irregular spacing (50-300mm), sub-vertical joints are conspicuous. Note the presence of fossil shells and imprints associated with, but not confined to, hard calcrete layers.		57.00
-55.00	-55.440										58.00
-56.00		30 / 30	22	3	NWD4						59.00
	-56.940										
-57.00		16 / 16	0	3	TNW.DT						60.00
-58.00	-58.440										61.00
-59.00		27 / 19	0	5	NWD4						62.00
	-59.940										
-60.00		63 / 63	50	7	NWD4						63.00
-61.00	-61.440									-61.140 to -61.580 CDP: Calcrete lens	64.00
-62.00		30 / 30	30	2	TNW.DT					-61.580 to -62.940 CDP: Residual Rock	65.00
	-62.940										
-63.00		56 / 56	51	5	NWD4						66.00
-64.00	-64.440									END OF BOREHOLE (-64.44 CDP / 67.50 m below platform)	67.00

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ZAA Project Number: 1370

Client Project Number: M-2122830-408

Client: Transnet
Project: PORT OF DURBAN BERTH DEEPENING Berths 203 to 205
Borehole No.: **1370 BHS03**

HOLE No: BD-BHM210A
Sheet 1 of 7

JOB NUMBER: 07-395

ROCK FABRIC
MF -massive
BF -bedded
FF -foliated
CF -cleaved
SF -schistose
GF -gneissose
LF -laminated

GRAIN SIZE
FG -fine grained
MG -medium grain
CG -coarse grain

JOINT SPACING
VCJ-very close spacg
CJ -close spacing
MJ -medium spacing
WJ -wide spacing
VWJ-very wide spacng

JOINT ROUGHNESS
SLJ-slickensided
SJ -smooth
RJ -rough

JOINT SHAPE
CUR-curvilinear
PLA-planar
UND-undulating
STE-stepped
IRR-irregular

ROCK HARDNESS
EHR-extremely hard rock
VHR-very hard rock
HR -hard rock
MHR-medium hard rock
SR -soft rock
VSR-very soft rock

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GEOTECHNICAL, CIVIL & ENVIRONMENTAL ENGINEERS

Client: TRANSNET PROJECTS
Project name: **Durban Harbour Berth Deepening**

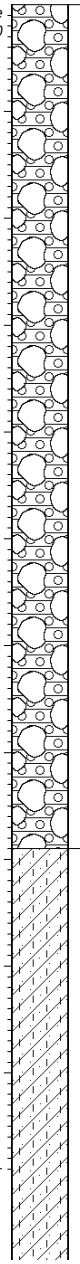
HOLE No: BD-BHM210A
Sheet 1 of 7

JOB NUMBER: 07-395

Drill Method and Size	Depth (m)	Material Recovery (%)	Core Recovery (%)	RQD (%)	Test Results	Set No.	Inclination (°)	Spacing	Joint shape	Roughness	Fill type	Fill thickness (mm)	Fracture Frequency	Weathering code	Elevation (m.a.m.s.l.)
													0 1 2 3 4 5		
NWD4	1.30	16	16	-	-	-	-	-	-	-	-	-	-		
NWD4	2.80	0	-	-	-	-	-	-	-	-	-	-	-		
NWD4	4.80	0	-	-	-	-	-	-	-	-	-	-	-		
NWD4	6.40	0	-	-	-	-	-	-	-	-	-	-	-		
NWD4	7.90	7	-	-	-	-	-	-	-	-	-	-	-		
NWD4	9.40	-	-	-	-	-	-	-	-	-	-	-	-		
SPT	9.85	33	-	-	N=48	-	-	-	-	-	-	-	-		
NWD4		-	-	-	-	-	-	-	-	-	-	-	-		

DEPTH Scale 1:50: 1 2 3 4 5 6 7 8 9 10

Scale 1:50



0.00 Angular to subangular boulders of bluish grey slightly weathered hard to very hard rock Tillite. (Quay Wall Rockfill/Rip Rap).

7.90 Wet dark grey to very dark olive grey very stiff very silty CLAY. (Harbour Beds). Becomes slightly sandy with depth.

ROCK FABRIC
MF -massive
BF -bedded
FF -foliated
CF -cleaved
SF -schistose
GF -gneissose
LF -laminated

GRAIN SIZE
FG -fine grained
MG -medium grain
CG -coarse grain

JOINT SPACING
VCJ-very close spacg
CJ -close spacing
MJ -medium spacing
WJ -wide spacing
VWJ-very wide spacng

JOINT ROUGHNESS
SLJ-slickensided
SJ -smooth
RJ -rough

JOINT SHAPE
CUR-curvilinear
PLA-planar
UND-undulating
STE-stepped
IRR-irregular

ROCK HARDNESS
EHR-extremely hard rock
VHR-very hard rock
HR -hard rock
MHR-medium hard rock
SR -soft rock
VSR-very soft rock

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Client: TRANSNET PROJECTS
Project name: **Durban Harbour Berth Deepening**

HOLE No: BD-BHM210A
Sheet 2 of 7

JOB NUMBER: 07-395

202/203

Drill Method and Size	Depth (m)	Material Recovery (%)	Core Recovery (%)	RQD (%)	Test Results	Set No.	Inclination (°)	Spacing	Joint shape	Roughness	Fill type	Fill thickness (mm)	Fracture Frequency	Weathering code (0 1 2 3 4 5)	Elevation (m.a.m.s.l.)
	11.15														
SPT	11.60	44	-	-	N=46	-	-	-	-	-	-	-	-		
Shelby	11.96	100	-	-	-	-	-	-	-	-	-	-	-		
NWD4	12.57	100	-	-	-	-	-	-	-	-	-	-	-		
Solid Tube	14.07	100	-	-	-	-	-	-	-	-	-	-	-		
NWD4	15.57	0	-	-	-	-	-	-	-	-	-	-	-		
NWD4	16.07	100	-	-	-	-	-	-	-	-	-	-	-		
NWD4	16.57	100	-	-	-	-	-	-	-	-	-	-	-		
NWD4	17.07	100	-	-	-	-	-	-	-	-	-	-	-		
NWD4	18.07	80	-	-	-	-	-	-	-	-	-	-	-		
Wash Bore	19.65	100	-	-	-	-	-	-	-	-	-	-	-		
SPT	20.10	44	-	-	N=25	-	-	-	-	-	-	-	-		
Wash Bore	21.15	100	-	-	-	-	-	-	-	-	-	-	-		
SPT	21.60	44	-	-	N=27	-	-	-	-	-	-	-	-		

DEPTH Scale 1:50

11
12
13
14
15
16
17
18
19
20
21

18.50

Wet dark brown medium dense to dense with depth silty fine to medium grained SAND. (Harbour Beds).

ROCK FABRIC
MF -massive
BF -bedded
FF -foliated
CF -cleaved
SF -schistose
GF -gneissose
LF -laminated

GRAIN SIZE
FG -fine grained
MG -medium grain
CG -coarse grain

JOINT SPACING
VCJ-very close spacg
CJ -close spacing
MJ -medium spacing
WJ -wide spacing
VWJ-very wide spacng

JOINT ROUGHNESS
SLJ-slickensided
SJ -smooth
RJ -rough

JOINT SHAPE
CUR-curvilinear
PLA-planar
UND-undulating
STE-stepped
IRR-irregular

ROCK HARDNESS
EHR-extremely hard rock
VHR-very hard rock
HR -hard rock
MHR-medium hard rock
SR -soft rock
VSR-very soft rock

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Client: TRANSNET PROJECTS
Project name: **Durban Harbour Berth Deepening**

HOLE No: BD-BHM210A
Sheet 3 of 7
JOB NUMBER: 07-395

202/203

Drill Method and Size	Depth (m)	Material Recovery (%)	Core Recovery (%)	RQD (%)	Test Results	Set No.	Inclination (°)	Spacing	Joint shape	Roughness	Fill type	Fill thickness (mm)	Fracture Frequency	Weathering code	Elevation (m.a.m.s.l.)
Wash Bore		-	-	-	-	-	-	-	-	-	-	-	-		
SPT	22.65	44	-	-	N=33	-	-	-	-	-	-	-	-		
	23.10														
Wash Bore		-	-	-	-	-	-	-	-	-	-	-	-		
	24.10														
SPT	24.55	33	-	-	N=31	-	-	-	-	-	-	-	-		
Wash Bore		-	-	-	-	-	-	-	-	-	-	-	-		
SPT	25.60	100	-	-	N=34	-	-	-	-	-	-	-	-		
	26.05														
Wash Bore		-	-	-	-	-	-	-	-	-	-	-	-		
	27.10														
SPT	27.55	100	-	-	N=37	-	-	-	-	-	-	-	-		
Wash Bore		-	-	-	-	-	-	-	-	-	-	-	-		
	28.60														
SPT	29.05	100	-	-	N=34	-	-	-	-	-	-	-	-		
Wash Bore		-	-	-	-	-	-	-	-	-	-	-	-		
	30.10														
SPT	30.55	100	-	-	N=37	-	-	-	-	-	-	-	-		
Wash Bore		-	-	-	-	-	-	-	-	-	-	-	-		
	31.60														
SPT	32.05	100	-	-	N=34	-	-	-	-	-	-	-	-		
Wash		-	-	-	-	-	-	-	-	-	-	-	-		

DEPTH Scale 1:50

22
23
24
25
26
27
28
29
30
31
32

23.10

Wet orangey brown dense silty fine to medium grained SAND with sparse shell fragments. (Harbour Beds).

ROCK FABRIC
MF -massive
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FF -foliated
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Client: TRANSNET PROJECTS
Project name: **Durban Harbour Berth Deepening**

HOLE No: BD-BHM210A
Sheet 4 of 7

JOB NUMBER: 07-395

202/203

Drill Method and Size	Depth (m)	Material Recovery (%)	Core Recovery (%)	RQD (%)	Test Results	Set No.	Inclination (°)	Spacing	Joint shape	Roughness	Fill type	Fill thickness (mm)	Fracture Frequency	Weathering code	Elevation (m.a.m.s.l.)
Bore															
SPT	33.10	100	-	-	N=37	-	-	-	-	-	-	-	-		
	33.55														
Wash Bore		-	-	-	-	-	-	-	-	-	-	-	-		
	34.60														
SPT		100	-	-	N=38	-	-	-	-	-	-	-	-		
	35.05														
Wash Bore		-	-	-	-	-	-	-	-	-	-	-	-		
	36.10														
SPT		100	-	-	N=34	-	-	-	-	-	-	-	-		
	36.55														
Wash Bore		-	-	-	-	-	-	-	-	-	-	-	-		
	37.60														
SPT		100	-	-	N=39	-	-	-	-	-	-	-	-		
	38.05														
Wash Bore		-	-	-	-	-	-	-	-	-	-	-	-		
	38.60														
SPT		44	-	-	N=41	-	-	-	-	-	-	-	-		
	39.05														
Wash Bore		38	-	-	-	-	-	-	-	-	-	-	-		
	40.10														
SPT		44	-	-	N=45	-	-	-	-	-	-	-	-		
	40.55														
Wash Bore		43	-	-	-	-	-	-	-	-	-	-	-		
	41.60														
SPT		47	-	-	N=50	-	-	-	-	-	-	-	-		
	42.05														
Wash Bore		24	-	-	-	-	-	-	-	-	-	-	-		
	43.10														
SPT		44	-	-	N=51	-	-	-	-	-	-	-	-		

0 1 2 3 4 5

DEPTH Scale 1:50

33 34 35 36 37 38 39 40 41 42 43

39.50

Wet very dark greyish brown dense to very dense with depth clayey silty fine grained SAND with sparse shell fragments. (Harbour Beds).

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HOLE No: BD-BHM210A
Sheet 5 of 7
JOB NUMBER: 07-395

202/203

Drill Method and Size	Depth (m)	Material Recovery (%)	Core Recovery (%)	RQD (%)	Test Results	Set No.	Inclination (°)	Spacing	Joint shape	Roughness	Fill type	Fill thickness (mm)	Fracture Frequency	Weathering code	Elevation (m.a.m.s.l.)
	43.55														
Wash Bore		-	-	-	-	-	-	-	-	-	-	-	-		
	44.60														
SPT		47	-	-	N=52	-	-	-	-	-	-	-	-		
	45.05														
Wash Bore		-	-	-	-	-	-	-	-	-	-	-	-		
	46.10														
SPT		100	-	-	N=44	-	-	-	-	-	-	-	-		
	46.55														
Wash Bore		-	-	-	-	-	-	-	-	-	-	-	-		
	48.00														
SPT		100	-	-	N=50	-	-	-	-	-	-	-	-		
	48.45														
Wash Bore		-	-	-	-	-	-	-	-	-	-	-	-		
	49.55														
SPT		100	-	-	N=55	-	-	-	-	-	-	-	-		
	50.00														
NWD4		100	100	25	-	1	90	M	UND	SRJ	slt	1	-		
	50.50														
NWD4		95	20	0	-	1	90	C	IRR	MRJ	slt	1	-		
	51.00														
NWD4		85	22	0	-	1	90	C	IRR	MRJ	slt	1	-		
	51.75														
Wash Bore		-	-	-	-	-	-	-	-	-	-	-	-		
	52.25														
		-	-	-	-	-	-	-	-	-	-	-	-		
	52.65														
NWD4		98	60	0	-	1	90	M	UND	SRJ	slt	1	-		
	53.25														
Wash Bore		-	-	-	-	-	-	-	-	-	-	-	-		
	53.75														
NWD4		54	54	-	-	-	-	-	-	-	-	-	-		
	54.25														
Wash		-	-	-											

0 1 2 3 4 5

DEPTH Scale 1:50

44 45 46 47 48 49 50 51 52 53 54

50.00

Dark olive grey medium to completely weathered very soft rock SILTSTONE with lenses / bands of medium hard rock and some lenses of residual dark grey medium to coarse grained SAND. (Cretaceous).

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Client: TRANSNET PROJECTS
Project name: **Durban Harbour Berth Deepening**

HOLE No: BD-BHM210A
Sheet 6 of 7

JOB NUMBER: 07-395

202/203

Drill Method and Size	Depth (m)	Material Recovery (%)	Core Recovery (%)	RQD (%)	Test Results	Set No.	Inclination (°)	Spacing	Joint shape	Roughness	Fill type	Fill thickness (mm)	Fracture Frequency	Weathering code	Elevation (m.a.m.s.l.)
Bore	54.75	-	-	-	-	-	-	-	-	-	-	-	-		
Wash Bore	55.25	-	-	-	-	-	-	-	-	-	-	-	-		
NWD4	55.75	100	100	33	-	1	90	C	UND	MRJ	slt	1	>20		
NWD4	56.25	68	68	-	-	-	-	-	-	-	-	-	-		
NWD4	56.75	100	100	60	-	1	0-50	C-M	UND	SRJ	slt	<1	6		
NWD4	57.25	100	100	80	-	1	0-50	C-M	UND	SRJ	slt	<1	2		
NWD4	57.75	100	100	80	-	1	0-50	C-M	UND	SRJ	slt	<1	4		
NWD4	58.25	72	72	70	-	1	0-50	C-M	UND	SRJ	slt	<1	4		
NWD4	58.75	76	76	-	-	1	0-50	C-M	UND	SRJ	slt	<1	8		
NWD4	60.25	100	100	67	-	1	0-50	C-M	UND	SRJ	slt	<1	7		
NWD4	61.00	93	93	93	-	1 2	0-50 65	M M	UND UND	SRJ SRJ	slt slt	<1 <1	2		
NWD4	61.70	97	97	43	-	1	0-50	C-M	UND	SRJ	slt	<1	5		
NWD4	62.50	100	100	75	-	1	0-50	C-M	UND	MRJ	slt	<1	13		
NWD4	63.30	100	100	81	-	1	0-50	M	UND	SRJ	slt	<1	4		
NWD4	63.90	100	100	-	-	-	-	-	-	-	-	-	-		
NWD4		100	100	73	-	1	0-50	M	UND	SRJ	slt	<1	9		

0 1 2 3 4 5

DEPTH Scale 1:50

55 56 57 58 59 60 61 62 63 64 65

55.25

Very dark olivish grey medium weathered soft rock SILTSTONE with abundant fossils. (Cretaceous).

56.25

As above but medium weathered soft to medium hard rock SILTSTONE with abundant fossils. (Cretaceous). With lenses of completely weathered very soft rock Siltstone at 63.30-63.90m.

ROCK FABRIC
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GRAIN SIZE
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HOLE No: BD-BHM210A
Sheet 7 of 7

JOB NUMBER: 07-395

202/203

Drill Method and Size	Depth (m)	Material Recovery (%)	Core Recovery (%)	RQD (%)	Test Results	Set No.	Inclination (°)	Spacing	Joint shape	Roughness	Fill type	Fill thickness (mm)	Fracture Frequency	Weathering code	Elevation (m.a.m.s.l.)
	65.40														
NWD4		100	100	86	-	1	5	C	UND	SRJ	slt	<1	8		
	66.90														
NWD4		100	100	80	-	1	0-10	C-M	UND	SRJ	slt	<1	10		
	68.40														

0 1 2 3 4 5

DEPTH Scale 1:50

66
67
68

68.40

NOTES

1) End of borehole at 68.40m below sea floor.

2) Final depth of NW casing at 46.0m.

3) Borehole carried out from jack up barge.

CONTRACTOR : Geopractica
MACHINE :
DRILLED BY : Martin/ Mike / Lawrence
PROFILED BY : LD

TYPE SET BY : Rev 0
SETUP FILE : MSJA3.SET

INCLINATION : 90°
DIAM : N
DATE : 01/09/2008
DATE : 25/09/2008

DATE : 04/03/09 14:06
TEXT : ..\BHOLES\BDCF87~1.TXT

ELEVATION : -13.205 (m) CD
X-COORD : 3306551.300
Y-COORD : -2280.970

HOLE No: BD-BHM210A

HOLE No: BD-BHM211
Sheet 1 of 6

JOB NUMBER: 07-395

ROCK FABRIC
MF -massive
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HOLE No: BD-BHM211
Sheet 1 of 6

JOB NUMBER: 07-395

Drill Method and Size	Depth (m)	Material Recovery (%)	Core Recovery (%)	RQD (%)	Test Results	Set No.	Inclination (°)	Spacing	Joint shape	Roughness	Fill type	Fill thickness (mm)	Fracture Frequency	Weathering code	Elevation (m.a.m.s.l.)
NWD4		63	-	-	-	-	-	-	-	-	-	-	-		
	1.50														
NWD4		82	-	-	-	-	-	-	-	-	-	-	-		
	3.00														
SPT		100	-	-	N=18	-	-	-	-	-	-	-	-		
	3.45														
NWD4		67	-	-	-	-	-	-	-	-	-	-	-		
	4.95														
NWD4		41	-	-	-	-	-	-	-	-	-	-	-		
	6.00														
NWD4		43	-	-	-	-	-	-	-	-	-	-	-		
	7.50														
Shelby		100	-	-	Shelby	-	-	-	-	-	-	-	-		
	8.05														
NWD4		100	-	-	-	-	-	-	-	-	-	-	-		
	9.00														
NWD4		71	-	-	-	-	-	-	-	-	-	-	-		
	10.40														
SPT		100	-	-	N=24	-	-	-	-	-	-	-	-		

Weathering code: 0 1 2 3 4 5

DEPTH Scale 1:50

Scale 1:50

Wet dark grey to brownish dark grey stiff shattered silty CLAY. (Harbour Beds).

HOLE No: BD-BHM211
Sheet 2 of 6

JOB NUMBER: 07-395

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HOLE No: BD-BHM211
Sheet 2 of 6

JOB NUMBER: 07-395

Drill Method and Size	Depth (m)	Material Recovery (%)	Core Recovery (%)	RQD (%)	Test Results	Set No.	Inclination (°)	Spacing	Joint shape	Roughness	Fill type	Fill thickness (mm)	Fracture Frequency	Weathering code	Elevation (m.a.m.s.l.)
	10.85														
NWD4		48	-	-	-	-	-	-	-	-	-	-	-	0 1 2 3 4 5	
	11.90														
NWD4		100	-	-	N=22	-	-	-	-	-	-	-	-		
	12.35														
Wash Bore		100	-	-	-	-	-	-	-	-	-	-	-		
	13.40														
SPT		100	-	-	N=12	-	-	-	-	-	-	-	-		
	13.85														
Wash Bore		100	-	-	-	-	-	-	-	-	-	-	-		
	14.90														
Solid Tube		100	-	-	-	-	-	-	-	-	-	-	-		
	16.40														
SPT		100	-	-	N=16	-	-	-	-	-	-	-	-		
	16.85														
Wash Bore		97	-	-	-	-	-	-	-	-	-	-	-		
	17.90														
Wash Bore		32	-	-	-	-	-	-	-	-	-	-	-		
	19.40														
Wash Bore		17	-	-	-	-	-	-	-	-	-	-	-		
	20.90														
Wash		27	-	-	-	-	-	-	-	-	-	-	-		

DEPTH Scale 1:50

11 12 13 14 15 16 17 18 19 20 21

0.00

17.00 — Wet greyish light brown speckled black and orange medium dense fine grained SAND. (Harbour Beds). (Logged from the wash sample).

19.40 — Wet orangey brown medium dense fine grained SAND. (Harbour Beds). (Logged from the wash sample and 1 SPT sample).

HOLE No: BD-BHM211
Sheet 3 of 6

JOB NUMBER: 07-395

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Sheet 3 of 6

JOB NUMBER: 07-395

Drill Method and Size	Depth (m)	Material Recovery (%)	Core Recovery (%)	RQD (%)	Test Results	Set No.	Inclination (°)	Spacing	Joint shape	Roughness	Fill type	Fill thickness (mm)	Fracture Frequency	Weathering code	Elevation (m.a.m.s.l.)
Bore															
	22.40														
SPT		100	-	-	N=24	-	-	-	-	-	-	-	-		
	22.85														
Wash Bore		31	-	-	-	-	-	-	-	-	-	-	-		
	23.90														
Wash Bore		20	-	-	-	-	-	-	-	-	-	-	-		
	25.40														
SPT		100	-	-	N=22	-	-	-	-	-	-	-	-		
	25.85														
Wash Bore		27	-	-	-	-	-	-	-	-	-	-	-		
	26.90														
Wash Bore		21	-	-	-	-	-	-	-	-	-	-	-		
	28.40														
SPT		100	-	-	N=23	-	-	-	-	-	-	-	-		
	28.85														
Wash Bore		29	-	-	-	-	-	-	-	-	-	-	-		
	29.90														
Wash Bore		18	-	-	-	-	-	-	-	-	-	-	-		
	31.40														
SPT		100	-	-	N=22	-	-	-	-	-	-	-	-		
	31.85														
Wash Bore		24	-	-	-	-	-	-	-	-	-	-	-		

0 1 2 3 4 5

DEPTH Scale 1:50

22 23 24 25 26 27 28 29 30 31 32

23.90

Wet dark greyish brown medium dense fine to medium grained SAND. (Harbour Beds).

HOLE No: BD-BHM211
Sheet 4 of 6

JOB NUMBER: 07-395

ROCK FABRIC
MF -massive
BF -bedded
FF -foliated
CF -cleaved
SF -schistose
GF -gneissose
LF -laminated

GRAIN SIZE
FG -fine grained
MG -medium grain
CG -coarse grain

JOINT SPACING
VCJ-very close spacg
CJ -close spacing
MJ -medium spacing
WJ -wide spacing
VWJ-very wide spacng

JOINT ROUGHNESS
SLJ-slickensided
SJ -smooth
RJ -rough

JOINT SHAPE
CUR-curvilinear
PLA-planar
UND-undulating
STE-stepped
IRR-irregular

ROCK HARDNESS
EHR-extremely hard rock
VHR-very hard rock
HR -hard rock
MHR-medium hard rock
SR -soft rock
VSR-very soft rock

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GEOTECHNICAL, CIVIL & ENVIRONMENTAL ENGINEERS

Client: TRANSNET PROJECTS
Project name: **Durban Harbour Berth Deepening**

HOLE No: BD-BHM211
Sheet 4 of 6

JOB NUMBER: 07-395

Drill Method and Size	Depth (m)	Material Recovery (%)	Core Recovery (%)	RQD (%)	Test Results	Set No.	Inclination (°)	Spacing	Joint shape	Roughness	Fill type	Fill thickness (mm)	Fracture Frequency	Weathering code (0 1 2 3 4 5)	Elevation (m.a.m.s.l.)
	32.90														
Wash Bore		17	-	-	-	-	-	-	-	-	-	-	-		
	34.40														
Wash Bore		27	-	-	-	-	-	-	-	-	-	-	-		
	35.45														
SPT		100	-	-	N=65	-	-	-	-	-	-	-	-		
	35.90														
Wash Bore		41	-	-	-	-	-	-	-	-	-	-	-		
	37.50														
Wash Bore		41	-	-	-	-	-	-	-	-	-	-	-		
	38.80														
SPT		0	-	-	N=60	-	-	-	-	-	-	-	-		
	39.25														
Wash Bore		40	-	-	-	-	-	-	-	-	-	-	-		
	40.75														
Wash Bore		47	-	-	-	-	-	-	-	-	-	-	-		
	42.25														
NWD4		47	10	-	-	-	-	-	-	-	-	-	-		

DEPTH Scale 1:50: 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43

34.40

Wet light greyish brown very dense fine to medium grained SAND. (Harbour Beds). (Logged from the wash sample and 1 SPT sample).

42.75

ROCK FABRIC
MF -massive
BF -bedded
FF -foliated
CF -cleaved
SF -schistose
GF -gneissose
LF -laminated

GRAIN SIZE
FG -fine grained
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HOLE No: BD-BHM211
Sheet 5 of 6

JOB NUMBER: 07-395

202/203

Drill Method and Size	Depth (m)	Material Recovery (%)	Core Recovery (%)	RQD (%)	Test Results	Set No.	Inclination (°)	Spacing	Joint shape	Roughness	Fill type	Fill thickness (mm)	Fracture Frequency	Weathering code	Elevation (m.a.m.s.l.)
	43.75													0 1 2 3 4 5	
NWD4		68	60	20	UCS=1.875MPa	-	-	-	-	-	-	-	-	-	
	45.25														
Wash Bore		52	-	-	-	-	-	-	-	-	-	-	-	-	
	46.06														
Wash Bore		27	-	-	-	-	-	-	-	-	-	-	-	-	
	47.56														
NWD4		63	13	-	-	-	-	-	-	-	-	-	-	-	
	49.06														
NWD4		87	20	-	-	-	-	-	-	-	-	-	-	-	
	50.56														
NWD4		53	47	-	-	-	-	-	-	-	-	-	-	-	
	52.06														
NWD4		41	7	-	-	-	-	-	-	-	-	-	-	-	
	53.56														
NWD4		29	29	-	-	1	0-5	C-M	PLA-UND	SJ-SRJ	slt	<1	5	-	

DEPTH Scale 1:50

42.90 Light grey moderately weathered medium hard rock fine grained SANDSTONE. (Cretaceous).

43.85 Slightly moist blackish brown apparently soft to firm sandy CLAY. Residual Siltstone. (Cretaceous).

45.25 Dark greyish brown highly weathered soft rock SILTSTONE. (Cretaceous).

Wet dark greyish brown apparently medium dense fine to medium grained SAND. (Residual Cretaceous).

47.56 Slightly moist blackish brown apparently soft to firm sandy CLAY with fragments of dark greyish brown highly to completely weathered soft rock SILTSTONE. (Residual Cretaceous).

53.50

HOLE No: BD-BHM211
Sheet 6 of 6

JOB NUMBER: 07-395

ROCK FABRIC
MF -massive
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CF -cleaved
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GRAIN SIZE
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HOLE No: BD-BHM211
Sheet 6 of 6

JOB NUMBER: 07-395

Drill Method and Size	Depth (m)	Material Recovery (%)	Core Recovery (%)	RQD (%)	Test Results	Set No.	Inclination (°)	Spacing	Joint shape	Roughness	Fill type	Fill thickness (mm)	Fracture Frequency	Weathering code	Elevation (m.a.m.s.l.)
	55.06														
NWD4		64	64	-	-	1	0-5	C-M	PLA-UND	SJ-SRJ	slt	<1	13		
	56.56														
NWD4		53	36	-	-	1	0-5	C-M	PLA-UND	SJ-SRJ	slt	<1	5		
	57.94														
NWD4		87	80	-	UCS=2.152MPa	1 2	0-5 75-85	C-M C	PLA-UND PLA	SJ-SRJ SJ-SRJ	slt slt	<1 <1	4		
	59.44														
NWD4		100	100	17	UCS=1.830MPa UCS=2.10MPa	1	0-5	C-M	PLA-UND	SJ-SRJ	slt	<1	9		
	60.94														
		33	33	17	UCS=1.131MPa	1	0-5	C-M	PLA-UND	SJ-SRJ	slt	<1	3		
	61.44														
NWD4		0	0	0	-	-	-	-	-	-	-	-	-		
	62.44														

0 1 2 3 4 5

DEPTH Scale 1:50

55 56 57 58 59 60 61 62

61.44

62.44

Light grey to dark grey moderately to completely weathered thinly to medium bedded closely to medium jointed soft to medium hard rock SILTSTONE with some fossils present. (Cretaceous). Note: Clay lenses at the following depths of 57.63-57.83m and 59.28-59.44m.

No core recovery. Core dropped out of core barrel.

NOTES

1) End of borehole at 62.44m below sea floor.

2) Final depth of HW casing at 38.5m and NW casing at 59.44m. (Interpreted from the driller's log).

3) Borehole carried out from jack up barge.

CONTRACTOR : Geopractica
MACHINE :
DRILLED BY : Martin/ Mike/ Lawrence
PROFILED BY : SAP

TYPE SET BY : Rev 0
SETUP FILE : MSJA3.SET

INCLINATION : 90°
DIAM : N
DATE : 03/07/2008
DATE : 21/07/2008

DATE : 24/02/09 16:18
TEXT : ..\BHOLES\BD5C75~1.TXT

ELEVATION : -12.187 (m) CD
X-COORD : 3306547.080
Y-COORD : -2356.105

HOLE No: BD-BHM211

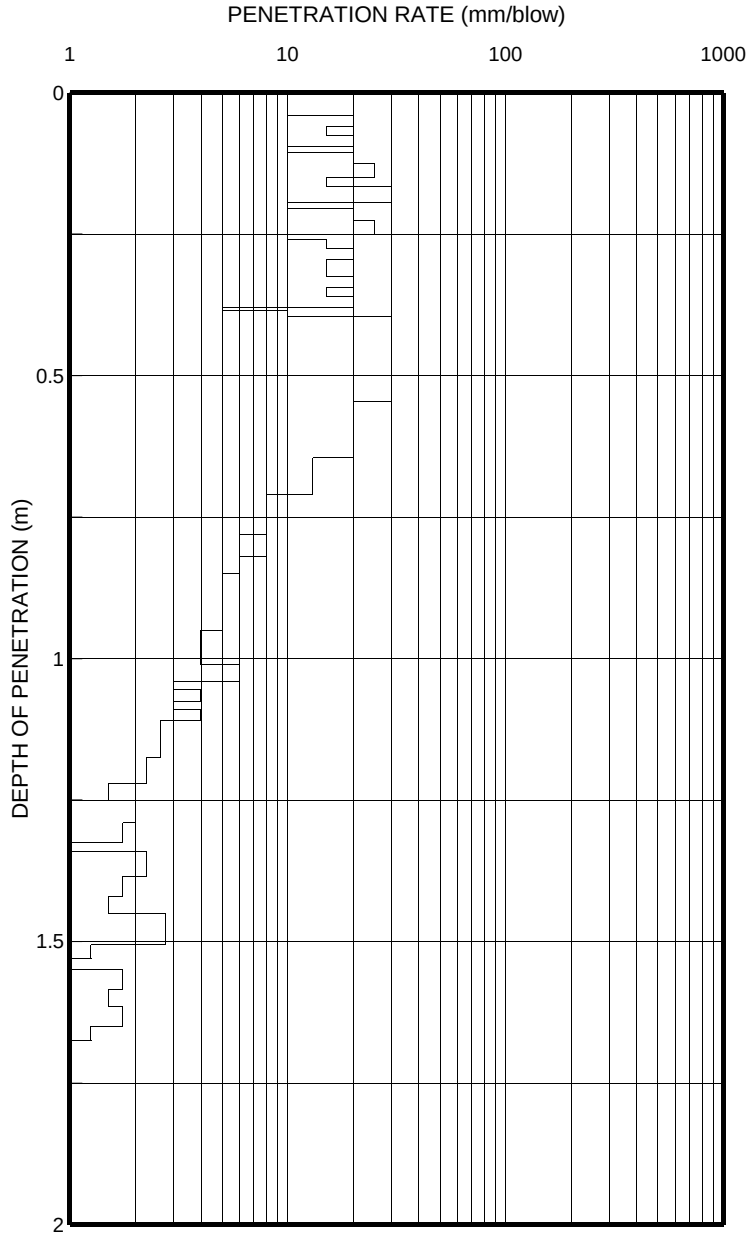
dot.PLOT 5003 J&W

ANNEXURE 3 - DCP RESULTS

DYNAMIC CONE PENETRATION TEST

PROJECT: PORT OF DURBAN DEEPENING OF BERTHS 203 TO 205 FACILITIES BUILDINGS **PROJECT NO:** 1370

TEST NO: DCP1 **STARTING DEPTH:** Ground Surface
DATE: 9 November 2012 **COORDINATES:** -1157Y, 3306853X



Sandy Materials:	Very loose	>75	**Clayey Materials:**	Very Soft	>110
(mm/blow)	Loose	30 - 75	(mm/blow)	Soft	55 - 110
	Medium Dense	12.5 - 30		Firm	30 - 55
	Dense	5 - 12.5		Stiff	15 - 30
	Very Dense	2 - 5		Very Stiff	7 - 15