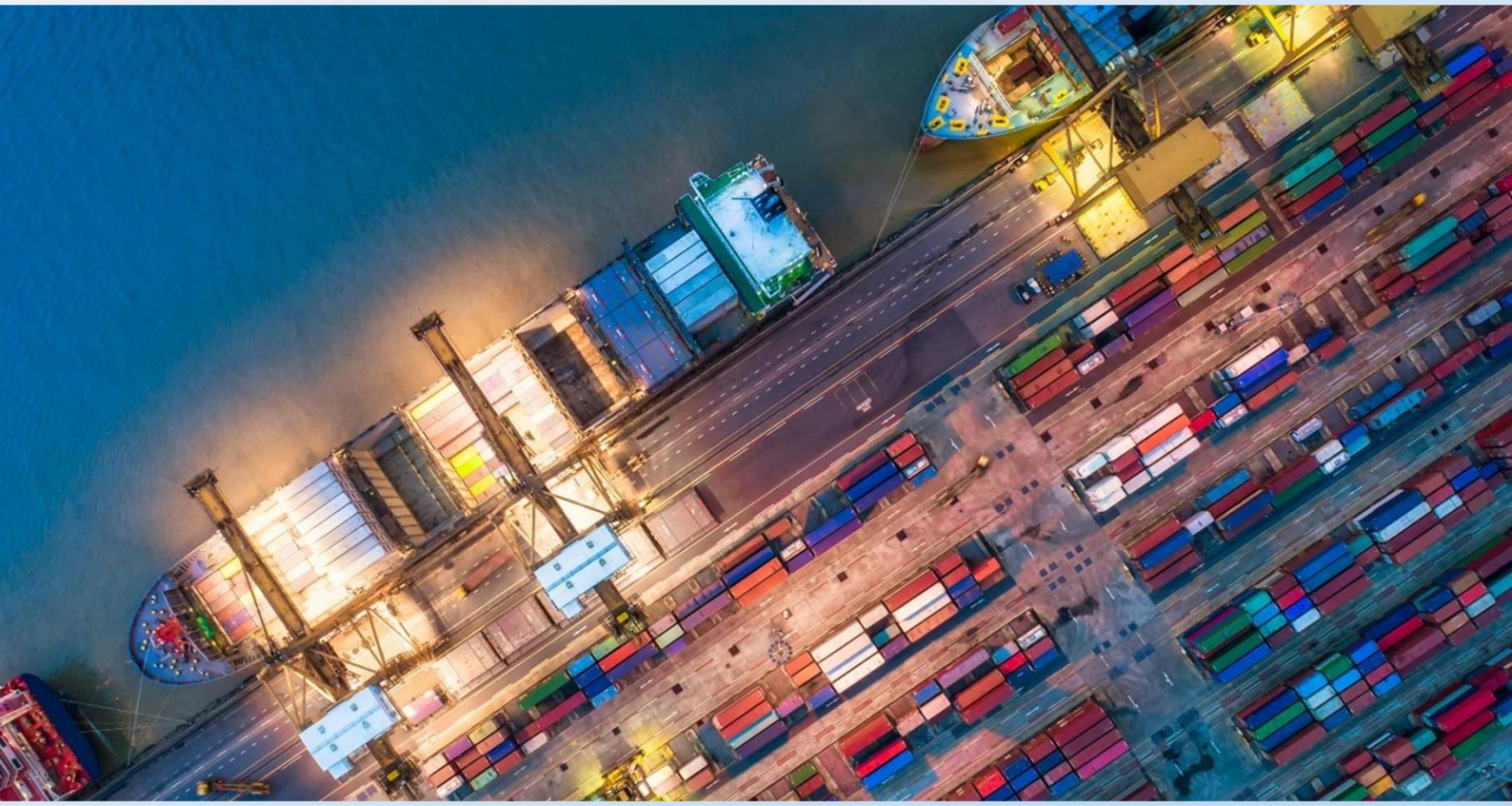
TRANSNET SOC Ltd

PROPOSED UPGRADE AND DEEPENING OF THE MAYDON WHARF BERTHS 5-11 & 15 IN THE PORT OF DURBAN

Draft Basic Assessment Report

DFFE Ref No.: 14/12/16/3/3/1/3125

MWD-WSP-XX-XX-RP-EE-0001



MAY 2025

PUBLIC

TRANSNET SOC Ltd

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DATE: MAY 2025

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Draft Basic Assessment Report

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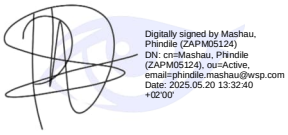
Signature	 Digitally signed by Tshepho.Mamashela@wsp.com DN: cn=Tshepho.Mamashela@wsp.com Date: 2025.05.20 13:38:54 +02'00'	 Digitally signed by Mashau, Phindile (ZAPM05124) DN: cn=Mashau, Phindile (ZAPM05124), ou=Active, email=phindile.mashau@wsp.com Date: 2025.05.20 13:32:40 +02'00'
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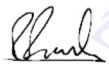
Signature	 Rowles, Rob (ZARR05387) 2025.05.20 14:26:39 +02'00'	
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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
AMAFA	Amafa aKwaZulu-Natali (Heritage KwaZulu-Natal)
AI	Artificial Intelligence
ATNS	Air Traffic Navigation Services
BA	Basic Assessment
BAR	Basic Assessment Report
BEPP	Built Environment Performance Plan
C_6H_6	Benzene
CA	Competent Authority
CAA	Civil Aviation Act, 2009 (Act 13 of 2009)
CAPEX	Capital Expenditure
CARA	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)
CBA	Critical Biodiversity Area
CD	Chart Datum
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CP	Cathodic protection
CRR	Comment and Response Report
CSIR	Council for Scientific and Industrial Research
DEA	Department of Environmental Affairs
DFFE	Department of Forestry, Fisheries and the Environment
D'MOSS	Durban Metropolitan Open Space System
DWS	Department of Water and Sanitation
DWT	Deadweight Tonnage
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners Association of South Africa
ECA	Environmental Conservation Act, 1989 (Act 73 of 1989)
ECO	Environmental Control Officer
EDTEA	KZN Department of Economic Development, Tourism and Environmental Affairs
EIA	Environmental Impact Assessment
EKZNW	Ezemvelo KZN Wildlife
EMPr	Environmental Management Programme
ESG	Environmental and Social Governance

Acronym / Abbreviation	Definition
ETA	eThekwini Transport Authority
GA	General Authorisation
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIIP	Good International Industry Practice
GNR	Gazette Notice Regulation
GVA	Gross Value Added
HGV	Heavy Goods Vehicle
I&APs	Interested and Affected Parties
ICAO	International Civil Aviation Organisation
IDP	Integrated Development Plan
IFC	International Finance Corporation
IFC GPH	IFC Good Practice Handbook
IoT	Internet of Things
IUCN	International Union for Conservation of Nature
KZN	KwaZulu-Natal
MMP	Maintenance Management Plan
MSDF	Municipal Spatial Development Framework
MV	Mechanical Vibrated
NDP	National Development Plan
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998) (as amended)
NEMAQA	National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004) (as amended)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) (as amended)
NEMPAA	National Environmental Management Protected Areas Act, 2003 (Act 57 of 2003) (as amended)
NEMWA	National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (as amended)
NHRA	National Heritage Resource Act, 1999 (Act 25 of 1999)
NMT	Non-Motorised Transport (walking, cycling)
NO_2	Nitrogen Dioxide
NPA	National Ports Authority
NPAES	National Protected Area Expansion Strategy
NWA	National Water Act, 1998 (Act 36 of 1998) (as amended)
OHSA	Occupational Health and Safety Act, 1993 (Act 85 of 1993)
OPEX	Operating Expenses/Expenditure

Acronym / Abbreviation	Definition
PHRA	Provincial Heritage Resources Authority
PM_{10}	Particulate Matter (particles 10 micrometres or smaller in diameter)
$PM_{2.5}$	Particulate Matter (particles 2.5 micrometres or smaller in diameter)
PoD	Port of Durban
POPIA	Protection of Personal Information Act, 2013 (Act 4 of 2013)
PPP	Public Participation Process
RI&APs	Registered Interested and Affected Parties
S&EIA	Scoping and Environmental Impact Assessment
SA	South Africa/African
SABS	South African Bureau of Standards
SACAA	South African Civil Aviation Authority
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
SAMSA	South African Maritime Safety Authority
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency
SANS	South African National Standards
SARPs	Standards and Recommended Practices
SARPs	Standards and Recommended Practices
SAWS	South African Weather Service
SDF	Spatial Development Framework
SDG	Sustainable Development Goal
SG	Surveyor General
SMEs	Small and Medium Enterprises
SO_2	Sulphur Dioxide
SOC	State-Owned Company
SPLUMA	Spatial Planning and Land Use Management Act, 2013 (Act 16 of 2013)
SSP	Shared Socioeconomic pathways
SST	Sea Surface Temperature
Stats SA	Statistics South Africa
TMP	Traffic Management Plan
TNPA	Transnet National Ports Authority (Pty) Ltd
Transnet	Transnet SOC Limited
TSS	Total Suspended Solids
TPPP	Transnet Preferential Procurement Policy
TVET	Technical and Vocational Education and Training

Acronym / Abbreviation	Definition
UV	Ultraviolet
VECs	Valued Environmental and Social Components
WMA	Water Management Area
WSP	WSP Group Africa (Pty) Ltd
WUA	Water Use Authorisation
WUL	Water Use Licence

UNITS OF MEASURE

Unit	Definition
°C	Degrees Celsius
ha	Hectares
km	Kilometres
km^2	Square Kilometres
m	Metres
m^3	Cubic Metres
mg/L	Milligrams per Litre
mm	Milimetre
NTU	Nephelometric Turbidity Units
µM	Micromolar

EXECUTIVE SUMMARY

WSP Group Africa (Pty) Ltd (WSP) has been appointed by Transnet National Ports Authority (TNPA) to undertake an application for environmental authorisation (EA) under the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) (as amended), for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 in the Port of Durban (PoD), in the eThekwini Municipality, KwaZulu-Natal (KZN) (hereafter referred to as the "proposed project"). The application for EA must be supported by a Basic Assessment (BA) process in terms of the Environmental Impact Assessment (EIA) Regulations, Gazette Notice Regulation (GNR) 326, 2014 (as amended).

Project Overview

The Maydon Wharf precinct serves as a multipurpose terminal, handling dry bulk, break-bulk, and liquid bulk cargo. The Maydon wharf precinct consists of 15 berths in total. Many of the current berths are older than 50 years and are too shallow to accommodate larger vessels. Maydon Wharf's berths 1-4 & 12-14 have been upgraded already, with construction completed in 2021. The purpose of the proposed project will be to upgrade the remaining berths (i.e., berths 5-11 & 15) (Figure 1), one at a time, to accommodate larger vessels, thereby improving trade efficiency and fostering economic growth.

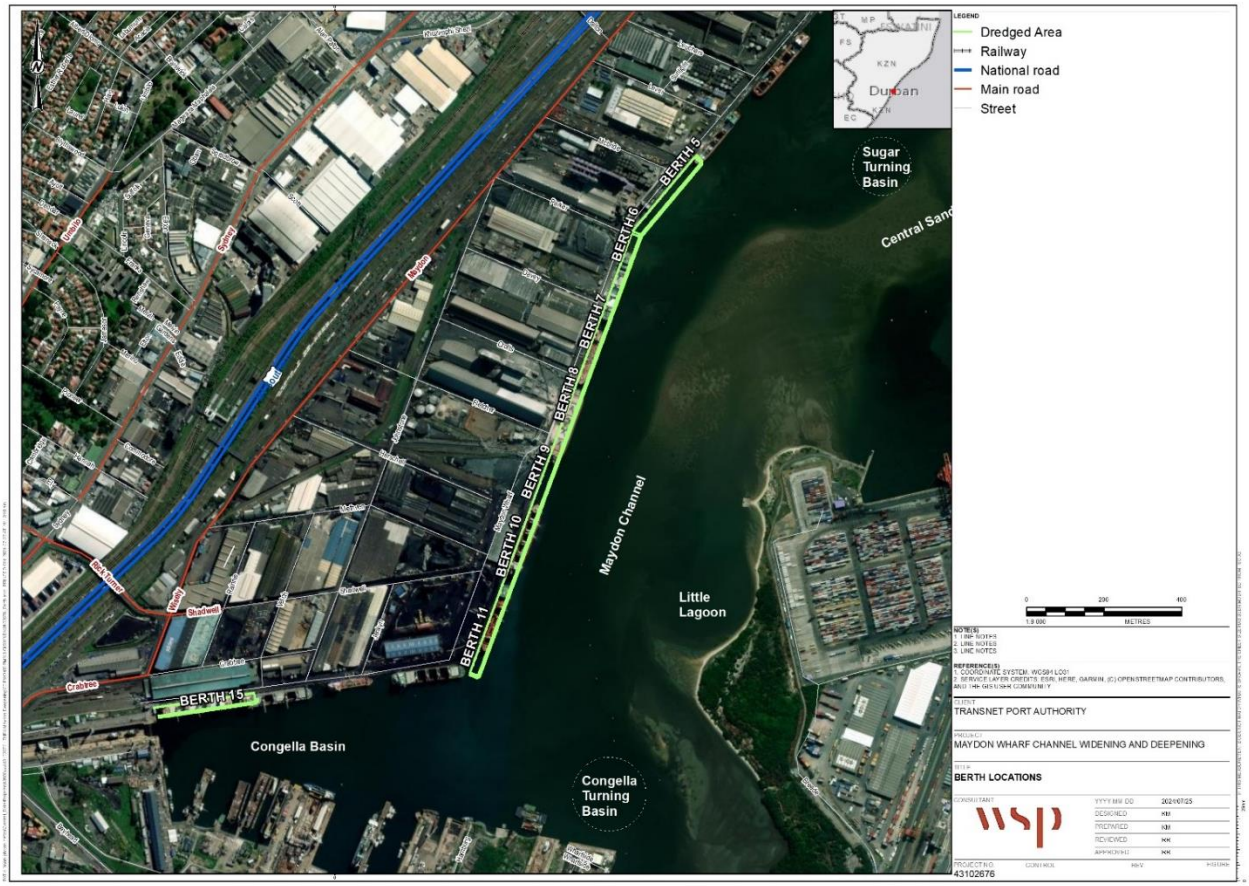

Figure 1: Maydon Wharf Berths 5 to 11 and 15 Locality Map

Berths 5 - 11 & 15 will be deepened by approximately 4.5 meters, reaching a final depth of approximately 14.5 meters Chart Datum (mCD). The width of the berth pocket will remain unchanged, with the deepening extending to the end of the berth pocket, which is approximately 50 meters from the quayside structures. The construction process is expected to span approximately ten years.

The key role players of the BA process include TNPA, who are the project proponent and the Department of Forestry, Fisheries and the Environment (DFFE), who are the competent authority (CA) overseeing the EA process. Various local and provincial departments are involved as commenting authorities.

Project Alternatives

The proposed project will be constructed within the existing footprint of the Maydon Wharf precinct, ensuring easy integration with current infrastructure; however, several alternatives have been considered for the project. These alternatives include different site locations for the contractor's office and laydown areas, design and construction alternatives for anchoring systems, and technology alternatives for scour protection. The preferred options involve using mechanical vibrated (MV) anchor piles for anchoring and implementing a rip-rap system for scour protection. Four disposal methodologies have been considered for the disposal of dredge material; offshore disposal at the existing authorised disposal site has been identified as the preferred option, as there are no significant impacts associated with using the alternative.

Baseline Assessment

The necessary Specialist studies have been conducted to assess the impacts of the proposed project. The baseline conditions of the project area encompass various physical, hydrological, biological, socio-economic, and archaeological aspects. The key findings of the Specialist baseline studies can be summarised as follows:

<u>Physical Environment:</u>

The physical environment is characterized by a warm maritime climate with hot, humid summers and cooler, drier winters, with mean annual temperatures ranging from 10°C to 25°C and annual rainfall varying from 500 mm to over 2 000 mm. The prevailing winds are from the south-southwest and north-northeast, strongest in spring and summer. The topography has been modified through dredging and reclamation, resulting in a relatively flat area with an elevation of about 5 meters above sea level. Metal concentrations in the sediment are below the sediment quality guidelines used by the DFFE to decide if sediment identified for dredging in South African ports is suitable for open water disposal. The toxicity testing of elutriates prepared from sediment sampled in the proposed dredging footprint also suggests that toxicity to pelagic organisms is not anticipated when the dredged material is disposed of at the open water dredged material disposal site off Durban.

Water quality near the dredging and construction footprint for the proposed upgrade and deepening of Maydon Wharf Berths 5 - 11 & 15 is periodically impaired. A considerable component of the impairment reflects contaminants and other matter introduced to the port by rivers that flow into the Silt Canal and then go on to affect the upper part of the Bay, and via stormwater flows from surrounding urban areas. Surface water near the dredging and construction footprint has rarely been identified as toxic to sea urchin embryos and larvae, but when toxicity was evident, it was usually classified as slight, apart from near Berth 15 in Congella Basin, where toxicity was evident more often and to a

slightly greater magnitude. The existing water quality does not thus present a significant impediment to dredging and construction activities for the proposed project.

Biological Environment:

The pre-development biological environment included diverse habitats such as intertidal mud and sandflats, mangrove forests, seagrass beds, and freshwater wetlands. Some of these characteristics have been lost entirely. Despite the transformation, the Bay remains ecologically important at local, regional, and national levels. The following biological key characteristics that remain are noted:

- The only significant macroalgal presence is *Ulva* spp that manages to grow at and slightly below the water line on navigation markers in Maydon Channel and Esplanade Channel;
- Mangroves are a prominent part of the primary producer community in Durban Bay. The types of mangroves present include white (*Avicennia marina*), black (*Bruguiera gymnorhiza*), and red (*Rhizophora mucronata*) mangroves, with red mangroves being less common. The current mangrove population is only about 3% of its original extent before development. The largest remaining area of mangroves is at the Natural Heritage Site in the Bayhead area;
- The macrocrustaceans (prawns and crabs) of Durban Bay, though diverse, appear to be much lower in abundance than previously reported. The decline was probably associated with habitat loss and the loss of the once extensive seagrass beds in the Bay;
- With regards to fish species, they have a far greater dependency on the sandbanks and mudflats than on deepwater channels in Durban Bay; however, it appears to be important as an area holding breeding stock of at least some strongly estuarine-dependent marine fishes, with some recorded as Endangered;
- The Central and Bayhead Sandbanks are identified as priority conservation areas for waterbirds based on diversity and abundance; and
- A particularly important habitat on the sandbanks that could potentially be impacted by the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 is the so-called Little Lagoon (Figure 1), a shallow permanently inundated area between the Central and Bayhead Sandbanks.

Socio-economic Environment:

The Maydon Wharf precinct plays a crucial role within the broader operations of the PoD, given its strategic handling of diverse cargo types such as break bulk, dry bulk and multipurpose goods. This makes it a cornerstone of Durban's logistics and trade infrastructure. Its ability to process significant volumes of cargo efficiently directly supports the economic vitality of the eThekwini Municipality, KwaZulu-Natal Province, and South Africa on a national level. The Maydon Wharf precinct's strategic role within the PoD amplifies its influence on the local and regional economy. Its operations are integral to the economic vitality of eThekwini and KwaZulu-Natal, with ripple effects that benefit the national economy. Investments in improving Maydon Wharf's infrastructure and operational efficiency are therefore not only beneficial to the precinct but also pivotal to sustaining the economic growth of the eThekwini and KwaZulu-Natal at large.

Archaeological and Cultural Heritage:

The probability of significant heritage resources being present in the area of interest is low. Historical harbour works, specifically berths, are present. As most of these are over 60 years old, they automatically fall under the protection of the National Heritage Resources Act, 1999 (Act 25 of 1999). Nevertheless, the oldest berth, Berth 15, was constructed in 1923 and Berth 8 as recently as 1985.

The majority of the other berths date to the 1960s. No indication has been found that these structures are in any way unique or have special historical, technological, or aesthetic value.

Two other types of maritime archaeological sites that may potentially be present in the area are anchorage debris and shipwrecks. Nevertheless, no direct indications have been found that such sites are indeed present in the Maydon Wharf precinct. The possibility remains, however, that such resources may be encountered during future development activities.

Impact Assessment

The environmental impact assessment identified several potential impacts associated with the project. The following key potential negative impacts have been identified for the proposed project:

- Impacts to geological resources and processes (construction and operational phase) (pre-mitigation = **medium**, post-mitigation = **medium**). The proposed project will involve dredging that will permanently remove up to 395 000 m^3 of sediment and reclaim around 3 180 m^2 of sediment area in Maydon Channel and Congella Basin. Although the sediment has no commercial value, it holds ecological importance. The following mitigation measures are recommended:
  - The new berth footprints should be restricted to the planned footprints.
  - Dredging should be restricted to the approved dredging footprint to the extent possible.
  - Dredging outside the approved footprint should occur only if this is unavoidable (e.g. vessel navigation safety reasons, to remove unexpected solid objects). In the event dredging outside the approved dredging footprint is required, the dredging should proceed only after approval from TNPA.
- Impacts due to underwater and above-water noise disturbance (construction phase) (pre-mitigation = **high**, post-mitigation = **medium**). The noise will arise mainly from percussive piling. This impact will affect water birds. The following key mitigation measures have been recommended:
  - Insofar as conditions allow, vibratory piling should be used in preference to percussive (impact) piling;
  - A pre-piling monitoring survey to establish if marine mammals are in the area near the piling activity should be performed for 15 minutes;
  - As far as possible, conduct any above-water maintenance that requires vessels to move closer to the Centre Bank than they would during normal shipping operations, in winter when migrant waders are absent;
  - A Waste Management Plan should be developed by the construction contractor, inclusive of different waste streams;
  - No dredging operations should be conducted between sunset and sunrise within 100 m of Centre Bank intertidal-sand flats; and
  - As far as possible, conduct any above-water maintenance that requires vessels to move closer to the Centre Bank than they would during normal shipping operations, in winter when migrant waders are absent.
- Loss of non-hazardous solid waste into Durban Bay from landside construction, if waste control and management practices are poor during the construction phase (pre-mitigation = **high**, post-mitigation = **medium**). The source of the waste could be non-biodegradable plastic and cord, which is particularly problematic. Marine mammals, sea turtles, and fish can be affected as they mistake this waste for food. The following key mitigation measures have been recommended:

- A Waste Management Plan should be developed by the construction contractor.
- The construction contractor must provide compulsory environmental awareness training for the construction workforce. The training must sensitise the workforce to the adverse environmental consequences of non-hazardous solid waste (especially plastic) on estuarine and marine environments and the consequent need to limit the ingress of such waste into Durban Bay. Environmental awareness training should be ongoing throughout the life of the project.
- A reduce, reuse, recycle waste philosophy should be followed.
- The intentional disposal of non-hazardous solid waste (indeed any waste) into Durban Bay is prohibited.

- Loss of benthic biological resources in the dredging footprint (construction phase) (pre-mitigation = **medium**, post-mitigation = **low**). The removal, disturbance, and injury of benthic biological resources is an unavoidable consequence of dredging and construction operations in aquatic ecosystems. Dredging usually leads to a marked decline in the species diversity, abundance, and biomass of benthic biological resources in the dredging footprint. The following key mitigation measures have been recommended:

  - Dredging for each berth should be completed within the shortest timeframe possible to limit the period over which benthic biological resources might be removed, disturbed, and injured by dredging operations, and to encourage recolonisation in the shortest timeframe possible.
  - The dredging footprint should be restricted to the smallest area possible (i.e. do not over-dredge) to limit impacts to benthic biological resources.

The following key potential construction phase positive impacts associated with the proposed project are rated **medium** without mitigation and **very high** - **high** after mitigation:

- Temporary stimulation of the regional and local economy; and
- Temporary employment creation.

The following enhancement measures for the positive impacts are recommended:

- Prioritising local procurement, supporting local workforce development and encouraging Small and Medium Enterprises (SMEs). This will ensure that more individuals from the local communities benefit from the project, while also enhancing long-term employability.
- Establish and enforce local hiring policies, introduce skills development programs and support indirect employment opportunities.

Public Participation Process

A public participation process will be conducted in accordance with the NEMA EIA Regulations (GNR 326) (as amended). This process will involve notifying Interested and Affected Parties (I&APs) through email, newspaper advertisements, site notices and SMS. I&APs will be provided with an opportunity to review the draft BAR and provide comments. The feedback received during this process will be incorporated into the final BAR. The draft BAR will be made available to I&APs from **17 April 2025** to **22 May 2025** at the following public places:

- Online on the WSP website: (https://www.wsp.com/en-ZA/services/public-documents);
- Durban Central Library; and
- Grosvenor Library.

Aspects for inclusion as conditions in the EA

The following key aspects, as a summary, are recommended to be included as conditions of authorisation:

- The final EMPr must form part of all contractual documents with contractors during the construction and operational phases of the project. Furthermore, a dedicated Environmental Control Officer (ECO) must be appointed to ensure compliance with all EA conditions and EMPr commitments throughout the construction phase, with monthly/two-monthly inspections and reporting to DFFE;
- Appropriate reporting must be submitted to Amafa as per Permit Ref: Ref No. SAH23/22240 & 23/507, issued on 18 April 2024.
- An environmental monitoring programme is recommended; the programme must be responsive and adaptive to address environmental conditions as they change.
- Turbidity limits should be defined from the most up-to-date turbidity and suspended sediment measurements available for the upgrade area at the time construction and dredging operations proceed.
- Continuous monitoring should be undertaken of turbidity levels during the dredge operations.
- The Traffic Management Plan (TMP) must be implemented and monitored.

Reasoned opinion as to whether the proposed activity should or should not be authorised

Provided that all the environmental management measures described in this draft BAR and EMPr are applied diligently, it is expected that the proposed development will not result in any environmental impacts that cannot be mitigated to acceptable levels.

No fatal flaws were found in the project, and with proper implementation of mitigation measures, the impacts are expected to be **medium** to **low**. The construction of the proposed project is expected to last for approximately 10 years, with a request for EA to remain in effect for at least 30 years due to the long-term nature of port infrastructure and operations. Maintenance activities will follow the established Maintenance Management Plan (MMP), which should be integrated into the EA for long-term efficiency and sustainability.

Conclusion

The proposed upgrade and deepening of Maydon Wharf Berths 5 - 11 & 15 is essential for enhancing the port's capacity and efficiency. The project will contribute to economic growth, job creation, and sustainable maritime practices. The EIA has identified potential impacts and proposed mitigation measures to minimise these effects. The public participation process will ensure transparency and consultative engagement, and the project aligns with various governance frameworks and development policies. Overall, the project is deemed beneficial for long-term community development and economic growth, with required environmental safeguards recommended to mitigate negative impacts.

1 INTRODUCTION

WSP Group Africa (Pty) Ltd (WSP) was appointed by Transnet National Ports Authority (TNPA) to undertake an application for environmental authorisation (EA) under the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) (as amended), for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 in the Port of Durban (PoD), in the eThekwini Municipality, KwaZulu-Natal (KZN) (hereafter referred to as the "proposed project") (see **Figure 1-1**).

The application for EA must be supported by a Basic Assessment (BA) process in terms of the EIA Regulations, Gazette Notice Regulation (GNR) 326, 2014 (as amended). The competent authority (CA) for the EA application is the Department of Forestry, Fisheries and the Environment (DFFE).

1.1 PURPOSE OF THIS REPORT

This report outlines the BA process that has been followed to assess the potential negative and positive impacts of the proposed project. The BA process is an interdisciplinary procedure to ensure that environmental and social considerations are included in decisions regarding projects. Simply defined, the process aims to identify the possible environmental and social effects of a proposed activity and how those impacts can be mitigated. This report seeks to provide the CA with sufficient information to make an informed decision on the granting or refusing the EA applied for.

1.2 PROJECT OVERVIEW

The Maydon Wharf precinct in the PoD serves as a multipurpose terminal, primarily handling dry bulk, break-bulk, and liquid bulk cargo. The precinct has a total of 15 berths.

Many of the current berths are older than 50 years and are too shallow to accommodate larger vessels. Maydon Wharf's Berths 1-4 &12-14 have been upgraded already, with construction completed in 2021. This next phase of berth upgrades will align the remaining older berths with the newer berth construction and design standards and specifications.

The purpose of the proposed project will be to upgrade the remaining berths, one at a time, to be able to accommodate larger vessels. The berths' existing infrastructure will be upgraded, and the berthing pockets of the berths will be deepened through capital dredging.

Two aspects of this project require EA, i.e., the quay wall upgrade and the associated capital dredging of the berth pockets. The quay walls and platform will be upgraded by demolishing the existing structures, followed by installing new sheet piles and constructing new concrete slabs. The berth pockets will be dredged up to -14.5 mCD (Chart Datum); approximately 4.5 m deeper than the current port floor depth between -10 to -12 mCD. Dredging will extend over an area of approximately 50 meters from the quayside structure. The dredged material that is removed for the proposed project will be disposed of at the existing, authorised dredging dump site located at sea.

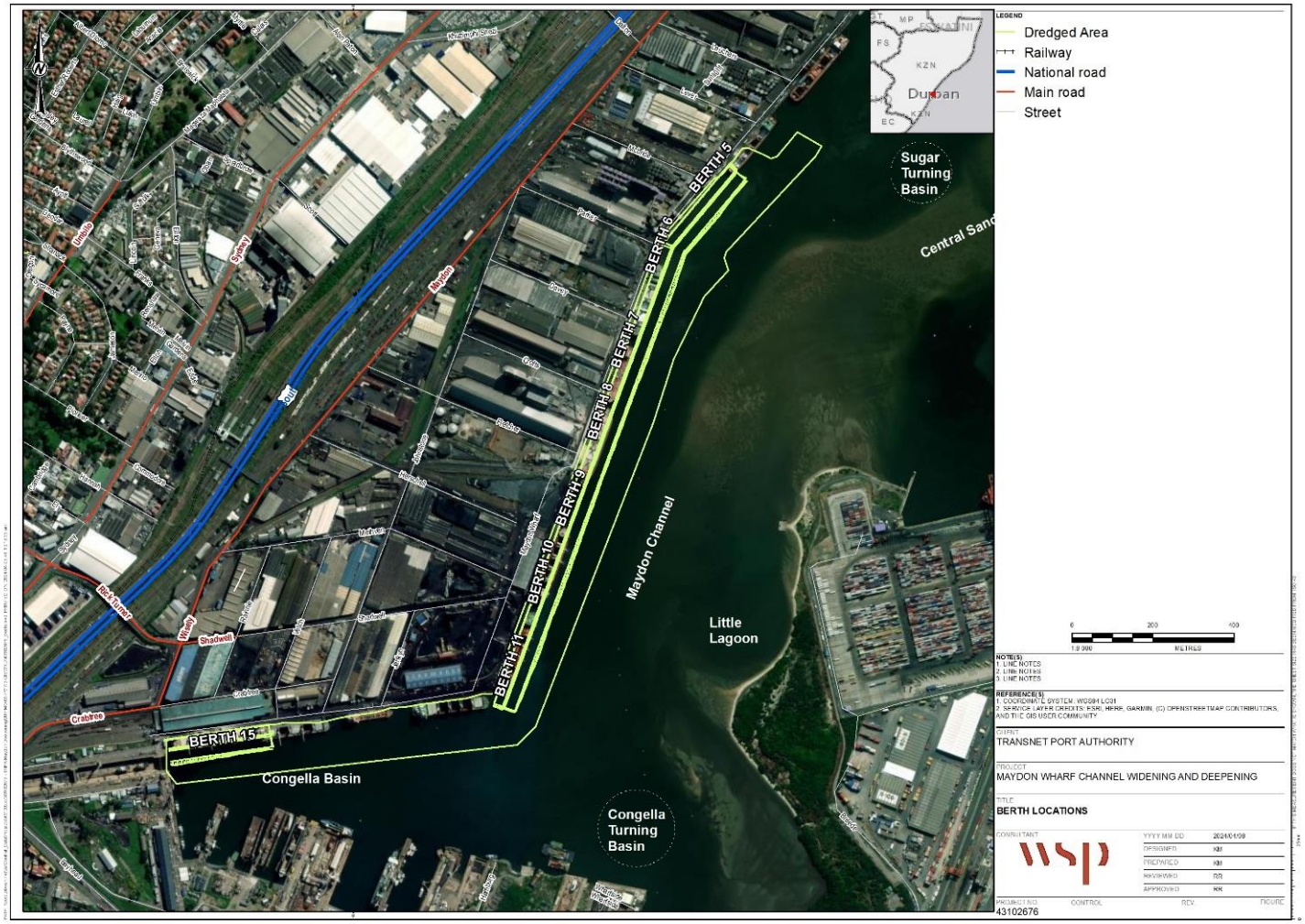

Figure 1-1 - Locality of the proposed Upgrade and Deepening of the Maydon Wharf Berths 5-11&15 Project

1.3 DETAILS OF KEY ROLE PLAYERS

1.3.1 PROJECT PROPONENT

TNPA is the project proponent (Applicant) for this EA application in respect of the proposed project. **Table 1-1** provides the relevant details of the project proponent.

Table 1-1 – Details of the Project Proponent

Proponent	TNPA
Contact Person:	Nosicelo Biyana
Postal Address	P.O. Box 1027, Durban
Telephone:	067 367 0110
Email:	Nosicelo.Biyana@transnet.net

1.3.2 COMPETENT AUTHORITY

The competent authority for the EA application is the DFFE: Regulatory Compliance and Monitoring. A pre-application meeting was held on 19 September 2024 with the DFFE to discuss the project details, legislative requirements and public participation plan.

1.3.3 COMMENTING AUTHORITIES

The commenting authorities for the project include:

- DFFE: Oceans & Coast Unit;
- KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA);
- Ezemvelo KZN Wildlife;
- KZN Amafa[1] (the Provincial Heritage Resources Authority (PHRA) for KZN);
- KZN Department of Water and Sanitation;
- KZN Department of Transport;
- KZN Department of Employment and Labour; and
- eThekwini Municipality: Biodiversity Unit.

Refer to the Public Participation Report in **0** for a full list of commenting authorities.

1.3.4 ENVIRONMENTAL ASSESSMENT PRACTITIONER

WSP has been appointed as the Independent Environmental Assessment Practitioner (EAP) to undertake the BA process for the proposed project. The details of the EAP are available in **Table 1-2**. The CV of the EAP and EAP's declaration of interest and undertaking are included in **0**.

[1] Heritage KwaZulu-Natal in isiZulu

Table 1-2 – Details of the EAP

EAP	WSP Group Africa (Pty) Ltd
Contact Person	Rob Rowles
Physical Address:	1st Floor, Pharos House, 70 Buckingham Terrace, Westville, 3629, South Africa
Postal Address:	As above
Telephone:	031 240 8832
Email:	Rob.Rowles@wsp.com
EAP Qualifications:	MSc Environmental Management
EAPASA Registration Number:	EAPASA (2022/5395)

Statement of Independence

Neither WSP nor any of the authors of this report have any material present or contingent interest in the outcome of this report, nor do they have any business, financial, personal or other interest that could be reasonably regarded as being capable of affecting their independence. WSP has no beneficial interest in the outcome of the assessment.

1.3.5 SPECIALISTS

Specialist input was required in support of this EA application. The details of the Specialists are provided in **Table 1-3** below. The Specialists' study reports are attached in **0**.

Table 1-3 – Details of Specialists

Assessment	Name of Specialist	Company	Draft BAR Appendix Reference
Assessment of Sediment Quality in Durban Bay	Brent Newman	CSIR	**0**
Estuarine Ecology Impact Assessment	Brent Newman	CSIR	**0**
Socio-Economic Assessment	Tinotenda Makoni	Urban-Econ	**0**
Maritime Archaeological Impact Assessment	Dr. Bruno Werz	Umtshuzi Archaeology Consultancy & Culture Tours c.c.	**0**
Traffic Management Plan	Christo Bredenhann	WSP	**0**

1.4 BASIC ASSESSMENT REPORT STRUCTURE

Appendix 1 of the EIA Regulations (GNR 326) (as amended) identifies the legislated requirements that must be contained within a BA report (BAR) for the CA to consider and arrive at a decision on the application. **Table 1-4** below details where the required information is located within the draft BAR.

Table 1-4 - Legal Requirements as detailed in Appendix 1 of the EIA Regulations (GNR 326) (as amended)

Appendix 1 of GNR 326	Description	Relevant Report Section
3(1) (a)	Details of the EAP who prepared the report and the expertise of the EAP, including a curriculum vitae	Section 1.3.4 and 0
3(1) (b)	The location of the activity	Section 3.1
3(1) (c)	A plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale	Section 3.1 and Section 3.3
3(1) (d)	A description of the scope of the proposed activity	Section 3.3 and Section 3.6
3(1) (e)	A description of the policy and legislative context within which the development is proposed	Section 5
3(1) (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location	Section 3.7
3(1) (g)	A motivation for the preferred site, activity and technology alternative	Section 3.7
3(1) (h)	A full description of the process followed to reach the proposed alternative within the site	Section 4
3(1) (i)	A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity	Section 4
3(1) (j)	An assessment of each identified potentially significant impact and risk	Section 8
3(1) (k)	Where applicable, a summary of the findings and impact management measures identified in any Specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report	Section 8 and 0
3(1) (l)	An environmental impact statement	Section 10
3(1) (m)	Based on the assessment, and where applicable, impact management measures from Specialist reports, the recording of the proposed impact management objectives, and the impact	Section 10.3

Appendix 1 of GNR 326	Description	Relevant Report Section
	management outcomes for the development for inclusion in the Environmental Management Programme (EMPr).	
3(1) (n)	Any aspects which were conditional to the findings of the assessment either by the EAP or Specialist which are to be included as conditions of authorisation.	Section 10.3
3(1) (o)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed	Section 2.7
3(1) (p)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation	Section 10
3(1) (q)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be conducted, and the post-construction monitoring requirements finalised	Section 10
3(1) (r)	An undertaking under oath or affirmation by the EAP	0
3(1) (s)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts	N/A
3(1) (t)	Any specific information that may be required by the competent authority	N/A
3(1) (u)	Any other matters required in terms of section 24(4)(a) and (b) of the Act	N/A

2 BASIC ASSESSMENT PROCESS

2.1 BASIC ASSESSMENT TERMS OF REFERENCE

According to the EIA Regulations, 2014 (as amended), the proposed project must be subjected to a BA process as it triggers activities contained in Listing Notice 1 (GNR 327) (as amended).

As defined in Appendix 1 of the EIA Regulations, 2014 (GNR 326) (as amended), the objective of the BA process is to, through a consultative process:

- Determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- Identify the alternatives considered, including the activity, location, and technology alternatives;
- Describe the need and desirability of the proposed alternatives;
- Through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic,

heritage, and cultural sensitivity of the sites and locations within sites and the risk of the impact of the proposed activity and technology alternatives on these aspects to determine:

- (i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
- (ii) the degree to which these impacts—
  - (aa) can be reversed;
  - (bb) may cause irreplaceable loss of resources; and
  - (cc) can be avoided, managed or mitigated; and

- Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to:
  - (i) identify and motivate a preferred site, activity and technology alternative;
  - (ii) identify suitable measures to avoid, manage or mitigate identified impacts; and
  - (iii) identify residual risks that need to be managed and monitored.

Public participation comprises a series of inclusive and culturally appropriate interactions aimed at providing Interested and Affected Parties (I&APs) with opportunities to express their views so that these can be considered and incorporated into the BA process. Effective public participation requires the prior disclosure of relevant and adequate project information to enable I&APs to understand the risks, impacts, and opportunities of the proposed project.

The objectives of the public participation process can be summarised as follows:

- Identify relevant individuals, organisations and communities who may be interested in or affected by the proposed project;
- Clearly outline the scope of the proposed project, including the scale and nature of the existing and proposed activities;
- Identify viable project alternatives that will assist the relevant authorities in making an informed decision;
- Identify shortcomings and gaps in existing information;
- Identify key concerns, raised by I&APs that should be addressed in the Specialist studies;
- Highlight the potential for environmental impacts, whether positive or negative; and
- To inform and provide the public with information and an understanding of the proposed project, issues and solutions.

2.2 ENVIRONMENTAL SCREENING

Environmental screening is a process involving the determination of whether or not an individual proposal (project, programme, policy, etc.) requires further environmental assessment, and if so, what level of detail this assessment should entail (Sadler, 1996, in: DEAT, 2002).

DFFE has developed the National Web-based Environmental Screening Tool to flag areas of potential environmental sensitivity related to a site as well as a development footprint and produces the screening report required in terms of Regulation 16 (1)(v) of the EIA Regulations, 2014 (GNR 326) (as

amended). The submission of a report generated from the National Web-based Environmental Screening Tool is compulsory[2] when applying for an EA.

The screening report generated by the National Web-based Environmental Screening Tool contains a summary of any development incentives, restrictions, exclusions or prohibitions that apply to the proposed development footprint as well as the most environmentally sensitive features on the footprint based on the footprint sensitivity screening results for the application classification that was selected.

A screening report for the proposed project was generated and is attached as **0**. The screening report for the project identified various sensitivities for the site. The report also generated a list of Specialist assessments that should form part of the BA Process based on the development type and the environmental sensitivity of the site. The assessment protocols in the report provide the minimum information to be included in a specialist report to facilitate decision-making.

Table 2-1 below provides a summary of the sensitivities identified for the development footprint by the screening tool.

Table 2-1 – Sensitivities identified in the DFFE screening report

Theme	Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity
Agriculture Theme		X		
Animal Species Theme		X		
Aquatic Biodiversity Theme	X			
Archaeological and Cultural Heritage Theme	X			
Civil Aviation Theme		X		
Defence Theme			X	
Palaeontology Theme			X	
Plant Species Theme			X	
Terrestrial Biodiversity Theme	X			

Based on the selected classification and the environmental sensitivities of the proposed development footprint, the following list of specialist assessments has been identified for inclusion in the assessment report, as determined by the screening tool:

- Landscape / Visual Impact Assessment;
- Archaeological and Cultural Heritage Assessment;

[2] In terms of *The Notice of the requirement to submit a report generated by the national web-based environmental screening tool in terms of section 24(5)(h) of the NEMA, 1998 (Act No 107 of 1998) and regulation 16(1)(b)(v) of the EIA regulations, 2014, as amended (GN 960 of July 2019)*

- Palaeontology Impact Assessment;
- Terrestrial Biodiversity Impact Assessment;
- Aquatic Biodiversity Impact Assessment;
- Marine Impact Assessment;
- Hydrology Impact Assessment;
- Socio-Economic Assessment;
- Plant Species Assessment; and
- Animal Species Assessment.

2.2.1 MOTIVATION FOR SPECIALIST STUDIES

The screening report recognises that "*it is the responsibility of the EAP to confirm this list and to motivate in the assessment report, the reason for not including any of the identified Specialist studies, including the provision of photographic evidence of the footprint situation*."

The Specialist studies required for the proposed project, as identified by the DFFE Screening Tool, are included in **Table 2-2**. The table also identifies the Specialist studies commissioned and the motivation for Specialist studies not commissioned.

Table 2-2 - Specialist Studies identified by the DFFE Screening Tool

Specialist Study Identified	Specialist Study Commissioned	Motivation for Specialist Studies Not Commissioned
Landscape/Visual Impact Assessment	No	The landscape and visual environment will not be altered with this project. This does not require further assessment.
Archaeological and Cultural Heritage Impact Assessment	Yes	Some of the berths are older than 60 years of age and others will be 60 years when the construction phase associated with the proposed project commences. Since infrastructure associated with the existing berths will be demolished as part of the proposed upgrade to the berths, an application for a permit in terms of Section 37 of the KZN Amafa and Research Institute Act, 2018 (Act 5 of 2018) was submitted to the KZN Amafa and Research Institute. The application was supported by a maritime and archaeological impact assessment for the proposed upgrade and deepening of the Maydon Wharf Berths 5 – 11 & 15 (Bruno, 2023) (see 0). Permit with Ref. No. SAH23/22240&23/507 was issued to TNPA; see 0.
Palaeontological Impact Assessment	No	The Palaeontological Theme is rated Medium in terms of the Screening Tool; also, palaeontological resources are unlikely to be at risk with this project. A Palaeontological Impact Assessment was therefore not commissioned.
Terrestrial Biodiversity Impact Assessment	No	The proposed project is situated in a highly disturbed and hard-standing area, surrounded by other industrial harbour activities and with limited to no potential of sustaining a healthy indigenous terrestrial habitat or ecology.

Specialist Study Identified	Specialist Study Commissioned	Motivation for Specialist Studies Not Commissioned
		However, this aspect will be partly addressed in the Estuarine Ecology Specialist Study (see 0). A Specialist statement/ opinion is provided in the BAR; see Section 10.2.1.
Avifauna Impact Assessment	Yes	This aspect is addressed in the Estuarine Ecology Specialist Study (see 0).
Aquatic Biodiversity Compliance Statement	Yes	This aspect is addressed in the Estuarine Ecology Specialist Study (see 0).
Marine Impact Assessment	Yes	This aspect is addressed in the Estuarine Ecology Specialist Study (see 0).
Hydrology Assessment	No	The hydrological environment will not be changed. This does not require further assessment. Stormwater management has been incorporated into the design of the proposed project.
Plant Species	No	The proposed project is situated in a highly disturbed and hard-standing area, surrounded by other industrial harbour activities and with limited to no potential of sustaining a healthy indigenous terrestrial habitat or ecology. Therefore, there will be no plant species impacted by this development. This does not require further assessment.
Socio-Economic Assessment	Yes	This aspect has been addressed in the Socio-Economic Assessment (see 0).

Since the proposed project has the potential to impact on traffic conditions in and around the PoD, a traffic impact assessment, as recommended by the EAP, was conducted, in addition to the studies listed above.

The above Specialist studies commissioned were presented to the DFFE during the pre-application meeting that was held on 19 September 2024.

The assessment protocols followed, as well as the site sensitivity verification undertaken by the EAP, are detailed in Section 7 of this report.

2.3 APPLICATION FOR ENVIRONMENTAL AUTHORISATION

A pre-application consultation meeting was held with the DFFE on 19 September 2024, to discuss the project details, legislative requirements and public participation plan. Subsequently, the appropriate EA application form was completed and submitted to the DFFE. The DFFE acknowledged acceptance of the application and issued Reference No. 14/12/16/3/3/1/3125 to the application.

2.4 BASELINE ENVIRONMENTAL ASSESSMENT

The description of the environmental attributes of the project area was compiled through a combination of desktop reviews, Specialist inputs and site investigations. Desktop reviews made use of available information, including existing reports, aerial imagery, and mapping.

2.5 IMPACT ASSESSMENT METHODOLOGY

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project and to propose a significance ranking. Issues/aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct[3], indirect[4], secondary[5] as well as cumulative[6] impacts. The impact assessment methodology that is adapted by WSP for the BAR is described below.

2.5.1 WSP IMPACT ASSESSMENT METHODOLOGY

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre- and post-mitigation (i.e., residual impact). The significance of environmental aspects is determined and ranked by considering the criteria[7] presented in **Table 2-3.**

Table 2-3 – Impact Assessment Criterion and Scoring System

Criteria	Score 1	Score 2	Score 3	Score 4	Score 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E)	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries

[3] Impacts that arise directly from activities that form an integral part of the project.
[4] Impacts that arise indirectly from activities not explicitly forming part of the project.
[5] Secondary or induced impacts caused by a change in the project environment.
[6] Impacts are those impacts arising from the combination of multiple impacts from existing projects, the project and/or future projects.
[7] The definitions given are for guidance only, and not all the definitions will apply to all the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.

Criteria	Score 1	Score 2	Score 3	Score 4	Score 5
The geographical extent of the impact on a given environmental receptor					
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				
Impact Significance Rating					
Total Score	**4 to 15**	**16 to 30**	**31 to 60**	**61 to 80**	**81 to 100**
Environmental Significance Rating (Negative (-))	**Very low**	**Low**	**Moderate**	**High**	**Very High**
Environmental Significance Rating (Positive (+))	**Very low**	**Low**	**Moderate**	**High**	**Very High**

2.5.2 IMPACT MITIGATION

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed development's actual extent of impact and are included to facilitate an understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during Project implementation to verify that actual impacts are the same as those predicted in this report.

The mitigation measures chosen are based on the mitigation sequence/hierarchy, which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The idea is that when project impacts are considered, the first option

should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. If this is not attainable, the impacts can be allowed, however, they must be minimised as far as possible by considering reducing the footprint of the development, for example so that little damage is encountered. If impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail to remedy high/significant residual negative impacts. If no offsets can be achieved on a potential impact, which results in full destruction of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan.

The mitigation sequence/hierarchy is shown in **Figure 2-1** below.

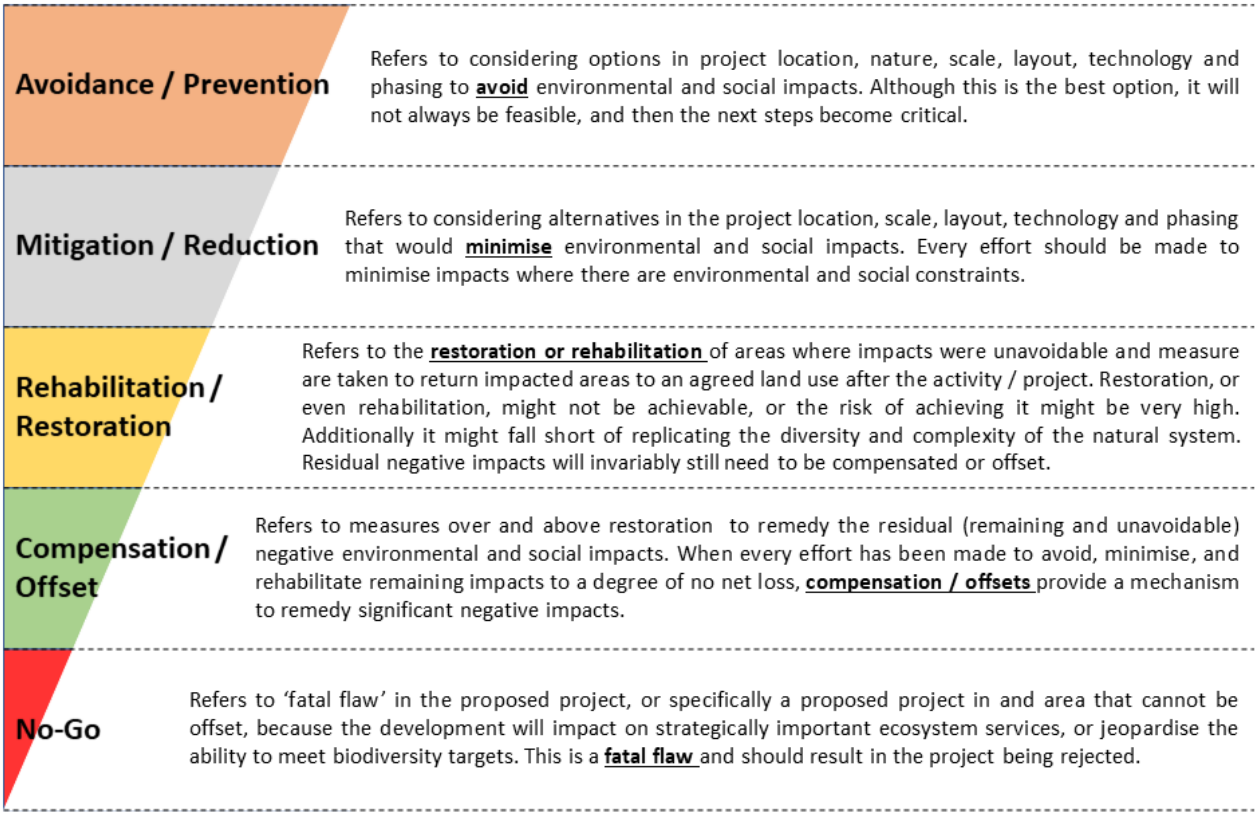

Figure 2-1 - Mitigation Sequence/Hierarchy

2.6 PUBLIC PARTICIPATION PROCESS

2.6.1 APPROACH TO PUBLIC PARTICIPATION

The approach to public participation is based on the following principles:

- Undertaking meaningful and timely participation with I&APs;
- Focus on important issues during the process;
- Undertake due consideration of alternatives;
- Take accountability for information used;
- Encourage co-regulation, shared responsibility and a sense of ownership over the proposed project lifecycle;

- Apply “due process”, particularly concerning public participation as provided for in the EIA Regulations, 2014 (GNR 326) (as amended); and
- Consider the needs, interests and values of I&APs.

The public participation guideline, drafted by the Department of Environmental Affairs (DEA) (now DFFE) in 2017, tabulates the level of public participation required for various levels of anticipated project impacts. This table has been used to determine the approach to be taken for the public participation process (PPP) for the proposed project. Highlighted cells (red) indicate the applicable response to the anticipated impacts. The results of the process are shown in **Table 2-4**.

Table 2-4 – Level of Public Participation as per Public Participation Guideline (DEA, 2017)

Scale of Anticipated Impacts	Recommended Response	
	If “Yes”	If “No”
Are the impacts of the project likely to extend beyond the boundaries of the local municipality?	Formal consultation with other affected municipalities should be carried out during the PPP.	No need to have a formal consultation with other municipalities during PPP. Minimum requirements for public participation in accordance with EIA must be met.
Are the impacts of the project likely to extend beyond the boundaries of the province?	Formal consultation with other affected provinces should be carried out during the PPP.	No need to have a formal consultation with other provinces during PPP. Minimum requirements for public participation in accordance with EIA must be met.
Is the project a greenfield development (a new development in a previously undisturbed area)?	Extensive consultation with Registered Interested and Affected Parties (RI&APs) might be required before a decision is taken on the project in order to gather more information and to ensure that there is minimal impact on the environment.	Minimum requirements for public participation in accordance with EIA Regulations must be met.
Does the area already suffer from socio-economic problems (e.g. job losses) or environmental problems (e.g. pollution), and is the project likely to exacerbate these?	Extensive consultation with RI&APs within the area should be undertaken, to gather more information on both the socio-economic and environmental problems.	Minimum requirements for public participation in accordance with EIA Regulations must be met.
Is the project expected to have a wide variety of impacts (e.g. socio-economic and ecological)?	Thorough consultation needs to be conducted with RI&APs, in order to address variety of impacts.	Minimum requirements for public participation in accordance with EIA Regulations must be met.
Public and environmental sensitivity of the project:		
Are there widespread public concerns about the potential negative impacts of the project?	Broader consultation with all RI&APs will need to be undertaken.	Minimum requirements for public participation in accordance with EIA Regulations must be met.
Is there a high degree of conflict among RI&APs?	There might need to be more consultation to ensure that there is consensus reached among RI&APs.	Minimum requirements for public participation in accordance with EIA Regulations must be met.

Scale of Anticipated Impacts	Recommended Response	
	If "Yes"	If "No"
Will the project impact on private land other than that of the applicant?	Consultation with the private landowner must be done, and all their concerns need to be addressed.	Minimum requirements for public participation in accordance with EIA Regulations must be met.
Does the project have the potential to create unrealistic expectations (e.g. that a new factory would create a large number of jobs)?	Thorough consultation that addresses the perceptions of unrealistic expectations needs to be carried out.	Minimum requirements for public participation in accordance with EIA Regulations must be met.
Potentially affected parties:		
Has very little previous public participation taken place in the area?	More thorough public participation should take place within the area, to ensure that all potential and RI&APs participate.	Minimum requirements for public participation in accordance with EIA Regulations must be met.
Did previous public participation processes in the area result in conflict?	Additional consultation might be needed to ensure that issues of conflict are addressed effectively.	Minimum requirements for public participation in accordance with EIA Regulations must be met.
Are there existing organisational structures (e.g. local forums) that can represent I&APs?	Organizational structures might minimise conflict whilst maximising the participation.	Minimum requirements for public participation in accordance with EIA Regulations must be met.
Is the area characterised by high social diversity (i.t.o. socio-economic status, language or culture)	Proper consultations that address language and cultural diversity should be promoted.	Minimum requirements for public participation in accordance with EIA Regulations must be met.
Were people in the area victims of unfair expropriations or relocation in the past?	PPP should be extensive and address any unfair practices that occurred in the past.	Minimum requirements for public participation in accordance with EIA Regulations must be met.
Is there a high level of unemployment in the area?	The PPP should ensure that there are no unrealistic expectations created due to the project. The consultation should ensure that any unrealistic expectations are adequately addressed before the project starts.	Minimum requirements for public participation in accordance with EIA Regulations must be met.
Do the RI&APs have special needs (e.g. a lack of skills to read or write, disability, etc)?	Consultation should include mechanisms that will ensure full participation by people with special needs.	Minimum requirements for public participation in accordance with EIA Regulations must be met. Minimum requirements for PP in accordance with the Act must be met as well as best practices relating to PP.

2.6.2 WHAT IS AN INTERESTED AND AFFECTED PARTY

An I&AP is defined as any person, group of persons or organisation(s) interested in or affected by an activity, and any organ of the state that may have jurisdiction over any aspect of the activity.

The difference between an I&AP and a registered I&AP:

- An I&AP can be directly or indirectly impacted by a proposed activity.

- A registered I&AP is a person whose name has been placed on the register of registered I&APs. According to the DEA (2017), only registered I&APs will be notified:
  - Of the availability of reports and other written submissions made to the CA by the Applicant; and
  - Of the outcome of the application, the reasons for the decision, and that an appeal may be lodged against a decision.

2.6.3 RIGHTS, ROLES AND RESPONSIBILITIES OF I&APS

In terms of Chapter 6, specifically, Section 43(1) of the EIA Regulations, 2014 (GNR 326) (as amended), registered I&APs have the right to bring to the attention of the CA any issues that they believe may be of significance to the consideration of the application. The rights of I&APs are qualified by certain obligations, namely:

- I&APs must ensure that their comments are submitted within the timeframes that have been approved by the DFFE, or within any extension of a timeframe agreed by the Applicant (TNPA), environmental assessment practitioner (EAP) (WSP), or the CA;
- Disclose to the EAP any direct business, financial, personal or other interest that they might have in the approval or refusal of the application;

The roles of I&APs in a public participation process usually include one or more of the following:

- Assisting in the identification and prioritisation of issues that need to be investigated;
- Making suggestions on alternatives and means of preventing, minimising and managing negative impacts and enhancing proposed project benefits;
- Assisting in or commenting on the development of mutually acceptable criteria for the evaluation of decision options;
- Contributing information on public needs, values and expectations;
- Contributing local and traditional knowledge; and
- Verifying that their issues have been considered.

In order to participate effectively, I&APs should:

- Become involved in the process as early as possible;
- Register as I&APs;
- Advise the EAP of other I&APs who should be consulted;
- Contribute towards the design of the public participation process (including timeframes) to ensure that it is acceptable to all I&APs;
- Follow the process once it has been concluded;
- Read the material provided and actively seek to understand the issues involved;
- Give timely responses to correspondence;
- Be respectful and courteous towards other I&APs;
- Refrain from making subjective, unfounded or ill-informed statements; and
- Recognise that the process is confined to issues that are directly relevant to the application.

2.6.4 PUBLIC PARTICIPATION PLAN

2.6.4.1 I&AP Identification

A preliminary list of I&APs was developed as per the requirements of the EIA Regulations (GNR 326) (as amended) (**Table 2-5**), utilising existing databases from TNPA and other project databases in the PoD area. Approximately 470 I&APs have been included in the I&AP database (**0**).

The EAP endeavoured to ensure that individuals/organisations from referrals and networking were notified of the proposed project. I&APs were identified at the horizontal (geographical) and vertical extent (organisation level).

Relevant authorities (organs of state) have been automatically registered as I&APs. In accordance with the EIA Regulations, 2014 (GNR 326) (as amended), all other persons must request in writing to be placed on the register, submit written comments or attend meetings in order to be registered as I&APs and included in future communication regarding the project.

The I&AP database for the proposed project will continue to be updated throughout the EA application process as follows:

- Networking with local business owners, non-governmental agencies, community-based organisations, and local council representatives;
- Advertising in the press;
- Placement of community notices;
- Capturing details of attendees to the focus group meeting (see Section 2.6.4.3 below); and
- Receiving completed registration and comment sheets from I&APs.

Table 2-5 – Interested and Affected Parties

NEMA Requirement	Discussion
(i) the owner or person in control of that land if the applicant is not the owner or person in control of the land	The proposed project is located on a portion of land owned by TNPA, who are the project applicant. TNPA has been included in the I&AP database. The land portions associated with the proposed project are: Portion 1 of Durban 10019; and Portion 203 of Durban 10004
(ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken	The proposed project will entail development within the existing premises owned by TNPA. The surrounding businesses have been included in the I&APs database and will continue to be informed through the BA process. Site notices will be placed at locations accessible to the public in and around the PoD. Adverts will be placed in English and isiZulu in the Mercury and Isolezwe Newspapers.
(iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken	
(iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area	Ward Councillors of Ward 32 (eThekwini Local Municipality; Albert Park) are included in the I&AP database.

NEMA Requirement	Discussion
(v) the municipality which has jurisdiction in the area	The eThekwini Local Municipality is included in the I&AP database.
(vi) any organ of state having jurisdiction in respect of any aspect of the activity	The organs of the state that have jurisdiction over the activity are DFFE and the eThekwini Municipality (Development Planning, Environment and Management Unit). The DFFE has been consulted as the CA regarding the EA application. These two organs of state will also be provided with written notification of the project via email and will be invited to attend a focus group meeting.
(vii) any other party as required by the competent authority.	All tiers of government, namely, national, provincial, local government and parastatals will be included in the I&AP database, including: ■ KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA) ■ DFFE: Regulatory Compliance; ■ DFFE: Oceans and Coast; ■ Ezemvelo KZN Wildlife; ■ KZN Amafa and Research Institute; ■ KZN Department of Water and Sanitation; ■ KZN Department of Transport; ■ KZN Department of Health; ■ KZN Department of Employment and Labour; and ■ eThekwini Municipality. For a comprehensive list of I&APs, please refer to Appendix A.

2.6.4.2 Protection of Personal Information

In terms of the Protection of Personal Information Act, 2013 (Act 04 of 2013) (POPIA), WSP will ensure the protection of I&APs' personal information. No contact information of I&APs will be shared in the public domain.

2.6.4.3 Notification Procedures

Direct Notification

Notification of the proposed project will be issued to I&APs on the database via emails and SMS. Proof of notification will be included in of the final BAR.

Newspaper Advertisements

Adverts will be placed in English and isiZulu in the Mercury and Isolezwe Newspapers. The purpose of the advertisement will be to notify the public about the proposed project and to invite them to register as I&APs.

Site Notices

Site notices in English and isiZulu will be placed in and around the PoD, at the locations included in **Table 2-6**.

Table 2-6 – Proposed site notice locations

No.	Address	Co-ordinates
1	Rotterdam Road	29°53'45.94"S; 31° 0'7.75"E
2	Bayhead Park	29°53'21.08"S; 30°59'42.48"E
3	Cnr Wisley Road and Shadwell Road	29°52'57.02"S; 30°59'44.28"E
4	Cnr Davey Road and Maydon Wharf Street	29°52'31.15"S, 31° 0'24.89"E
5	Cnr Maydon Road and Parker Road	29°52'20.33"S; 31° 0'15.57"E
6	Cnr Maydon Road and Leuchars Road	29°52'7.20"S; 31° 0'28.06"E

Focus Group Meeting

One online focus group meeting (FGM) will be held during the public review comment period. The following categories of I&APs will receive invitation letters via email to attend the FGM:

- Local government (i.e. local municipality);
- Commenting authorities;
- Interest groups / non-governmental organisations;
- Academia and research; and
- Port users / adjacent occupiers.

Public Review of the Draft BA Report

The draft BAR will be made available to I&APs at the following public places:

- Online on the WSP website: (https://www.wsp.com/en-ZA/services/public-documents);
- Durban Central Library; and
- Grosvenor Library.

2.6.4.4 Comment and Response Report

All concerns, comments, viewpoints and questions (collectively referred to as 'issues') will be documented and responded to adequately in a Comment and Response Report (CRR) to be included in the final BAR. The CRR records the following:

- List of all issues raised;
- Record of who raised the issues;
- Record of where the issues were raised;
- Record of the date on which the issue was raised; and
- Response to the issues and comments raised.

2.6.4.5 Final BAR Submission and Decision Making

All issues raised during the public review of the draft BAR will be incorporated and addressed in the final BAR and then submitted to DFFE. The DFFE is allocated 107 calendar days to review the final BAR as per the EIA Regulations (GNR 326) (as amended). I&APs will be notified of the final BAR availability. I&AP comments after final BAR submission are to be submitted by I&APs directly to DFFE for consideration. I&APs will be notified of this requirement in the final BAR notification.

Once the CA has issued a decision on the application, I&APs will be notified of the decision via email and SMS, including the process to be followed, should an I&AP wish to appeal the decision.

2.7 GAPS, UNCERTAINTIES AND LIMITATIONS

2.7.1 GENERAL ASSUMPTIONS AND LIMITATIONS

The assumptions, limitations and constraints associated with the BA process for the proposed project are listed below:

- The project information received from TNPA is deemed to be accurate and representative of the project;
- A site visit or verification has been undertaken by the EAP to better understand the project and ensure that the information provided by TNPA is correct, based on site conditions observed;
- The comments received in response to the public participation process will be representative of comments from the broader community; and
- Based on the pre-application meeting discussions, the CA would not require additional Specialist input in order to make a decision regarding the application.

2.7.2 ESTUARINE ECOLOGY SPECIALIST STUDY

The Estuarine Ecology Specialist Study pertained particularly to the extent of the development within the proposed project area. The assumptions and limitations are summarised as follows:

- The impacts identified in the Estuarine Ecology Specialist Study are assumed to address complex interactions in the environment;
- It is assumed that the dredging-related impacts identified and assessed, as for other activities for which finalised information is not available, will cover the range of possible scenarios that might arise due to the proposed upgrades to Maydon Wharf Berths 5-11 and 15 project. There is a precedent in terms of impacts for the proposed upgrades since dredging and construction operations are assumed to entail the same procedures that were followed for upgrades made to Berths 1-4 and 12-14 during Phases 1 and 2 of the Maydon Wharf Berth Upgrade project. If this is not the case and the final dredging and construction management plan suggests impacts might be more widespread and/or persistent than assumed, the scientists who prepared this specialist study assume they will be provided an opportunity to reassess the environmental impacts identified, including their significance assessment, should this be necessary.
- It is assumed the actions identified to mitigate the significance of environmental impacts are reasonable, practical, and feasible, or that reasonable, practical, and feasible mitigation will be identified, and when implemented will enhance the benefits of positive impacts and avoid, prevent, or minimise the outcomes of negative impacts as intended and assumed.

2.7.3 SOCIO-ECONOMIC ASSESSMENT

The study has been conducted based on the following assumptions:

- Project-related information supplied by TNPA for the analysis is assumed to be reasonably accurate;
- Although the secondary data sources used to compile the socio-economic baseline (demographics and the dynamics of the economy) are not exhaustive, they can be viewed as indicative of broad trends within the study area;

- The identification of possible impacts is based on the experience of the project team with similar studies in the past, and given the existing desktop-level knowledge of the socio-economic environment; and
- Possible impacts, as well as I&AP responses to the identified impacts, cannot be predicted with complete accuracy, even when circumstances are similar and these predictions are based on research and years of experience, taking the specific set of circumstances into account.

The limitations of the study include the following:

- The latest available stats at the local municipal level and sub-place were used as the primary source of data. Where possible, this has been augmented with data obtained from the Quantec Standardised Regional Dataset, which contains some of the most widely accepted projections of Statistics South Africa (Stats SA) data up to 2022. It must be noted that at the time of developing this report, the Census 2022 data was not yet available at the local area/sub-place level; and
- CAPEX (Capital Expenditure) and OPEX (Operating Expenses/Expenditure) information for the proposed precinct is not yet available; therefore, the economic impacts could not be quantified. Consequently, the assessment is presented in a qualitative format and may be updated on the availability of the CAPEX and OPEX information.

2.7.4 MARITIME ARCHAEOLOGICAL IMPACT ASSESSMENT

The Specialist study does not explicitly state assumptions, limitations or knowledge gaps, but some implicit assumptions are made in the Specialist study regarding the distribution of marine and maritime cultural resources/sites and artefacts within the study area. Therefore, the conclusion of the study should be interpreted with this in mind.

2.7.5 CLIMATE CHANGE IMPACT ASSESSMENT

The below summarises the exclusions and limitations that were made while undertaking this study:

- This study excludes a greenhouse gas (GHG) inventory and thus any impact of the project on climate change. Transitional risks or any other risks to the project are not included as per the scope of work.

3 PROJECT DESCRIPTION

This section provides a description of the location of the project area, the activities to be undertaken during the construction and operational phases, as well as the considerations for site accessibility, water demand, supply, storage, and site waste management. This section also considers the need and desirability of the project in accordance with Appendix 1 of the EIA Regulations, 2014 (GNR 326) (as amended).

3.1 LOCATION AND LAYOUT OF THE PROPOSED PROJECT

The Maydon Wharf precinct is located within the PoD, in the eThekwini Local Municipality, KZN (Figure 1-1). The precinct is a multipurpose terminal with five major dry bulk terminals, four major break bulk terminals, five major multi-purpose terminals and three liquid bulk terminals. In total, there are 15 terminals in the Maydon Wharf precinct.

This project focuses on the upgrading and deepening of Berths 5 – 11 & 15. The upgrade of Berths 5 - 11 & 15 will be taking place within the existing footprint of the Maydon Wharf precinct and will include the upgrade of the quay walls. Additionally, the berth pockets will be dredged up to approximately 4.5 m deeper than the current port floor depth. Dredging will extend to the end of the berth pocket, which is approximately 50 meters from the quayside structures. The proposed development layout of the upgrade of the Maydon Wharf's Berths 5 - 11 & 15 is illustrated in **Figure 3-2** to **Figure 3-5** below.

The dredged material that is removed for the proposed project will be disposed of at the existing authorised dredging dump site located at sea.

The details of the property associated with the proposed project, including the 21-digit Surveyor General (SG) codes for the cadastral land parcel, are outlined in **Table 3-1.** The coordinates of the cadastral land parcel are included in **Table 3-2** below.

Table 3-1 – Maydon Wharf Property Details

Property Description	Details
Province	KZN
District Municipality	eThekwini Metropolitan Municipality
Local Municipality	eThekwini Metropolitan Municipality
Ward Number	Ward 32
Portion Number	Portion 1 of ERF 10019, Durban
	Portion 203 of ERF 10004, Durban
Surveyor General (SG) Code	N0FU00850001001900001
	N0FU00850001000400203

Table 3-2 – Coordinate Points of the Cadastral Land Parcel

Map Label	Latitude	Longitude
Berth 5	29°52'22.86"S	31° 0'29.42"E
Berth 6	29°52'27.97"S	31° 0'26.81"E
Berth 7	29°52'33.57"S	31° 0'24.48"E
Berth 8	29°52'38.04"S	31° 0'21.96"E
Berth 9	29°52'45.48"S	31° 0'18.95"E
Berth 10	29°52'50.54"S	31° 0'16.92"E
Berth 11	29°52'53.21"S	31° 0'15.28"E
Berth 15	29°53'3.11"S	30°59'51.77"E

Map Label	Latitude	Longitude

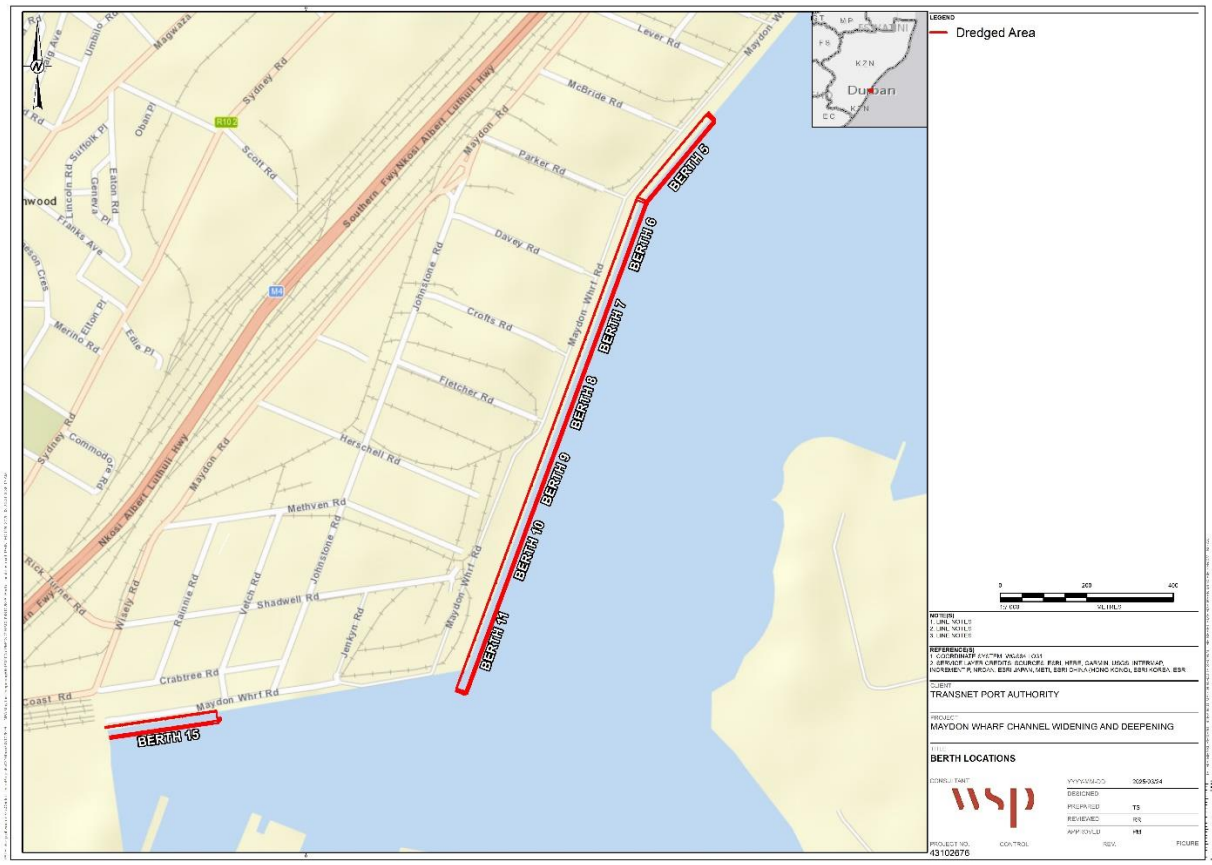

Figure 3-1 - Berth Location

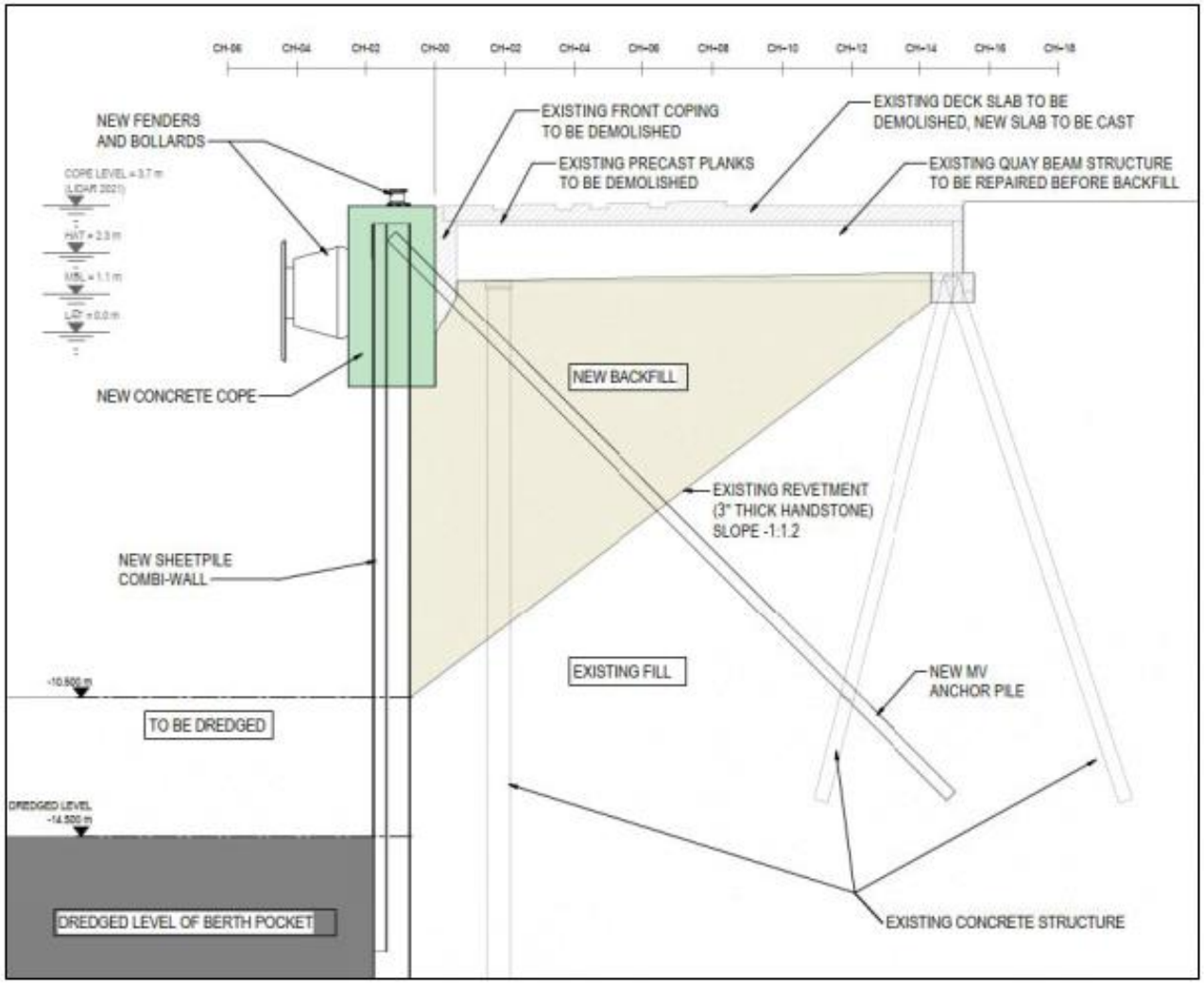

Figure 3-2 – New proposed Berth 5 layout

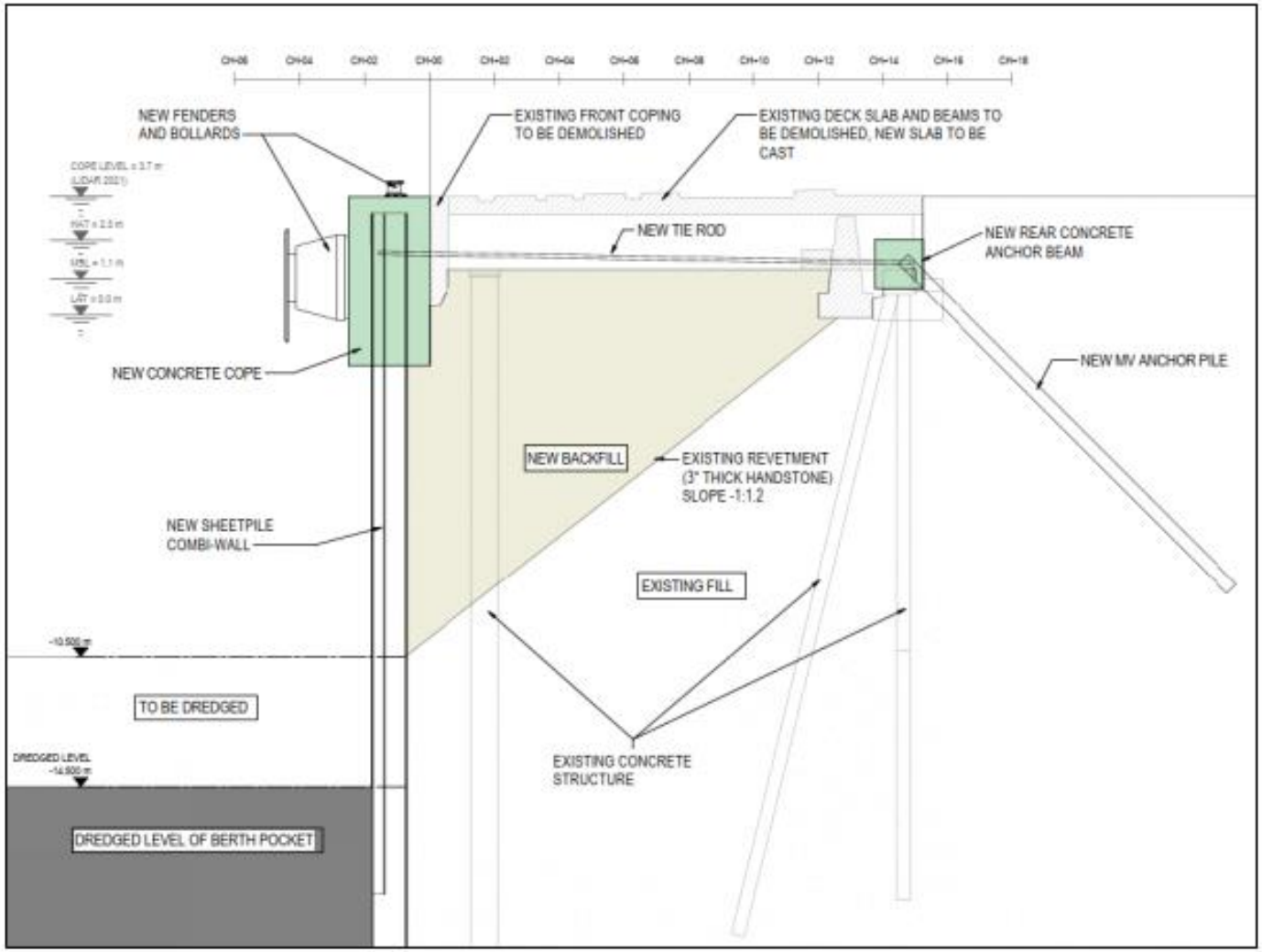

Figure 3-3 – New proposed Berth 6, 7, 9, 10 & 11 Layout

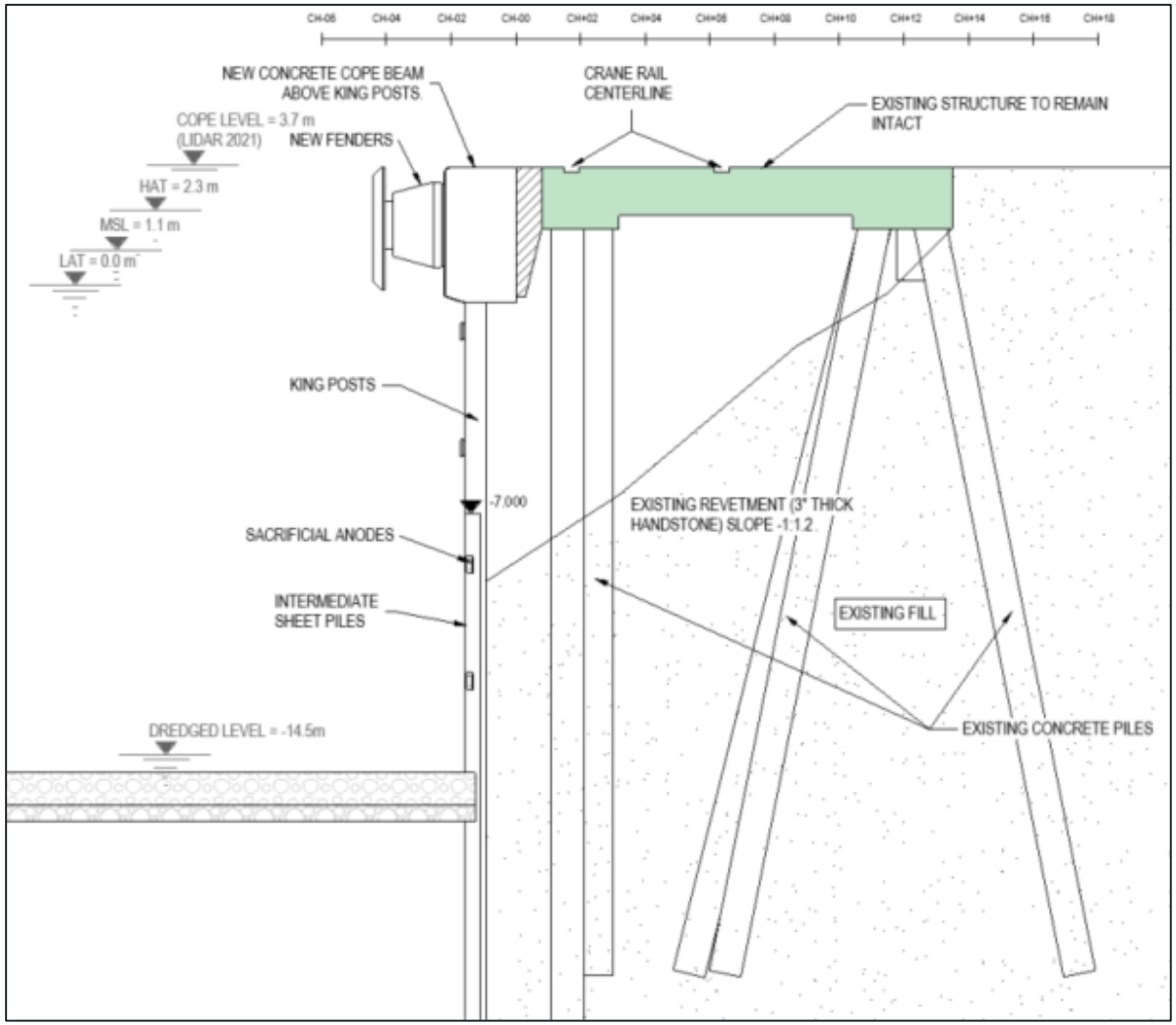

Figure 3-4 – New proposed Berth 8 Layout

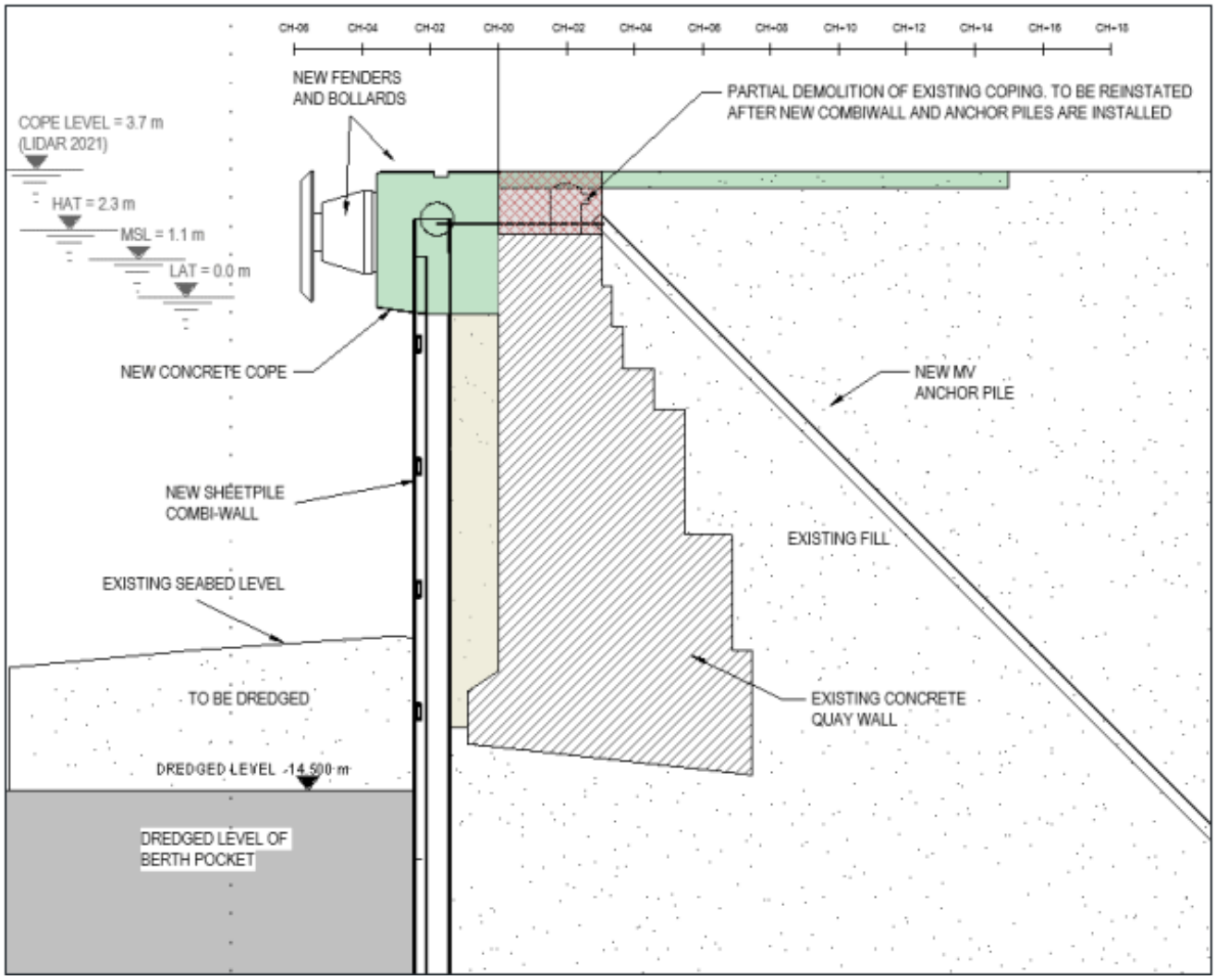

Figure 3-5 – New proposed Berth 15 Layout

3.2 THE CURRENT MAYDON WHARF BERTHS FACILITY DESCRIPTION

The information in this section is supplemented by the information outlined in the engineering design reports compiled by WSP (2024a – 2024d).

The Maydon Wharf Berths 5 to 11 & 15 were constructed between 1925 and 1985 and are currently operational. The general layout of Berths 5 - 11 consists of typical deck-on-pile type structures, while Berth 15 is a concrete block structure (**Figure 3-6**).

Berths 5, 6, 7, 9 & 10 have similar structures, which consist of the following:

- Prestressed Post-Tensioned Beams: The berths are built with strong prestressed post-tensioned concrete beams, positioned at 3.048-metre intervals, perpendicular to the cope line;
- Single Front Vertical Pile Support: Each beam is supported at the cope by a single large vertical concrete pile placed at the front;
- Rear Support: At the rear of these structures, the beams are typically supported by a cluster of three inclined piles. However, in certain cases, a single large pile, similar to the front support, is used;
- Deck Construction: The deck is built using precast concrete panels, which are complemented by in-situ cast decking on top; and
- Cope Design: The cope is comprised of precast concrete down-stand panels.

Berth 8 structure:

- Longitudinal In-Situ Cast Beams: Berth 8 includes large, longitudinally positioned in-situ concrete beams at both the front and rear of the structure;
- Front Longitudinal Beam with Down-Stand Cope: The front longitudinal beam includes a down-stand concrete cope, which enhances its structural integrity;
- Front Longitudinal Beam Supported on Alternating Large Vertical Piles: The front longitudinal beam is supported by large-diameter vertical concrete piles, which are positioned alternately on each side beneath the wide beam;
- Rear Longitudinal Beam Supported on Alternating Large Raked Piles: The rear longitudinal beam is supported by large concrete raked piles, which are similarly placed alternately beneath the wide beam, though at opposite angles of rake;
- Secondary Precast Beams: Secondary precast concrete beams are cast perpendicular to the longitudinal beams between the front and rear longitudinal beams, offering additional support and structural integrity; and
- Precast Panels with In-Situ Cast Topside Deck: The deck of Berth 8 consists of precast concrete panels with an in-situ cast top layer, providing the required durability and load-bearing capacity for its specific function.

The Berth 11 structure:

Berth 11 is the oldest of the deck-on-pile structures at Maydon Wharf. The concrete deck is supported by ground fill, which adds significant mass to counteract the negative skin friction on the raked piles when the structure bears lateral loads. To strengthen its structural integrity, the deck is reinforced with upstand beams, typically positioned over the pile locations. The deck is supported by numerous piles, with vertical piles at both the front and back, while the central section is reinforced by two rows of raked pile pairs. Additionally, a down-stand beam strengthens the cope of the structure.

Berth 15 Structure

Berth 15 is the oldest structure at Maydon Wharf, and it is made up of large mass concrete blocks, which form a vertical quay wall.

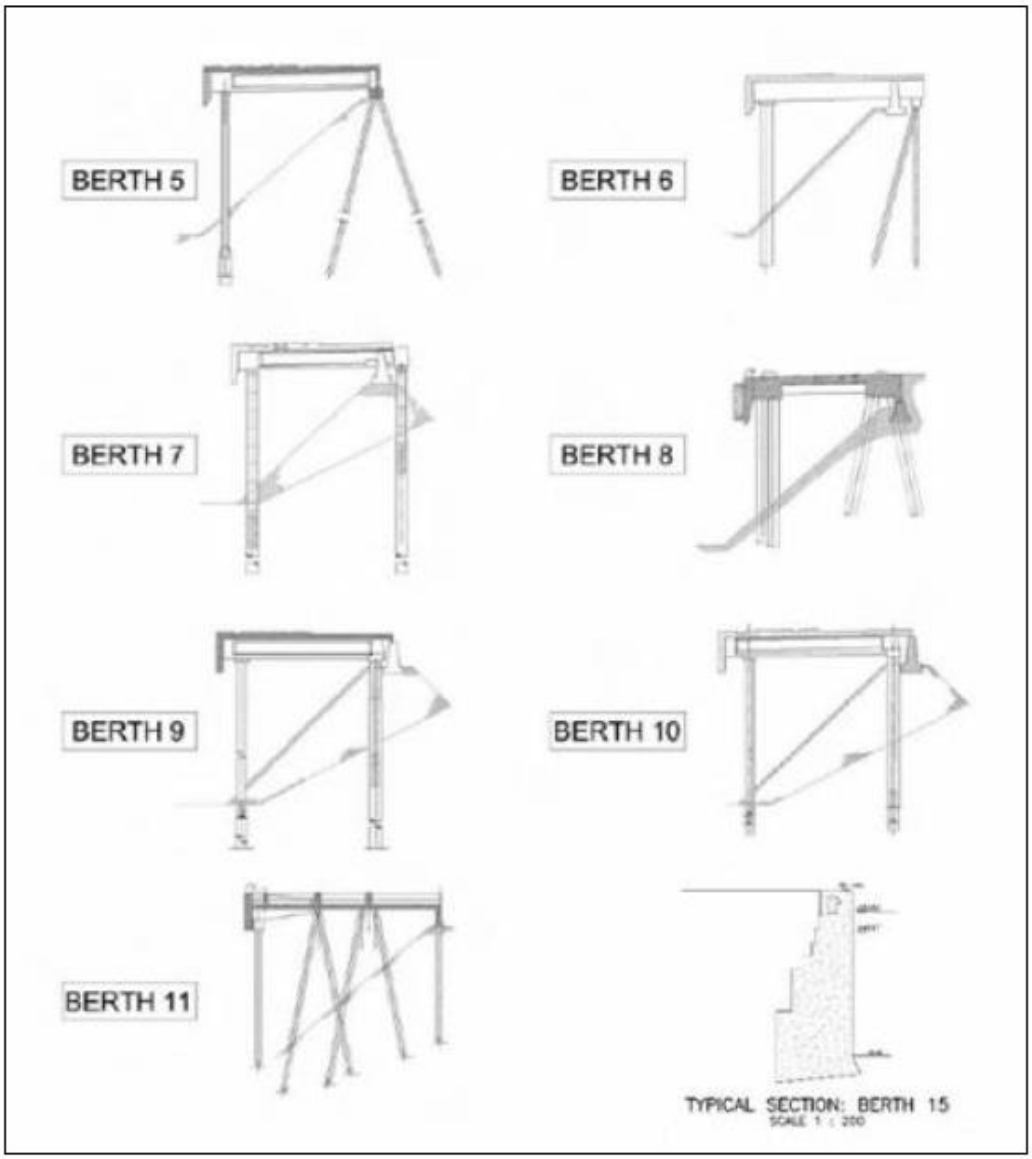

Figure 3-6 - Current layout of Maydon Wharf Berths 5 to 11 & 15

3.3 PROPOSED PROJECT INFRASTRUCTURE

The new deepened berth layouts will incorporate steel sheet pile (combi) walls, which has been evaluated based on the loading conditions. The use of Muller Verpress (MV) piles will be used for the berth anchoring systems.

3.3.1 BERTH 5

Berth 5 will be upgraded as illustrated in **Figure 3-2**. The existing slab and cope beam will be demolished. However, due to the presence of the existing ship loader on the berth, the existing piles

and transverse precast beams must remain intact. These beams will need to be repaired before the structure is backfilled to ensure their structural integrity and prolong their service life. Provisional grouting beneath the existing beams should also be considered to prevent the settlement of the surrounding backfilled material. The cope line of the newly deepened berths will extend approximately 2.5 m seaward, which will reduce the operational reach of the existing ship-loader. The new MV anchor piles will be connected to the combi wall.

3.3.2 BERTHS 6, 7, 9, 10 & 11

The upgrade of Berths 6, 7, 9, 10, and 11 is illustrated in **Figure 3-3**. These upgrades will involve the installation of a new combi-wall and cope beam in front of the existing structure. The existing cope beam, slab, and precast beams will be demolished. The current rear piles will be repurposed as bearing piles for a new rear concrete beam, which will be connected to the combi-wall with tie rods and supported by MV anchor piles.

3.3.3 BERTH 8

The proposed upgrade of berth 8 is shown in **Figure 3-4**. The existing structure, consisting of concrete piles supporting precast concrete beams and a slab, is designed to handle overhead gantries and berthing loads. The new design approach involves constructing a new combined wall in front of the current cope line, tied back to the existing coping beam. WSP conducted a due diligence review of the existing structure's stability. The proposed wall will support a new cope beam with fenders and bollards suitable for larger vessels, incorporating rubber cone fenders as a modern alternative to the existing tyre fenders. The cope line of the newly deepened berths will extend approximately 2.5 meters seaward, which will reduce the operational reach of the existing ship-loader. Concrete repairs will be required on the existing berthing structure to address damages and prolong its service life.

3.3.4 BERTH 15

The upgrade of Berth 15 is shown in **Figure 3-5**. This involves the installation of a new combi-wall, cope beam and MV anchor piles. Portions of the existing structure will need to be demolished locally to install the MV anchor piles. The concrete cope beam will be sized to ensure that the new combi-wall can be installed without interfering with the toe of the existing gravity wall structure. The structural stability of the existing block wall at Berth 15 has been assessed under the new loading conditions. The existing gravity quay wall was found to be unstable under the proposed loads. As a result, the structure requires a tie-back system, which is recommended to be separate from the existing block structure and supported by MV anchor piles.

Berth 15 also accommodates services that must be integrated into the new design. The service channel in the existing cope will be reinstated. At the end of the berth, an existing pumphouse will remain in place. The new combi-wall will extend to the end of the berth, with cut-outs made to accommodate and extend the existing culverts through the new combi-wall.

3.3.5 SCOUR PROTECTION

Following the capital dredging of each berth pocket after each berth has been upgraded, scour protection will be put in place in the berth pockets to protect the installed infrastructure from tidal and propeller scouring. All berths will be deepened from the current assumed depth of -10 mCD to a new final depth of approximately -14.5 mCD.

Slope protection will not be necessary for the proposed design approach. Scour protection will primarily be implemented to prevent propeller scour caused by the design vessels. Rock scour protection will be provided. An over-dredge allowance of 1 meter will be incorporated into the design.

3.4 ESTIMATED CONSTRUCTION DURATION

The projected construction duration per berth for the structural works is shown in **Table 3-3**. The estimated durations presented below consider dredging and scour protection activities to be conducted at each berth after the structural works are completed for that berth, prior to the start of construction on the next berth. Summing up the durations listed in **Table 3-3**, results in a total estimated construction time of 120 months, equivalent to 10 years.

Table 3-3 - Estimated construction time for each berth

Berth	Estimated berth construction time
Berth 5	23 months
Berth 6	15 months
Berth 7	15 months
Berth 8	10 months
Berth 9	15 months
Berth 10	15 months
Berth 11	15 months
Berth 15	12 months

3.5 CONTRACTOR LAYDOWN AND OFFICE AREA

Various options for the contractor laydown area and site office have been assessed – see Section 4.1.1. Based on various considerations, it was determined that, in the interim, the vacant ERF adjacent to Davey Road will be made available as the area for the contractor's site office and laydown area (see **Figure 4-1**). Subsequently, Area A will be made available for the contractor's site office, and Area B will be made available for the contractor's laydown area. Pending the space requirements of the laydown area and available service connections, Area B may also be suitable for a contractor's site office. This will provide the benefit of a single property to manage and secure. Area D can be considered as an additional laydown area if Area B is not large enough.

A single laydown and office area will be used throughout all construction phases will have the following advantages:

- It will improve operational safety as the contractor and all tenants will get used to traffic movement between the laydown area and the berth under construction for the full construction duration;
- It will simplify traffic management per phase;
- The relocation of the laydown area after each construction phase, which is time and cost-sensitive, will be avoided;

- Laydown areas on the quayside adjacent to a berth under construction have very limited space, and
- A laydown area on the quayside adjacent to a berth under construction may impact operations on the adjacent operational berth due to the space requirements.

3.6 PROPOSED PROJECT DEVELOPMENT ACTIVITIES

3.6.1 CONSTRUCTION PHASE

The construction process will follow industry-standard methods and techniques and will take place over a 10-year construction period. Key activities associated with the construction phase are described in **Table 3-4**.

Table 3-4 – Construction activities

Activity	Description
Establishment and access	Maydon Wharf is located in the north-western part of the PoD. It is connected to the Port's internal road network, which links to the local eThekwini Municipality road network. There are no National or Provincial roads nearby. The east-west internal roads of the precinct are accessed from the north via Richard Walne Road (Canal Road), Maydon Road, Wisely Road, and South Coast Road. These roads form a single north-east to south-west aligned link, marking the western boundary of the precinct. South Coast Road connects to Bayhead Road at a signalized intersection. There is also a grade-separated link over the M4 freeway leading to Wisely Road at the Shadwell Road intersection. Richard Walne Road transitions into Boatman Road to the north, which connects to Margaret Mncadi Avenue (Victoria Embankment).
Site preparation and establishment	The first phase of construction involves establishing survey points and defining the construction footprint. Surveying will be conducted throughout the construction process to ensure alignment with the design plans. During this phase, a screening survey should also be conducted to identify rubble, debris, and existing subterranean infrastructure (such as timber piles). Test piles will be carried out to verify that the design specifications are met. Additionally, this phase will include the inspection and alignment of existing services that need to be demolished or relocated. All electrical services must be disconnected and made safe before any construction activities begin. Proper precautions must be taken to prevent electrical hazards during the construction process.
Coping demolition	Existing copings will be demolished where necessary to allow for the new construction works. A portion of the existing cope beam at Berth 12 will be removed and later reinstated after the construction of Berth 11, ensuring that a continuous retaining structure for Berth 11 is in place and that the backfilling is properly contained.
Sheet pile installation	A combi-wall system will be implemented at the site. At Berth 8, only the kingposts of the combi-wall will reach the coping height, while the AZ profiles[8] will extend

[8] Thick Z-shaped sheet piles that can resist corrosion

Activity	Description
	only to the required fill retention height. The pile-driving process will be carried out using a barge, although the anchoring of sheet piles may be performed either from a barge or on land, depending on the equipment and plant available to the contractor. Where anchors are required, MV piles will be used. Some berths will need a tie-back beam, which will have its anchor pile foundation installed and will be connected to the sheet pile wall via tie rods.
Return wall installation	Return sheet piles will be installed at the end of certain berths before backfilling can begin. These sheet pile walls will create a closed "box" where material can be deposited. Temporary sheet pile walls will be used between Berths 5 and 6, 6 and 7, 9 and 10, and 10 and 11. Permanent return walls will be installed between Berths 7 and 8, as well as between Berths 8 and 9, to secure the backfill at Berths 7 and 9 while Berth 8 remains an open-berth structure. No return walls are needed at Berth 15.
Structural repair works	Reinforcement and modification of the existing beams to withstand the increased load and strength requirements.
New coping and slab casting	New coping beams and slabs will be cast. Slab panels will be cast in an alternating pattern with joints installed as per design. This will then be followed by the installation of bollards, fenders and paint demarcations on the quay where required.
Dredging and placement of scour protection	This involves dredging the seabed to achieve the required depth. Scour protection measures will also be implemented to ensure the stability and durability of the newly deepened berths. Dredging and scour protection installation for one berth should be completed before construction on the next berth begins. Plant and equipment will need to be mobilised and demobilised after each berth construction. The proposed project is expected to remove approximately 400 000 m^3 of material. The dredged material will be disposed at the existing authorised dredging dump site located at sea.
Transport of components and equipment to the site	All construction material (piping, tanks and concrete), machinery and equipment (i.e., excavators, trucks, cement mixers etc.) will be transported to the site utilising the national, regional and local road network. Large components may be defined as abnormal loads in terms of the Road Traffic Act, 1989 (Act 29 of 1989). In such cases, a permit may be required for the transportation of these loads on public roads.
Completion of construction	Once all construction is completed on-site, all equipment and machinery will be removed from the site. Note that construction will take place on a site that is already hard-surfaced thereby limiting environmental impacts.

3.6.2 OPERATIONAL PHASE

During operation, the key activities will include docking of vessels to load and offload cargos and inspection and maintenance of the wharf berths.

Note that only one berth will be upgraded at a time. The other 14 berths that are not under construction will remain operational during the proposed 10-year construction period.

3.7 NEED AND DESIRABILITY OF THE PROJECT

The DFFE's Guideline on Need and Desirability (GN R.891 of 2014) emphasises that while national strategies and policies are important for the development of the economy, they also need to address

strategic issues such as climate, food security and the sustainability of natural resource supply and the condition of South Africa's ecosystem services. It is for this reason that the overarching framework for assessing the need and desirability of developments is adopted at the policy level by identifying and promoting the activities/industries/developments that civil society needs.

The guidelines also note that at the project level (e.g., within the BA process), the “need” and “desirability” of a project should be reflected in the content of local and regional plans, frameworks and strategies. Considering the above, the purpose of this part of the report is to outline the necessity and desirability of the proposed project, highlighting how it fits into the strategic framework of global, national, regional and local development policies and programmes, as well as wider societal requirements (where applicable).

3.7.1 PROJECT DESTINATION

South Africa’s strategic location along one of the world’s busiest international shipping routes presents unique opportunities for developing a diverse maritime economy. The country’s coastline, stretching approximately 2 798km is home to a national port system with eight commercial seaports managed by TNPA. Operating under a "landlord" model, TNPA oversees the development, maintenance, and governance of port infrastructure while private operators manage cargo-handling services (UrbanEcon, 2024).

Among these ports, the PoD is the largest and busiest port in the southern hemisphere. Often referred to as "Africa's Gateway," it plays a crucial role in global trade by connecting South Africa to international markets and facilitating the imports and exports vital to the country’s economy. The PoD is a key hub for regional and continental trade, contributing directly to economic growth and the industrial development of Southern Africa. The PoD, strategically located along the Indian Ocean coastline, plays a crucial role in global trade by serving as a key maritime link connecting South Africa to major international markets in Asia, Europe, North and South America, and other African nations. As one of the busiest and most vital ports in Africa, its operational efficiency and capacity are integral to the cost-effectiveness and reliability of global supply chains. The port's performance directly influences shipping times, freight costs, and the smooth flow of goods between continents, making it a critical hub for international commerce.

In the PoD, the Maydon Wharf precinct functions as a multipurpose terminal primarily handling dry bulk, break-bulk, and liquid bulk cargo. As one of the oldest areas within the port, it consists of 15 berths with varying ages and structural features. Many of these berths are over 50 years old and no longer have the necessary depth to accommodate modern vessels. As a result, TNPA launched a comprehensive programme to upgrade and deepen the berths within the Maydon Wharf precinct to better accommodate larger vessels (WSP, 2024a).

The upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 aims to increase the port's capacity by allowing it to accommodate larger vessel drafts, thus enhancing overall efficiency and meeting the growing demands of maritime trade.

3.7.2 EXTENSION OF EMPLOYMENT AT MAYDON WHARF

TNPA aims to foster the expansion of the Oceans Economy and broaden the scope of benefits provided by the ports to a more extensive array of participants and stakeholders. Given that ports serve as a growth catalyst, their role is pivotal in combating the three significant challenges afflicting South Africa: unemployment, poverty and inequality.

Maydon Wharf specialises in handling a diverse range of cargo types, including break bulk, dry bulk, liquid bulk, and multipurpose goods. The terminal's facilities are equipped to manage the efficient loading and unloading of cargo, featuring dedicated berths, cranes, and expansive storage areas. To ensure seamless connectivity between the port and inland destinations, the precinct boasts robust infrastructure, including integrated road and rail networks.

Key operational improvements at Maydon Wharf are focused on decongestion strategies. These initiatives aim to reduce reliance on road freight by increasing rail freight volumes, streamlining truck movements through road de-proclamation to minimise access points, and implementing a one-way traffic system. Enhanced security management measures further support the precinct's goal of optimising traffic flow and ensuring operational efficiency (TNPA Durban Brochure, 2018).

Currently, Maydon Wharf houses 27 terminals operated by 13 terminal operators, catering to specific cargo needs. These include five major dry bulk terminals, four break bulk terminals, five multipurpose terminals, and three liquid bulk terminals. The precinct features 15 berths, of which 10 are fully operational, providing extensive capacity to handle the diverse cargo demands.

eThekwini currently has an unemployment rate of 20.6%, which is lower than the provincial unemployment rate (32.6%). The project is expected to generate a significant number of temporary jobs across various skill levels, including skilled, semi-skilled and unskilled labour. Employment will primarily benefit the local population, fostering skill development and offering experience in construction-related trades. Indirect employment in supporting sectors, such as logistics and catering, will also likely increase.

3.7.3 INTERNATIONAL POLICY AND PLANNING FRAMEWORKS

The international framework on the marine economy refers to the collection of global agreements, initiatives and institutions that guide the sustainable development, management and protection of marine and ocean resources. The marine economy, often referred to as the "blue economy", involves industries that rely on the ocean, such as fisheries, shipping, tourism, energy production, and marine biotechnology. In this section, various international maritime policies and frameworks that acknowledge the significance of the marine economy and are relevant to the project will be explored.

3.7.3.1 The 2030 Agenda for Sustainable Development

Sustainable Development Goal (SDG) 14 is crucial for the health of the world's oceans, the people who depend on them, and the overall well-being of the planet. The focus is on the conservation and sustainable use of oceans, seas and marine resources. The goal recognises the importance of the ocean in providing livelihoods, regulating climate, supporting biodiversity, and sustaining food security. The proposed project contributes towards the achievement of Goal number 14 of the SDGs by ensuring the sustainable use of the ocean resources.

3.7.4 NATIONAL POLICY AND PLANNING FRAMEWORKS

South Africa has several National policies and planning frameworks that promote the sustainable use of ocean resources.

3.7.4.1 National Development Plan (NDP) 2030

South Africa's National Development Plan (NDP) 2030 is a comprehensive policy framework aimed at addressing the country's socio-economic challenges and ensuring sustainable development by 2030. Within the broader goals of the NDP, ocean conservation plays a vital role, particularly given

South Africa's extensive coastline, dependence on marine resources and strategic location in the Southern Hemisphere. Ocean-based industries such as fishing, tourism, shipping and offshore energy are essential to South Africa's economy, and the preservation of the marine environment is critical to their long-term sustainability.

3.7.4.2 Key Elements of NPD concerning Ocean Conservation

The NDP 2030 emphasises inclusive growth, environmental sustainability and social equity, and these principles extend to the ocean and marine resources. The plan highlights the need to protect marine biodiversity, manage the ocean economy sustainably and ensure that coastal and ocean-based communities benefit from these resources.

- **Sustainable Ocean Economy (Blue Economy):** South Africa recognises the blue economy as a key area for development. The NDP underscores the importance of ensuring that ocean industries are developed sustainably to support job creation, economic growth, and environmental protection. The proposed project will enhance the PoD's capacity to handle larger vessels and more cargo, contributing to the sustainability of maritime trade. Efficient ports are essential for international trade, and by increasing trade volumes while reducing operational inefficiencies, the Maydon Wharf upgrade will boost the blue economy by facilitating more sustainable global shipping practices.
- **Ocean Governance and Policy Framework:** The NDP underscores the importance of strong governance to protect South Africa's oceans. This includes improving the implementation of laws related to marine conservation and addressing issues such as illegal fishing, marine pollution, and coastal development. Maydon Wharf precinct upgrade can contribute to ocean governance by supporting sustainable port and maritime practices, engaging in regulatory frameworks, and promoting policies that protect marine and coastal ecosystems.
- **Public Awareness and Capacity Building:** The NDP emphasises the importance of raising public awareness about the value of ocean conservation and sustainable practices. Education campaigns focus on the importance of protecting marine biodiversity, reducing pollution, and the sustainable use of ocean resources. The NDP includes plans to enhance the capacity of local communities, especially those dependent on the ocean for their livelihoods, to manage marine resources sustainably. This includes training in sustainable fishing practices, eco-tourism, and conservation strategies. To ensure public awareness of the upgrade of the proposed project, public participation will be conducted as per the requirements of the NEMA. This process will involve engaging the community and I&APs to gather their input, address concerns and ensure transparency and accountability in the project's development. By involving the public, the project aims to achieve more sustainable and inclusive outcomes. Furthermore, the proposed project will temporarily stimulate the region and local economy and support the local workforce development through skill development and training.
- **Blue Economy and Job Creation:** The NDP recognises the potential of the blue economy to create jobs and stimulate economic growth, particularly in coastal areas. Sustainable ocean industries such as marine tourism, green shipping, and marine renewable energy are identified as key drivers for inclusive economic development. There will be limited job opportunities during the construction phase of the project.
- **Science, Research and Innovation:** South Africa emphasises the need for cutting-edge marine research to understand ocean ecosystems and improve management practices. This includes investing in oceanographic research, monitoring ocean health and developing innovative technologies for sustainable ocean resource management. The NDP calls for stronger international

collaborations in marine science and innovation, including partnerships with other countries in the Southern African Development Community (SADC) region. Specialist studies such as marine ecology, marine archaeology, and socio-economic were commissioned for the Maydon Wharf project to ensure that the latest research about the study is considered. Refer to **0** for the Specialist studies commissioned for the proposed development.

3.7.5 REGIONAL, LOCAL POLICY AND PLANNING FRAMEWORKS

This part of the report discusses the policy and planning frameworks that are relevant to the proposed project at a regional level.

3.7.5.1 eThekwini Municipal Spatial Development Framework 2022/2023 – 2026/2027

The eThekwini Spatial Development Framework (SDF) underscores the PoD's pivotal role in the region's economy. To strengthen the Port's capacity and competitiveness, the SDF advocates for strategic infrastructure enhancements and spatial planning. Additionally, the SDF emphasises the importance of aligning municipal planning with provincial and national frameworks to ensure cohesive development. This alignment supports the Port's expansion and modernization efforts, aiming to enhance its status as a key international trade gateway.

3.7.5.2 Port Development Framework Plan 2022 Update

As part of the KZN Logistics Hub Programme, TNPA is proposing to restructure the PoD and Port of Richards Bay (PoRB), to elevate the PoD to hub port status. To achieve this, TNPA has created the Durban Port Master Plan, which is a strategic framework guiding the long-term development and optimisation of the PoD. At the PoD, TNPA manages the busiest container port in Africa (Transnet, 2024). Its responsibilities include maintaining port infrastructure, providing marine services such as pilotage and tug assistance, and ensuring safe and efficient port operations. Within the framework of the PoD Master Plan, TNPA intends to upgrade and deepen the berths at Maydon Wharf as part of its planned short-term PoD layout (Transnet, 2022).

4 PROJECT ALTERNATIVES

The EIA Regulations, 2014 (GNR 326) (as amended) require that the BA process must identify and describe alternatives to the proposed activity that were considered, or the motivation for not considering alternatives. Different types or categories of alternatives could be considered, including different locations, site locations, technology types, and project layouts. It is not always possible to provide alternatives to various categories, as project designs and locations may already be located strategically or may be too costly for the project to proceed.

4.1 SITE ALTERNATIVES

The proposed project will be located within the current footprint of the Maydon Wharf precinct. No site alternatives for the berth upgrades and deepening can be provided or considered, due to the following reasons:

- Maydon Wharf is an existing facility;
- The proposed project will be constructed within the Maydon Wharf precinct, and

- The purpose is to rehabilitate and upgrade existing berths, rather than the development of new berths. Existing facility infrastructure will tie into the proposed expansion infrastructure, allowing for easy integration.

However, site alternatives were considered for the contractor's office and laydown areas.

4.1.1 LAYDOWN AREAS

TNPA has identified several potential sites that are available for use for the contractor's office and/or laydown areas. These areas are indicated in **Figure 4-1** and detailed below. As indicated in **Figure 4-1**, most of the sites are located in or around built areas; none of the sites are located in a critical biodiversity area.

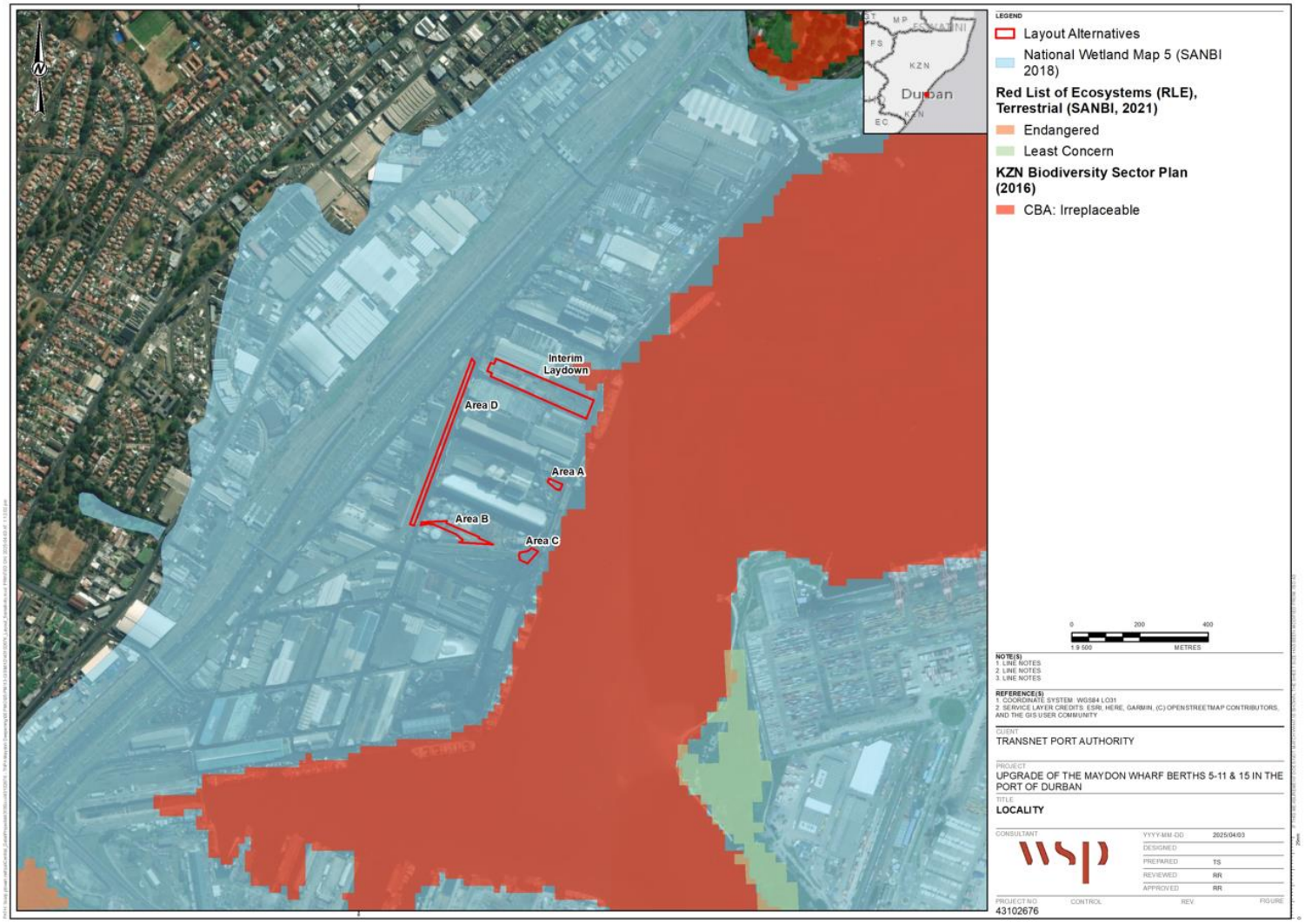

Figure 4-1 - Location of the potential office and laydown areas

4.1.1.1 Area A

Location

Refer to **Figure 4-1** for the location and approximate extent of the site.

Extent and facilities

The site is approximately 625m², and a TNPA-owned single-storey building is located on a portion of the erf, with limited vehicle parking.

Access from the external road network

Indirect access to the property is possible via the Crofts Road access control to the quayside.

Access to the quayside

The property is located directly adjacent to the quayside, with direct Non-Motorised Transport (NMT) and vehicle access possible.

Findings and suitability

Pending the condition of the existing building and services (water, sewer, electricity), it may be suitable for use as a contractor's office.

4.1.1.2 Area B

Location

Refer to **Figure 4-1** for the location and approximate extent of the site.

Extent and facilities

The site is approximately 3 630m² and is unbuilt.

Access from the external road network

There is direct access to Johnstone Road via a dual gate.

Access to the quayside

- No direct vehicle access is possible, as the site is surrounded by other properties and the rail shunting yard is located directly to the south of the property.
- An indirect access via Johnstone Road and Fletcher Road to Maydon Wharf Street is possible.

Findings and suitability

- Although no direct access is possible between the quayside and this area, it is suitable as a laydown area.
- If large enough, the site may also be suitable for a temporary contractor office. The availability of service connections (water, sewer, electricity) will enhance this opportunity.

4.1.1.3 Area C

Location

Refer to **Figure 4-1** for the location and approximate extent of the site.

Extent and facilities

The site is approximately 1 300 m² and is unbuilt.

Access from the external road network

- No direct vehicle access is possible.
- An indirect access via Johnstone Road to Fletcher Road and Maydon Wharf Street is possible.

Access to the quayside

Direct vehicle and NMT access are provided, as the area is located directly to the quayside.

Findings and suitability

Pending the availability of services connections (water, sewer, electricity), the area may be suitable for use as a contractor's office.

4.1.1.4 Area D

Location

Refer to **Figure 4-1** for the location and approximate extent of the site.

Size and facilities

The site is approximately 8 300 m² and is primarily unbuilt. There is a single-storey TNPA building located on it. To note, the area is only approximately 16 m wide.

Access from the external road network

Direct access is possible to Johnstone Road.

Access to the quayside

No direct access is possible to the quayside, however, indirect access is possible from Johnstone Road via Fletcher Road or Crofts Road.

Findings and suitability

The very narrow width of the site (+/- 16m) will make it difficult to use for material laydown areas and vehicle circulation on it. Off-loading from a delivery vehicle with for example a forklift, will be constrained.

4.1.1.5 Alternative Option

Pending the size of the laydown area required, a satellite (container) office and supplementary laydown areas can be located within the construction area adjacent to each berth under construction. It should be noted that the space available on the quayside will be very limited, as access must be retained to adjacent properties.

4.1.1.6 Interim Option

The plot adjacent (north) of Davey Road is owned by TNPA, and it is currently vacant. Refer to **Figure 4-1** for the location of the erf. A lease agreement was recently signed for the erf; however, it may be available to use as a temporary laydown area until the lessee takes occupation.

Size and facilities

The ERF is approximately 19 280 m² and is mostly unbuilt apart from some minor structures. A large portion is surfaced, and it has direct vehicle access onto the quayside via a dual gate and access from Davey Road. The ERF is serviced (water, sewer, electricity). The western portion of the property is developed but vacant; the building on the property can potentially be used for offices, storage, etc.

Access from the external road network

Direct access is possible to Johnstone Road via Davey Road.

Access to the quayside

Direct access is possible to the quayside.

Findings and suitability

- External access to the laydown area from the external road network will only be allowed via Johnston and Davey Road. Davey Road is outside TNPA security control; therefore, the arriving contractor vehicles can directly access the laydown area without entering the quayside via the security access control. This will reduce construction traffic on Maydon Wharf, and
- The access via Davey Road will improve contractor accessibility to the laydown area.

4.1.1.7 Preferred Option

Based on the various considerations, it was determined that, in the interim, the vacant ERF adjacent to Davey Road will be made available as the area for the contractor's site office and laydown area. Later on, Area A will be made available for the contractor's site office, and Area B will be made available for the contractor's laydown area. Pending the space requirements of the laydown area and available service connections, area B may also be suitable for a contractor's site office. This will provide the benefit of a single property to manage and secure. Area D can be considered as an additional laydown area if Area B is not large enough.

A single laydown and office area used throughout all construction phases will have the following advantages:

- It will improve operational safety as the contractor and all tenants will get used to traffic movement between the laydown area and the berth under construction for the full construction duration;
- It will simplify traffic management per phase;
- The relocation of the laydown area after each construction phase, which is time and cost-sensitive, will be avoided;
- Laydown areas on the quayside adjacent to a berth under construction have very limited space, and
- A laydown area on the quayside adjacent to a berth under construction may impact operations on the adjacent operational berth due to the space requirements.

4.1.2 DREDGE MATERIAL DISPOSAL SITE ALTERNATIVES

Four disposal sites have been considered for the dredged material associated with the proposed project:

- Land disposal;
- In-port disposal;
- Disposal at the existing, authorised offshore dump site, and
- A new offshore dump site.

4.1.2.1 Land Disposal

TNPA routinely utilise dredged sand material from the Port entrance for beach rejuvenation. The material composition of the material that will be dredged from the Maydon Wharf Channel will only be partially suitable for beach rejuvenation. Neither the sediment nor the clay layers would be suitable

for beach rejuvenation; therefore, this option is not a practical disposal option for the proposed capital dredging operation.

4.1.2.2 In-port Disposal

With the Port being developed deeper and deeper, there is very limited “shallow” space in the current Port footprint. It is estimated that 1 300 000 m^3 of sand will be required for reclamation purposes from the berth 203 and 205 deepening, 1 000 000 m^3 of which is expected to be available from the dredging of the basin within Berths 203 - 205. This would leave 300 000 m^3 to be sourced from elsewhere, i.e., from sand-sourcing via offshore dredging or from material dredged during the proposed project. Reclaiming approximately 300 000 m^3 of material for the reclamation project from the Maydon Wharf Channel is a viable option being considered by TNPA.

Should dredged material from the project footprint be considered for in-port disposal for reclamation purposes, it is recommended that the material dredged from the Congella Basin (**Figure 1-1**) be excluded for this use, because of the historical sediment contamination associated with this part of the Port (CSIR, Assessment of Sediment Quality in Proposed Maydon Wharf Berth Deepening Dredging Footprint in Durban Bay, 2024).

Approximately 70 342m^3 of material will need to be disposed of elsewhere, for which offshore disposal has been identified as the preferred option.

4.1.2.3 Existing, authorised offshore dump site disposal (preferred)

The existing, authorised offshore dump site has been used routinely for dredged material disposal. This site has the capacity for the 3.5 million m^3 of material needing to be dredged from the Maydon Wharf Channel for the proposed project. There are no significant impacts associated with using this site, and it is therefore considered a suitable alternative for dredge disposal.

4.1.2.4 A new offshore dump site

A new offshore dredge disposal site could be located. This would require a Specialist marine assessment and a new environmental authorisation. The time and resources this would require are not justified until such time as the current disposal site has been exhausted.

The current offshore dump site has sufficient capacity and remains the logical alternative to receive the Maydon Wharf Capital dredged material.

4.2 DESIGN AND CONSTRUCTION ALTERNATIVES

Multiple options were evaluated for the anchoring systems for the berths, including MV anchor piles, deadman anchors, and ground anchors (WSP, 2024e).

4.2.1 MULLER VERPRESS (MV) ANCHOR PILES: (PREFERRED)

MV piles have been used in the construction of Berths 1 - 4 berth deepening at Maydon Wharf and were also the proposed anchors for the concept design of the upgrade to Berths 5 - 11 & 15. MV piles are steel piles designed with a widened tip for installation at an angle ranging from 1:1 to 1:3 to the horizontal. This configuration facilitates soil displacement during installation, creating a cavity around the pile which is continuously filled with grout. Upon hardening, the grout creates a bond between the soil and the pile, thereby enhancing its bearing capacity. Notably, MV piles are used for transferring substantial forces to the surrounding soil, making them a preferred choice for applications such as quay walls, where high tension forces from heavy loads are prevalent. MV piles typically consist of H-profiles ranging from 250 mm to 400 mm, with lengths exceeding 60 meters.

The installation method for MV piles primarily relies on driving, which uses specialized machinery equipped with hammering blocks to accommodate the forces required for pile installation. Throughout the installation process, grout is continuously pumped into the cavities around the pile.

The advantages of MV piles are:

- Enhanced bearing capacity due to improved attachment between the pile and soil; and
- Resistance to corrosion, ensuring long-term durability in the marine environment.

The disadvantages are:

- Complex installation process involving simultaneous driving and grouting, requiring specialised plant, equipment and skilled labour; and
- Potential for higher project costs and timelines due to the complexity of installation and specialised requirements.

4.2.2 DEADMAN ANCHOR WALL

Deadman anchors consist of a series of tie rods connecting the combined sheet pile wall to a concrete or steel wall buried underground at the back of the quay. A deadman anchor operates by utilizing the weight and resistance of the wall to counteract the lateral forces acting on the retaining wall. The anchor is placed outside of the active soil pressure zone behind the wall. When lateral forces act upon the wall, the tie rods pull against the resistance of the deadman wall, creating a stabilizing force that helps to prevent the wall from shifting or collapsing. The deadman anchor should be located in stable soil or rock conditions behind the wall, ensuring that it can effectively resist the forces exerted on the structure. Based on the analysis of the structures, the deadman anchors should be 33 to 35 meters from the cope line to ensure structural and geotechnical stability.

4.2.3 GROUND ANCHOR WALL

Ground anchors consist of high-strength steel tendons or cables and are embedded into the ground and securely grouted, facilitating the transfer of tensile loads to the surrounding soil or rock mass. The resistance capacity relies on both the frictional resistance generated between the anchor and the surrounding ground and the mechanical interlocking of the grout with the soil or rock. The ground anchors were considered due to their adaptability to varying ground conditions, and straightforward installation methods compared to the MV piles. In contrast to MV piles, the installation and procurement of ground anchors are anticipated to be faster and more cost-effective. Nonetheless, ground anchors have a reduced resistance capacity relative to MV piles.

Considering the large anchor forces that need to be transferred through the anchors, it was confirmed by WSP and geotechnical industry experts that ground anchors would not be the best technical or practical solution for these structures.

At many of the berths associated with the proposed project, the existing buildings are approximately 23 m from the current cope line. Those building that will interfere with the installation of the deadman anchors. The area behind the existing deck on pile quay structures also contains water, sewer and electrical services, which would need to be demolished and reinstated. This is necessary due to the excavation required for installing of the deadman anchors and tie rods, leading to additional time and cost during construction. Due to the location of the back-of-quay buildings and infrastructure, and the services in this area that would be affected by the construction of the deadman and tie rods, it is not deemed as a practical solution for the berthing structures at Berths 6, 7, 9, 10, 11 and 15.

4.2.4 PREFERRED OPTION

The best technical and practical solution for the anchoring of the berths is to implement MV piles. The MV piles pose no discernible impact on existing services or buildings, thereby obviating any restrictions stemming from building leases or demolition considerations. While it may incur higher costs than the other options primarily associated with plant utilisation, this expense would be mitigated by potential savings accrued from reinstating services, rebuilding structures, and terminating leases.

4.3 TECHNOLOGY ALTERNATIVES

4.3.1 PROPELLER SCOUR PROTECTION FOR VERTICAL WALL

Scour protection is required to prevent the erosion of material within the berth pockets for the deepening of Berths 5 - 11 & 15. Scour is the removal of granular bed material by hydrodynamic forces. The source of these forces can typically be attributed to either natural phenomena such as current or wave action, or man-made in the case of propeller scour. If scour is not dealt with appropriately, it can lead to the loss of soil passive resistance at the base of the retaining structure and hence a reduction in capacity, which can lead to failure.

Two options were considered for scour protection:

- A rip-rap system, which consists of at least two rock layers placed on a filter layer of gravel or filter fabric. The rock layers consist of an upper layer of larger rock and a secondary layer of smaller rock. The thickness of the primary (or top) layer and secondary (or bottom) layer is linked to the calculated scour rock size. The rock size is specifically calculated to withstand the bottom flow velocity, and
- A concrete mattress system, which consists of a post-filled concrete mattress that is installed empty by a diver and then filled with concrete from the quay with a feed pipe.

For each option, the estimated dredge volumes were assessed for comparison.

4.3.2 RIP-RAP

The rip-rap system consists of two rock layers placed on a filter layer of gravel or filter fabric. This scour protection system has a total layer thickness of 1.5 m. The primary layer is 0.98 m thick, with the secondary layer of rock being 0.5 m thick. A filter fabric is also required at the bottom of the scour protection between the existing seabed and the rip-rap material.

This scour protection system is to be placed along the entire length of the berth structure and extend approximately 30 m from the cope line. The benefit of a rip-rap protection system compared to the concrete mattress system is its ease of maintenance. In the event of failure, the rip-rap system can be readily repaired.

4.3.3 CONCRETE MATTRESS

The concrete mattress consists of a textile shutter filled with concrete, which is placed directly on the seabed. The proposed design thickness of the concrete mattress is 0.45 m. This scour protection system should extend approximately 30 m from the cope line and be placed along the entire length of the quay.

The volume of dredging required for the rip-rap system is slightly higher than for the concrete mattress system (319 985 m^3 vs 263 331 m^3).

4.3.4 PREFERRED OPTION

Based on the factors and considerations assessed, both scour protection systems were deemed satisfactory for use in preventing propeller-induced scour within the berth pocket. Therefore, implementing the rip-rap system was selected.

4.4 LAYOUT ALTERNATIVES

The proposed upgrade and deepening of the Maydon Wharf Berths is to allow vessels to operate at a higher capacity. Therefore, the berths upgrade considered the existing Wharf at the site and therefore no further layout or location alternatives were considered.

4.5 NO-GO ALTERNATIVE

The no-go alternative is essentially the option of not upgrading the Maydon Wharf Berths, in which case none of the negative and positive impacts described in Section 8 would come into effect. Should the no-go alternative be implemented, the quay walls at Berths 5 -11 & 15 will continue to deteriorate, leading to operational risks. Larger modern vessels will be unable to dock, which will diminish the economic benefits of increased trade.

5 GOVERNANCE FRAMEWORK

5.1 NATIONAL LEGAL AND REGULATORY FRAMEWORK

The South African regulatory framework establishes well-defined requirements and standards for environmental and social management of industrial and civil infrastructure developments. Different authorities at both national and regional levels carry out environmental protection functions. The applicable legislation and policies are shown in **Table 5-1.**

Table 5-1 – Applicable National Legislation

Legislation	Description of Legislation and Applicability
Civil Aviation Act, 2009 (Act 13 of 2009)	Civil aviation in South Africa is governed by the Civil Aviation Act, 2009 (Act 13 of 2009) (CAA). This Act provides for the establishment of a stand-alone authority mandated with controlling, promoting, regulating, supporting, developing, enforcing and continuously improving levels of safety and security throughout the civil aviation industry. This mandate is fulfilled by the South African Civil Aviation Authority (SACAA) as an agency of the Department of Transport. SACAA achieves the objectives set out in the Act by complying with the Standards and Recommended Practices (SARPs) of the International Civil Aviation Organisation (ICAO) while considering the local context when issuing the South African Civil Aviation Regulations. The DFFE Screening Tool Report identified Civil Aviation as having high sensitivity for the proposed project. The SACAA has been included in the I&AP database. However, no impact on civil aviation is anticipated from the proposed project.
Constitution of South Africa, 1996 (Act 108 of 1996)	The Constitution cannot manage environmental resources as a stand-alone piece of legislation hence additional legislation has been promulgated to manage the various spheres of both the social and natural environment. Each promulgated Act and associated Regulations are designed to focus on various industries or components of the environment to ensure that the

Legislation	Description of Legislation and Applicability
	objectives of the Constitution are effectively implemented and upheld on an ongoing basis throughout the country. In terms of Section 7, a positive obligation is placed on the State to give effect to the environmental rights.
National Environmental Management Act, 1998 (Act 107 of 1998) (as amended)	In terms of Section 24(2) of the NEMA, the Minister may identify activities, which may not commence without prior authorisation. The Minister thus published GNR 327 (as amended) (Listing Notice 1), GNR 325 (as amended) (Listing Notice 2) and GNR 324 (as amended) (Listing Notice 3) listing activities that may not commence before authorisation. The regulations outlining the procedures required for authorisation are published in the EIA Regulations of 2014 (GNR 326) (as amended). Listing Notice 1 identifies activities that require a BA process to be undertaken, in terms of the EIA Regulations, before the commencement of that activity. Listing Notice 2 identifies activities that require a Scoping and Environmental Impact Assessment (S&EIA) process to be undertaken, in terms of the EIA Regulations, before the commencement of that activity. Listing Notice 3 identifies activities within specific areas that require a BA process to be undertaken, in terms of the EIA Regulations, before commencement of that activity. WSP undertook a legal review of the listed activities according to the proposed project description to conclude that the activities listed below are considered applicable to the development: ▪ Listing Notice 1: GNR 327, as amended: **Activity 19A**: *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—* *(ii) 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 - (i) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour.* **Activity 52**: *The expansion of structures in the coastal public property where the development footprint will be increased by more than 50 square metres, excluding such expansions within existing ports or harbours where there will be no increase in the development footprint of the port or harbour and excluding activities listed in activity 23 in Listing Notice 3 of 2014, in which case that activity applies.* **Activity 55**: *Expansion (ii) in an estuary in respect of (a)(a) facilities associated with the arrival and departure of vessels and the handling of cargo, but excluding the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.* A BA process must be followed. An EA is required and will be applied for with the DFFE.
Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes (GNR 320, 20	The protocols provide the criteria for Specialist assessment and minimum report content requirements for impacts for various environmental themes for activities requiring environmental authorisation. The protocols replace the requirements of Appendix 6 of the EIA Regulations, 2014 (GNR 326) as amended. The assessment and reporting requirements of the protocols are

Legislation	Description of Legislation and Applicability
March 2020 and GNR 1150, 30 October 2020)	associated with a level of environmental sensitivity identified by the national web-based environmental screening tool (screening tool). The following environmental themes were identified for the upgrade of the Maydon Wharf Berths 5 - 11 & 15: ■ Agriculture Theme ■ Animal Species Theme ■ Aquatic Biodiversity Theme ■ Archaeological and Cultural Heritage Theme ■ Civil Aviation Theme ■ Defence Theme ■ Palaeontology Theme ■ Plant Species Theme ■ Terrestrial Biodiversity Theme
National Ports Act, 2005 (Act 12 of 2005)	This Act is the primary legislation that governs the management, operation, and development of ports in South Africa. It establishes the National Ports Authority (NPA) as the entity responsible for overseeing the country's ports. The Act outlines the NPA's roles and powers, addressing areas such as port operations, tariffs, security, environmental protection, and other related administrative matters.
Merchant Shipping Act, 1951 (Act 57 of 1951)	The Act regulates various aspects of merchant shipping, including the operation and safety of vessels, the rights and duties of ship owners and operators, and matters related to shipping registration, navigation, and maritime safety. It also addresses issues related to maritime labour, the prevention of pollution, and other relevant shipping-related regulations.
National Environmental Management: Integrated Coastal Management Act, 2008 (Act 24 of 2008) (as amended)	The National Environmental Management: Integrated Coastal Management Act (Act 24 of 2008) (NEMICMA) (as amended) is a key piece of legislation in South Africa aimed at promoting the integrated and sustainable management of the country's coastal resources. The Act outlines the principles and framework for the development, conservation, and use of coastal areas, balancing environmental protection with economic and social development. It establishes guidelines for coastal planning, development, and the management of coastal ecosystems, ensuring that environmental considerations are central to decision-making in coastal areas. The Act also addresses the preservation of marine biodiversity, the prevention of coastal degradation, and the involvement of local communities in coastal management processes. The Dumping at Sea Regulations (GN R.711 of 2017) published under the NEMICMA govern the disposal of waste at sea. They outline the process for applying for a dumping permit, the assessment criteria for applications, and the conditions under which emergency dumping may be authorised. The dredged material that is removed for the berth upgrade project requires disposal. TNPA plans to dispose the dredged material at the existing authorised dredging dump site located at sea. The dredging of the Maydon Wharf berths is planned to take place once each berth has been upgraded, one berth length at a time. A Disposal at Sea Application has been submitted to the DFFE Oceans and Coasts Directorate.

Legislation	Description of Legislation and Applicability
National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEMWA) (as amended)	This Act provides for regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation. The Act also provides for the licensing and control of waste management activities through GNR. 921 (2013) (as amended): List of Waste Management Activities that Have, or are Likely to Have, a Detrimental Effect on the Environment. The proposed project activities do not constitute a Listed Activity requiring a Waste Management Licence as defined in GNR 921. The Waste Classification and Management Regulations (GN R. 634 of 2013), established under the NEMWA, provide a structured framework for the classification and management of waste in South Africa. These regulations aim to promote sustainable waste practices while ensuring compliance with environmental standards. During the construction and operational phases, all waste generated would need to be classified according to the prescribed standards. Furthermore, the project would require the implementation of comprehensive waste management plans to ensure proper handling, storage, and disposal practices, aligned with the norms and standards. Adhering to these regulations would be essential for obtaining the necessary environmental approvals and licences, ensuring that the project's development proceeds without adverse environmental impacts. The National Norms and Standards for the Storage of Waste (GN R.926 of 2013) provide clear guidelines for the storage of waste to safeguard the environment and public health. These standards apply to both general and hazardous waste storage, ensuring consistent and responsible waste management practices across facilities. During construction and operation, the project would generate various types of waste, necessitating safe and secure storage solutions. Ensuring compliance with these standards would prevent environmental contamination and uphold public health standards.
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) (as amended)	The National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) (NEMBA) was promulgated in June 2004 within the framework of NEMA to provide for the management and conservation of national biodiversity. The NEMBA's primary aims are for the protection of species and ecosystems that warrant national protection, the sustainable use of indigenous biological resources, the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources. In addition, the NEMBA provides for the establishment and functions of a South African National Biodiversity Institute (SANBI). SANBI was established by the NEMBA with the primary purpose of reporting on the status of the country's biodiversity and conservation status of all listed threatened or protected species and ecosystems. The biodiversity assessment identifies Critical Biodiversity Areas (CBAs) which represent biodiversity priority areas which should be maintained in a natural to near natural state. The CBA maps indicate the most efficient selection and classification of land portions requiring safeguarding in order to meet national biodiversity objectives. The proposed project area falls within a CBA (irreplaceable) area. The Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (CARA) Regulations with regards to alien and invasive species have been superseded by the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) – Alien and Invasive Species (AIS) Regulations which became law on 1 October 2014. Specific management measures for

Legislation	Description of Legislation and Applicability
	the control of alien and invasive plants will be included in the Environmental Management Programme (EMPr).
National Environmental Management Protected Areas Act, 2003 (Act 57 of 2003) (as amended)	The purpose of the National Environmental Management Protected Areas Act, 2003 (Act 57 of 2003) (NEMPAA) is to, *inter alia*, provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. To this end, it provides for the declaration and management of various types of protected areas. Section 50(5) of NEMPAA states that "no development, construction or farming may be permitted in a nature reserve or world heritage site without the prior written approval of the management authority." According to the National Protected Area Expansion Strategy (NPAES), areas near the study site have been identified as priority regions for future protected areas. The focus for land-based protected area expansion includes large, intact, and unfragmented regions that are crucial for biodiversity representation and ecological persistence, making them suitable for the creation or expansion of large, protected areas. However, the proposed upgrade and deepening of the Maydon Wharf berths is not a land-based project and therefore falls outside the NPAES focus area. From an offshore perspective, various marine protected areas (MPAs) were proclaimed in terms of NEMPAA for the South African offshore marine environment. Offshore MPAs near the project are the uThukela Marine Protected Area and Alwal Shoal Marine Protected Area. However, the project itself is not within a protected area.
The National Water Act, 1998 (Act 36 of 1998) (as amended)	The National Water Act, 1998 (Act 36 of 1998) (NWA) (as amended) provides the framework to protect water resources against over-exploitation and to ensure that there is water for social and economic development, and human needs and to meet the needs of the aquatic environment. The Act defines water sources to include watercourses which are defined as a river or spring, a natural channel in which water flows regularly or intermittently, a wetland, lake or dam into which or from which water flows, and any collection of water that the Minister may declare a watercourse. Section 21 of the Act outlines several categories that require a water user to apply for a Water Use License (WUL) and Section 22 requires water users to apply for a General Authorisation (GA) with the Department of Water and Sanitation (DWS) if they are under certain thresholds or meet certain criteria. The Wharf obtains water from eThekwini water and no natural freshwater watercourses will be impacted by the project. Therefore, no water use authorisation is required for the project.
The National Heritage Resources Act, 1999 (Act 25 of 1999)	The National Heritage Resource Act (Act 25 of 1999) (NHRA) serves to protect national and provincial heritage resources across South Africa. The NHRA provides for the protection of all archaeological and palaeontological sites, the conservation and care of cemeteries and graves by the South African Heritage Resources Agency (SAHRA) and lists activities that require any person who intends to undertake to notify the responsible heritage resources agency and furnish details regarding the location, nature, and extent of the proposed development. The South African Heritage Resources Agency (SAHRA) (Development Applications Unit) is the CA for heritage resources below the high-water

Legislation	Description of Legislation and Applicability
	mark and Amafa and Research Institute (the KZN provincial heritage authority) is the CA for heritage resources above the high water mark. Some of the berths are older than 60 years of age and others will be 60 years when the construction phase associated with the proposed project commences. Since infrastructure associated with the existing berths will be demolished as part of the proposed upgrade to the berths, an application for a permit in terms of Section 37 of the KZN Amafa and Research Institute Act, 2018 (Act 5 of 2018) was submitted to the KZN Amafa and Research Institute. The application was supported by a maritime and archaeological impact assessment for the proposed upgrade and deepening of the Maydon Wharf Berths 5 – 11 & 15 (Bruno, 2023) (see 0). Permit with Ref. No. SAH23/22240&23/507 was issued to TNPA; see 0. As outlined in the permit, the Amafa and Research Institute graded the entire facility as not conservation worthy; however, if any heritage artefacts are found during excavation works, construction will cease and the find will be reported to Amafa.
Noise Control Regulations in terms of the Environmental Conservation, 1989 (Act 73 of 1989)	In South Africa, environmental noise control has been in place for three decades, beginning in the 1980s with codes of practice issued by the South African National Standards (SANS) (formerly the South African Bureau of Standards, SABS) to address noise pollution in various sectors of the country. Under the previous generation of environmental legislation, specifically the Environmental Conservation Act, 1989 (Act 73 of 1989) (ECA), provisions were made to control noise from a national level in the form of the Noise Control Regulations (GNR 154 of January 1992). In later years, the ECA was replaced by the NEMA (as amended). The National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004) (NEMAQA) was published in line with NEMA and contains noise control provisions under Section 34: (1) The minister may prescribe essential national standards – (a) for the control of noise, either in general or by specific machinery or activities or in specified places or areas; or (b) for determining – (i) a definition of noise; and (ii) the maximum levels of noise. (2) When controlling noise, the provincial and local spheres of government are bound by any prescribed national standards. Under NEMAQA, the Noise Control Regulations were updated and are to be applied to all provinces in South Africa. The Noise Control Regulations give all the responsibilities of enforcement to the Local Provincial Authority, where location-specific by-laws can be created and applied to the locations with the approval of the Provincial Government. Where province-specific regulations have not been promulgated, acoustic impact assessments must follow the Noise Control Regulations. Furthermore, NEMAQA prescribes that the Minister must publish maximum allowable noise levels for different districts and national noise standards. These have not yet been accomplished and as a result, all monitoring and assessments are done in accordance with SANS 10103:2008 and 10328:2008.

Legislation	Description of Legislation and Applicability
National Environmental Management Air Quality Act, 2004 (Act 39 of 2004) (as amended)	The overarching piece of legislation that governs air quality management in South Africa is the NEMAQA, administered and enforced by the DFFE, Metropolitan, District and Local authorities. The NEMAQA focuses on the protection of the environment by providing reasonable measures for: ▪ The protection and enhancement of air quality. ▪ The prevention of air pollution and ecological degradation. ▪ Securing ecologically sustainable development while promoting justifiable economic and social development. ▪ Give effect to everyone's right "to an environment that is not harmful to their health and well-being". The NEMAQA is therefore the key legislative framework for managing and controlling air quality in South Africa. The Act plays a critical role in regulating air pollution and ensuring that emissions are minimised to protect human health and the environment. The National Ambient Air Quality Standards as published in GN 1210 of 2009 and GN 486 of 2012 define the priority pollutants as sulphur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter (PM_{10}), particulate matter ($PM_{2.5}$), benzene (C_6H_6) and carbon monoxide (CO). Of these, the NO_2, SO_2, benzene, PM_{10} and $PM_{2.5}$ standards will apply to this project.
National Road Traffic Act, 1996 (Act 93 of 1996)	The National Road Traffic Act, 1996 (Act 93 of 1996) is a key piece of legislation in South Africa that governs road traffic, including the rules for licensing drivers, registering vehicles, and enforcing traffic laws. The Act sets out detailed regulations to enhance road safety, reduce accidents, and ensure the proper management of road traffic. The Act regulates the transportation of goods and passengers, setting rules for the type of vehicles used and the required licenses for professional drivers.
Occupational Health and Safety Act, 1993 (Act 85 of 1993)	The National Occupational Health and Safety Act, 1993 (Act 85 of 1993) (OHSA) and the relevant regulations under the Act apply to the proposed project. This includes the Construction Regulations promulgated in 2014 under Section 43 of the Act. Adherence to South Africa's OHSA and its relevant Regulations is essential.

5.2 PROVINCIAL AND MUNICIPAL LEGAL AND REGULATORY FRAMEWORK

Table 5-2 – Provincial Plans

Applicable Plan	Description of Plan
eThekwini Municipality Integrated Development Plan (2022/23)	The main purpose of the Integrated Development Plan (IDP) is to foster more appropriate service delivery by providing the framework for economic and social development within the municipality. In doing so, it contributes towards eradicating the development legacy of the past, operationalises the notion of developmental local government and fosters a culture of co-operative governance amongst the three spheres. Integrated development planning is a process whereby municipalities prepare strategic development plans for five years. IDPs are the main platform through which the sustainable provision of service delivery could be achieved. They intend to promote coordination between local, provincial and national governments. Once adopted by the Council, these plans should

Applicable Plan	Description of Plan
	inform planning, decision making, budgeting, land management, promotion of local economic development, and institutional transformation in a consultative, systematic and strategic manner. eThekwini Municipality's vision is "*By 2030, eThekwini will enjoy the reputation of being Africa's most caring and liveable City, where all citizens live in harmony".* This will be achieved by growing the municipal economy, providing equal opportunities and meeting the citizens' basic needs in order to enjoy a high quality of life. The strategic delivery of eThekwini's IDP is informed by an 8 Point Plan: ▪ Develop and sustain their spatial, natural and built environment; ▪ Development of a prosperous, diverse economy and creation of employment; ▪ Creating a quality living environment; ▪ Fostering a socially equitable environment; ▪ Creating a platform for growth, empowerment and skills development; ▪ A vibrant and creative city – the foundation for sustainability and social cohesion; ▪ Good governance and responsive local government; and ▪ Financially accountable and sustainable municipality. The proposed project aligns with eThekwini's IDP, particularly from a local economic development perspective.
eThekwini Municipality Spatial Development Framework (2022/2023 – 2026/2027)	The eThekwini Municipal Spatial Development Framework (MSDF) prepares and adopts requirements from the Municipal Systems Act, 2000 (Act 32 of 2000), Spatial Planning and Land Use Management Act, 2013 (Act 16 of 2013) (SPLUMA) and the eThekwini Municipal: Planning and Land Use By-Law (2016). The MSDF supports the implementation of the IDP, by informing spatial distribution of land uses within the Municipality and identifying spaces for transformational targets. The MSDF provides strategic multi-sectoral planning for the Local Area Plans, Precent Plans, Special Projects and Built Environment Performance Plans, Rural Settlement plans and Land Use Schemes. Each plan is then accompanied by its land use proposals and detailed implementation plans with proposed projects to be implemented to reach these targets. The MSDF has the following benefits: ▪ It facilitates effective use of scarce land resources; ▪ It facilitates decision-making concerning the location of service delivery projects; ▪ It guides public and private sector investment; ▪ It strengthens democracy, inclusivity and spatial transformation; ▪ It promotes intergovernmental coordination on spatial issues; ▪ It serves as a framework for the development of lower-order plans and Scheme and is the basis for land development decisions; and ▪ It guides and informs the spatial location of municipal infrastructure investment and spatial priorities; and provides visual representation of the desired urban form of the municipality in the short, medium and long term. The MSDF notes that Maydon Wharf forms part of the PoD, which is the primary contributor to eThekwini's economy, and which is of provincial and national significance. Enhanced capacity at the harbour would further aid the MSDF's Strategic Investment Areas.

Applicable Plan	Description of Plan
Durban Metropolitan Open Space System, governed by the Spatial Planning and Land Use Management Act, 2013 (Act 16 of 2013), and implemented through the eThekwini Planning By-law (13 of 2016)	The Durban Metropolitan Open Space System (D'MOSS) is a system of open spaces, comprising 74 671 ha of land and water that incorporates areas of high biodiversity value linked together in a viable network of open spaces. D'MOSS has been mapped by the Biodiversity Planning Branch of the Environmental Planning and Climate Protection Department (EPCPD) using the Systematic Conservation Planning approach, which is recognised by National and Provincial environmental authorities as the accepted methodology for the prioritisation of areas for biodiversity and ecosystem service protection in South Africa. Since the proposed project site is situated within an Estuarine Zone, it is included in the D'MOSS. Regarding this, the Ethekwini Municipality submitted a letter indicating that since the site has been previously disturbed, as it is used for docking ships and vessels, and the proposed development footprint has been previously dredged to acquire the required depth, the municipality does not have any objections to the proposed upgrade and deepening of the TNPA Maydon Wharf, Berths 5 – 11 & 15, provided the relevant approvals be obtained from DFFE, an EMP be compiled, measures are implemented to prevent water pollution, including spill prevention and response plans, etc. See 0 for a copy of the letter.
KZN Amafa and Research Institute Act, 2018 (Act 5 of 2018)	The KZN Amafa and Research Institute Act, 2018 (Act 05 of 2018) was established to recognise the KwaZulu-Natal Amafa and Research Institute as the provincial heritage resources authority for KwaZulu-Natal in terms of Section 23 of the National Heritage Resources Act, 1999, and to amalgamate the Amafa and Research Institute in terms of the KwaZulu-Natal Heritage Act, 2008. The aim of the Institute and Act is to identify, conserve, protect, manage and administer heritage resources, whilst researching and generating relevant knowledge to provide solutions within the field of heritage in the province. The Amafa and Research Institute issued a permit in terms of Section 37 of the KwaZulu-Natal Amafa and Research Institute Act, 2018 (Permit Ref: SAH23/22240 & 23/507) and graded the entire facility as not conservation worthy; however, if any heritage artefacts are found during excavation works, construction will cease, and the find will be reported to Amafa. The requirements of this permit have been included in the proposed project's EMPr.
KZN Export Strategy	The KZN Export Strategy is a strategic framework designed to enhance the export capabilities of KZN, a province in South Africa. The strategy aims to boost the region's participation in global trade by identifying key export opportunities, supporting local businesses, and promoting KZN's competitive advantages. It focuses on expanding market access, improving logistics and infrastructure, and increasing the value-added exports from various sectors such as agriculture, manufacturing, and tourism. Additionally, the strategy involves strengthening partnerships between government, private sector stakeholders, and international markets to foster sustainable economic growth and development in the province. The proposed project will support the KZN Export Strategy.
eThekwini Built Environment Performance Plan (BEPP)	The eThekwini Built Environment Performance Plan (BEPP) is a strategic framework aimed at improving the built environment in the eThekwini Municipality, which includes the city of Durban in South Africa. The BEPP

Applicable Plan	Description of Plan
	focuses on enhancing urban development, infrastructure, and service delivery to foster sustainable growth and improve the quality of life for residents. It aligns with national policies and goals to promote spatial transformation, economic development, and social inclusion. The plan addresses key issues such as urban regeneration, housing, transportation, and public facilities, with an emphasis on creating a more efficient, resilient, and inclusive urban space. It also guides investment in infrastructure and development projects to support economic growth and address challenges related to poverty, inequality, and urbanisation. The proposed project aligns with eThekwini's BEPP, particularly from a local economic growth perspective.

5.3 ADDITIONAL PERMITS AND AUTHORISATIONS

Table 5-3 outlines the additional permit and authorisations required for the proposed development, as well as the relevant CA responsible.

Table 5-3 – Additional Permits and Authorisations required for the proposed development

Permits / Authorisation	Legislation	Relevant Authority	Status
Disposal at Sea Permit	National Environmental Management: Integrated Coastal Management Act (Act 24 of 2008)	DFFE: Oceans and Coast	Submitted

6 BASELINE ENVIRONMENT

The following chapter presents an overview of the physical, biological and socio-economic environment in which the proposed project is located. It is important to gain an understanding of the project area and its surroundings, as it will provide a better understanding of the receiving environment in which the project is being considered.

The description of the baseline environment is essential in that it represents the conditions of the environment before the construction of the proposed project (i.e. the current, or status quo, environment) against which environmental impacts of the proposed project can be assessed and future changes monitored.

The area has previously been studied to some extent and is recorded in various sources. Consequently, some components of the baseline have been generated based on a literature review. However, where appropriate, baseline information has been supplemented or generated by the Specialist appointed to undertake baseline and impact assessments for the proposed project.

6.1 PHYSICAL ENVIRONMENT

6.1.1 PHYSICAL DESCRIPTION OF DURBAN BAY

The following is extracted from the Estuarine Ecology Study compiled by CSIR (CSIR, 2024b) and included in ***0.***

Durban Bay is a large estuarine embayment on the subtropical northeast coast of South Africa. The Bay has been extensively transformed over time through the development of the PoD, which occupies most of the landside part of the Bay, and by urbanisation of the surroundings. Before development, the Bay was characterised by extensive intertidal mud and sandflats, mangrove forests, shallow waters, seagrass (*Zostera capensis*) beds, and freshwater wetlands fringing the Bay.

The pre-development estuarine area is estimated to have been approximately 35 km^2, but is now estimated at 13.5 km^2. Only a small relict of the pre-development intertidal mud and sandflat area (14%) and mangrove forest area (3%; Allan et al., 1999, in CSIR, 2025) remains, while essentially all freshwater wetlands that fringed the Bay have been lost to development, urbanisation, and the canalisation of the lower parts of inflowing rivers. The once extensive seagrass beds have been lost entirely, along with the nursery function they provided for invertebrates and fish. The Bay is now characterised largely by deepwater channels maintained through dredging, while virtually the entire shoreline is armoured by development in some way or other. These changes have altered the character of the Bay and have diminished its ecological value, function, and productivity.

However, despite the transformation, the Bay remains ecologically important at local, regional, and national levels in terms of the ecological goods and services it provides, to the extent it is regarded as a critical (irreplaceable) biodiversity area from a conservation perspective. Durban Bay has a permanent tidal connection to the sea through an Entrance Channel that is armoured by breakwaters. The Entrance Channel serves as the access and exit point for large ocean-going vessels and a range of smaller watercraft. Immediately beyond the Entrance Channel to the Bay widens into the Point Basin, with its western extremity defined by two piers that extend toward one another (Pier 1 Terminal on the southern side and the T-jetty on the northern side) (see **Figure 6-1**). The southern part of the Point Basin connects to the Island View Basin, a relatively insulated part of the Bay.

Beyond the Point Basin is the Pier 1/Pier 2 complex, which comprises two basins. One is armoured on all sides, while a large, tidally exposed sandbank (the Central Sandbank) defines the western and northern sides of the other basin. To the immediate west of the T-jetty is a smaller, unnamed basin that is armoured on all sides except its north-western extremity, which is defined by a small tidally exposed sandbank. The sandbank is part of a larger tidally exposed sandbank, the Embankment/Esplanade Sandbank, which is bisected by the entrance to the Point Yacht Club Basin. The Esplanade Channel extends between the Embankment Sandbank and Central Sandbank and then gives way to Maydon Channel, which is bounded by quay walls (Maydon Wharf Berths 1-11) on its western side and the Central Sandbank on its eastern side.

The Esplanade and Maydon Channels vary in width at spring low tide from approximately 200 – 230 m except at a turning basin (Sugar Turning Basin) at the head of Maydon Channel, where it is roughly 450 m wide. Maydon Channel extends for 2 km before giving way to Congella Basin. The Silt Canal extends from Congella Basin in a south-westerly direction before doglegging in a south-easterly direction. The Central Sandbank gives way to the Bayhead Sandbank along the eastern side of Congella Basin, eventually giving way to a narrow strip of sandy shoreline that stretches to the head of the Silt Canal. The area that essentially defines the break between the Central and bayhead Sandbanks is Little Laboon, a shallow, permanently inundated feature.

The entire western part of the Silt Canal is armoured. There is a Natural Heritage Site that is a protected area comprising intertidal sandflats and mangroves, that extend parallel to but are isolated from the northern part of the Silt Canal.

The distance by boat from the seaward part of the breakwaters to the head of the Silt Canal is approximately 9.7 km. The circumference of the Bay, including the intertidal sandbanks, is 34 km. Almost the entire circumference is armoured, with only 9.6 km comprising soft shoreline. The reported water surface area is roughly 838 ha at spring high tide and roughly 673 ha at spring low tide, although the reported areas vary among different information sources. The difference in surface area between high and low tides is due to the exposure of sandbanks at low tide.

Figure 6-1 – Aerial view of Durban Bay shpowing place names mentioned in the text

6.1.2 HYDROLOGY

The site falls within U60F quaternary catchment in the Pongola - Umzimkulu Water Management Area (WMA) 11. The total catchment area for the Bay is 242 km^2, comprising 14 km^2 catchment for the Amanzimnyama River, 24 km^2 for the Umbilo River, and 81 km^2 for the Umhlatuzana River. The remaining 23 km^2 is comprised mainly by urban and industrial areas to the northwest, north, and northeast of the Bay (CSIR, 1996, in CSIR, 2025).

The lower parts of the rivers are canalised, the Umhlatuzana and Umbilo Rivers joining shortly before discharging at the dogleg of the Silt Canal (the latter rivers are hereafter referred to as the Umhlatuzana/Umbilo Rivers). The Amanzimnyama River discharges into the head of the Silt Canal. Each of the rivers has a permanent, but low-volume base flow. The mean annual runoff is estimated at 66.1 million m^3, with most of the runoff entering the Bay via the rivers mentioned above (Begg, 1978; Ninham Shand, 2007, in CSIR, 2025). Surface runoff from the adjacent urban catchment discharges into the Bay through an estimated 57 stormwater outfalls.

6.1.3 TEMPERATURE AND RAINFALL

The following is extracted from the Modelling of Potential Dredging Impacts Specialist Study compiled by WSP (2023) and from the Climate Assessment Specialist Study and Impact Assessment compiled by Promethium (2023).

Durban Bay experiences a warm maritime climate, characterised by hot summers with high humidity and cooler, drier winters. The region is primarily a summer rainfall zone, with most precipitation occurring from October to March, often in the form of thunderstorms. This seasonal rainfall leads to increased freshwater inflows into the port from surrounding catchments and canals during the summer months.

The mean annual temperature in the Bay area ranges from approximately 10°C to 25°C. Over the past century, the mean annual temperature has increased from around 17.2°C in 1900 to 18.8°C in 2020, reflecting a rise of 0.13°C per decade. Notably, there has been a more pronounced increase of 0.3°C per decade since 1991. Winter temperatures have experienced a greater increase compared to summer temperatures. The impact of this warming trend has been more evident inland, where it is less moderated by the maritime influence that helps regulate coastal temperatures.

Regarding precipitation, the mean annual rainfall in the region varies from 500 mm to over 2 000 m per year. While overall mean annual precipitation has seen a slight increase since around 1950, it has experienced a small but noticeable decline since 1991. Winter rainfall has shown a more significant increase compared to summer rainfall over this period.

6.1.4 WIND FIELD

The following is extracted from the Modelling of Potential Dredging Impacts Specialist Study compiled by WSP (2023).

Wind roses are useful for illustrating the prevailing meteorological conditions of an area, indicating wind speeds and directional frequency distributions. In the following wind roses, the colour of the bar indicates the wind speed while the length of the bar represents the frequency of winds blowing from a certain direction (as a percentage). The prevailing winds at the Bay are mainly from the south to southwest and from the north-northeast to northeast, with the strongest winds occurring in spring and summer (**Figure 6-2**) (van Ballegooyen *et al.*, 2023).

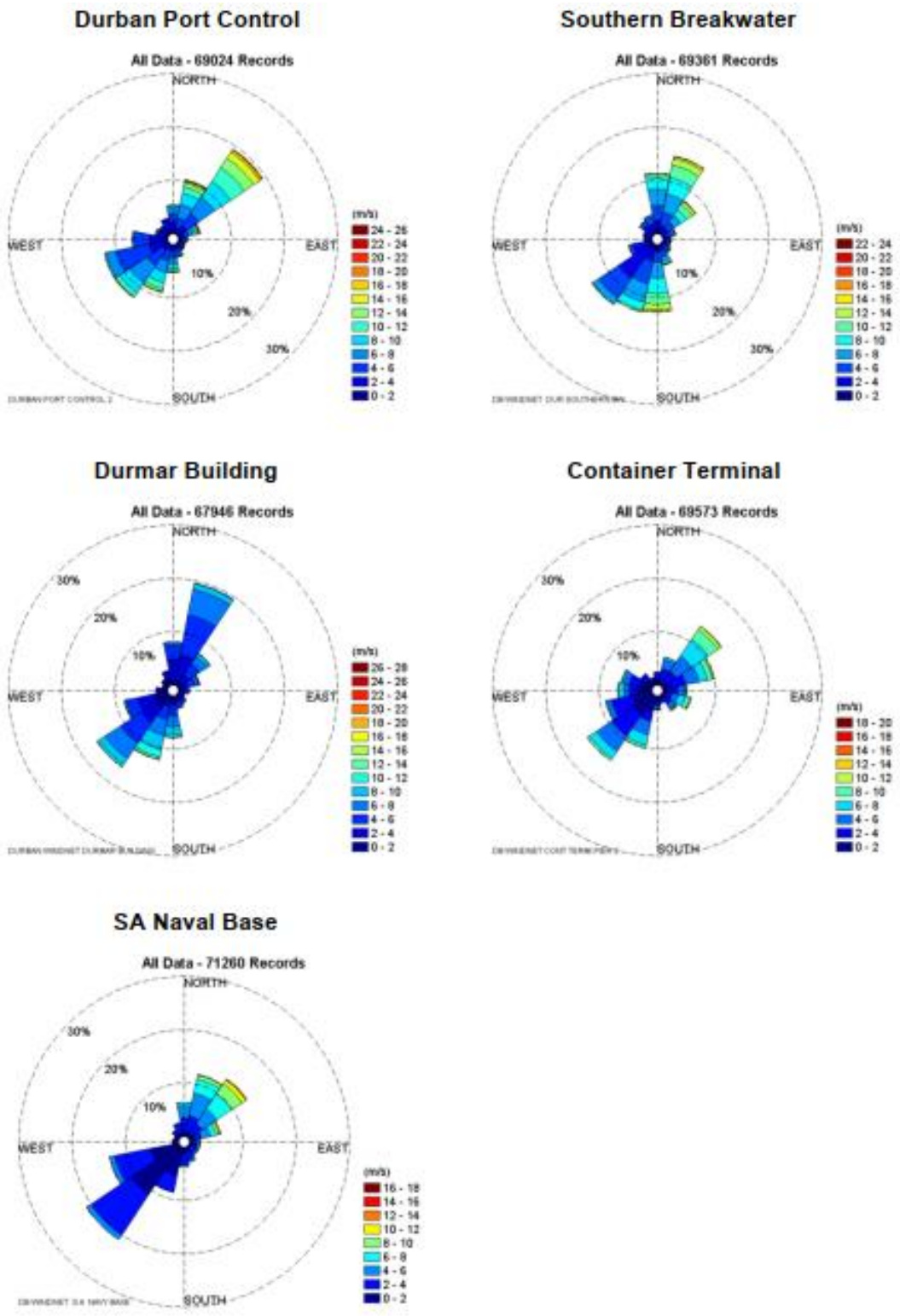

Figure 6-2 - Annual wind roses for various locations in and near Durban Bay for the period June 2010 to Oct 2018 (from van Ballegooyen et al., 2023a, in CSIR, 2024b)

6.1.5 TOPOGRAPHY

The majority of groundcover at the Bay is hardstanding surfaces, i.e., concrete and bitumen-seal. The topography of the Bay has been modified through various dredging and reclamation activities to

facilitate port operations, which have resulted in the creation of storage facilities for cargo, and quays and berths for vessel mooring. Maydon Wharf has a relatively flat topography, with an elevation of approximately 5 meters above sea level.

6.1.6 GEOLOGICAL CONTEXT

The Bay area is situated within the Durban System of the Natal Group, which is part of the Karoo Supergroup. The Karoo Supergroup is a vast sequence of sedimentary rocks that were deposited between the late Carboniferous and early Jurassic periods, approximately 300 to 180 million years ago. The Natal Group is the uppermost unit of the Karoo Supergroup, and it is composed of a series of alternating sandstones, mudstones, siltstones, and coal seams. The site is underlain by Quaternary alluvium and sediments of the Berea formation (2930 Durban, 1:250 000 Geological series), and characterised by greyish sandy, excessively drained soils.

6.1.7 HYDRODYNAMIC FUNCTIONING OF DURBAN BAY

*The following is extracted from the Estuarine Ecology Study compiled by CSIR (CSIR, 2024b) and included in **0**.*

Water circulation in the Bay is largely tidally driven, but with localised effects due to the wind-forcing of surface waters and inflows of freshwater in the upper part of the Bay. Tides in the Bay are semi-diurnal, with a period of approximately 12.4 hours and a range of 0.4 m at neap tide, increasing to 2.3 m at maximum spring tide. The strongest flows are in the Entrance Channel on spring tides (PRDW, 2009, in CSIR, 2024b). Strong tidal flows occur over the shallows adjacent to Esplanade Sandbank and Central Sandbank between Pier 2 and Maydon Channel.

The nature of flushing in Durban Bay (tidal near the Entrance Channel and by freshwater inflows in the upper part) results in a strong gradient in flushing potential. In the Entrance Channel, flushing is strong due to tidal flows. However, in the upper part, the influence of tidal flushing is limited. The fact that freshwater inflows are generally confined to surface layers of the water column means the surface water may be relatively well-flushed in the upper part of the Bay. However, the deeper waters are largely insulated from these flushing effects unless there are very large freshwater inflows (i.e. flushing of deeper waters is mainly tidally and, to a lesser extent wind-driven).

6.1.8 BATHYMETRY AND SUBSTRATE

*The following is extracted from the Estuarine Ecology Study compiled by CSIR (CSIR, 2024b) and included in **0**.*

The deeper parts of Maydon Channel and Congella Basin range from -12 m to -15 m Chart Datum. The depth decreases sharply where channel slopes rise to the intertidal of the Central and Bayhead Sandbanks on the eastern side of Maydon Channel and Congella Basin.

The Maydon Wharf Terminal precinct, as with most of Durban Bay, is underlain by Cretaceous bedrock between approximately 27 to 33 m below existing ground level. This is overlain by the so-called Harbour Beds, which comprise numerous lenses of sand, clay-rich sand, and silt, with subordinate lenses of clay of alluvial and estuarine origin. Overlying this natural sediment succession is made ground and fill, comprising reclaimed and/or reworked materials of mixed origin, mostly sediment dredged from the Bay, and, in places, of substantial thickness (WSP, 2014; TNPA, 2021, in CSIR, 2024b).

Previous sediment surveys conducted at the Bay indicate that sediment in the subtidal in the upper part of the Bay is muddier than in the lower part. The highest contribution of mud to the bulk weight of

sediment is generally evident in the Silt Canal and Congella Basin but is also high in parts of Maydon and Esplanade Channels. Sediment in the intertidal and shallow subtidal is generally sandier than sediment in the deeper subtidal.

Sediment collected in the proposed dredging and construction footprint for the proposed upgrade and deepening of Maydon Wharf Berths 5- 11 & 15 in May 2024 was dominated by mud, which contributed 71.6 - 93.8% of the bulk sediment weight (CSIR, 2024a).

6.1.9 WATER QUALITY

*The following is extracted from the Estuarine Ecology Study compiled by CSIR (CSIR, 2024b) and included in **0**.*

There is a large amount of information on water quality in Durban Bay, generated through monitoring commissioned by TNPA and independent research by various organisations. In summary, the water quality, for the water quality indicators most relevant to the proposed project, can be summarised as follows:

- Water quality in the upper part of Durban Bay is more often and more significantly impaired than water quality in the lower part of the Bay. This is largely due to:
  - more anthropogenic sources of contaminants, and more vectors (which are the Amanzimnyama, Umhlatuzana and Umbilo Rivers) that introduce anthropogenic contaminants to the upper part of the Bay compared to the lower part. Water (and sediment) quality is known to be impaired in the rivers (e.g., Newman et al., 2015, in CSIR, 2024b).
  - more anthropogenic contaminants are introduced in surface runoff that flows into the Bay, introduced from frequent sewer reticulation system failures, vessel maintenance and construction operations, and the spillage of bulk cargo during vessel loading and offloading.
  - the channel-like morphology of the upper part of the Bay increases the residence time of water in this part. The long residence time promotes the retention of contaminants in the water column and facilitates the settling and accumulation of contaminants in sediment in this part of the Bay.
- For the stations associated with the Maydon / Esplanade Channel, water quality measured near the surface and bottom of the water column between October 2008 and September 2022 indicates that:
  - the salinity ranges between 21 and 35;
  - the pH ranges between 7.8 and 8.4;
  - the dissolved oxygen concentration is variable. The minimum dissolved oxygen concentration recorded near the surface and bottom of the water column at the relevant stations was <5 $mg.L^{-1}$, and as low as 3.39 $mg.L^{-1}$ at the point where Congella Basin meets Maydon Channel;
  - the median turbidity measured in surface and bottom water is 4 Nephelometric Turbidity Units (NTU) and 10 NTU, respectively;
  - the median for dissolved inorganic nitrogen and orthophosphate concentration is 10 µM and 2 µM, respectively;
  - for metals, concentration of cadmium, chromium, mercury, and lead was usually too low to measure accurately in the laboratory. The concentrations of certain metals, such as copper and zinc, do, however, suggest they are contaminants in the water column at times, likely stemming from the water quality in the rivers. All mercury concentrations were above the water quality guideline. However, the mercury guideline is very low, at 0.016 µg.L-1. To place this into

perspective, the existing guideline for mercury is 0.4 µg.L-1. All mercury concentrations were lower than the latter guideline; and

- toxicity testing of surface water sampled at 15 stations in summer and winter in 2024 indicated that toxicants entered the Silt Canal via one or more of the Amanzimnyama, Umbilo, and Umhlatuzana Rivers. The toxicants could not be identified, but did not enter the Maydon Channel.

In summary, water quality near the dredging and construction footprint for the proposed upgrade and deepening of Maydon Wharf Berths 5 - 11 & 15 is periodically impaired. A considerable component of the impairment reflects contaminants and other matter introduced to the port by rivers that flow into the Silt Canal and then go on to affect the upper part of the Bay, and via stormwater flows from surrounding urban areas. Surface water near the dredging and construction footprint has rarely been identified as toxic to sea urchin embryos and larvae, but when toxicity was evident it was usually classified as slight apart from near Berth 15 in Congella Basin, where toxicity was evident more often and to a slightly greater magnitude. The existing water quality does not thus present a significant impediment to dredging and construction activities for the proposed project.

6.1.10 SEDIMENT CHEMISTRY

The following is extracted from the Sediment Assessment Study compiled by CSIR (CSIR, 2024a) and included in **0**.

Physical and chemical analysis and toxicity testing of sediment sampled in May 2024 was undertaken in the proposed Maydon Wharf Berth 5 - 11 & 15 upgrade and deepening dredging footprint area. The sampling points are indicated in **Figure 6-3**. Sediment sampled was analysed for its grain size, total organic carbon content, and the concentrations of 15 metals. Elutriates of the sediment were tested for toxicity using the sea urchin embryo-larval toxicity test.

The results of the assessment indicated that:

- The sediment at all stations was dominated by mud.
- The sediment at a station in Congella Basin (Station 15) was significantly enriched with particulate organic matter, but not the sediment at stations in Maydon Channel.
- Apart from the chromium concentration in sediment at three stations (Stations 6, 9 and 15) and the zinc concentration in sediment at one station (Station 6), metal concentrations were within the baseline range for Durban Bay.
- In the case of the enriched metal concentrations, they fall only slightly above the baseline range and reflect low level contamination. Metal concentrations in the sediment were below sediment quality guidelines that the Department of Forestry, Fisheries and the Environment uses to decide if sediment identified for dredging in South African ports is suitable for open water disposal.
- Undiluted elutriates prepared using sediment sampled at four stations were slightly or marginally toxic, but not those prepared using sediment sampled at other stations. The 75% and 50% strength elutriates for the four stations were not toxic. The proportion of embryos that developed to a normal 4-arm pluteus in the 100% elutriate was not reduced by >20% relative to the control treatment and a 25% dilution of the elutriates was sufficient to render the elutriates non-toxic.
- Acute toxicity is not anticipated when sediment dredged in the proposed dredging footprint is disposed at the open water dredged material disposal site off Durban. The sediment is also unlikely to pose a risk if it is placed elsewhere in Durban Bay.
- However, based on historical data, the sediment used for placement in Durban Bay should ideally exclude that dredged in Congella Basin, where contamination has been pronounced in the past.

Figure 6-3 - Durban Bay showing the positions (stations) where sediment was sampled

6.1.11 OFFSHORE DREDGED MATERIAL DISPOSAL SITE

The sediment dredged for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 will be disposed at a registered open water dredged spoil disposal site off Durban. The disposal site is approximately 3.8 km to the east-southeast of the entrance to Durban Bay, in water of 70 - 90 m depth. The site, which has a surface area of 9.6 km^2, is divided into two unequal sized parts; the part nearest the shoreline is reserved for the disposal of solid objects, such as blocks of concrete, while the part furthest from the shoreline, which constitutes the largest part of the site, is reserved for the disposal of sediment. The disposal site has been used for many years for the disposal of sediment that is routinely maintenance dredged, and periodically capital dredged in the Bay.

The CSIR (2018) (in CSIR, 2024b) sampled surficial sediment at eleven sites (three stations per site) on and near the dredged spoil disposal site in March 2018. The sediment at each site was dominated by sand, which contributed 82.9 - 94.9% of the bulk sediment weight. Fine-grained sand was the dominant grain size class at 27 of the 33 stations followed by medium-grained sand, and vice versa for the remaining stations. The total organic content of the sediment was low (maximum contribution of 0.78%).

The concentrations of several metals in the sediment collected by the CSIR in 2018 (CSIR, 2018, in CSIR, 2024b) were higher than the baseline concentration. However, the sites where metal concentrations were higher than the baseline were not always on the dredged spoil disposal site, and the actual metal concentrations were not much higher than the baseline. The highest cumulative number of metals that were higher than baseline concentrations was 13 (out of a possible 32 for the three stations per site) at a site on the disposal site, followed by 11 at another site on the disposal site. The metal that was most often at a concentration higher than the baseline was copper, at 15 stations at six sites, followed by zinc at eight stations at four sites, and barium at seven stations at three sites. Copper and zinc are amongst the most significant and widespread contaminants of

sediment in Durban Bay. The logical conclusion is the concentrations of these (and other) metals higher than the baseline in sediment on the disposal site reflects their transfer to the disposal site in dredged sediment. There were, however, enrichment trends for other metals that are not easily related to dredged sediment disposal. Barium, for instance, was only found at a concentration higher than the baseline in sediment at sites off the disposal site.

Metal concentrations in the sediment were well below Action Levels used by the DFFE to regulate the disposal of sediment dredged in South African ports. Apart from arsenic and mercury, metal concentrations were also below the more conservative (environmentally protective) sediment quality guidelines derived by Long et al. (1995) (in CSIR, 2024b) for use in North American coastal waters. The arsenic concentration in one sediment sample slightly exceeded, and the mercury concentration in another sample significantly exceeded the Effects Range Low of the Long et al. (1995) (in CSIR, 2024b) sediment quality guidelines. In each case this was for sediment collected at a site in the middle part of the dredged spoil disposal site. The inference is metals do not accumulate to concentrations in sediment on the dredged spoil disposal site that are likely to pose a toxic risk to sediment-dwelling organisms.

6.2 BIOLOGICAL ENVIRONMENT

6.2.1 MICROALGAE

*The following is extracted from the Estuarine Ecology Study compiled by CSIR (CSIR, 2024b) and included in **0**.*

Microalgae are single-celled plants that live independently or in colonies. Microalgae that remain suspended in the water column are referred to as phytoplankton, while those that live on the bottom are referred to as microphytobenthos. Microalgae are so small they are usually invisible to the naked eye, but they may become visible when they form colonies or when they are present at such high abundances in the water column (called a bloom) that they discolour the water (usually a green colour). They may also reach such high abundances in the intertidal that they discolour the sediment (also usually a green colour).

Microalgae are important to the ecological functioning of estuaries by contributing to the primary productivity of these systems (i.e., they form the base of food webs). Their photosynthetic activity also contributes dissolved oxygen to the water column in daylight hours.

Chlorophyll-a, the main green pigment in plants that is responsible for photosynthesis, is used as surrogate measure of phytoplankton and microphytobenthic biomass. The chlorophyll-a concentration measured in the water column in Durban Bay by the CSIR over an extended period has showed that the concentration in parts of the Bay is often high, indicating the phytoplankton often reach bloom status. This is not surprising considering the high nutrient concentrations in the water column and the long retention time of water in parts of the Bay.

Although phytoplankton blooms are not in and of themselves not problematic, if they occur frequently, they indicate there are water quality problems. Intense phytoplankton blooms may lead to a host of ecological problems, such as the development of very low dissolved oxygen concentrations at night when the phytoplankton cease to produce dissolved oxygen but rather consume it. A phytoplankton bloom in the upper part of Durban Bay was considered the proximal cause of a particularly serious fish kill in December 2007 (Newman et al., 2008, in CSIR, 2024b).

Microphytobenthos live in the surface few centimetres of bedded sediment where there is adequate light. Since they rely on sunlight for photosynthesis, microphytobenthos are limited to relatively shallow

and quite clear waters. Apart from their role in primary productivity and forming the base of food webs, they also perform an important (bio)stabilising effect on sediment. Benthic diatoms, for example, produce extracellular polymeric substances that create a biofilm on the sediment surface that increases the critical threshold for erosion, thereby reducing bed erosion and sediment resuspension (Malarkey et al., 2015; Parsons et al., 2016, in CSIR, 2024b).

Microphytobenthos are cited as particularly important contributors to the primary productivity in Durban Bay (e.g. MER/ERM, 2011, in CSIR, 2024b), but as far as the scientists that prepared the specialist study could establish their contribution to primary productivity relative to other primary producers in the Bay has not been quantified.

Central Sandbank is cited by MER/ERM (2011) (in CSIR, 2024b) as the intertidal area in Durban Bay with the highest diversity and abundance of microphytobenthos. Microphytobenthos are restricted to the intertidal and shallow subtidal because the available amount of sunlight required for photosynthesis diminishes with increasing water depth. Shallow pools that form on sandbanks at low tide are considered to offer a favourable microhabitat for microphytobenthos, but they are known to photosynthesise at low tide in the absence of such pools.

The Central Sandbank is shallow at high tide, and there are only short-lived turbid (i.e., light-reducing) conditions after major inflows of river water into the Bay in summer (MER/ERM, 2011, in CSIR, 2024b), further allowing photosynthesis. Clark et al. (2017) (in CSIR, 2024b) measured the chlorophyll-a concentration in sediment sampled seasonally at stations in the intertidal and shallow subtidal in Durban Bay between 2014 - 2016. The chlorophyll-a concentration (biomass) in intertidal sediment was highest at stations near the Bayhead mangroves and on parts of the Central Sandbank. The highest microphytobenthic primary productivity is thus in these areas.

6.2.2 MACROALGAE

*The following is extracted from the Estuarine Ecology Study compiled by CSIR (CSIR, 2024b) and included in **0**.*

Macroalgae (seaweeds) are an insignificant component of the primary producer community in Durban Bay, being largely restricted to floating structures (e.g. navigation markers, walk-on moorings in yacht moles) apart from hard structures (e.g. breakwaters) in the entrance channel (CSIR, personal observation, in CSIR, 2024).

Macroalgae thus contribute insignificantly to the primary productivity in the Bay. In the dredging and construction footprint for the proposed upgrade and deepening of Maydon Wharf Berths 5 - 11 & 15, the only significant macroalgal presence is *Ulva* spp that manages to grow at and slightly below the water line on navigation markers in Maydon Channel and Esplanade Channel.

6.2.3 MANGROVES

*The following is extracted from the Estuarine Ecology Study compiled by CSIR (CSIR, 2024b) and included in **0**.*

Mangroves are the most conspicuous component of the primary producer community in Durban Bay. White (*Avicennia marina*), black (*Bruguiera gymnorhiza*), and red (*Rhizophora mucronata*) mangroves are represented, but red mangroves are uncommon. The extant mangroves are a remnant of the once extensive mangrove stands that characterised the Bay, with estimates that these represent only 3% (Allan et al., 1999, in CSIR, 2024b) of the pre-development mangrove extent. The largest area of extant mangroves is at the Natural Heritage Site in the Bayhead area, the only other area of

significance for mangroves being in the Silt Canal. Here, however, the mangrove stands are restricted to a narrow band along the edge of the water in parts of the canal, or the trees occur individually.

Mangroves are recognised for their contribution to the ecology of coastal ecosystems. Apart from contributing to the primary productivity of the Bay, mangroves provide important, and in some cases, essentially critical habitat for a range of crabs and other invertebrates.

6.2.4 ZOOPLANKTON

*The following is extracted from the Estuarine Ecology Study compiled by CSIR (CSIR, 2024b) and included in **0.***

Apart from work on postlarval prawn (Forbes et al., 1994, in CSIR, 2024b) and larval fish (Harris and Cyrus, 1999, in CSIR, 2024b) recruitment into Durban Bay, there is little published information on the zooplankton of Durban Bay. In the early 1990's, Dr Alan Connell from the CSIR reported the presence of an alien copepod species (*Acartia spinicauda*) in the Ports of Richards Bay and in Durban Bay. This species was most probably introduced through ships' ballast water. Information on its abundance in Durban Bay is not available.

6.2.5 BENTHIC INVERTEBRATES (MACROFAUNA)

*The following is extracted from the Estuarine Ecology Study compiled by CSIR (CSIR, 2024b) and included in **0**.*

Durban Bay provides extensive sediment habitat for benthic and epibenthic invertebrates. The term benthic macrofauna is commonly used to refer to invertebrates >0.5 mm that live in and on sediment in aquatic ecosystems. They fulfil many ecological roles in estuaries, forming a link between lower trophic levels and fish and birds. They are particularly important in the diets of juvenile fish that use estuaries as nurseries. They are widely used as indicators of the status of benthic environments.

Benthic macrofauna communities across large parts of the Bay are undoubtedly fundamentally shaped by ongoing disturbances that include vessel propeller wash, maintenance dredging, and pollution. In navigation channels and alongside berths, the communities are undoubtedly in a (semi-) permanent state of flux because of vessel propeller wash and maintenance dredging. In less disturbed parts of the Bay, the communities will be less impacted by these disturbances, but may be impacted by pollution or other disturbances.

Overlying these anthropogenic disturbances are natural events, such as floods, that also affect these communities, although the degree to which these events can be described as natural is debatable, considering ongoing development in catchments has modified their influence compared to the situation before development (e.g. by delivering more suspended sediment due to erosion).

The CSIR (CSIR, unpublished data) analysed benthic macrofaunal communities in subtidal sediment sampled at 17 stations in Durban Bay in annual surveys between 2015 - 2019 (CSIR, unpublished data). The stations where the sediment was sampled are identical to those where sediment was sampled for physical and chemical analysis. The benthic macrofauna were identified to the family level rather than the species level.

If diversity is used as an indicator of the health of these communities, the most impacted communities were in the Silt Canal, near the Moore Road Culvert in Maydon Channel, and in the Point Yacht Club Basin. A feature at numerous stations is the high level of variability in various univariate indices at any station amongst surveys. The causes of the variability are uncertain, but at the latter stations, there is little doubt that this was a consequence of pollution, as the sediment at these stations was highly

anoxic. However, other factors, such as periodic maintenance dredging, undoubtedly influence benthic macrofaunal communities in the Bay.

The benthic macrofaunal communities in deepwater parts of the Bay characterised by various forms of anthropogenic disturbance are largely comprised largely of short-lived, fast-growing species. No species of special conservation interest were found in the sediment – the species are common in estuaries and/or the nearshore marine environment along the KwaZulu-Natal coastline.

6.2.6 MACROCRUSTACEANS

*The following is extracted from the Estuarine Ecology Study compiled by CSIR (CSIR, 2024b) and included in **0**.*

The macrocrustaceans (prawns and crabs) of Durban Bay have attracted little scientific attention apart from the burrowing sandprawn *Krausillichirus kraussi* (previously *Callianassa kraussi* and *Callichirus kraussi*) and, in times past, swimming prawns. The Bay once supported an abundance of swimming prawns, to the extent it supported a small push net fishery for ginger shrimp (P*enaeus japonicus*) (Joubert, 1964; cited in MER/ERM, 2011, in CSIR, 2024b). Although swimming prawns are still found in the Bay, their abundance appears to be much lower than previously reported. The decline dates back over 50 years, exemplified by the collapse of the ginger shrimp push-net fishery. The decline was probably associated with habitat loss and the loss of the once extensive seagrass beds in the Bay.

A diversity of other macrocrustaceans nevertheless persists. While some have a strong association with the remaining mangrove habitat in the Bay, such as sesarmid and most fiddler crabs, others, such as the sandprawn, sentinel crabs, soldier crabs, and spotted lunar crabs, have greater dependencies on sandbanks in the Bay. The presence of these crustaceans depends on the availability of suitable intertidal sandbanks and mudflat habitat. Relatively few species of macrocrustacea are found in the deepwater channels, which are subject to disturbance by intermittent dredging and more regular propeller wash. This said, the mud prawn (*Upogebia spp*) is known to inhabit muddier subtidal sediment in some parts of the Bay (evidence from juveniles periodically encountered in grab samples), but information on its abundance and distribution is virtually unknown as the adults are not effectively sampled by the traditional equipment used to sample benthic macrofauna.

The sandprawn *Krausillichirus kraussi* is an important component of the macrocrustacea in Durban Bay. The role of this sandprawn as a bioturbator is well documented (Siebert and Branch, 2007; Pillay and Branch, 2011, in CSIR, 2024b). These activities have been shown to be particularly important on sandbanks in the Bay, affecting benthic macrofauna, fish, and bird communities (Pillay et al., 2007a,b, 2008, in CSIR, 2024b). They are an important food resource for numerous fish species and are heavily exploited as a bait organism for angling.

Although the sandprawn does not depend on intertidal sediment for its survival, it prefers a sandy substrate, which is largely restricted to intertidal and shallow subtidal areas in Durban Bay. The soldier crab *Dotilla fenestrata* is another important component of the sandbanks. These crabs work the surface of the sediment as they feed on microalgae, releasing nutrients in the process. Fiddler crabs are generally restricted to areas near mangroves, although *Austruca occidentalis* is also found in the intertidal far from mangroves. Soldier and fiddler crabs are an important prey item for birds.

6.2.7 FISH

*The following is extracted from the Estuarine Ecology Study compiled by CSIR (CSIR, 2024b) and included in **0**.*

The fishes of Durban Bay have attracted considerable scientific attention, partly because they support a popular (and economically important) recreational fishery (Guastella, 1994, in CSIR, 2024b) and a growing subsistence fishery, and partly because they are biological indicators of the state of the Bay environment. Consequently, relatively good information exists on fish species that occur in the system. Using species lists provided by Hutchings et al. (2022) (in CSIR, 2024b), but omitting some species whose larval presence does not necessarily infer the presence of juveniles or adults, and correcting for other species known to occur in the Bay, it is apparent that a total of eight fish species are listed as Near Threatened, seven species as Vulnerable, seven species as Endangered, and two species as Critically Endangered in the IUCN Red Listing (see Table 6 in **0**).

Nine of these fishes have clear estuarine affinities, and although the Bay, in its modified state, is undoubtedly more marine than it was in its pre-development condition, one of its primary ecological values remains that of serving as a nursery for estuarine fishes (and crustaceans, above). This is underpinned by recruitment from the sea of marine-spawned, estuarine-dependent species into the Bay, and the natural habitats within the Bay itself that serve as nursery areas (feeding and predation refuge) for juvenile and subadult fishes.

Harris and Cyrus (1999) (in CSIR, 2024b) sampled ichthyoplankton in the Entrance Channel to the Bay in 1991 - 1992. Connell (2012) (in CSIR, 2024b) sampled the same area for fish eggs and larvae from 1990 - 1994. In both studies, marine (estuarine-independent) forms dominated the number of species sampled, reflecting the marine nature of the system's lower part. However, there was a strong presence of fish species that depend on estuaries at some stage in their life cycle, pointing to the systems estuarine characteristics.

A better reflection of the estuarine nursery value of Durban Bay comes from surveys targeting the later life stages of fish – juveniles, sub-adults, and adults. As is the case for early life stages (eggs and larvae), marine forms dominate in terms of the number of species, if a full species list of fish in the system is considered.

However, much of this diversity arises from species reported in the early 1950's (Day and Morgan, 1956, in CSIR, 2024b) from structured artificial habitats in the lower part of the Bay. Moreover, in terms of fish abundance, estuarine resident and estuarine associated marine species have always far exceeded that for estuarine-independent marine species (Day and Morgan, 1956; Guastella, 1994, Graham, 1994, Beckley et al., 1995, Cyrus and Forbes, 1996; Forbes et al., 1996, Newman et al., 2008, Hutchings et al., 2022; in CSIR, 2024b). Further evidence of the inherently estuarine character (and value) of the Bay comes from the fisheries it supports, which are strongly based on catches of estuarine-dependent fishes (e.g. Spotted grunter *Pomadasys commersonnii*, Natal stumpnose *Rhabdosargus sarba*, Kingfish *Caranx spp*., various mullet species).

An added consideration in the case of Durban Bay is that it appears to be important as an area holding breeding stock of at least some strongly estuarine-dependent marine fishes. In South Africa, fish that spawn and complete their life cycles in estuaries make up the minority of species found in these systems. They are typically small-bodied fishes, including gobies (Gobiidae), glassies (Ambassidae), and seahorses.

Most fish in estuaries are species that breed and spawn in the sea and use estuaries as a nursery area for juveniles. They differ in their degree of estuarine dependence, including marine fish whose juveniles depend wholly, mainly, or weakly on estuaries. They typically leave estuaries after 1 - 3 years, returning to the sea to mature and spawn. Some may return to estuaries after spawning and use these systems intermittently as feeding grounds. These typically include larger-bodied fish, such as mullets (Mugilidae), seabreams (Sparidae), grunters (Haemulidae), and kingfishes (Carangidae).

A few of these species, in a few systems, are known to spawn in estuaries, mostly near the mouths, or in the lower reaches of large systems. Connell (2012) (in CSIR, 2024b) sampled pelagic eggs in the Entrance Channel to Durban Bay from 1990 - 1994 and found that eggs of estuarine bream *Acanthopagrus vagus* were the most common in the samples. The abundance of these eggs in outflowing waters of the Bay signifies its importance as a sheltered habitat holding the key stock of this species on the KwaZulu-Natal coast south of Richards Bay (Connell, 2012, in CSIR, 2024b). This is significant given the historic decline of estuarine bream in South Africa (Mann et al., 2014, in CSIR, 2024b).

Of relevance here is that these fishes, like many of the macrocrustaceans, have a far greater dependency on the sandbanks and mudflats than on deepwater channels in Durban Bay. Adults and late juveniles of some species may well feed in deep waters, but are more likely to use deep waters as transit areas to access preferred feeding areas on the sandbanks and mudflats. The early juveniles of all estuarine-associated species will also occur almost exclusively in shallow water habitats in the Bay. The importance of the sandbanks to fishes is thus obvious. Fish communities in the intertidal are not homogenous in the Bay, displaying species-specific habitat preferences and heterogeneity in spatial distribution (Newman, 2008; Hutchings et al., 2022, in CSIR, 2024b).

6.2.8 MARINE REPTILES

*The following is extracted from the Estuarine Ecology Study compiled by CSIR (CSIR, 2024b) and included in **0**.*

No surveys or other information on marine reptiles (e.g. turtles) in Durban Bay could be found in peer-reviewed scientific journals or other literature. They are likely to occur in the Bay, but incidentally and infrequently.

6.2.9 AVIFAUNA

The following is extracted from Avifauna Impact Assessment Study compiled by Anchor Environmental Consultants (Anchor Environmental, 2023)***.***

Five natural and semi-natural areas that serve as avifauna habitats within Durban Bay have been identified through previous avifaunal surveys. These are Centre Bank, Bayhead, Fish Wharf and Yacht Basin, Sporting Bodies and Pelican Island, and the harbour (open water). These areas provide essential habitats such as intertidal sand and mud flats, mangrove forests, small islands, semi-natural shorelines, and open water. Durban Bay remains a critically important estuary, ranked as the 10th most significant estuary in South Africa.

The sandbank habitats within the port are vital for the region's ecological balance. These sandbanks are exposed at low tide and play a significant role in the recycling of nutrients and organic matter from both terrestrial and marine sources. The sandbanks support diverse invertebrate fauna and are essential feeding grounds for fish and birds, thus maintaining biodiversity within the port. These habitats have been identified for conservation in both the Bay of Natal Estuary Management Plan and the Draft Durban Bay Estuarine Management Plan. Additionally, Durban Bay is included in the South

African National Biodiversity Assessment as a priority estuary requiring partial protection to ensure the conservation of its biodiversity.

Between March 1999 and September 2022, 232 358 birds were recorded at Durban Bay, with 46% of these counted at Centre Bank and Little Lagoon (**Figure 6-1**). Waders and wading birds represented around 51% of the total species recorded, with 28 species of waders (28.6%) and 22 species of wading birds (22.4%) (**Figure 6-4**). The most common bird groups in the region were piscivores (44%) and invertebrate feeders (39%) (**Figure 6-4**). The Charadriiformes group, including waders, gulls, and terns, is the most species-rich in the port.

Over 110 water-associated bird species have been recorded in the port, including 17 Red Data species. 62 species are listed in the Bonn Convention's annex on migratory waterbirds. Endemic species in the port are relatively few, with only four, namely the Cape cormorant, Cape gannet, Cape shoveler, and Hartlaub's gull. Bird numbers show seasonal variation, with higher numbers in the warmer summer months (September to April), coinciding with the migration period for waders (which make up 30.3% of bird numbers during summer).

Spatially, bird numbers were higher at Centre Bank and Little Lagoon (mean 369 ± 189) compared to the Mangroves (mean 214 ± 90) and Northern Bank (mean 136 ± 83) sites. This highlights the critical role of Centre Bank as an avian habitat. Particularly, migratory waders and other estuarine-dependent species rely heavily on this area for feeding and roosting. Disturbances to the Centre Bank could have significant impacts on the overall avian community structure in Durban Bay.

The Centre Bank also serves as a crucial roosting site for gulls and terns, especially for the Kelp Gull (which has regionally and globally significant numbers) and Swift Terns (both resident and migratory). The relative isolation of the Centre Bank compared to other intertidal flats may enhance its appeal to birds. In contrast, the open harbour waters had a much lower average bird abundance, accounting for just 13% of the recorded birds.

Long-term historic data reveals a steep downward trend in migratory wader abundance, with average migratory wader numbers declining some 55%, from 3 400 in 1999-2000 to 1 524 in 2021-2022. Similarly, the number of migratory species visiting the port each year has also decreased over this period, from 16 to 13 species. For example, Curlew Sandpiper numbers had dropped from an average of 1 584 birds in 2000/2001 to 205 birds in 2021/2022. Decreasing numbers of migrant waders utilising the PoD reflect a global trend, which can be attributed to loss of breeding habitat and hunting along their migration routes, as well as human disturbance and habitat loss on their wintering grounds.

Anthropogenic pollution of the port (i.e., the summer grounds) must also be taken into consideration when assessing population patterns and habitat use. Resident wader abundance in the port is generally much lower than that of migratory waders and has remained relatively stable with an annual average count of 767 ± 223 birds since 1999-2000; however, the number of species has decreased slightly.

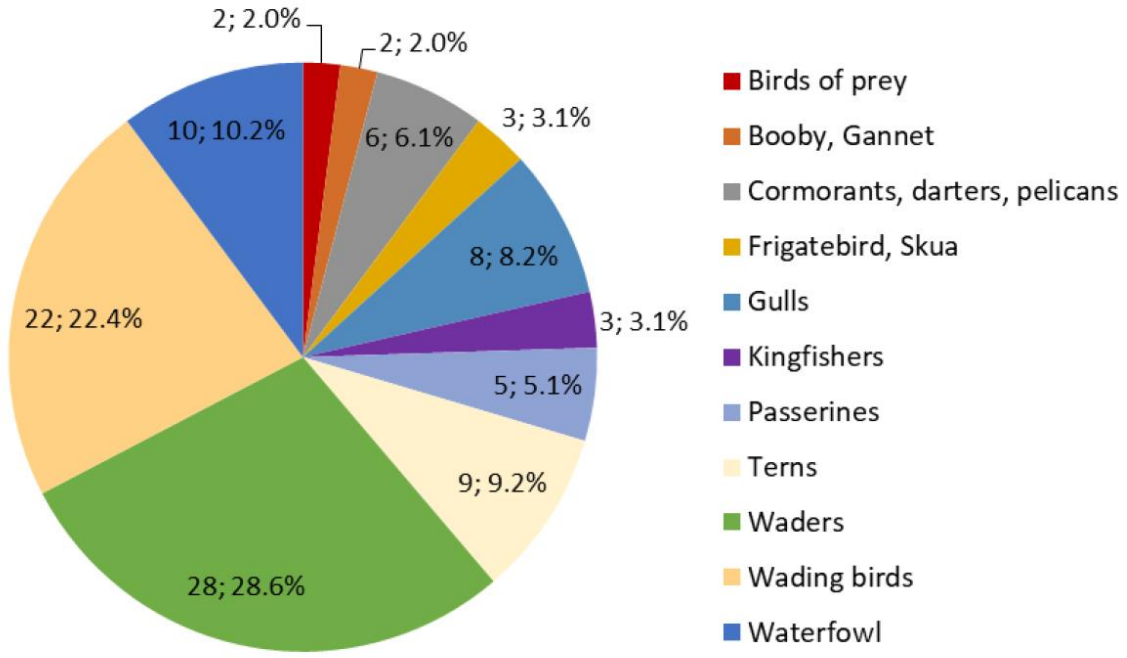

Figure 6-4 – Number of avifauna species (number, percentage) per taxonomic group found during monthly counts between 1999 and 2022 (Anchor Environmental, 2023)

6.2.10 MARINE MAMMALS

*The following is extracted from the Estuarine Ecology Study compiled by CSIR (CSIR, 2024b) and included in **0**.*

No surveys or other information on marine mammals in Durban Bay could be found in scientific journals or other literature. However, Humpback Dolphin (*Sousa plumbea*) are known to make periodic forays into the Bay and are regularly sighted in or near the mouth of the Entrance Channel (Steven Weerts, personal observation, in CSIR, 2024b). The humpback dolphin is a species recognised as Vulnerable in South Africa (South African Red Data, Friedman and Daly, 2004, in CSIR, 2024b) or globally as Endangered (IUCN, Braulik et al., 2017, in CSIR, 2024b).

Various whale species are common in the waters off Durban, including Southern Right, Humpback, Brydes, and Minke whales. Other whales also occur off the KwaZulu-Natal coast, but usually further offshore. The presence of Southern Right and Humpback whales in waters off Durban is strongly linked to migration – northwards for breeding purposes and southwards to Antarctic waters for feeding. The main migration period for both species is between June and November. Brydes and Minke whales can be found along the KwaZulu-Natal coast throughout the year, but are not particularly common off Durban Bay (CSIR, personal observation, in CSIR, 2024b).

6.2.11 ECOLOGICAL VALUE AND SIGNIFICANCE OF DURBAN BAY

Durban Bay is one of only three estuarine Bays in South Africa, the others being Richards Bay in KwaZulu-Natal and Knysna Lagoon on the southern Cape coast. In the conservation planning lexicon, it thus constitutes irreplaceable habitat. Indeed, Durban Bay is identified as an Irreplaceable Area in the KwaZulu-Natal Marine Systematic Conservation Plan (2012). Irreplaceable Areas represent the only area/s for which the biodiversity targets for one or more biodiversity features contained within can

be achieved (i.e. there are no alternative sites available to achieve these targets). Despite the Bay being transformed to a degree, it bears little resemblance to its pre-development state, it nevertheless retains an important ecological value and remains an estuary of local, regional, and national significance (MER/ERM, 2011, in CSIR, 2024b).

Durban Bay is the only sheltered, marine dominated, permanently tidal sandbank habitat in the central KwaZulu-Natal (MER/ERM, 2011, in CSIR, 2024b). Other estuaries in the central KwaZulu-Natal are small and often tend to close off from the sea, meaning they do not possess significant intertidal sandbank habitat are often dominated by freshwater conditions.

The ecological significance of Durban Bay should be seen in the light of the severe degradation evident in most estuaries in the greater Durban area, because of contaminant inputs via uncontrolled discharges and runoff from urban areas in their catchments and the discharge of essentially untreated wastewater into many of the estuaries from wastewater treatment works. This is compounded by habitat loss through development in estuarine flood plains and catchments, and extreme levels of (often illegal) resource extraction. The ecological value of most estuaries in the greater Durban area has thus been severely diminished, to a degree some should be essentially considered as having largely lost their ecological value.

This accentuates the ecological importance of Durban Bay. The resilience of biological resources and the ecological value of Durban Bay in the light of ongoing and further development proposals has been called into question, with the term 'tipping point' having been used to suggest that further habitat loss and disturbance will irretrievably affect the ecosystem functioning of the Bay. It is, however, apparent that despite ongoing impacts, certain biological resources in the Bay are surprisingly resilient. The sandprawn *Krausillichirus kraussi*, for example, is present in large numbers on intertidal sandbanks, despite often poor water quality and sustained pressure through its collection as a bait organism. Nevertheless, evidence that the Bay's ecological functioning and value is on a downward trajectory is evident in lost biological resources, such as various bird species and long-term declines in the abundance of other bird species (Allan et al., 1999, in CSIR, 2024b), the loss of the once extensive seagrass beds, and the decline in swimming prawn abundances.

Furthermore, various habitats in parts of the Silt Canal, Maydon Channel, and Point Yacht Club Basin are so degraded that some biological resources have all but disappeared (e.g. sandprawns and crabs in the intertidal), and these habitats are in many ways no longer ecologically functional or have a much diminished contribution to the ecological functioning of the Bay. Protecting and restoring these habitats and protecting other habitat in the Bay that has retained an important ecological function is thus emphasised.

6.2.12 CRITICAL AND SENSITIVE HABITATS IN DURBAN BAY

In an ecological sense, all habitats (and related species) in Durban Bay are important. However, certain habitats are considered more important because of their disproportionate influence on ecological productivity and processes and/or their rarity amongst estuaries at the local, regional, and national level.

The discussions above have alluded to the ecological importance of intertidal sandbanks and mudflats in Durban Bay, particularly the Central and Bayhead Sandbanks. A particularly important habitat on the sandbanks that could potentially be impacted by the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 is the Little Lagoon (**Figure 6-1**), a shallow permanently inundated area between the Central and Bayhead Sandbanks. The area has been identified as a biological 'hotspot'. Benthic macrofauna, fish, and bird communities are generally more species diverse and, in

some cases also more abundant in and near Little Lagoon than elsewhere on the sandbanks and mudflats (Allen et al., 1999, Forbes and Demetriades, 2003; McInnes et al., 2005, Newman et al., 2008; Clark et al., 2017, in CSIR, 2024b).

6.2.13 OFFSHORE DREDGED MATERIAL DISPOSAL SITE

The CSIR (2018) (in CSIR, 2024b) analysed benthic macrofauna in sediment collected on and near the dredged spoil disposal site. An important finding was that none of the sites surveyed on the dredged spoil disposal site were depauperate. Thus, despite ongoing maintenance dredged sediment disposal, benthic macrofauna at least were able to tolerate various disturbances associated with dredged sediment disposal (discussed in more detail in the impact assessment section of this specialist report). Univariate measures of benthic macrofaunal community structure (e.g. abundance, species diversity) provided no clear evidence for consistent differences in the benthic macrofaunal community amongst sites on and off the disposal site. However, multivariate analyses, which include consideration of benthic macrofaunal community composition, revealed that the benthic macrofaunal community at two of the three sites sampled on the dredged spoil disposal site were different to communities at other sites. In the absence of any other logical explanation, this was considered to reflect the impact of the disposal of dredged sediment.

Benthic macrofaunal communities at sites to the immediate northeast of the disposal site were also identified as dissimilar to communities at other sites off the disposal site. This difference may reflect the physical influence of the bedload transport of sediment in a predominantly north-northeast direction and/or that some of the disposed sediment was often deposited on the seabed here and adversely affecting the benthic macrofaunal community.

6.3 SOCIO-ECONOMIC ENVIRONMENT

*The following is extracted from the Economic Impact Assessment Study compiled by Urban-Econ (Urban-Econ, 2025) and included in **0**.*

The Maydon Wharf precinct plays a crucial role within the broader operations of the PoD, given its strategic handling of diverse cargo types such as break bulk, dry bulk and multipurpose goods. This makes it a cornerstone of Durban's logistics and trade infrastructure. Its ability to process significant volumes of cargo efficiently directly supports the economic vitality of the eThekwini Municipality, KwaZulu-Natal Province, and South Africa on a national level. The Maydon Wharf precinct's strategic role within the PoD amplifies its influence on the local and regional economy. Its operations are integral to the economic vitality of eThekwini and KwaZulu-Natal, with ripple effects that benefit the national economy. Investments in improving Maydon Wharf's infrastructure and operational efficiency are therefore not only beneficial to the precinct but also pivotal to sustaining the economic growth of the eThekwini and KwaZulu-Natal at large.

This section focuses on profiling eThekwini and KwaZulu-Natal as the primary and secondary areas of impact (respectively) because the direct economic benefits of the proposed project are most significantly concentrated within these regions. Most of the operational and construction-related activities associated with the project will be localised within eThekwini, and the broader KwaZulu-Natal economy also captures substantial indirect benefits due to its regional integration with the PoD's supply chains.

6.3.1 ETHEKWINI MUNICIPALITY

6.3.1.1 Demographics

The eThekwini Municipality, located in KwaZulu-Natal, includes the city of Durban, the largest city in the province. The eThekwini has experienced significant population growth due to urbanisation, from 2.7 million in 1994 to 4.2 million in 2022. As a highly urbanised area, eThekwini Municipality had 1.1 million households in 2022, with a growth rate of 2.1%. People from rural areas and other parts of South Africa are drawn to eThekwini in search of better economic opportunities, education, and healthcare. This influx of people has contributed to the municipality's growing population.

In line with both national and provincial gender splits, eThekwini Municipality has a larger female population than males, with 51.1% females and 48.9% males. The population pyramid of eThekwini Municipality typically has a broad base, indicating a higher proportion of younger individuals, and narrows toward the top, suggesting a lower percentage of elderly individuals. This shape is characteristic of a developing or transitional population. Individuals under the age of 49 are predominantly male, while those above 49 are mostly female. This indicates that there is a larger male working-age population in eThekwini.

6.3.1.2 Skills and Education

An estimated 47.7% of adults in eThekwini (above the age of 20 years) have achieved a matric qualification or higher. While approximately 4.4% of the population in eThekwini has no schooling. However, on average, the municipality has been experiencing a slight increase in the proportion of adults with no schooling, coupled with a growing proportion of the population receiving higher education.

The proportion of adults with no schooling has increased from 4.3 % in 2011 to 4.4% in 2022, while the proportion of adults with higher education increased from 12.0% in 2011 to 12.9% in 2022. However, the skills profile provided in **Figure 6-5** below underscores the necessity for elevating the skill levels of the overall workforce within the nation.

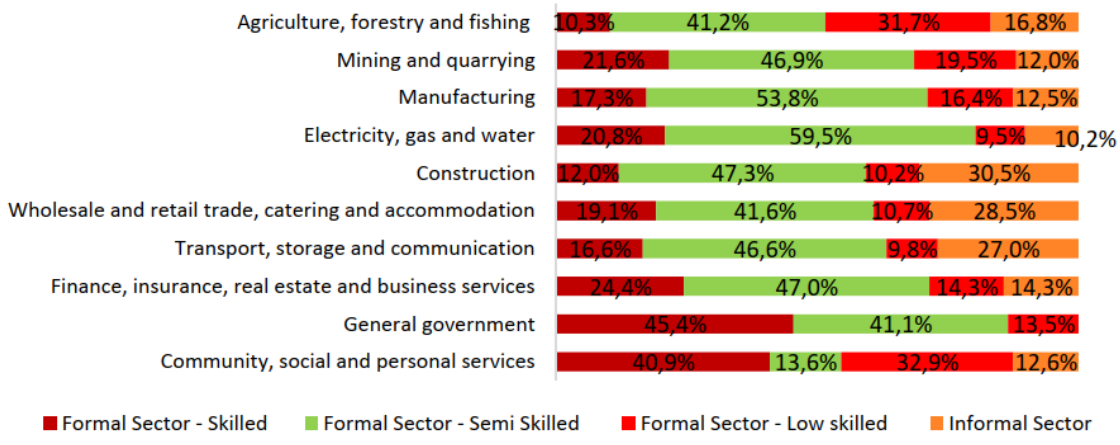

Figure 6-5 – Skill level by industry in eThekwini, 2022 (Quantec Regional Standardised Data, 2024, in Urban-Econ, 2025)

The eThekwini Municipality is characterised by a diverse economic landscape that encompasses various sectors, including manufacturing, services, trade, transport, tourism, and agriculture. Thus, the economy offers employment opportunities to a wide range of professionals, support staff, and service workers, with a large proportion being low to semi-skilled.

6.3.1.3 Labour Market

Of the total population in eThekwini Municipality, 72.2% falls within the working age group (15-64 years), with 62% being economically active. Much of the employment is within the are employed in formal sector (82.3%). However, like the provincial and national trends, high levels of unemployment and underemployment persist, particularly among the youth. eThekwini Municipality currently has an unemployment rate of 20.6%, which is lower than both the provincial (32.6%) and the national unemployment rates (32.1%). Economic disparities and income inequality also affect the distribution of employment opportunities.

The municipality's economic activities contribute to employment opportunities across a broad spectrum of industries. Most of the people in eThekwini Municipality are employed in the wholesale and retail trade, catering and accommodation (24%), as well as within the service industries. As a major port city, eThekwini Municipality has a robust transport and logistics sector. Employment in this sector encompasses activities related to port operations, logistics, freight handling, and transportation services.

6.3.1.4 Household Income

Income inequality is a prominent feature of eThekwini's household income landscape. The municipality comprises a mix of affluent areas, middle-income neighbourhoods, and impoverished communities. In terms of the average annual household income levels in eThekwini, a large proportion of households earn very low incomes, with about 82.7% of households earning less than R153 600 on average per annum.

6.3.1.5 Economic Size, Growth and Performance

The KZN economy is dominated by the eThekwini Metro. This is the main economic hub for the province, making up over half (55.6%) of the total provincial economic output. Except for the Agricultural and Mining sectors, the Metro closely reflects the provincial sectoral distribution. eThekwini shows high-level establishment in predominantly the secondary and tertiary sectors. The Manufacturing (18.0%), Finance, Insurance, Real Estate and Business services (25.1%), and Wholesale and Retail Trade (14.0%) sectors are accountable for more than 50% of the region's higher-than-average development. The significant contribution of the Transport sector (13.2%) indicates the important role played by logistical support in the industrialised metro.

The agriculture sector has exhibited the most rapid growth in gross value added (GVA) terms between 2010 and 2022 (6.8%) (**Figure 6-6**). Broad sector decline is noted in the construction industry as well as the utilities sector. Interestingly, the manufacturing sector in the municipality also contracted over the past 10 years.

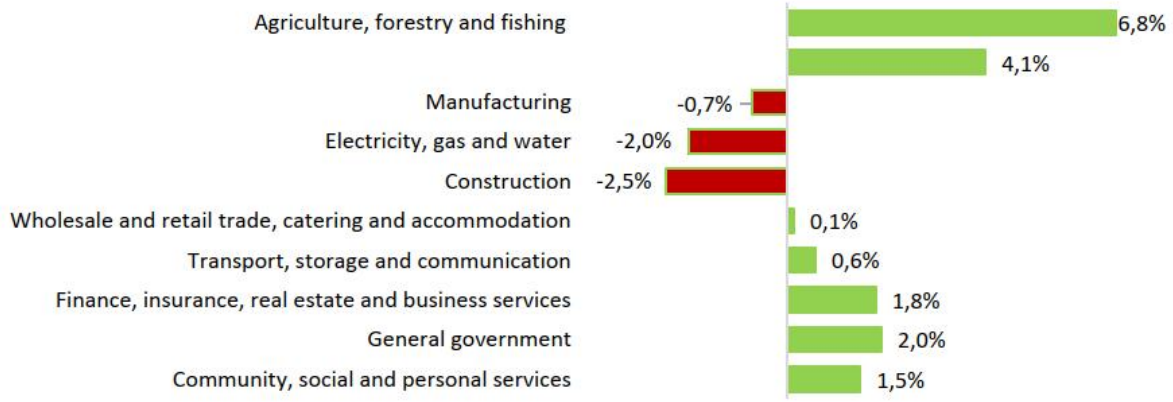

Figure 6-6 – Compound Annual Growth Rate per sector in GVA terms, eThewini Municipality, 2010-2022 (Quantec Regional Standardised Data, 2024, in Urban-Econ, 2025)

The transport, storage and communication sector is an important supporting industry in the eThekwini Municipality economy and is also directly impacted by the port operations. The industry has an average sector share of about 13.6% of total GVA, which has remained relatively stable over 10 years. The industry has also had positive growth; however, with the contraction in the Manufacturing industry in 2020 and the national lockdown restrictions on movement, the transport, storage and communication sector experienced a sharp decline in 2020.

However, with the PoD and Port of Richards Bay as well as the international airport as key destinations for transport, storage and communication, this industry is expected to continue to have a stable sector share within the municipality.

Transport and communication are viewed as significant contributors to the economy of Durban (14.54%) for several reasons, including:

- The PoD is a major transportation hub.
- Established road infrastructure, of which the N2 and N3 routes form the backbone.
- The establishment of the King Shaka International Airport and Dube Trade Port.

No other district in KwaZulu-Natal can match the transport capacity of eThekwini, and as such, the major transport and logistics companies continue to be attracted to the metro.

In eThekwini, the construction sector is a relatively stable albeit small sector within the economy, with an average sector share of about 4.0% annually. Even though the sector showed a marked decline between 2016 and 2019, it is slowly recovering to the pre-pandemic levels (**Figure 6-6**).

6.3.2 KWA-ZULU NATAL

6.3.2.1 Demographics

According to the latest Census data, 2022, the KwaZulu-Natal (KZN) population is 11 562 055 persons in 2 822 880 households. KZN has the second largest population size in South Africa, after Gauteng, making up about 20% of South Africa's population. The percentage change in the share of the population residing in KwaZulu-Natal between 2011 and 2022 was 0.6%, showing an increase in the share. Much of the population is concentrated within eThekwini.

The population of KZN grew by 17.4 percent between 2011 and 2022, from 10.2 million persons in 2011 to 12.4 million persons in 2022 (Stats SA, 2023, in Urban-Econ, 2025) with a Compound Annual

Growth Rate (CAGR) of 1.9% over the 10 years. The CSIR projects that the population may reach up to 14.7 million people by 2050.

The province has a predominantly youthful demographic, with a growing working-age group. Regarding the gender distribution, 47.6% of KZN's population comprises males, while 52.4% comprises females. The population pyramid of KwaZulu-Natal typically has a broad base, indicating a higher proportion of younger individuals, and narrows toward the top, suggesting a lower percentage of elderly individuals. This shape is characteristic of a developing or transitional population.

6.3.2.2 Skills and Education

About 74.2% of the school-age population (5 – 24 years) in KZN has some form of formal education, while 25.8% has never attended an educational institution. 41.2% of adults in KZN (above the age of 20 years) have achieved a matric qualification or higher. While approximately 8.3% of the population in KZN has no schooling. This may be attributable to the proportion of the population in the province falling within the very young age cohorts below school-going age.

On average, KZN has been experiencing a decline in the proportion of adults with no schooling. There are also growth rates in the proportion of people receiving higher education. The proportion of adults with no schooling has declined from 10.7% in 2011 to 8.3% in 2022, while the proportion of adults with higher education increased from 0.9% in 2011 to 10.4% in 2022.

The situation regarding education in KZN has improved over the past ten years. However, problems in the education sector are still prevalent, including high drop-out rates at the secondary and tertiary level, poor performance in the National Senior Certificate Examination, and a mismatch in skills gained from the formal education system and the requirements in many sectors of the economy.

Progress made in education is hampered by problems of human capital development, including inequality in access to tertiary education among young people in different sub-groups of the population. The situation regarding education in KZN has improved over the past ten years. However, problems in the education sector are still prevalent, including high drop-out rates at the secondary and tertiary level, poor performance in the National Senior Certificate Examination, and a mismatch in skills gained from the formal education system and the requirements in many sectors of the economy. Progress made in education is hampered by problems of human capital development including inequality in access to tertiary education among young people in different sub-groups of the population.

In terms of skills, a significant proportion of individuals who hold formal employment in various economic sectors fall within the category of semi-skilled or low-skilled workers.

6.3.2.3 Labour Market

The official unemployment rate has risen by 1.4 percentage points to 31.2% in Q2 2024. The prevalence of unemployment among the youth is still a persistent challenge in KZN. This may be attributed to the lack of employable skills and further worsened by low educational attainment, as most young people tend to drop out of school before completing secondary level. It is within this backdrop that the province has a large number of discouraged work-seekers and thus a high unemployment rate.

The bulk of the employment in KZN is within the formal sector, with 63.4% of total employment. The informal sector has 19.7% of employment, and the rest is within household employment. The individual sector with the highest share of employment is the community, social and personal services sector. Other large employers in KZN are wholesale and retail trade, catering and accommodation

and Finance, insurance, real estate and business services. The two sectors with the lowest share of employment are mining and quarrying, and electricity, gas and water supply.

6.3.2.4 Household Income

Many households in KZN fall within the very low to low-income category (nearly 88% of households in the province), earning less than R153 600 on average per annum. This is a weighted average monthly income of about R6 826 per household. With an average household size of 4 persons per household, this may be related to the high poverty incidence within the province. Linked to this is the aspect of inequality, which poses a significant threat to social cohesion in the province. Reducing inequality is, therefore, a persistent goal and a key step towards achieving spatial and social justice in the province.

6.3.2.5 Economic Size, Growth and Performance

The economy of KZN remains the second largest contributor to South Africa's economy behind Gauteng, generating about 16% of the national output. In 2022, KZN's GVA at constant 2015 prices reached R954 billion, with a modest growth rate of 1.9%. KZN's economic growth has shown a gradual upward trend over the years before the COVID-19 pandemic through the province's economic recovery efforts. However, economic prospects remain dampened due to the external national and global economic conditions.

The economic base within the province is diverse and has seen a structural shift in output in recent years. KZN is moving towards becoming a knowledge-based service economy, with a greater focus on technology, e-commerce, financial and other services. The economy in KZN is driven mainly by the tertiary sector, which includes finance and business services, wholesale and retail trade, tourism and government services. Tertiary sector industries constitute nearly three-quarters of the KZN economy.

The leading sectors in the KZN economy are finance, real estate and business services (21.5%), followed by manufacturing (16,6%), and community, social and personal services (16.1%) of KZN GVA. Another major sector in KZN is the wholesale and retail trade sector which makes up 13% of the province's economy. The smallest sector is the mining and quarrying sector which constitutes only 1% of the KZN economy.

The agriculture sector has exhibited the most rapid growth in GVA terms between 2010 and 2022 (5.2%). It is trailed by the finance, insurance, real estate, and business services sectors, which achieved a growth rate of 2.1% over the same period. In stark contrast, the construction, electricity, gas and water, and manufacturing sectors all witnessed negative compound annual growth rates throughout this timeframe. Particularly, the construction industry demonstrated the least favourable growth prospects during this period.

6.4 ARCHAEOLOGICAL AND CULTURAL HERITAGE

This section is supplemented with information from the Maritime Archaeological Impact Assessment compiled by Bruno E.J.S Werz (2023) and included in **0** *of this BAR.*

According to the screening tool report, the Maydon Wharf precinct is located within 2 km of a Grade II heritage site, highlighting its proximity to areas of historical and cultural significance. Additionally, there are six notable cultural and historical sites situated within 3 to 4 km of the precinct. These sites include Dick King Statue, Victoria Embankment, South Beach Howard College / Memorial Tower, City Hall, Old Post Office Local History Museum and Farewell Square.

These landmarks contribute to the region's rich cultural heritage and reflect its historical importance. The proximity of the Maydon Wharf precinct to these sites underscores the need to balance development with preservation in the area. However, these sites are situated outside the PoD and will not be negatively impacted by the proposed upgrade of the berths.

Within the PoD, there is one site of cultural and architectural value, the Ocean Terminal Building, which was completed in 1962. This building originally served as the passenger terminal for ocean liners, and its design holds historical significance. However, it is located some distance away from the Maydon Wharf precinct and is not expected to be adversely affected by the planned development in that area. This indicates that the planned development will not interfere with or impact the preservation of this historically important structure.

The Phase 1 desktop study that was undertaken for the proposed project (Brune, 2023) initially identified five possible categories of sites of potential archaeological, historical and/or heritage value. These included: prehistoric material underwater and on shore, historical occupation sites on shore, historical harbour works (including berths), shipwrecks, and anchorage debris.

During further research, two of these, namely prehistoric material under water and on shore and historical occupation sites on shore, could be eliminated. Examples of the category ‘Historical harbour works’ are definitely present in the study area. They comprise Berths 5 - 11 & 15. Nevertheless, the oldest berth, Berth 15, was constructed in 1923 and Berth 8 as recently as 1985. The majority of the other berths date to the 1960s. No indication has been found that these structures are in any way unique or have special historical, technological, or aesthetic value.

Two additional site categories that are potentially present in the area concern ‘Anchorage debris’ and ‘Shipwrecks’. Nevertheless, as both the old anchorage and those areas that were dangerous to shipping traffic in the past are situated outside the Maydon Wharf precinct, it is assumed that this specific location will not reveal anchorage debris that is of historical or cultural importance. In addition, it can be stated that potential displacement through dredging, resulting in the destruction of contextual information, is of less importance for this category, as in each case it concerns a once-off, isolated event. Although dredging and construction would have a more damaging effect on shipwrecks, the available historical information indicates that only a few vessels foundered in the vicinity of the Maydon Wharf precinct, whereas no specific reference was found to any wreck at that specific location.

7 SITE SENSITIVITY VERIFICATION

7.1 AGRICULTURAL POTENTIAL

A map of the proposed Maydon Wharf Berths 5 - 11 & 15 development area overlaid on the screening tool sensitivity is given in **Figure 7-1**. The site is classified as high agricultural because it is classified as cropland in the data set used by the screening tool. However, the dataset is outdated.

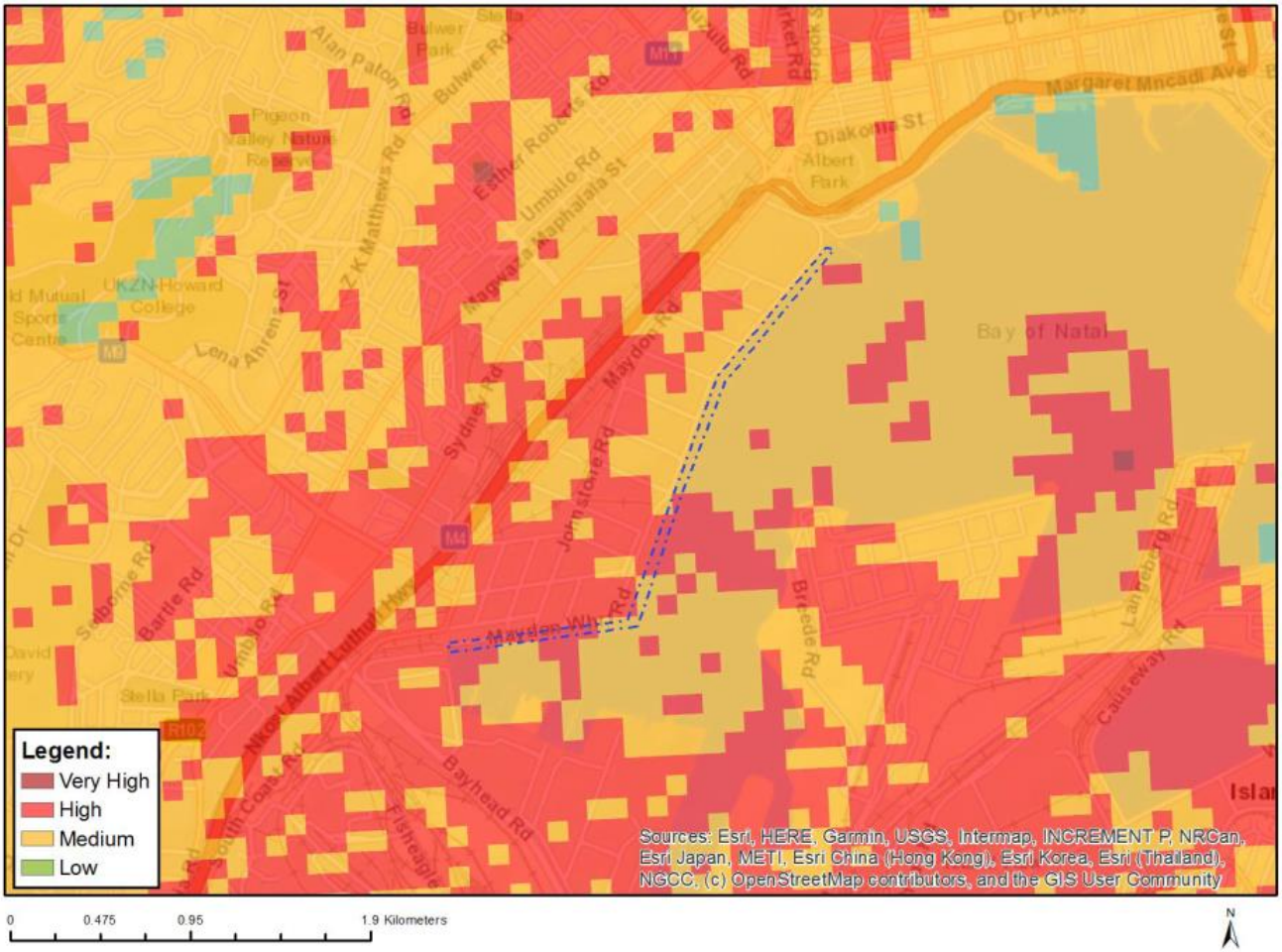

Figure 7-1 - Map of Agriculture Sensitivity (Source: DFFE Screening Report)

The site visit conducted on 13 February 2024 confirmed the development footprint and surrounding areas to be completely transformed due to industrial activities operating at the Maydon Wharf precinct, PoD. Therefore, the EAP refutes the high sensitivity rating and considers the site to be of low sensitivity for the agricultural theme.

7.2 ARCHAEOLOGICAL AND CULTURAL HERITAGE

The DFFE Screening Tool indicates that the proposed project falls within an area of Very High Sensitivity for the Archaeological and Cultural Heritage Theme since the Maydon Wharf precinct is located within 2km of a Grade II heritage site (**Figure 7-2**). The Maritime Archaeological Impact Assessment conducted by Bruno Werz in November 2023 indicated that there are six sites of cultural/historical value in the vicinity, situated at a distance of between 3 and 4km from the Maydon Wharf precinct.

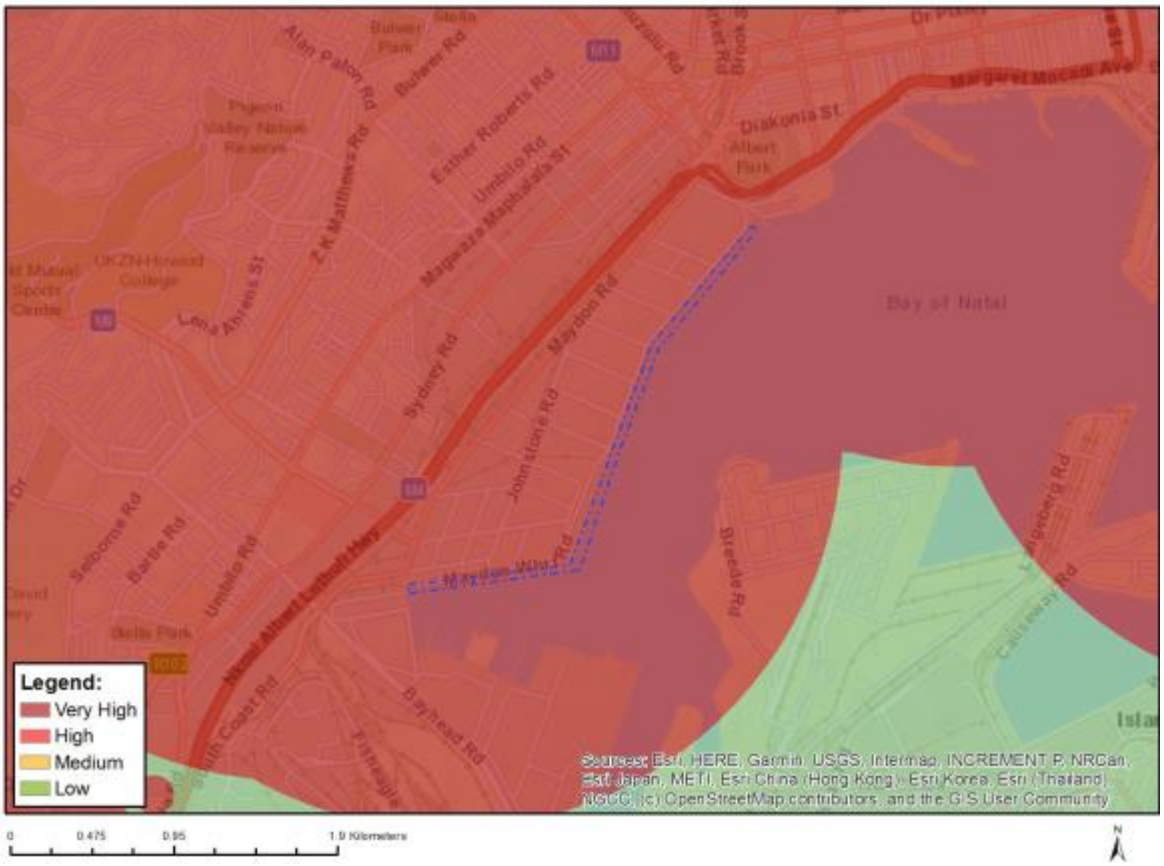

Figure 7-2 - Map of Archaeological and Cultural Heritage Sensitivity (Source: DFFE Screening Report)

7.3 PALAEONTOLOGY

The DFFE Screening Tool indicates that the proposed project falls within an area of Medium Sensitivity for the Palaeontology Theme (**Figure 7-3**). The site verification conducted on 13 February 2024 confirmed the low sensitivity of the project footprint as it has been completely transformed. The project footprint is industrialised and hard-standing, surrounded by other industrial harbour companies.

Due to the disturbed and transformed nature of the area where the proposed project is to be constructed, it is highly unlikely that palaeontology resources will be found on the site.

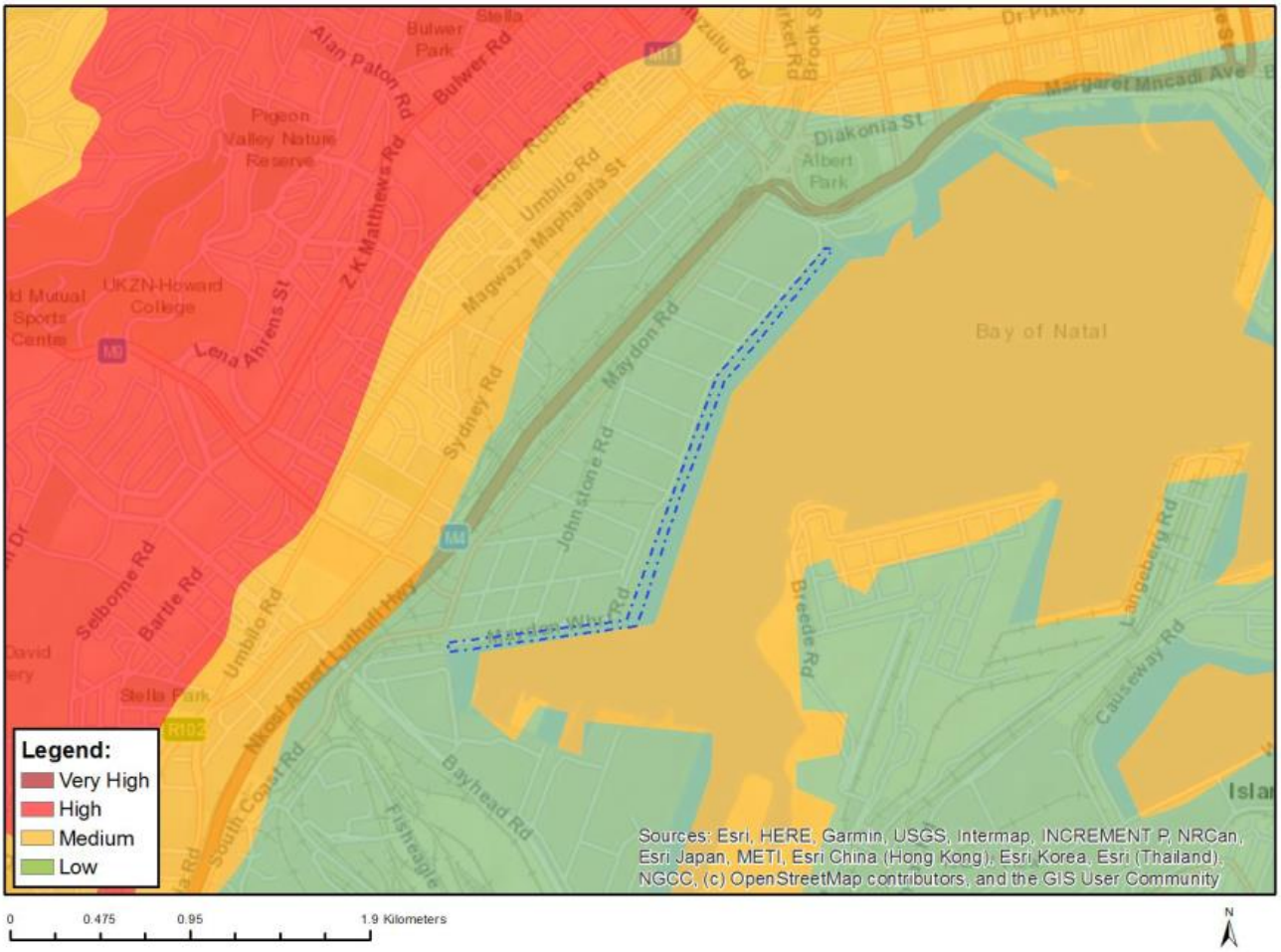

Figure 7-3 - Map of Palaeontology Sensitivity (Source: DFFE Screening Report)

7.4 TERRESTRIAL BIODIVERSITY

The DFFE Screening Tool indicates that the proposed project falls within an area of Very High Sensitivity for the Terrestrial Biodiversity Theme (**Figure 7-4**). According to the Screening Tool, the site is located within a CBA (irreplaceable), NPAES and within the KZN Coastal Belt Grassland.

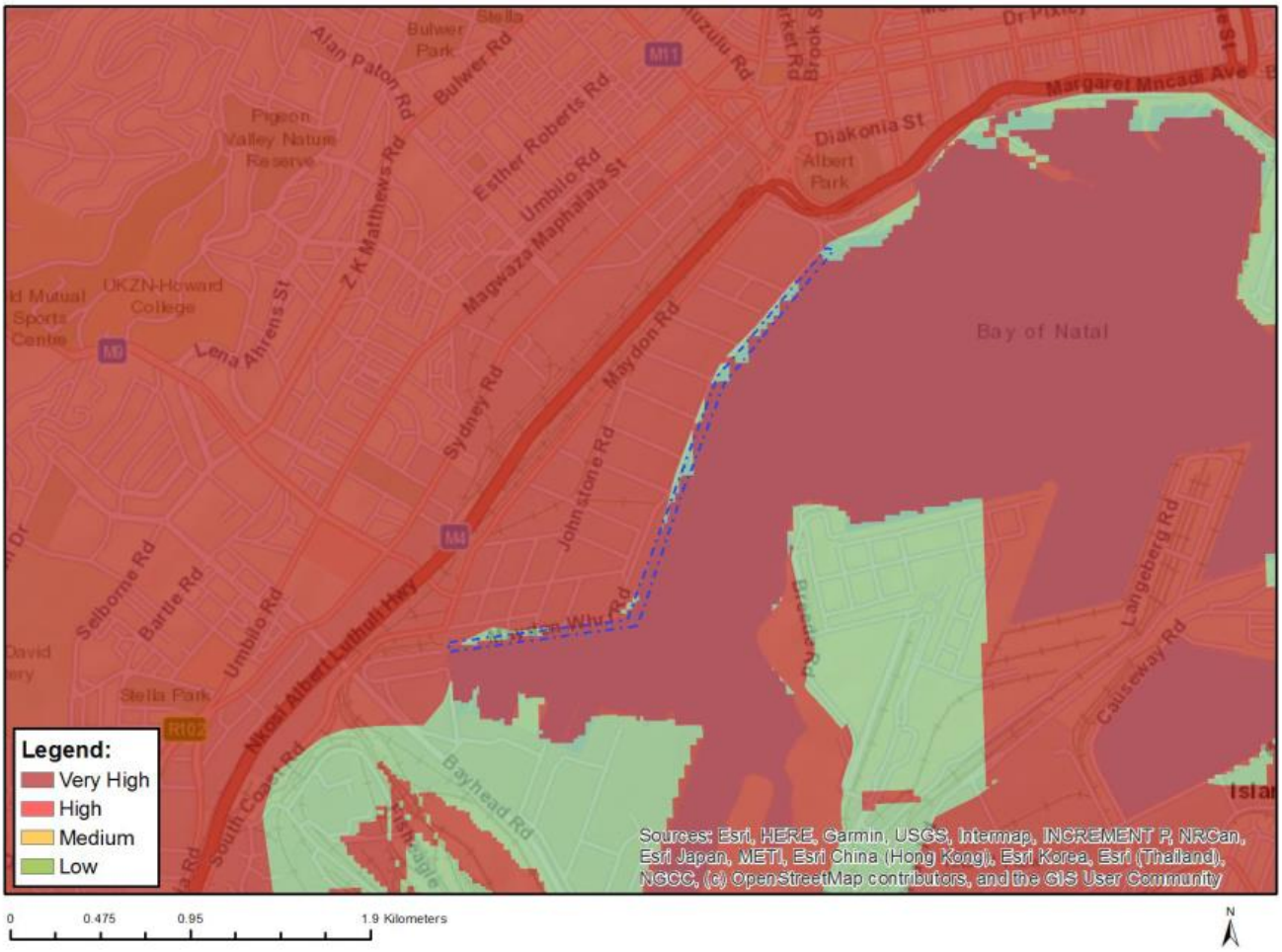

Figure 7-4 - Map of Terrestrial Biodiversity Sensitivity (Source: DFFE Screening Report)

7.4.1 PLANT SPECIES

The DFFE Screening Tool indicates that the proposed project falls within an area of Medium Sensitivity for the Plant Species Theme (**Figure 7-5**). The site verification conducted on 13 February 2024 confirmed the low sensitivity of the project footprint as it has been completely transformed. The project footprint is industrialised and hard-standing, surrounded by other industrial harbour companies with limited to no potential of sustaining healthy indigenous vegetation due to the absence of green zones. Therefore, the EAP refutes the medium sensitivity rating and considers the site to be of low sensitivity for the plant species theme.

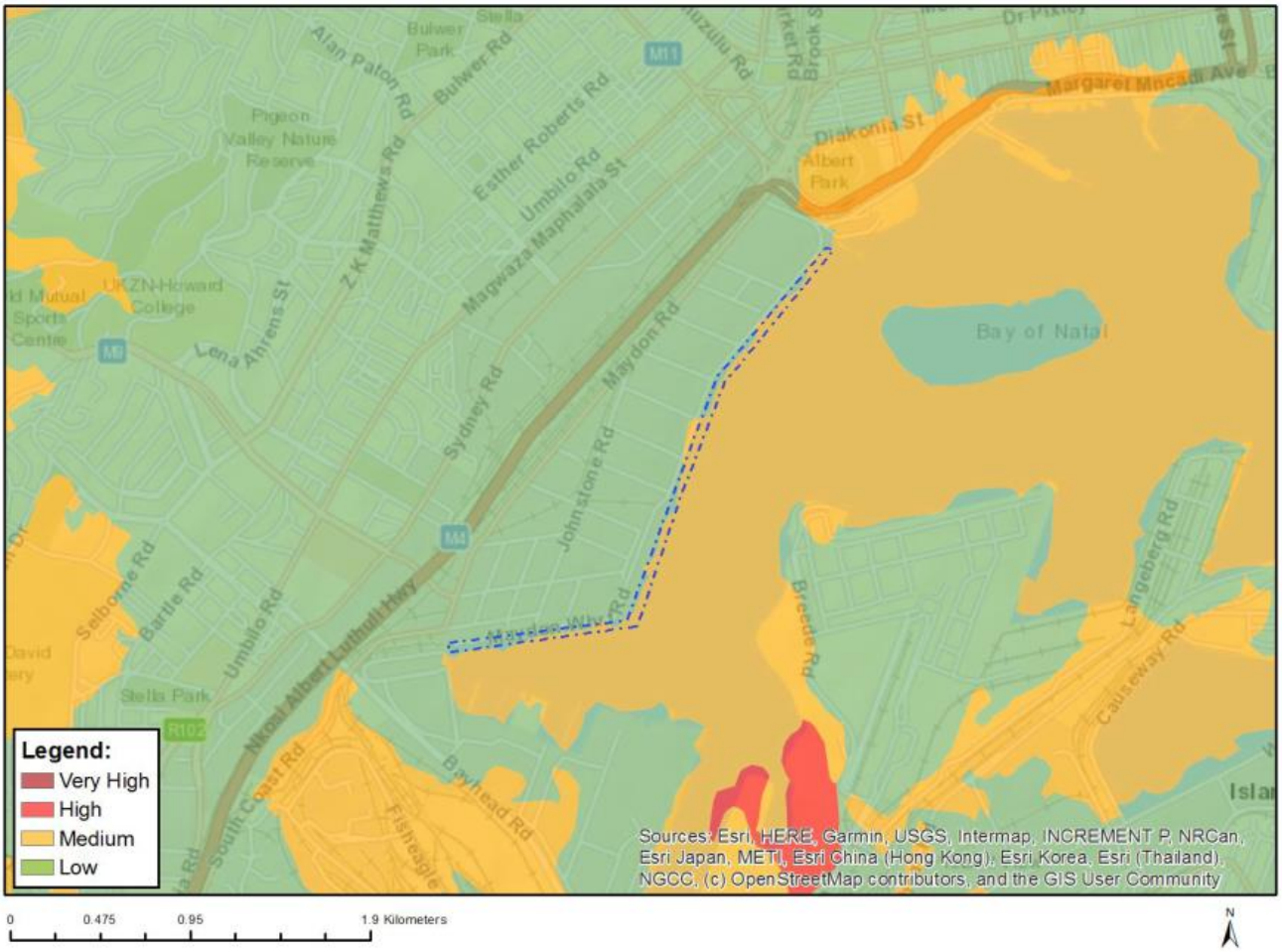

Figure 7-5 - Map of Plant Species Sensitivity (Source: DFFE Screening Report)

7.4.2 ANIMAL SPECIES

The DFFE Screening Tool indicates that the proposed project has a High sensitivity, although the site predominantly falls within a Medium sensitivity area (**Figure 7-6**). The High sensitivity features include the potential presence of avifaunal species: *Stephanoaetus coronatus*, *Hydroprogne caspia*, *Pelecanus onocrotalus, Halcyon senegaloides, Pelecanus rufescens*, *Mycteria ibis, Bradypterus sylvaticus and Microparra capensis,* all of which being listed as Least Concern under the IUCN Red List of Threatened Species (2016). The Medium sensitivity features include the potential presence of avifaunal species: *Podica senegalensis* and *Stephanoaetus coronatus*; mammalian species: *Chrysospalax villosus;* amphibian species: *Hyperolius pickersgilli*; invertebrate species; *Arytropteris basalis, Pomatonota dregii, Phymeurus illepidus* and *Doratogonus rubipodus;* and sensitive species 8.

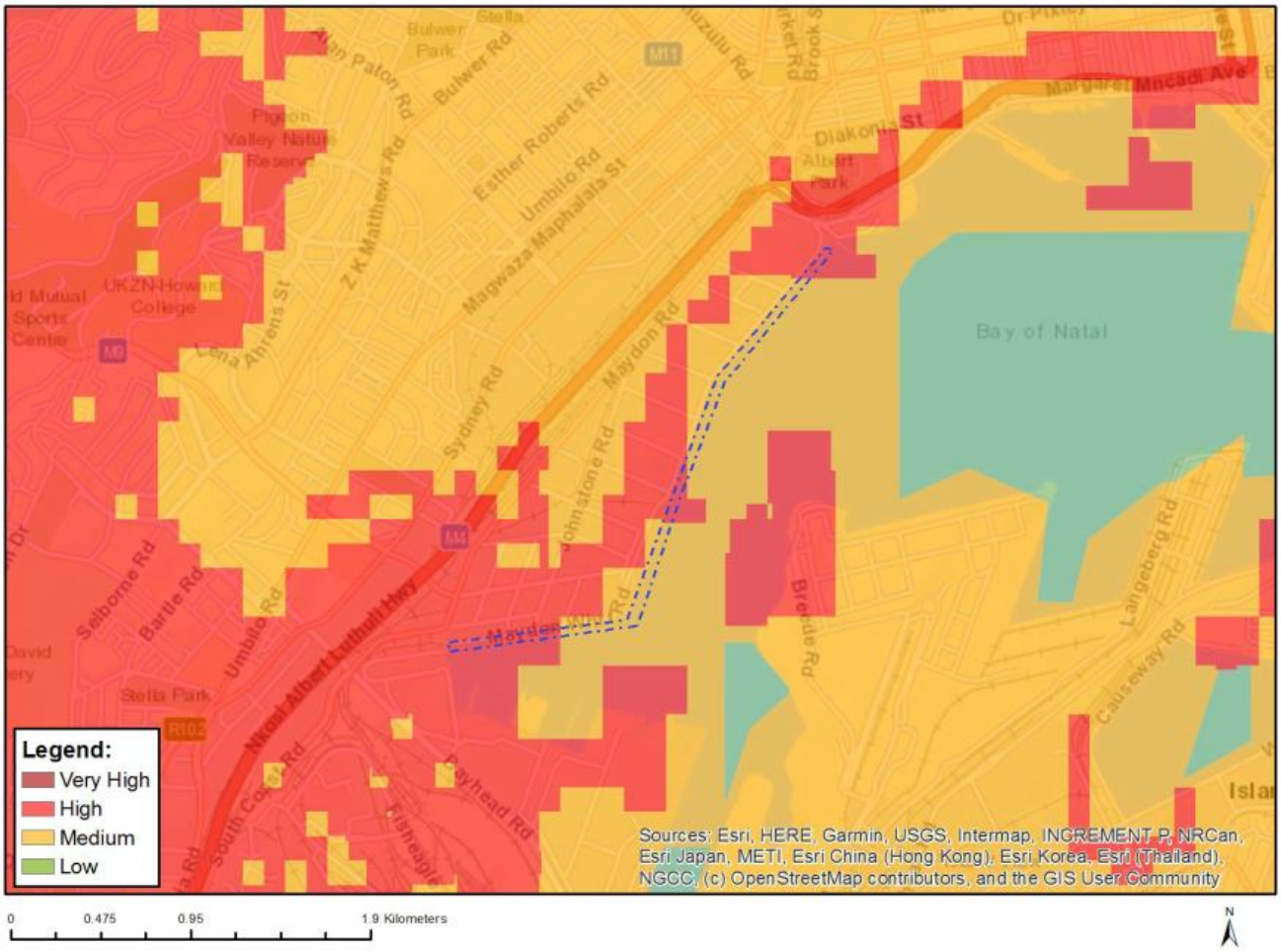

Figure 7-6 - Map of Animal Species Sensitivity (Source: DFFE Screening Report)

7.5 AQUATIC BIODIVERSITY

7.5.1 AQUATIC BIODIVERSITY

The DFFE Screening Tool indicates that the proposed project has a Very High sensitivity for the Aquatic Biodiversity Theme (**Figure 7-7**). This is due to the facility being located within a 500 m radius of the Durban Bay Estuarine Functional Zone, which has already been largely impacted by industrial developments and activities due to the PoD operations.

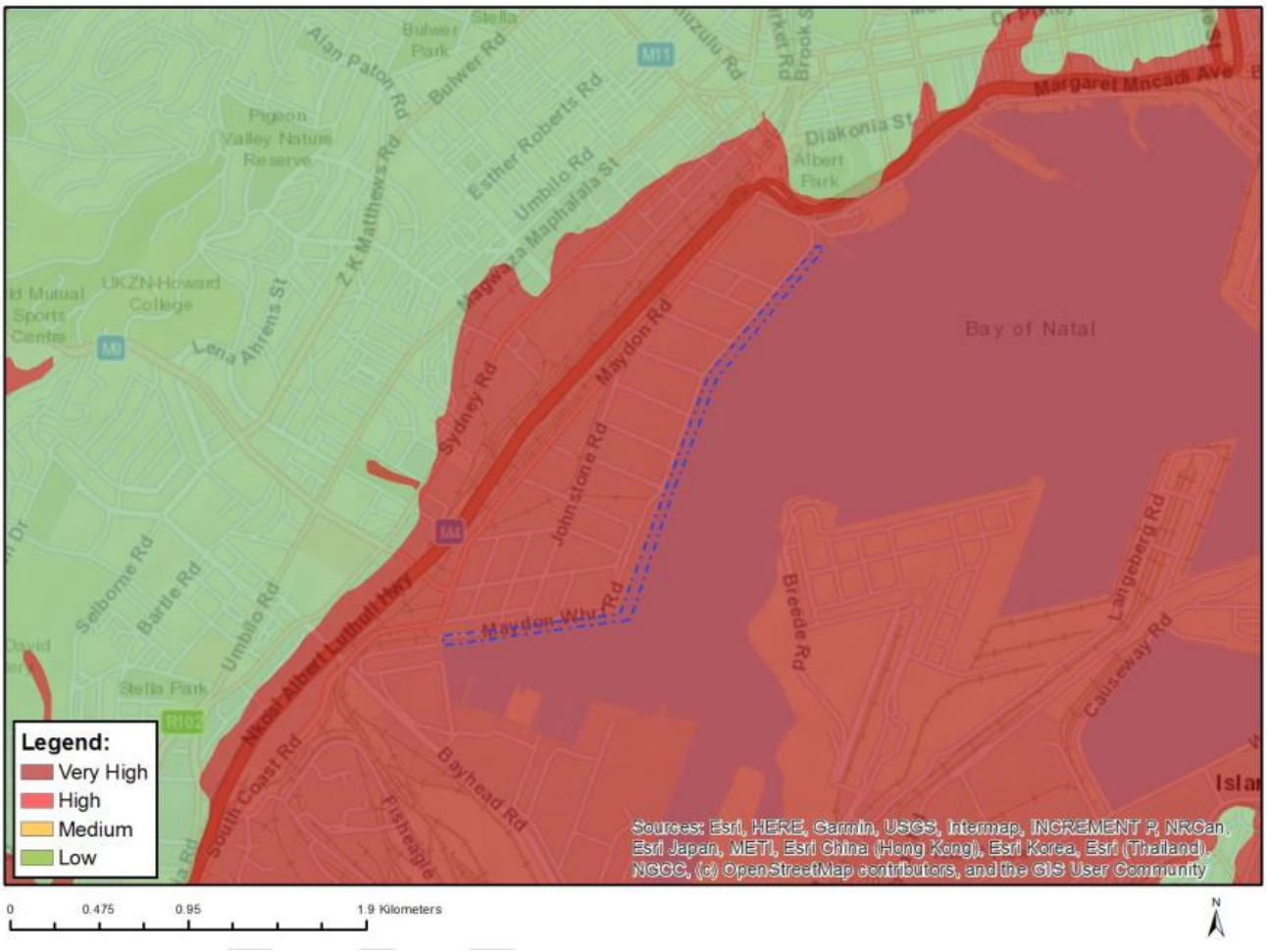

Figure 7-7 - Map of Aquatic Biodiversity Sensitivity (Source: DFFE Screening Report)

7.6 CIVIL AVIATION THEME

Figure 7-8 below indicates that the proposed project is rated as High sensitivity by the DFFE Screening Tool. The classification of the site as high sensitivity is due to the proposed project being located within 15 km from a civil aviation radar, between 15 to 35 km from a major civil aviation aerodrome and between 8 to 15 km from other civil aviation aerodromes. However, due to the nature and location of the proposed project, the sensitivity is regarded as low.

Air Traffic Navigation Services (ATNS) and the South African Civil Aviation Authority (SACAA) are included in the project's I&AP database. They will be informed of the proposed project, and comments will be sought from these authorities, as applicable.

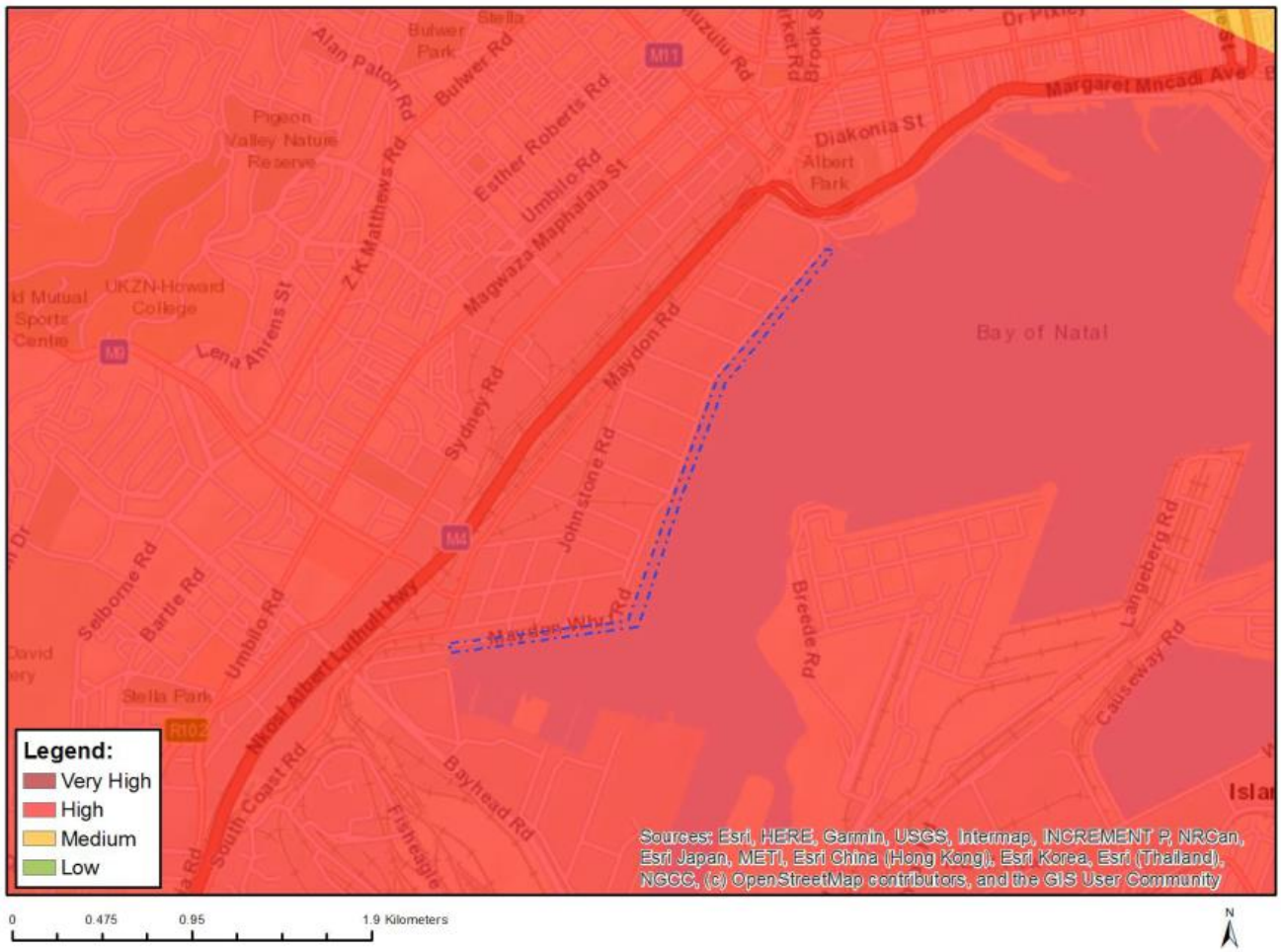

Figure 7-8 - Map of Civil Aviation Sensitivity (Source: DFFE Screening Report)

7.7 DEFENCE THEME

As indicated in **Figure 7-9** below, the proposed project is rated as Medium sensitivity, due to the presence of Lord Ground Military Base on the North-North West side and the Naval Station on the east side of Maydon Wharf. No further assessment was required, as indicated by the screening tool; however, the Department of Defence has been included in the I&AP database. They will be informed of the proposed project, and comments will be sought from them, as applicable.

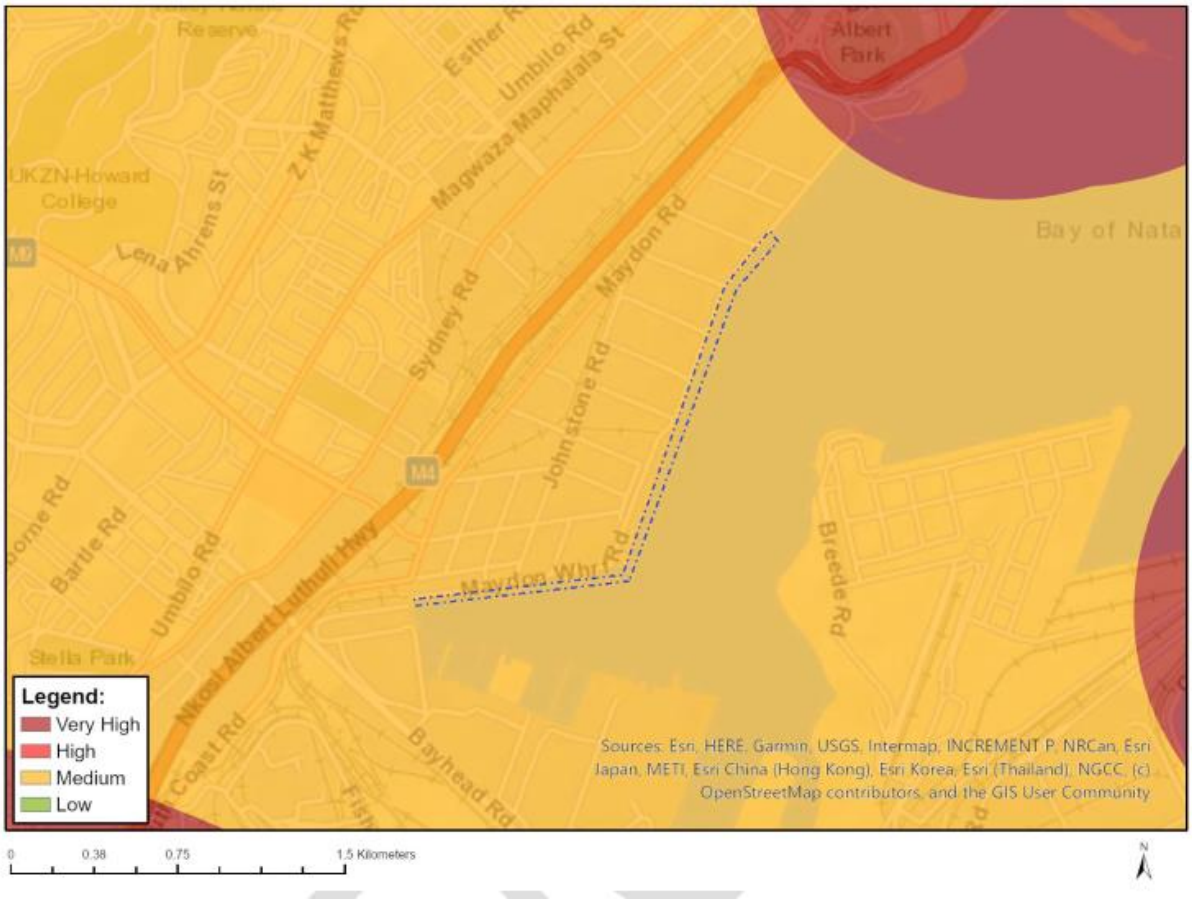

Figure 7-9 - Map of Defence Sensitivity (Source: DFFE Screening Report)

8 ENVIRONMENTAL IMPACT ASSESSMENT

This Chapter identifies the perceived environmental and social effects associated with the proposed project. The assessment methodology is outlined in Section 2.5. The issues identified stem from those aspects presented in Section 6 of this document as well as the project description provided in Section 3.

The impact assessment in this section encompasses the geographical, physical, biological, social, economic, heritage and cultural aspects in accordance with Appendix 1 of the EIA Regulations, 2014 (GNR 326) (as amended).

8.1 MARINE ECOLOGY

8.1.1 IMPACTS SCREENED OUT FROM DETAILED IMPACT ASSESSMENT

Several environmental impacts associated with the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 were scoped out from a detailed significance assessment because it is assumed the (potential) causes of the impacts will be (a) adequately controlled and managed (and are often easy to do so), (b) because they will not result in a major additional change compared to the existing environmental impact, and/or (c) because their potential to occur is difficult to assess (including because of limited information available).

8.1.1.1 Loss of non-hazardous solid waste into Durban Bay from dredging, construction, and support vessels

The proposed activities could lead to the release of non-hazardous solid waste from dredging, construction, and support vessels if waste management practices are inadequate. Non-biodegradable plastic waste, in particular, is a major concern, as it can be carried by ocean currents over large distances and affect marine life. Animals may ingest plastic, leading to internal damage, nutrient absorption issues, or entanglement, which can cause injury or death. Plastic waste can also smother benthic habitats and release harmful chemicals, while smaller particles (microplastics) may harm zooplankton and other marine organisms. Additionally, solid waste can carry invasive species, affecting ecosystems in areas far from its origin.

In Durban Bay, plastic waste is already a significant issue, particularly after heavy rainfall, but past dredging and construction projects did not show significant evidence of waste being released. However, if losses were substantial, they may have gone unnoticed or unreported. It is expected that dredging, construction, and support vessels will have in place procedures to manage non-hazardous waste in accordance with the International Convention for the Prevention of Pollution from Ships (MARPOL) and any additional requirements that the South African Maritime Safety Authority, TNPA, and/or any other South African authority might deem fit to identify to minimise the potential for this impact.

8.1.1.2 Loss of hazardous substances into Durban Bay due to spills and leaks from dredging, construction, and support vessels

There is a potential for hazardous substances like oil, grease, lubricants, and hydraulic fluid to be spilled or leaked from dredging, construction, and support vessels. These substances pose a toxic risk to marine life and can disrupt ecosystems. The impact of a spill depends on the substance and the amount released. Large spills can cause immediate harm to biological resources, while smaller, chronic leaks may accumulate in organisms over time, affecting their health and entering the food web. Vulnerable life stages like larvae and juveniles are particularly sensitive to contaminants. Hazardous substances can also affect primary production, oxygen levels, and microbial communities, impacting overall ecological health.

While hazardous substance spills are possible, it is expected that the vessels involved will be well-maintained and operated by trained personnel, with pollution prevention measures in place. The impact on the bay's water, sediment, and biological resources as a result of spills is therefore expected to be minimal. Previous upgrades to Maydon Wharf Berths 1-4 and 12-14 did not show significant hazardous substance leaks, though some smaller incidents may have gone unreported. It is unlikely that a large, unnoticed spill would occur.

<u>The following mitigation measures are recommended:</u>

- A Hazardous Substance Spill Response and Contingency Plan must be developed by the Dredging and Construction Contractor/s.
- The Hazardous Substance Spill Response and Contingency Plan must identify appropriate response procedures in the event of a hazardous substance spill in water. The plan must provide specific responses for spills of different types of hazardous substances that may be handled.
- Hazardous substances must be stored and handled in accordance with appropriate legislation and standards, including the Hazardous Substances Act, 1973 (Act 15 of 1973) and Occupational Health and Safety Act, 1993 (Act 85 of 1993).

- Hazardous substance spills and leaks must be reported immediately. The contractor personnel to whom a spill or leak must be reported must be outlined in the Hazardous Substance Spill Response and Contingency Plan. The plan must also outline subsequent lines of reporting as deemed necessary (e.g. Transnet National Ports Authority, relevant authorities).
- Spill containment and clean-up kits, including floating booms, must be readily available on vessels and on land in areas where there is a risk of a hazardous substance spill or leak and must be appropriate to the type of possible spill or leak.
- Responsible and trained personnel must be available to deal with hazardous substance spills and leaks. Training/drills must be implemented to enable personnel to respond appropriately to hazardous substance spills and leaks.
- Appropriate methods for the disposal of cleaned up spilled substances and clean-up materials must be identified in the Hazardous Substance Spill Response and Contingency Plan – this material must not be disposed with 'normal' waste but rather at an appropriately licensed waste disposal site.
- Dredging, construction, and support vessels, and related equipment and machinery must be properly maintained and regularly checked for leaks of hazardous substances.
- Fuel tanks of small vessels should not be refilled onboard, but at a dedicated site on land or on a larger, more stable vessel.

8.1.1.3 Navigation hazard posed by dredging, construction, and support vessels leading to accidents that cause environmental harm

The proposed project will involve high vessel traffic in Maydon and Esplanade Channels and Congella Basin. Dredging, construction, and support vessels could pose a navigation hazard, potentially leading to accidents, such as oil spills. The significance of this impact was not assessed in detail because it is expected that the TNPA will establish procedures to ensure that contractors avoid navigation risks. Marine contractors typically have experience in busy waterways and follow safety protocols to prevent accidents. During Phase 1 of the Maydon Wharf Berth Upgrade, dredging and construction did not cause navigation issues or impede vessel movement, suggesting the procedures in place were effective. Therefore, it is assumed that similar procedures will prevent navigation risks during the proposed upgrades.

8.1.1.4 Risk of marine megafauna strikes by dredging

The dredging and dredging support vessels for the proposed project will need to transit from Durban Bay to the dredged spoil disposal site, which could pose a risk to marine mammals and large marine fauna, such as turtles, during transit. Several whale species, including Humpback Dolphins, frequent nearshore waters off Durban, with documented cases of vessel strikes on whales in South Africa, though strikes by dredging vessels are rare. The risk of such strikes is difficult to quantify due to limited records on the distribution of megafauna and the complexity of factors such as vessel speed, frequency of vessel movements, and animal behaviour. Previous dredging operations in Durban Bay have not resulted in any reported strikes on marine mammals. It is expected that the TNPA and the South African Maritime Safety Authority (SAMSA) will implement procedures to reduce the risk of strikes by ensuring that dredging contractors take appropriate precautions. These measures are anticipated to minimise the potential for accidents during the transit to the spoil disposal site.

8.1.1.5 Loss of construction material and demolition debris into Durban Bay

During the implementation of the proposed project, various construction materials and demolition debris, including concrete debris, solid granular material, and liquid concrete, may be lost into Durban

Bay. This could alter the physical properties of the benthic habitat, potentially transforming it from a sediment-dominated environment to one with mixed sediments and gravel or stone, which may impact benthic organisms. Wet concrete and grout, being highly alkaline and corrosive, could harm biological resources by raising the pH of the water and impairing water quality. However, the loss of construction materials will be mitigated by the installation of scour protection in the dredged berth pockets, consisting of concrete mattresses. These mattresses will cover any remaining debris and nullify the long-term effects on the habitat. Over time, sediment deposition will cover the scour protection, ensuring the bottom habitat remains similar to the current conditions in the long term.

The following mitigation measures are recommended:

- During demolition alongside and over water, structurally adequate debris shields should be used where practicable to contain debris and prevent it from entering the water.
- The intentional disposal of debris into the water is strictly prohibited. Debris on the quay apron must not be swept into the water but must be recovered and disposed at an appropriate waste disposal site by a licensed contractor.
- Fresh concrete and cement are highly alkaline and corrosive and can cause significant water and sediment quality impairment. The use of wet concrete and cement near, over, and in water thus requires careful control to minimise the risk of spillage. Wherever possible, pre-cast concrete structural elements should be used.
- Concrete and cement batching should ideally not occur at the construction site. Concrete and cement should rather be delivered in ready-mix form. It is, however, acknowledged that some batching will probably be required at the construction site.
- If concrete is poured with a concrete pump, ensure hoses and couplings are sealed and secured.
- Concrete forms must not be filled to overflowing.
- Concrete should ideally not be poured when the weather is adverse.
- For concrete placed under water, fast-setting concrete should be used to limit losses from shuttering and to minimise the period over which impacts can occur.
- Concrete forms must be properly sealed to prevent the loss of concrete into the port.
- Concrete mixing and pouring equipment must not be washed onsite unless this is unavoidable. In these instances, the wash water must be collected in a dedicated wastewater collection system and disposed appropriately.

8.1.1.6 Impact of artificial lighting and shading (construction and operational phases)

Artificial lighting and shading can affect fish behaviour, including foraging, migration, and reproduction, by influencing their environment and predation risks. However, the impact of artificial lighting and shading from the proposed project is expected to be minimal. The new quays will extend slightly seaward, changing shading patterns slightly, but the type and amount of lighting used will be similar to the existing setup. Larger vessels at the new berths will cast light and shade over a larger area, but it is anticipated that biological resources not currently affected by lighting and shading will not be significantly impacted by these minor changes. Dredging and construction will occur mainly during the day, with minimal lighting at night, which will be much less than the lighting from large vessels alongside the quay. Overall, the expected changes in artificial light and shade will not significantly affect the local marine life.

8.1.1.7 Impact of altered vessel traffic (operational phase)

The proposed project will allow larger vessels to access the berths than is currently the case. The movement of large vessels in Durban Bay has several environmental consequences. Disturbance of

bottom sediment by vessel propeller wash, including by tugboats assisting vessels during berthing and de-berthing, causes a temporary increase in the suspended sediment concentration and related turbidity in the water column, with several potential impacts to pelagic and benthic biological resources. The disturbance of bottom sediment by vessel propeller wash also disturbs benthic biological resources.

Larger vessels, and the tugboat power required to berth and de-berth these vessels can be expected to create a larger propeller wash influence. This impact was not assessed in detail because the change in propeller wash related disturbance of sediment on pelagic and benthic biological resources is anticipated to be small compared to the existing situation, because larger vessels are expected to remain alongside the berths for longer than the existing smaller vessels. Propeller wash disturbance of the benthic environment is thus expected to be less frequent. Furthermore, the deeper berth pockets may reduce the magnitude of bottom sediment disturbance.

8.1.1.8 Impact of increased vessel noise (operational phase)

A purpose of the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 is to allow larger vessels to access the berths. A slight increase in vessel related underwater and above water noise can thus be expected, which may adversely affect biological resources. The ways that biological resources are affected by underwater and above water noise is outlined in Section 8.1.2.2 and Section 8.1.2.3 below.

The significance of this environmental impact was not assessed in detail because there is already a large amount of vessel related underwater and above water noise in Durban Bay, and biological resources are assumed to be habituated to the noise. Biological resources that are not displaced or disturbed by existing vessel traffic noise are thus considered unlikely to be significantly affected by the anticipated increase in vessel noise.

8.1.1.9 Loss of recreation and tourism opportunities (construction and operational phases)

Durban Bay is a popular spot for recreational activities, including angling, small boat tours, canoeing, sculling, and sailing. The dredging and construction activities associated with the proposed project could impact water and sediment quality, potentially affecting fish and bait populations, and in turn, recreational angling. These activities may also disrupt recreational opportunities due to impaired water quality or the physical presence of dredging and construction operations. However, the significance of this impact is considered minimal, as the upgrade and deepening activities are not expected to majorly affect fish and bait populations. While angling could be impacted in parts of Maydon Channel, especially due to water quality and noise disturbances, these effects are expected to be limited to Maydon Channel, which is not a major recreational area aside from angling.

8.1.2 CONSTRUCTION AND OPERATIONAL PHASE IMPACTS

8.1.2.1 Impacts to geological resources and processes (construction and operational phases)

The proposed project will involve dredging that will permanently remove up to 395 000 m^3 of sediment and reclaim around 3 180 m^2 of sediment area in Maydon Channel and Congella Basin. Although the sediment has no commercial value, it holds ecological importance. The impact on geological resources will be limited to the areas directly affected by the dredging and construction. The loss of sediment is relatively small compared to the overall geological material in Durban Bay. Changes in hydrodynamic conditions due to the new berths are unlikely to significantly affect geological processes such as sedimentation.

The significance rating for this impact without mitigation is **medium** because it involves the permanent loss of a geological resource. This impact is irreversible since geological resources will be permanently lost. With mitigation, the impact significant remains **medium**.

The following mitigation measures are recommended:

- The new berth footprints should be restricted to the planned footprints.
- Dredging should be restricted to the approved dredging footprint to the extent possible.
- Dredging outside the approved footprint should occur only if this is unavoidable (e.g. vessel navigation safety reasons, to remove unexpected solid objects). In the event dredging outside the approved dredging footprint is required, the dredging should proceed only after approval from TNPA.

8.1.2.2 Impacts due to underwater noise disturbance (construction phase)

Construction and dredging operations for the proposed project will generate underwater noise, with percussive piling being the most significant source. This impulsive noise can cause injury to marine life, including invertebrates, fish, waterbirds, and marine mammals, by disrupting their behaviour and causing potential tissue damage, hearing loss, or death. The effects of underwater noise on marine fauna vary; while some animals, like fish with swim bladders, are more susceptible to injury, others, like those without swim bladders, are less affected. Dolphins, although occasionally entering Durban Bay, are unlikely to be impacted significantly by the noise, as they do not frequent the areas with the most intense construction activity. The impact on biological resources is anticipated to be localised, extending up to 400 m from the piling site, and is expected to be of high intensity but medium-term duration, as piling will not occur continuously. The significance of this impact is rated as **high** without mitigation and **medium** post mitigation.

The following mitigation measures are recommended:

- In so far as conditions allow, vibratory piling should be used in preference to percussive (impact) piling.
- A pre-piling monitoring survey to establish if marine mammals (in this case likely to be restricted to dolphins) are in the area near the piling activity should be performed for 15 minutes. In the unlikely event dolphins are observed, piling should not commence until at least 15 minutes after they were last observed. It is important to ensure they have left the area in the direction of the entrance to Durban Bay to avoid them becoming trapped in Maydon Channel by an underwater noise barrier.
- A ‘soft-start’/‘ramp-up’ procedure must be followed at the commencement of piling on each day to allow biological resources that are able the opportunity to move away from the area before the sound pressure increases to a level at which they might be injured or killed. A ‘soft-start’/‘ramp-up’ procedure should also be followed if there is a temporary halt of >30 minutes in piling on any given day.
- If dolphins or waterbirds are observed near the piling operation when in full power, there is no need to cease piling since the dolphins or waterbirds can be assumed to have entered the area ‘voluntarily’ and to not be overly disturbed by the underwater noise.
- Driving piles into the sediment one at a time will reduce the magnitude of underwater noise exposure. However, this will prolong the period over which high intensity noise is generated. No recommendation is thus made on whether piles should be driven individually or concurrently.
- If dead fish are observed near the piling operation the ‘soft-start’/‘ramp-up’ procedure should be lengthened. The presence of dead fish near the piling operation should be reported to the

Environmental Control Officer. The dead fish should be collected and photographed if possible, so that the most sensitive fish can be identified.
- Construction personnel should receive some exposure to identifying dolphins during environmental awareness training.

8.1.2.3 Impacts due to above water noise disturbance (construction phase)

Construction and dredging operations for the proposed project will generate above water noise. The noise will arise from the same sources identified for underwater noise, but will also include the operation of generators, vehicles, and other equipment on land. As is the case with underwater noise, the most significant above water noise will arise from percussive (impact) piling. The above water noise will principally affect waterbirds, either while feeding in the intertidal and shallows or while roosting on the Central Sandbank at low tide.

Waterbirds in the upper part of Durban Bay are undoubtedly habituated to and tolerant of noise associated with ongoing port activities and operations. However, they are not (at least regularly) exposed to sounds as intense as those generated by percussive piling. Even in the case of percussive piling, however, a degree of habituation will probably be an outcome for some waterbird species (Hill et al., 1997, in CSIR, 2024b). High levels of noise will not last all day as construction will be limited to daylight hours, meaning waterbirds will be able to roost near the proposed project area at night. However, the noise will go on for some time and may displace sensitive waterbirds from parts of the upper part of Durban Bay until construction ceases. The consequence of displacement is essentially the same as habitat loss (albeit temporary).

Construction activities, particularly piling, will generate above water noise that will impact on waterbirds in the area. The impact intensity of considered moderate for the reason above water noise intensity will be affected by wind and will not be persistently high in any area used by waterbirds, nor will it persist throughout the day. The duration is considered medium-term for the construction of any berth, and the extent local. The significance rating for this impact without mitigation is thus **high** and **medium** post mitigation.

The following mitigation measures are recommended:

- In so far as conditions allow, vibratory piling should be used in preference to percussive piling.
- Piling activities should not be conducted at dawn or during the early hours.
- A ‘soft-start’/‘ramp-up’ procedure should be followed at the commencement of piling on each day to allow birds and other biological resources an opportunity to habituate to the noise. A ‘soft-start’/‘ramp-up’ procedure should also be followed if there is a temporary halt of >30 minutes in piling on any given day.
- Driving piles into the substrate one at a time will reduce the magnitude of above water noise exposure. However, this will prolong the period over which high intensity above water noise is generated by piling. No recommendation is thus made on whether piles should be driven individually or concurrently.

8.1.2.4 Loss of hazardous substances into Durban Bay due to spillages and leaks from landside construction equipment and machinery and storage areas (construction phase)

The proposed project may lead to hazardous substance spills, including oil, hydraulic fluids, and fuel, due to the operation of construction machinery and equipment near or over water, as well as during refuelling or repairs. These spills could either directly enter Durban Bay from machinery near the

water's edge or indirectly through runoff from hard surfaces like quay aprons. While small leaks are expected and can typically be contained and cleaned up without significant environmental impact, larger spills could cause substantial harm, affecting water and sediment quality, and potentially harming local biological resources. The environmental impact of hazardous substance spills would be short-term if the substances disperse, dilute, or degrade, but if they accumulate in sediment, the effects may last for years. Without mitigation, the impact is rated as **medium** in significance, and **very low** significance post mitigation.

The following mitigation measures are recommended:

General

- A Hazardous Substance Spill Response and Contingency Plan must be developed by the Construction Contractor/s.
- The Hazardous Substance Spill Response and Contingency Plan must identify appropriate response procedures in the event of a hazardous substance spill on land and in water. The plan must provide specific responses for spills of different types of hazardous substances that may be handled onsite.
- Hazardous substances must be stored and handled in accordance with appropriate legislation and standards, including the Hazardous Substances Act, 1973 (Act 15 of 1973) and Occupational Health and Safety Act, 1993 (Act 85 of 1993).
- Hazardous substance spills and leaks must be reported immediately. The contractor personnel to whom a spill or leak must be reported must be outlined in the Hazardous Substance Spill Response and Contingency Plan. The plan must also outline subsequent lines of reporting as deemed necessary (e.g. Transnet National Ports Authority, relevant authorities).
- Spill containment and clean-up kits must be readily available onsite in areas where there is a risk of a hazardous substance spill or leak and must be appropriate to the type of possible spill or leak.
- Responsible and trained personnel must be available to deal with hazardous substance spills and leaks. Training/drills must be implemented to enable personnel to respond appropriately to hazardous substance spills and leaks.
- Appropriate methods for the disposal of cleaned up spilled substances and clean-up materials must be identified in the Hazardous Substance Spill Response and Contingency Plan – this material must not be disposed with ‘normal’ waste but rather at an appropriately licensed waste disposal site.
- The intentional disposal of hazardous substances into Durban Bay or into stormwater drains and surface drainage channels is strictly prohibited. Procedures to remove contractor personnel from site if they have received environmental awareness training yet are observed intentionally disposing of hazardous substances into Durban Bay or into stormwater or other drainage channels that lead to the Bay should be formulated, and if necessary, implemented. Construction personnel must be educated that stormwater drains lead to aquatic ecosystems, and in the case of the construction site for the proposed project these will lead to the Bay.
- All construction personnel must receive comprehensive environmental awareness training and must be sensitised to the negative environmental impacts of hazardous substance spills and leaks on the environment. Environmental awareness training must be ongoing through the life of the project.
- Only authorised and trained personnel must be allowed to handle hazardous substances.

Landside

- Develop a site drainage plan that shows the positions of sewers, surface drainage channels, and stormwater drains, including where the channels and drains flow into the Bay.
- Only authorised and trained personnel must be allowed to refuel or lubricate construction machinery, equipment, and vehicles, and to perform emergency repairs of machinery, equipment, and vehicles onsite. Refuelling of construction machinery, equipment, and vehicles, and emergency repairs of the same onsite, must take place in areas demarcated for this purpose. These areas must be as far as practically possible from the edge of the estuary, on hard-topped (impermeable) surfaces, and must include measures to prevent the migration of possibly spilt or leaked hazardous substances from the area (e.g. bunding, drip trays). If construction machinery and equipment cannot be easily removed for refuelling, but this must be done from a bowser, a drip tray must be used to capture any spillage that might occur.
- Routine maintenance of construction machinery, equipment and vehicles should not be performed on site. However, it is recognised that it might not be possible to easily move certain construction machinery and equipment that might require emergency repairs to a dedicated repair site (e.g. pile driving machinery). In this case, emergency repairs should be allowed onsite, but the contractor and Transnet National Ports Authority must reach an agreement in this regard.
- Construction machinery, equipment, and vehicles must be properly maintained and regularly checked for leaks of hazardous substances. No vehicles should be allowed on-site if they have visible leaks, including the vehicles of suppliers.
- Hydraulically operated machinery should ideally use a synthetic biodegradable hydraulic oil.
- Hazardous substance storage containers must be labelled, sealed, and stored in accordance with Material Safety Data Sheet requirements.
- Only authorised and trained personnel must be allowed access to areas where hazardous substances are stored or used. Personnel with responsibilities for the use, handling, and storage of hazardous substances must be provided with competency training and environmental, health, and safety training. The training should enable the personnel to perform their tasks efficiently without resulting in any contamination, as well as knowing the appropriate actions to take in response to an emergency (e.g. fire) or spill incidents.
- All hazardous substances must be stored with adequate spill protection (bunding) in secured (locked) and covered areas to prevent wash-off of hazardous substances by rainfall/surface runoff as far as is practicable (fuel bowsers, for example, might need to be stored in the open). Secondary containment (including bunding) must be appropriate to the volume and nature of the hazardous substances being stored but should at a minimum be ≥110% of the volume of the stored material. The base and bund walls must be impermeable to the material stored and of adequate capacity.
- Hazardous substances storage and handling areas should not be positioned near surface (stormwater) runoff drains or surface water drainage areas as these will lead to the estuary. If this is impossible, stormwater drains must have protection facilities.
- The volume of hazardous substances stored onsite should be kept to the minimum practicable.
- A register/inventory of chemical and hazardous substances stored/used on-site should be maintained and regularly updated.
- Construction machinery, equipment, and vehicles must not be washed onsite unless this is unavoidable, and measures are in place to retain and then remove the wash liquid (e.g. in conservancy tanks).
- Photographic records of hard surfaces should be maintained to provide an Environmental Control Officer (if required) with evidence that hazardous substances spills and leaks have not occurred, or if they did occur were properly contained and cleaned.

- Sufficient, marked receptacles for the disposal of hazardous waste, such as oily rags, sorbent material used to clean up spills, and so must be present onsite.

8.1.2.5 Loss of non-hazardous solid waste into Durban Bay from landside construction area

Construction activities for the proposed activities will generate non-hazardous solid waste that, if not properly managed, will be lost into Durban Bay and will pose an environmental risk. The types of non-hazardous solid waste in question and related environmental impacts are outlined in Section 8.1.1.1.

It is probable at least some non-hazardous solid waste will be lost into Durban Bay from the construction site even in the case of effective waste management. The amount will probably be small, but the implications (intensity) are potentially high because this waste can pose a risk to threatened, vulnerable, and endangered species. The potential for non-hazardous solid waste to enter the Bay will persist for the duration of construction (i.e. medium term). However, many forms of non-hazardous solid waste (such as plastic items) are essentially non-biodegradable (or at least take a long time to degrade) and may be transported over large distances by ocean currents. The extent of this impact is thus potentially international and the duration permanent (or at least long-term). The significance rating for this impact without mitigation is thus **high** and **medium** post mitigation.

<u>The following mitigation measures are recommended:</u>

- A Waste Management Plan should be developed by the construction contractor.
- The construction contractor must provide compulsory environmental awareness training for the construction workforce. The training must sensitise the workforce to the adverse environmental consequences of non-hazardous solid waste (especially plastic) on estuarine and marine environments and the consequent need to limit the ingress of such waste into Durban Bay. Environmental awareness training should be ongoing through the life of the project.
- A reduce, reuse, recycle waste philosophy should be followed.
- The intentional disposal of non-hazardous solid waste (indeed any waste) into Durban Bay is prohibited. Procedures to remove project personnel from the construction site if they have received environmental awareness training yet intentionally dispose of non-hazardous solid waste into the Bay should be formulated, and, if necessary, enforced.
- Construction personnel must be encouraged to collect and dispose of plastic litter and other non-hazardous solid waste they see in the construction area, even if it does not originate from the construction site/operation.
- Regular litter sweeps should be carried out across the construction site.
- If non-hazardous solid waste from the construction site enters Durban Bay this should be recovered immediately where practicable. This might be difficult from the quayside, but pool cleaning nets can be used for this purpose if a construction support vessel is available.
- Onsite temporary storage areas for non-hazardous solid waste must be clearly demarcated, signposted, and maintained. These should be situated as far as practical from the water's edge.
- Waste should be properly segregated, stored, and handled to promote recycling and avoid impacts to human health.
- Bins, skips, and/or other receptacles for the temporary storage of non-hazardous solid waste must be sealed and secured to avoid them becoming a source of litter in Durban Bay, noting the proposed project area is often characterised by gale force winds that can blow waste from unsealed receptacles and can overturn unsecured receptacles.
- Waste receptacles must be vermin proof.
- Non-hazardous solid waste must be regularly removed from the construction site and disposed at a registered waste disposal site in accordance with national and local waste legislation, using a

licensed waste disposal contractor. The waste contractor must provide proof the waste was disposed at a registered waste disposal site. The contractor should keep such records onsite for auditing by an Environmental Control Officer.

- Waste receptacles must not be washed onsite unless the wash water is captured and disposed to sewer. The wash water should not be allowed to enter surface runoff channels or stormwater drains as these will discharge into Durban Bay.

8.1.2.6 Entry of materials leaked from portable ablution facilities into Durban Bay (construction phase)

Ablution facilities will be required for personnel involved in the proposed project. It is assumed the contractor/s will provide portable ablution facilities. If ablution facilities leak or overflow and faecal material and chemicals used in the facilities find their way into Durban Bay, either directly or via surface (rainfall) runoff, this will pose an environmental risk since the chemicals used in these facilities are toxic to aquatic biological resources.

It is possible faecal material and chemicals leaked or spilled from portable ablution facilities could enter Durban Bay if controls are ineffective. However, this is unlikely because controls on such facilities at construction sites are usually effective. Furthermore, construction activities will occur along the edge of quays. Ablution facilities cannot thus be cited near the quay edge, reducing the probability that leaked or spilled material will reach the Bay. The potential for this impact will persist for the duration of construction, but a spill or leak would have a temporary impact since the amount of leaked or spilled material is likely to be small and will be diluted and dispersed rapidly if it enters the Bay. Adverse impacts will thus be limited to a small area. The spatial extent is thus anticipated to be site-specific and of a low intensity. The impact is reversible since leaked or spilled material entering the Bay will degrade over time. The significance assessment for this impact without mitigation and with mitigation is **very low**.

<u>The following mitigation measures are recommended</u>:

- Portable ablution facilities must be regularly inspected for signs of leaks. If a leak is found sorbent material must be used to contain and absorb the leaked matter. The portable ablution facility should be removed and replaced as soon as is practically possible. The sorbent material used to clean leaked matter must be treated as hazardous waste and be disposed accordingly.
- Portable ablution facilities must be placed in areas where there is little possibility of them being toppled over by strong winds that are common in the project area. If necessary, the facilities must be secured to the ground to avoid them being toppled by wind or any other cause.
- Portable ablution facilities must be placed in areas where there is little possibility of potential leaks or overflows reaching Durban Bay. Portable ablution facilities should not be positioned near surface (stormwater) runoff drains or surface water drainage areas wherever possible since these will inevitably lead to the Bay. If these controls are not possible then portable ablution facilities must have secondary containment.
- Portable ablution facilities must be maintained in a good, clean condition by a licensed contractor. The contractor must remove waste from the site and disposed at a permitted wastewater treatment works. The disposal contractor must provide proof the waste was disposed at a registered wastewater treatment works. The construction contractor should keep such records onsite for audit purposes.

8.1.2.7 Loss of benthic biological resources in the dredging footprint (construction phase)

The proposed dredging and construction operations associated with the proposed project will inevitably cause the removal, injury, and disturbance of benthic biological resources in the dredging footprint. This includes a decline in species diversity, abundance, and biomass of benthic macroflora, invertebrate fauna, and other organisms, which will result in temporary habitat loss for fish and invertebrates that rely on these resources. While recolonisation of disturbed sediments will occur, it will take time for the benthic biological community to recover to its pre-dredging composition, abundance, and biomass, with recovery expected to be faster in muddy sediments compared to sandy or gravelly ones. The overall impact on benthic resources is expected to be medium-term (approximately 6-24 months) and site-specific. Although the loss of benthic ecology is unlikely to have significant long-term ecological consequences for Durban Bay, it could temporarily affect the food sources for fish and shellfish. The impact is reversible since the disturbed sediments will eventually be recolonised, and deeper water will support comparable communities to those before dredging. The significance rating without mitigation is **medium**. The significance rating is **low** post mitigation.

The following mitigation measure are recommended:

- Dredging for each berth should be completed within the shortest timeframe possible to limit the period over which benthic biological resources might be removed, disturbed, and injured by dredging operations, and to encourage recolonisation in the shortest timeframe possible.
- The dredging footprint should be restricted to the smallest area possible (i.e. do not over-dredge) to limit impacts to benthic biological resources.

8.1.2.8 Deterioration in water quality due to increased suspended sediment concentrations related to dredging and in-water construction operations (construction phase)

The proposed dredging associated with the proposed project will disturb bottom sediment, increasing suspended sediment and turbidity in the water column. This may lead to impacts such as reduced primary productivity, physical damage to aquatic organisms' respiratory and feeding organs, and impaired foraging success for fish and birds. The highest turbidity will be localised near active dredging, with minimal significant effects on sensitive habitats based on previous monitoring data. The impact is expected to be medium-term, with low average intensity, but moderate for sensitive biological resources. Overall, the significance of the impact is **very low** and reversible once dredging operations cease.

The following mitigation measures are recommended:

- Dredging methods that limit the resuspension of fine-grained sediment into the water column must be used wherever possible.
- The dredging footprint must be restricted to the smallest area and depth possible (i.e. avoid over dredging) to minimise the quantity of, and period during which sediment is resuspended into the water column.
- There should be no overflow or leakage from barge compartments during transit to the dredged spoil disposal site off Durban.
- Hoppers and barges should not be overfilled.
- Construction methods that limit the resuspension of fine-grained sediment into the water column must be used wherever possible.
- The area behind the sheet pile wall should not be dewatered if the water is highly turbid.
- The escape of turbid water through sheet pile walls should be limited to the greatest degree possible, if necessary, by using silt curtains.

8.1.2.9 Deterioration in water quality due to increased suspended sediment concentrations related to land-based construction operations (construction phase)

Construction activities for the proposed project, such as demolition, site establishment, and material handling, have the potential to release soil and dust into Durban Bay, increasing suspended sediment concentrations. These activities are expected to be site-specific, with limited dispersion of the suspended sediment at high concentrations. Pelagic and benthic resources in the area are likely accustomed to periodic increases in sediment, and the impacts are anticipated to be minor and temporary. The duration of the impact will be medium-term, but the intensity is considered low. Overall, the significance of the impact is **very low** and reversible once construction ceases.

The following mitigation measures are recommended:

- A demolition and reconstruction plan should be formulated, to identify procedures that will minimise the loss of material into Durban Bay.
- The intentional disposal of construction material and construction waste into Durban Bay must be strictly prohibited. Any construction material and construction waste spilled onto the quay apron must not be swept into the water but must be recovered and reused or be disposed at an appropriate waste disposal site by a licensed contractor.
- During demolition works over water or near the water's edge, structurally adequate debris shields should be used where practical to contain debris and prevent it from entering the water.
- Implement appropriate controls to minimise wind and surface runoff erosion of construction materials stored onsite, especially soil and other fine-grained materials.
- Where practical and possible, minimise the amount of construction materials stored onsite that can be easily blown by wind or eroded by surface runoff into the Bay.
- Where practical and possible, store stockpiles of construction materials that can be easily blown by wind or eroded by surface runoff as far from the water's edge as possible, and on level ground. Stockpiles should not be stored near stormwater drains or surface runoff drainage channels.
- If losses from construction material stockpiles onsite becomes a problem, these must be covered with a tarpaulin or similar material to limit and ideally avoid losses.
- Where practical and possible, and without unduly delaying the project, the handling of construction materials that can be easily blown by wind (e.g. soil, cementitious dust) should be avoided when the wind speed is excessive or during heavy rainfall.
- If increases in suspended sediment concentrations are observed to be more frequent and wide ranging in spatial extent than predicted above, construction methods must be reviewed to identify areas for improvement to prevent this occurrence.

8.1.2.10 Effect of resuspended sediment deposition on benthic biological resources (construction phase)

Dredging and construction activities associated with the proposed project will disturb and resuspend sediment into the water, leading to potential deposition on the bottom. Fine-grained sediment will remain suspended for longer and may settle in areas of weak current flow, affecting benthic organisms and ecological processes. This sediment deposition can smother microphytobenthos, damage invertebrates, and disrupt the sediment structure, which can impact species diversity and ecosystem functions. However, some benthic organisms can tolerate sediment deposition, and in some cases, dredging may even enhance food resources for benthic fauna. The impacts of sediment deposition are expected to be localised and of low intensity, with the overall significance considered low, and the impacts reversible once dredging and construction cease. The impact significance without mitigation is **low.** The impact significance post mitigation is **very low**.

The following mitigation measures are recommended:

- Dredging methods that limit the resuspension of fine-grained sediment should be used wherever possible.
- The dredging footprint should be restricted to the smallest area and depth possible (i.e. do not over dredge) to minimise the amount of sediment resuspended and the period over which it is resuspended into the water column.
- There must be no overflow or leakage from hopper/barge compartments during non-dredging transit at the dredging site and during transit to the dredged spoil disposal site off Durban. The seal on split hull barges must be tight to prevent sediment loss during transit.
- Barges should not be overfilled to the point there is the overflow of turbid water from the barges.
- If suspended sediment concentrations are found to be markedly higher than anticipated, consideration must be given to the use of silt curtains to control the dispersion of suspended sediment.

8.1.2.11 Deterioration in water quality due to the remobilisation of oxygen demanding substances from sediment (construction phase)

Dredging and construction operations for the proposed project will inevitably release oxygen-demanding substances from the sediment into the water column, potentially lowering the dissolved oxygen concentration. The magnitude of the oxygen depression depends on the amount of resuspended substances, the water column's oxygen levels, and the types of biological resources present. While some studies have shown significant drops in oxygen levels, others have found minimal impact, with any changes being temporary. Most of the sediment to be dredged is unlikely to contain large quantities of oxygen-demanding substances, and previous monitoring suggests that oxygen levels will remain above thresholds necessary for most marine life. The overall impact on dissolved oxygen levels is before and after mitigation expected to **be very low**.

The following mitigation measures are recommended:

- Complete dredging and construction in the shortest time possible to limit the time biological resources might be exposed to depressed dissolved oxygen concentrations.
- Restrict dredging to the smallest area and depth possible (i.e. do not over dredge), to minimise the remobilisation of oxygen demanding substances from sediment.
- If dissolved oxygen concentrations are found to be significantly depressed to the extent this may be posing a risk to biological resources, appropriate mitigation must be implemented. This might include temporarily halting dredging to allow dissolved oxygen concentrations to stabilise, dredging in short cycles, and/or shifting the dredging operation within the dredging footprint.

8.1.2.12 Deterioration in water quality due to the remobilisation of noxious chemicals from sediment (construction phase)

Dredging and construction activities associated with the proposed project will disturb sediment, potentially remobilising noxious chemicals such as metals, oils, and pesticides into the water. These chemicals are usually immobilised in sediment under low-oxygen conditions, but disturbance can release them, posing a potential toxic risk to aquatic life. However, only a small proportion of metals dissolve in the water, and many organic chemicals have low solubility, reducing the likelihood of direct toxicity. The sediment in the dredging area was minimally contaminated, and while there may be some toxicity, it is expected to be low and temporary. The impact is considered **very low** in significance before and post mitigation.

The following mitigation measures are recommended:

- Dredging methods that limit the resuspension of fine-grained sediment should be used wherever possible.
- Dredging and construction should be completed within the shortest timeframe possible to minimise the period over which biological resources might be exposed to noxious chemicals remobilised from sediment.
- The dredging footprint must be restricted to the smallest area possible (i.e. do not over dredge), to minimise the potential for noxious chemical remobilisation from sediment.

8.1.2.13 Bioaccumulation of noxious chemicals by fish and shellfish (construction phase)

Dredging and construction activities associated with the proposed project will disturb contaminated sediment, potentially remobilising noxious chemicals such as metals, oils, and pesticides into the water column. These chemicals could become bioavailable and accumulate in fish and shellfish, posing a direct risk to their health and to higher trophic levels in the food web, including humans who consume them. While the concentrations of these chemicals in the dredging area are generally low, some bioaccumulation in aquatic species may occur. The intensity of the impact is considered low, with the spatial extent being local, and the duration medium-term. The significance rating for this impact without mitigation and with mitigation is **low**.

The following mitigation measures are recommended:

- Dredging methods that limit the resuspension of fine-grained sediment into the water column must be used wherever possible,
- The dredging footprint must be restricted to the smallest area and depth possible (i.e. avoid over-dredging) to minimise the quantity of, and period during which, sediment is resuspended into the water column,
- There should be no overflow or leakage from barge compartments during transit to the dredged spoil disposal site off Durban,
- Hoppers and barges should not be overfilled,
- Construction methods that limit the resuspension of fine-grained sediment into the water column must be used wherever possible,
- The area behind the sheet pile wall should not be dewatered if the water is highly turbid, and
- The escape of turbid water through sheet pile walls should be limited to the greatest degree possible, if necessary, by using silt curtains.

8.1.2.14 Deterioration in water quality due to an increase in the suspended sediment concentration during dredged sediment disposal (construction phase)

The proposed disposal of dredged sediment for the proposed project will result in temporary increases in suspended sediment concentrations and turbidity at and near the disposal site off Durban. The sediment is typically disposed of through dredging vessels, and while most sediment sinks to the seabed, some fine sediment may resuspend and disperse into the water column. These suspended concentrations usually return to baseline levels within hours, though fine sediment may travel further depending on currents.

The impact of suspended sediment concentrations on biological resources is expected to be minimal and localized, with sensitive species potentially experiencing chronic exposure but not acute lethal concentrations. Biological resources are anticipated to have some resilience due to regular maintenance dredging at the site. The intensity of the impact is considered low, and the spatial extent

is limited to the disposal area. The impact is reversible once the dredging and disposal operations cease. The overall significance rating for this impact without mitigation and with mitigation is **low**.

The following mitigation measures are recommended:

- Dredging should be completed within the shortest time possible to reduce the period over which biological resources at and near the dredged spoil disposal site will be exposed to suspended sediment concentrations above the baseline,
- The dredging footprint should be restricted to the smallest area and depth possible (i.e. do not over-dredge) to minimise the amount of sediment that needs to be disposed of at the dredged spoil disposal site, and
- The dredged spoil disposal site should be divided into cells that do not extend to the margin of the dredged spoil disposal site. Sediment should be disposed of in the cells in a non-sequential but rotational manner, to avoid the focusing of sediment disposal in only a small area, and to limit persistent exposure to elevated suspended sediment concentrations.

8.1.2.15 Deterioration in water quality due to the release of oxygen-depleting substances and noxious chemicals from dredged sediment during disposal (construction phase)

The dredged sediment from the proposed project will be disposed of at an offshore dredged spoil disposal site near Durban. This will lead to the remobilization of oxygen-depleting substances and noxious chemicals into the water column, similar to the impacts of resuspension caused by dredging. However, studies suggest that the disposal of sediment in open water has a minimal effect on dissolved oxygen levels. Most sediment quickly reaches the bottom, and the amount of oxygen-depleting substances released is small relative to the dilution in the disposal area. Occasionally, dissolved oxygen concentrations may fall briefly to 0 mg/L, but this is rare and typically localised.

The potential impacts on water quality from the release of oxygen-depleting substances or noxious chemicals are expected to be temporary, minor, and site-specific. The concentrations of these substances are anticipated to be low, and the dissolved oxygen in the area will remain above 5 mg/L. As such, the significance of these impacts without mitigation and with mitigation is rated as **very low**.

<u>The following mitigation measures are recommended</u>

- Dredging must be completed within the shortest time possible to reduce the period over which biological communities at and near the dredged spoil disposal site might be exposed to depressed dissolved oxygen concentrations, and
- The dredging footprint must be restricted to the smallest area and depth possible (i.e. do not over-dredge) to minimise the amount of sediment that needs to be disposed of at the dredged spoil disposal site.

8.1.2.16 Transfer of noxious chemicals to the dredged spoil disposal site (construction phase)

The dredged sediment for the proposed project will be disposed of at an open water dredged spoil disposal site off Durban, transferring noxious chemicals from the sediment. Benthic organisms that survive or avoid the physical effects of disposal could be exposed to these chemicals, which may pose acute or chronic toxic risks. The contamination in the dredging footprint is generally low, but the noxious chemicals will still reach the disposal site. While unlikely, there is a possibility that these chemicals could affect benthic organisms on the disposal site. The impact is expected to be minor, with a site-specific spatial extent, as the chemicals will disperse and dilute over time. Previous surveys have shown low metal concentrations on the disposal site. The impact is anticipated to be short-term,

and it will be reversible as sediment erosion will dilute chemical concentrations once dredging stops. The significance of these impacts without mitigation and with mitigation is **low**, since there is little that can be done to mitigate this impact.

The following mitigation measures are recommended

- TNPA must secure a permit from the DFFE for the open water disposal of sediment before capital dredging proceeds, and
- Dredged sediment should be disposed of in designated cells on the dredged spoil disposal site following a pre-approved sequence that avoids disposal in adjacent cells for successive disposal events, to ensure the sediment is disposed of as evenly as possible across the site and environmental impacts are minimised in this way.

8.1.2.17 Physical impact of dredged sediment disposal on benthic biological resources (construction phase)

The disposal of dredged sediment for the proposed project will result in the burial, smothering, and/or crushing of benthic biological resources, including invertebrates and bottom-dwelling fish. These impacts are primarily limited to the dredged spoil disposal site and its immediate vicinity. Although such disposal events can affect species composition and abundance, benthic organisms typically recover over time, with recolonisation occurring within days, but full recovery to pre-disposal conditions may take years. The volume of sediment disposed of for this project is smaller compared to previous projects, making a significant loss of benthic resources unlikely unless disposal is concentrated in a specific area.

The disturbance is not expected to have a significant impact on ecological productivity offshore, given the availability of surrounding habitats. The impact is anticipated to be moderate if disposal is focused in specific locations, but remains overall low in significance. The impact is reversible, with benthic resources recolonizing the area after disposal ceases, though recovery may be slow due to ongoing dredging activities in the region. The significance of these impacts without mitigation is **low,** and with mitigation is **very low**.

The following mitigation measures are recommended

- Dredged sediment should be disposed of in designated cells on the dredged spoil disposal site following a pre-approved sequence that avoids disposal in adjacent cells for successive disposal events, to ensure the sediment is disposed of as evenly as possible across the site and environmental impacts are minimised in this way,
- Dredging vessel and barge tracks should be examined to ensure that dredged sediment is disposed of as evenly as possible across the dredged spoil disposal site, and
- The dredging footprint should be restricted to the smallest area and depth possible (i.e. do not over-dredge) to minimise the amount of sediment that needs to be disposed of at the dredged spoil disposal site, in that way minimising environmental impacts.

8.1.2.18 Enhancement of shoreline erosion due to the accumulation of sediment on the dredged spoil disposal site (construction phase)

The disposal of dredged sediment for the proposed project may cause changes in seabed elevation. However, these changes are unlikely to amplify wave, current, or sediment transport patterns enough to significantly affect shoreline erosion. The shoreline erosion to the north of Durban Bay's Entrance Channel is already a concern, but the sediment disposal is not expected to exacerbate this issue. Bathymetric surveys show limited erosion of sediment from the disposal site over the past decade, and modelling suggests that even larger disposal projects would not notably impact shoreline erosion.

The volume of sediment for the proposed project is much smaller than the planned Berth 203-205 Expansion project, so it is unlikely to significantly affect the wave or current regimes. The impact on the seabed elevation and related changes in current and wave flows will be localised and minor, with little risk of enhancing shoreline erosion. The significance of this impact, without mitigation and with mitigation, is **very low**.

The following mitigation measures are recommended:

- Dredged sediment should be disposed of as evenly as possible across the dredged spoil disposal site to avoid mounding to the extent possible,
- To guide dredged sediment disposal, the dredged spoil disposal site should be divided into equally sized cells,
- The volume of dredged sediment disposed of in the cells must consider the existing seabed bathymetry and the disposal of sediment dredged for other projects,
- The tracks of dredging vessels/barges should be audited to ensure dredged sediment is disposed of according to an approved sequence and position, and
- TNPA and/or eThekwini Municipality should use the findings of shoreline elevation and volume monitoring that the municipality performs to confirm that shoreline erosion in Durban is not enhanced by dredged sediment disposal.

8.1.2.19 Temporary loss of quay wall biological resources (construction phase)

The proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 involve the installation of a combi-wall 2 m in front of the existing quay wall, and then backfilling the area between the new and existing walls. Biological resources that have colonised the intertidal and subtidal parts of the existing quay walls, such as algae, barnacles, oysters, sponges, ascidians, and the communities of small fauna that live amongst these larger fauna and flora, will be destroyed in the process. Biological resources will colonise the new quay walls over time.

The destruction of the quay wall's biological resources and the related temporary loss in ecological productivity will be an unavoidable consequence of the proposed project. The loss in ecological productivity is anticipated to be medium-term since biological resources will colonise the new quay walls, but it will take time (possibly years) for a 'mature' community to develop. The impact is anticipated to be of a moderate intensity since, although biological resources and related ecological productivity will be temporarily lost, this will involve a relatively small area at any time and is unlikely to have a major impact on the ecology of Durban Bay. The impact is anticipated to be local since the loss of quay wall biological resources and related ecological productivity will affect the ecology of the wider Bay environment. The significance rating for this impact without mitigation is thus **very low**. The impact is reversible since biological resources will colonise the new quay walls.

The following mitigation measures are recommended:

Complete construction and dredging operations in the shortest timeframe possible.

8.1.2.20 Permanent loss of deepwater sediment and open water habitat (operational phase)

As a result of the proposed project, the berths will project 2 m further into Maydon Channel and Congella Basin than is currently the case. The consequence will be the permanent loss (reclamation) of approximately 0.318 ha of deepwater sediment and overlying open water habitat in Durban Bay. The reclaimed deepwater sediment habitat area represents 0.047 % of the estimated 673 ha subtidal area of the Bay at spring low tide, acknowledging that the total subtidal area in the Bay does not entirely comprise deepwater sediment habitat. Biological resources that currently use or rely on the

deepwater sediment and open water habitat within the reclaimed area will be permanently displaced. This will lead to a minor decline in the abundance and productivity of these biological resources in the Bay.

The loss of deepwater sediment and open habitat will have a definite, permanent, but minor intensity local impact on biological resources and ecological productivity in Durban Bay. The significance assessment for this impact without mitigation is **medium**.

There is nothing that can be done to mitigate the permanent loss of deepwater sediment and open water habitat other than not proceeding with the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 (i.e. the 'Do Nothing' option). The permanent loss of habitat could be compensated for by the creation of similar or more ecologically valuable habitat in Durban Bay (e.g. intertidal and shallow subtidal sediment habitat), but this will be difficult since there is little area in the Bay to do so. No habitat compensation is included in the project plan. The significance assessment with mitigation thus remains **medium**.

8.1.2.21 Alterations to the hydrodynamic functioning of Durban Bay (operational phase)

Upon the completion of the proposed project, the berths will project 2 m further into Maydon Channel and Congella Basin than is currently the case. Berth pockets will also be dredged alongside the berths. These changes will alter current flows and consequently will alter the hydrodynamic functioning of Durban Bay. Current speeds, for example, will probably be reduced in the deeper berth pockets and will alter sedimentation patterns. However, the changes are expected to be negligible, and no change to the water residence time in the upper part of the Bay is anticipated. The changes are also not anticipated to promote the erosion of ecologically valuable intertidal and shallow subtidal sandbank habitat.

Any alteration in the hydrodynamic functioning of Durban Bay will be site-specific but could have local implications, will be permanent, but of such a minor intensity that the change is highly unlikely to have implications for water and sediment quality, biological resources, and ecosystem processes in the Bay. The significance rating for this impact without mitigation is **very low**.

No mitigation is required, considering the **very low** significance rating for this impact. However, it is good practice to implement mitigation to further reduce the potential for and implications of environmental impacts. Recommended mitigation is thus outlined below, although there is little that can be done to mitigate this impact apart from the 'Do Nothing' option. The significance rating for this impact with mitigation remains **very low.**

<u>The following mitigation measures are recommended:</u>

- The berth extension footprints should correspond to the construction plan, and
- The dredged area should correspond to the dredging plan. The berth pockets should not have steep slopes to avoid the trapping of water in the pocket, as this could lead to a deterioration in water quality that goes on to affect benthic biological resources.

8.2 SOCIO-ECONOMICS

8.2.1 CONSTRUCTION PHASE

8.2.1.1 Temporary disruption of business activities at the Maydon Wharf Precinct

The temporary disruption of business activities at Maydon Wharf Berth during the upgrade project will primarily affect businesses that rely on the berth for cargo handling, storage, and logistical operations.

The disruption will occur as construction activities necessitate the partial or full closure of certain facilities, leading to delays in loading and unloading processes, reduced storage capacity, and potential logistical bottlenecks. Stakeholders directly impacted include shipping companies, freight forwarders, and ancillary service providers such as transport and warehousing firms. These disruptions could lead to temporary financial losses, increased operational costs, and strained timelines for businesses dependent on the berth's functionality. Effective communication, phased construction scheduling, and temporary operational adjustments will be critical in mitigating the adverse impacts on these businesses. The significance rating for this impact without mitigation is **medium**, and **low** post-mitigation.

The following mitigation measures are recommended:

- Design the construction plan to occur in phases, allowing some berths or sections to remain operational while others undergo upgrades. This will minimise the extent of disruptions at any given time.
- Maintain transparent and regular communication with affected businesses to keep them informed about construction schedules, expected disruptions, and mitigation measures. This will allow stakeholders to plan their operations effectively.
- Establish temporary operational facilities or utilise other berths within the PoD to accommodate displaced activities. This could include reallocating vessels or redirecting cargo to nearby functional berths.
- Offer extended hours of operation during less active periods to handle backlogged activities and mitigate delays caused by construction.

8.2.1.2 Temporary Stimulation of the Regional and Local Economy

The construction activities are projected to temporarily boost the economy of the eThekwini Municipality and the KZN region. Increased spending on construction materials, labour, and services is expected to contribute to regional GVA. The economic uplift will extend to businesses supplying goods and services to the project. The impact will be most pronounced during the construction phase, aligning with peak project activities, and will primarily affect businesses within the precinct and surrounding communities. While the stimulation is temporary, it holds potential for longer-term economic benefits if local businesses use this opportunity to expand their capabilities and workforce, thereby enhancing regional economic resilience. The significance rating for this impact without enhancement is **high**, and **very high** post enhancement.

The following enhancements are recommended:

- Actively engage with local suppliers for construction materials, equipment, and services to ensure a significant portion of the expenditure remains within the eThekwini Municipality and KZN region. This will help to bolster the capacity of regional businesses. In terms of procurement, the following preference points will apply, as per the Transnet Preferential Procurement Policy (TPPP):
    - The promotion of enterprises located in eThekwini Metro Municipality for work to be done or services to be rendered in that Municipality.
    - B-BBEE Status Level of Contributor 1 or 2.
    - The promotion of supplier development through subcontracting a minimum of 30% of the value of the contract to/with exempt micro enterprises (EMEs) and /or qualifying small enterprises (QSEs) 51% owned by black people, youth, women or disabled people.

- Provide skills development and training programs for local workers to equip them for opportunities created during the construction phase. This will ensure that more individuals from the local communities benefit from the project, while also enhancing long-term employability.
- Establish partnerships with local Small and Medium Enterprises (SMEs) to integrate them into the project supply chain. This can include mentoring and providing support to help these businesses meet the project's quality and capacity requirements.

8.2.1.3 Temporary Employment Creation

eThekwini currently has an unemployment rate of 20.6% % which is lower than the provincial unemployment rate (32.6%). The project is expected to generate a significant number of temporary jobs across various skill levels, including skilled, semi-skilled, and unskilled labour. Employment will primarily benefit the local population, fostering skill development and offering experience in construction-related trades. Indirect employment in supporting sectors, such as logistics and catering, will also likely increase. The significance rating for this impact without enhancement is **medium**, and **high** with enhancement.

The following enhancements are recommended

- Establish and enforce policies that prioritise hiring from the local community, ensuring that residents directly benefit from the employment opportunities.
- Introduce training initiatives to upskill the local workforce, particularly in construction-related trades. This will enhance employability beyond the construction phase and contribute to long-term economic development.
- Partner with local technical and vocational education and training (TVET) colleges to source labour and provide on-the-job training opportunities for students.
- Require contractors to allocate a percentage of their workforce to local hires as part of their contractual obligations, incentivising them to integrate local labour into their operations.
- Facilitate the growth of ancillary businesses, such as catering, transportation, and equipment supply, by providing information and access to contracts related to the project.
- Offer workshops and support programs for SMEs to help them meet project demands, enabling them to provide goods and services and participate in the economic opportunities generated.

In terms of procurement, the following preference points will apply, as per the TPPP:

- The promotion of enterprises located in eThekwini Metro Municipality for work to be done or services to be rendered in that Municipality.
- B-BBEE Status Level of Contributor 1 or 2.
- The promotion of supplier development through subcontracting a minimum of 30% of the value of the contract to/with EMEs and /or QSEs 51% owned by black people, youth, women or disabled people.

8.2.1.4 Temporary Increase in Household Income

The temporary increase in household income resulting from the Maydon Wharf upgrade project will positively affect workers and their families within eThekwini Municipality and surrounding areas. Construction workers, including those in direct employment on-site and individuals indirectly employed in supporting sectors like logistics, catering, and equipment supply, will experience improved financial stability due to wages earned during the construction phase. This boost in disposable income is anticipated to elevate living standards by enabling households to meet basic needs, invest in education, and access better healthcare. The economic uplift will primarily occur during the project's

active construction period and will particularly benefit low-income families who rely on temporary employment opportunities for financial security. The significance rating for this impact with and without enhancement is **medium**.

The following enhancements are recommended:

- Prioritise hiring from the surrounding communities within eThekwini Municipality to ensure that economic benefits remain localised, directly uplifting the households most in need.
- Provide pre-construction training programs for local workers to increase their employability, enabling them to secure higher-paying positions within the project and beyond.
- Ensure that wages meet or exceed industry standards to maximise the financial benefits for workers and their households.
- Engage local suppliers and subcontractors to create indirect employment opportunities, thereby increasing household incomes in ancillary sectors.

In terms of procurement, the following preference points will apply, as per the TPPP:

- The promotion of enterprises located in eThekwini Metro Municipality for work to be done or services to be rendered in that Municipality.
- B-BBEE Status Level of Contributor 1 or 2.
- The promotion of supplier development through subcontracting a minimum of 30% of the value of the contract to/with EMEs and /or QSEs 51% owned by black people, youth, women or disabled people.

8.2.1.5 Temporary Increase in Production

The construction phase of the Maydon Wharf berths upgrade is expected to result in a temporary surge in production activities across various sectors. This increase will primarily benefit industries supplying construction materials, machinery, and associated services. Local manufacturers and suppliers within eThekwini Municipality and the KZN region will experience heightened demand, creating opportunities to expand production capacities to meet project requirements. The impact will extend to logistics providers, transportation companies, and ancillary businesses involved in supporting construction operations. This short-term boost in production will contribute to increased economic activity, enhanced business revenues, and temporary job creation in supply chain sectors, driving a ripple effect of economic benefits through the regional economy. The significance rating for this impact with and without enhancement is **medium**.

The following enhancements are recommended:

- Source construction materials, machinery, and equipment from local suppliers to boost production within eThekwini and KZN, thereby maximising regional economic benefits; and
- Engage local SMEs in the supply chain by providing technical assistance, contract opportunities, and capacity-building initiatives to enable their participation in the project.

8.2.1.6 Change to the Sense of Place

The construction phase will temporarily alter the local environment through increased noise, dust, and pollution from construction vehicles, machinery, and materials, alongside the influx of workers. This shift may disrupt the local community's accustomed lifestyle and visual landscape; however, due to the industrial nature of the port, it is expected to be very limited. The significance rating for this impact without mitigation is **medium**, and **low** post-mitigation.

The following mitigation measures are recommended

- Implement soundproofing around construction zones to limit noise pollution,
- Reduce the number of construction vehicles by establishing dedicated transport routes for construction traffic. This will help limit congestion and the impact of heavy machinery and vehicles on the local environment,
- Where feasible, introduce landscaping elements or temporary green screening around construction areas. This can help reduce visual disruptions and restore the aesthetic value of the area once construction is completed,
- To minimise noise and disruptions during sensitive hours, such as early mornings or late evenings, construction activities can be scheduled to occur during off-peak hours. This will ensure that the local community's daily routines are less affected by construction activities, and
- Proactively engage with stakeholders and businesses, informing them about the construction schedule, potential disruptions, and steps taken to mitigate impacts. Clear communication will help manage expectations and reduce community dissatisfaction.

8.2.2 OPERATIONAL PHASE

8.2.2.1 Local Economic Development

Local Economic Development during the operational phase of the proposed project will primarily stem from the enhanced cargo-handling capacity at the PoD. As Maydon Wharf handles a larger volume of goods, trade-related activities such as warehousing, logistics, distribution, and customs services are expected to experience growth. This increased throughput will create a ripple effect, benefiting local businesses directly involved in these sectors and stimulating economic growth across KZN. The operational phase will also likely enhance the competitiveness of the region by attracting more domestic and international businesses, thereby increasing job opportunities, fostering investments, and contributing to the overall GVA in the region. This local economic stimulation will be driven by demand for goods and services, which, in turn, will have a positive impact on related industries such as transportation, retail, and manufacturing within eThekwini Municipality and the wider KZN region. The significance rating for this impact without enhancement is **high**. No mitigation or enhancement measures apply to this impact.

8.2.2.2 Improved Trade Competitiveness

Improved Trade Competitiveness in the operational phase of the proposed project will arise from the enhanced infrastructure, which is expected to significantly improve the efficiency of cargo handling at the PoD. The upgraded facilities will streamline operations by reducing turnaround times for ships, improving the speed and reliability of cargo processing, and enabling better logistics and transportation flow. As a result, the PoD will become more competitive in regional and global markets, attracting both local and international trade. The increased efficiency and capacity will not only strengthen Durban’s position as a key gateway for trade but also create a more favourable business environment, drawing further investments into the region. This will help the Port and KZN maintain their competitive edge in the global supply chain, ultimately contributing to economic growth by fostering trade, improving connectivity, and enhancing the region's attractiveness as a logistics hub. The significance rating for this impact without enhancement is **high**. No mitigation or enhancement measures apply to this impact.

8.2.2.3 Employment Creation

Employment creation in the operational phase of the proposed project will result from the need for operational staff and maintenance workers to support the day-to-day activities at the port. The upgrade will increase the scale and complexity of port operations, requiring a larger workforce to manage cargo

handling, logistics coordination, and facility maintenance, albeit the existing workforce will likely maintain infrastructure. This direct job creation will primarily benefit local communities, with long-term opportunities in a range of roles, including equipment operators, warehouse staff, and maintenance technicians. In addition to these direct positions, the upgraded infrastructure will stimulate indirect job creation in supporting sectors such as logistics, warehousing, and security. As businesses connected to the port grow in scale, the demand for services like transportation, customs clearing, and supply chain management is expected to rise, further enhancing employment opportunities across the region. The cumulative effect will contribute to a more robust labour market and support sustained economic development in KZN. The significance rating for this impact without enhancement is **medium**. No mitigation or enhancement measures are applicable to this impact.

8.2.2.4 Pressure on Existing Infrastructure

Pressure on existing infrastructure during the operational phase of the proposed project will arise from the increased cargo volumes generated by improved efficiency in the port's operations. As cargo handling capacity expands, there will likely be higher traffic volumes of both heavy trucks and rail transport in and around the port area. This intensified movement of goods will place additional pressure on the surrounding infrastructure, including local roads, rail networks, and utility services. The increased demand on transport routes could lead to congestion, delays, and potential degradation of road quality. Additionally, the strain on utility services such as water, electricity, and waste management systems may emerge as the upgraded port facilitates more business and trade activity. To manage this pressure effectively, ongoing investments in surrounding infrastructure will be essential, ensuring that transportation networks are upgraded and service provision is optimised to meet the increased demand associated with higher operational throughput at the port. The significance rating for this impact without mitigation is **medium**, and **low** post-mitigation.

The following mitigation measures are recommended

- Continuous investment in road and rail infrastructure surrounding the port is essential. This includes widening roads, improving rail connections, and constructing dedicated transport lanes for cargo movement. These measures can alleviate congestion and prevent delays caused by increased traffic volumes.
- Creating alternative routes for cargo transportation can help divert traffic from heavily congested areas. This would also reduce the burden on key transport corridors, improving the overall flow of goods in and out of the port.
- Deploying advanced traffic management technologies, such as real-time monitoring, automated signals, and congestion-reducing systems, can optimise traffic flow and prevent bottlenecks at critical points
- Proactively upgrading local utility services, including electricity, water, and waste management systems, will be necessary to meet the increased demand from businesses and the port's expanded operations. This could involve increasing capacity or expanding networks to ensure efficient service delivery during operations.
- Implementing the project in phases can prevent sudden surges in infrastructure demand. This approach will allow for the gradual expansion of supporting infrastructure, ensuring that the necessary upgrades occur alongside the port's growing throughput.

8.2.2.5 Increased government revenue

The operational phase of the proposed project is expected to contribute positively to government revenue through multiple channels. As employment opportunities increase, individuals will contribute

more to income tax through their wages, while businesses benefiting from the port's enhanced operations will generate higher corporate tax revenues. The expanded economic activities will also stimulate consumer spending, which will lead to greater value-added tax (VAT) collections. Additionally, businesses involved in the port's operations will contribute to other forms of taxation, including excise duties and property taxes, further boosting government income. The overall increase in economic activity driven by the upgraded infrastructure is likely to provide significant fiscal benefits to local and national government entities. The significance rating for this impact without enhancement is **high**. No mitigation or enhancement measures are applicable to this impact.

8.3 TRAFFIC

8.3.1 CONSTRUCTION PHASE

The estimated additional traffic during the construction phase is expected to be caused by the closure of some access roads and some roads allowing for movement in one direction. As a result, alternative routes will need to be used. The affected access roads are listed in **Table 8-2**. It is also anticipated that the closure of the quayside during the construction phase will impact some adjacent properties. The affected properties are listed in **Table 8-3**.

8.3.1.1 Pedestrian management:

- The management of pedestrians on the quayside will be the same as for vehicles, with the berth under construction restricting pedestrian movements through the construction area.
- Accommodate all the construction vehicles on site and not on Johnstone Road or Fletcher Road.

8.3.1.2 Construction phase road signage:

It is recommended that signage be placed as indicated in **Table 8-1**.

Table 8-1 – Maydon Wharf signage required per construction phase

Phase	Berth	Description	Signage
All	Berth under construction	The hoarding of the berth under construction must be fully closed on each side of the quay, with the following signage on each side of the closure: ▪ No entry (R3) signage ▪ Road closed Chevrons (TW410) on both vehicle approaches to the closure ▪ Pedestrians prohibited (TR218) on the hoarding on both sides of the closure ▪ Construction and tenant access only on both sides of the closure	
1	Berth 11	N/a	
2	Berth 10	N/a	
3	Berth 9	Fletcher Road T-junction with Maydon Wharf Road: Right turn ahead prohibited (TR210)	

Phase	Berth	Description	Signage
4	Berth 8	Fletcher Road T-junction with Maydon Wharf Road: No entry (R3) signage & Road closed Chevrons (TW410) on the eastbound approach to the T-junction Crofts Road T-junction with Maydon Wharf Road: Right turn ahead prohibited (TR210)	
5	Berth 7	Davey Road T-junction with Maydon Wharf Road: Right turn ahead prohibited (TR210)	
6	Berth 6	Parker Road T-junction with Maydon Wharf Road: No entry (R3) signage & Road closed Chevrons (TW410) on the eastbound approach to the T-junction Davey Road T-junction with Maydon Wharf Road: left turn ahead prohibited (TR209)	
7	Berth 5	Parker Road T-junction with Maydon Wharf Road: left turn ahead prohibited (TR209)	
8	Berth 15	Vetch Road T-junction with Maydon Wharf Road: Right turn ahead prohibited (TR210)	

8.3.1.3 General impact of construction on traffic management

It is intended that while each berth is under construction, it will be closed to all traffic and persons. Therefore, no non-construction vehicles or persons will be able to traverse the construction area of the berth between the quayside and the properties behind the berth.

The reconstruction of each berth is limited to an area approximately 15m wide from the quay wall, with an additional 5.0m wide area required within this construction area. The general quayside area at each berth varies from +/- 25m to 30m. There will therefore be limited space between the construction area and the adjacent properties. The use of these areas will be restricted to only construction vehicles and personnel and for the operators of the adjacent properties to access the quay side entrances to their properties.

The operational berths south of the berth under construction will only be accessible to operators via the southern vehicle accesses to the quayside, and those located north will only be accessible from the northern accesses to the quayside. This will require minor accessibility and access route changes to the operational berths.

8.3.1.4 Vehicle access and route planning

Quayside access

The current security access-controlled roads that provide access to Maydon Wharf will be retained during construction. However, due to the closure of a berth per construction phase, some of the access and routes to the berths will be closed to all quayside traffic.

- These changes are briefly described below and in **Table 8-2**, in the order of construction,
- Berth 11: Access to Berth 12 to 15 is only via the Johnstone, Jenkyn or Vetch Road accesses. Access to other berths is unaffected,
- Berth 10: Access to Berth 11 to 15 is only possible via the Johnstone, Jenkyn or Vetch Road accesses. Access to other berths is unaffected,
- Berth 9: Access to Berth 10 to 15 is only possible via the Johnstone, Jenkyn or Vetch Road accesses. Access to other berths is unaffected,
- Berth 8: Access to Berth 9 to 15 is only possible via Johnstone, Jenkyn, or Vetch Road accesses. Access to other berths is unaffected,
- Berth 7: Access to Berth 8 to 15 is only possible via the Johnstone, Jenkyn, Vetch or Fletcher Road accesses. Access to other berths is unaffected,
- Berth 6: Access to Berth 7 to 15 is only possible via the Johnstone, Jenkyn, Vetch or Fletcher Road accesses. Access to other berths is unaffected,
- Berth 5: Access to Berth 6 to 15 is only possible via the Johnstone, Jenkyn, Vetch, Fletcher, Davey or Parker Road accesses. Access to other berths is unaffected, and
- Berth 15: The current access to the quayside and internal routes to all other berths is unaffected.

Table 8-2 – Maydon Wharf access route changes per construction phase

Phase	Berth	Affected access road
1	Berth 11	No accesses affected All vehicles from the north or south may not traverse Berth 11
2	Berth 10	No accesses affected All vehicles from the north or south may not traverse Berth 10
3	Berth 9	Fletcher Road access will remain open, but vehicles can only travel north on Maydon Wharf Road All vehicles from the north or south may not traverse Berth 9
4	Berth 8	Fletcher Road access closed Crofts Road access will remain open, but vehicles can only travel north on Maydon Wharf Road All vehicles from the north or south may not traverse Berth 8
5	Berth 7	Davey Road access will remain open, but vehicle may only travel up to Berth 7 or north on Maydon Wharf Road Fletcher Road access will remain open, but vehicle may only travel up to Berth 7 or south on Maydon Wharf Road All vehicles from the north or south may not traverse Berth 7
6	Berth 6	Parker Road access closed Davey Road access will remain open, but vehicle may only travel to the south on Maydon Wharf Road All vehicles from the north or south may not traverse Berth 6
7	Berth 5	Parker Road access will remain open, but vehicle may only travel to the south on Maydon Wharf Road

Phase	Berth	Affected access road
		All vehicles from the north or south may not traverse Berth 5
8	Berth 15	No accesses or routes affected

In summary, berths south of the berth under construction will only be accessible via the southern accesses, and those located north will only be accessible from the northern accesses to Maydon Wharf. The accesses and routes per phase are graphically shown in **Figure 8-1** to **Figure 8-8**.

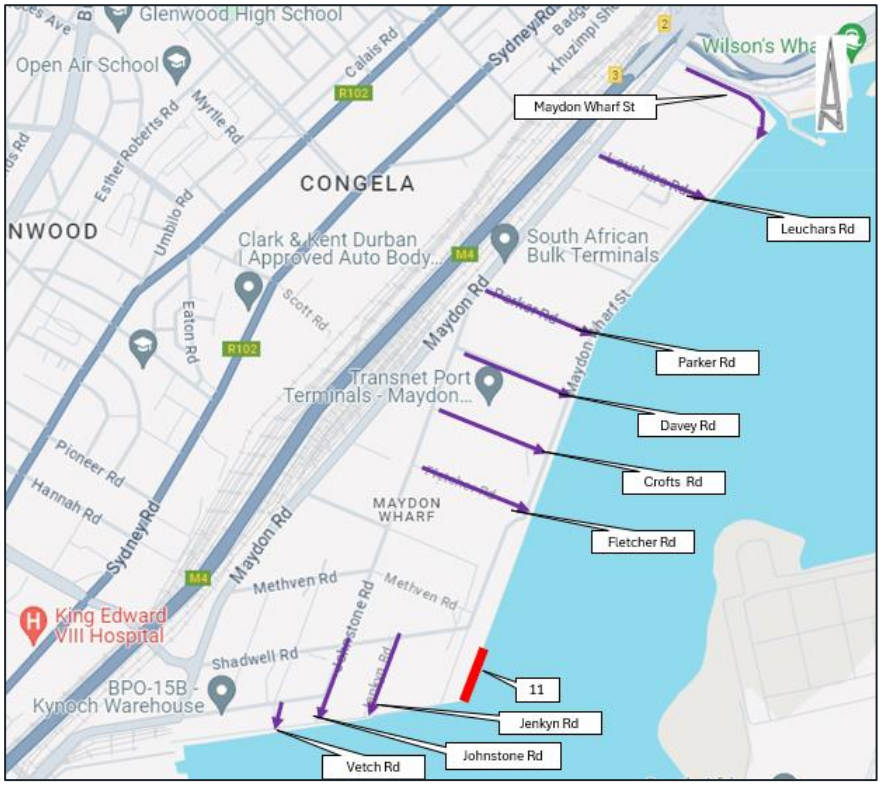

Figure 8-1 - Berth 11 access routes

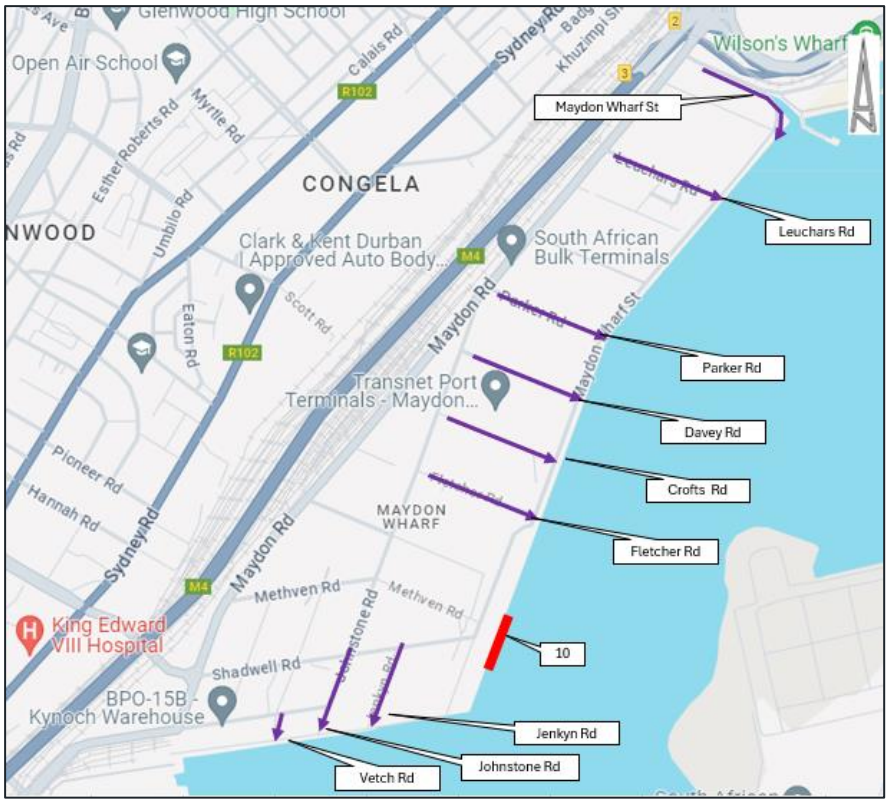

Figure 8-2 - Berth 10 access routes

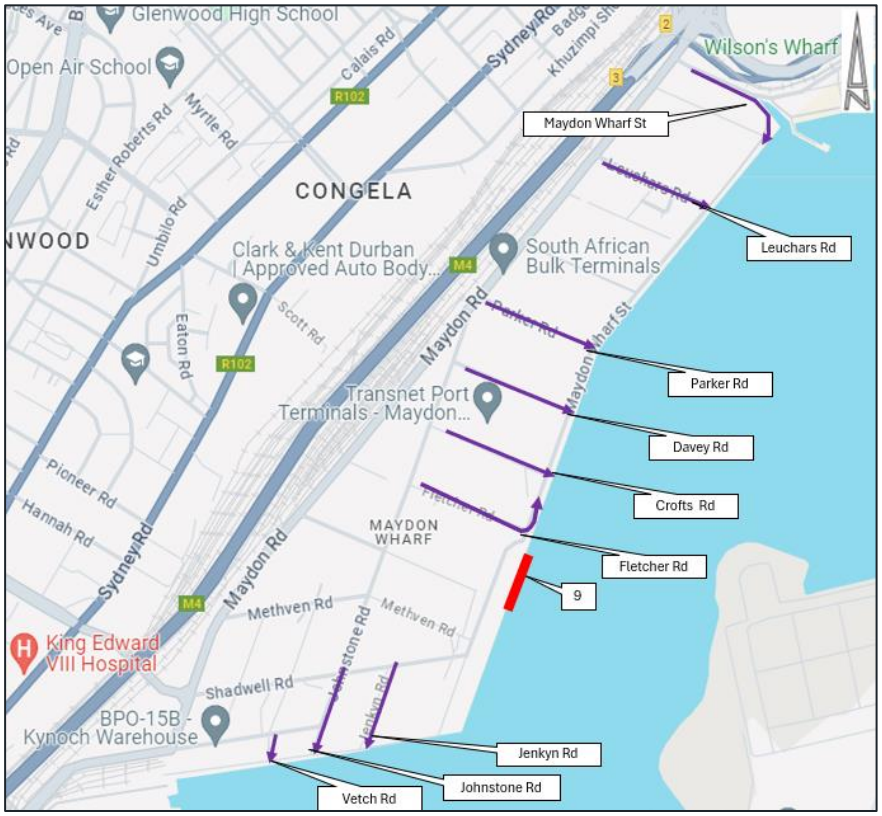

Figure 8-3 - Berth 9 access routes

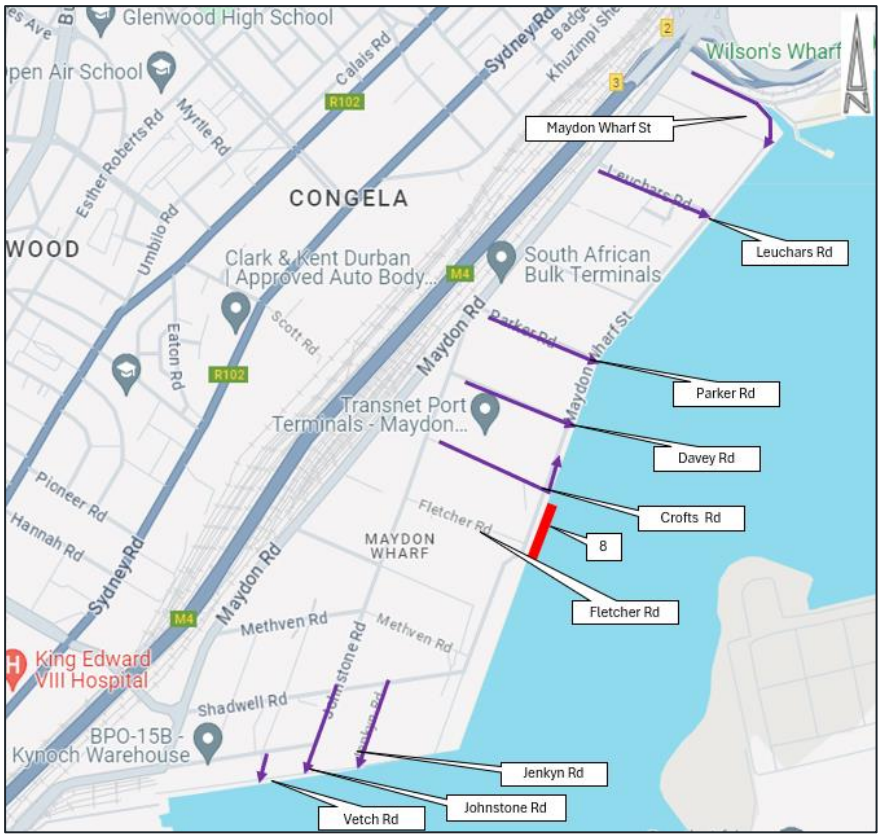

Figure 8-4 - Berth 8 access routes

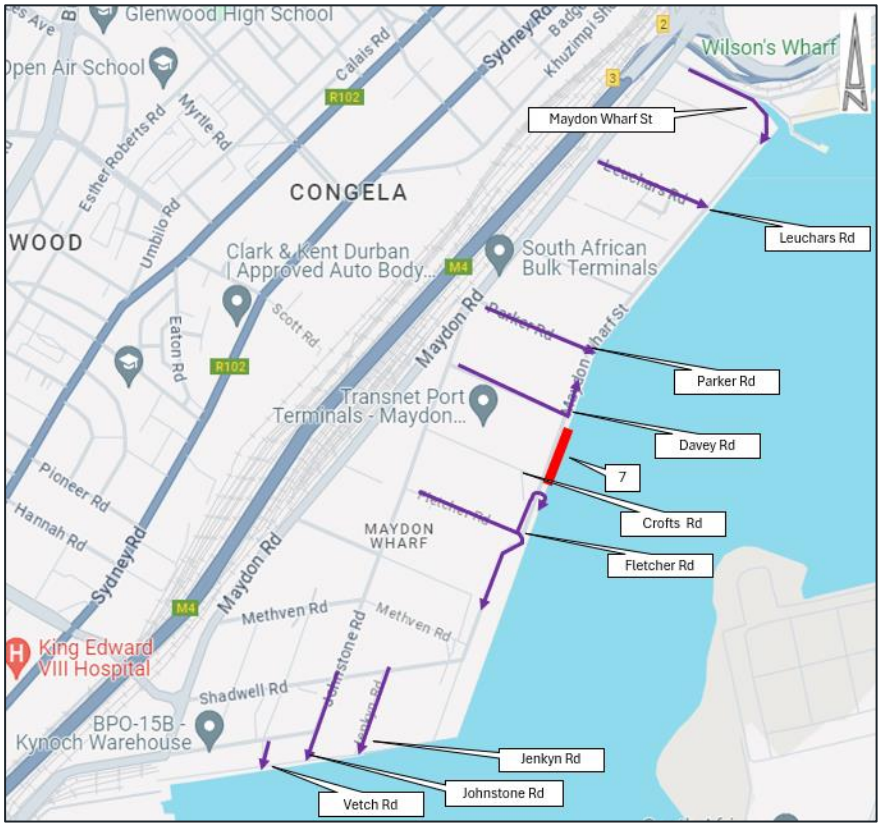

Figure 8-5 - Berth 7 access routes

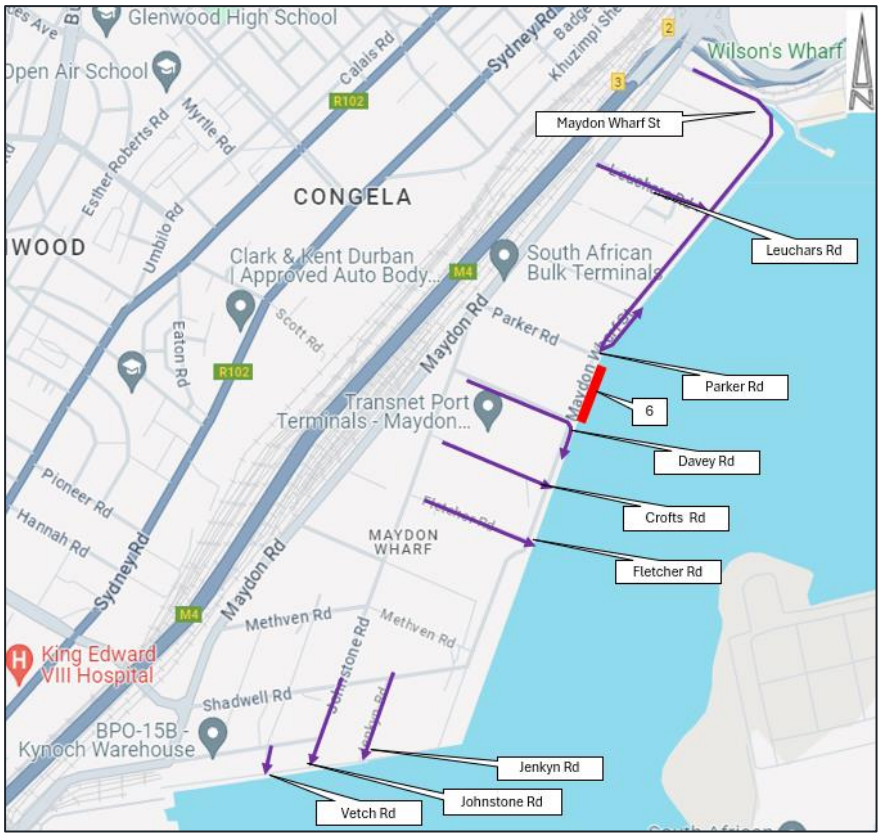

Figure 8-6 - Berth 6 access routes

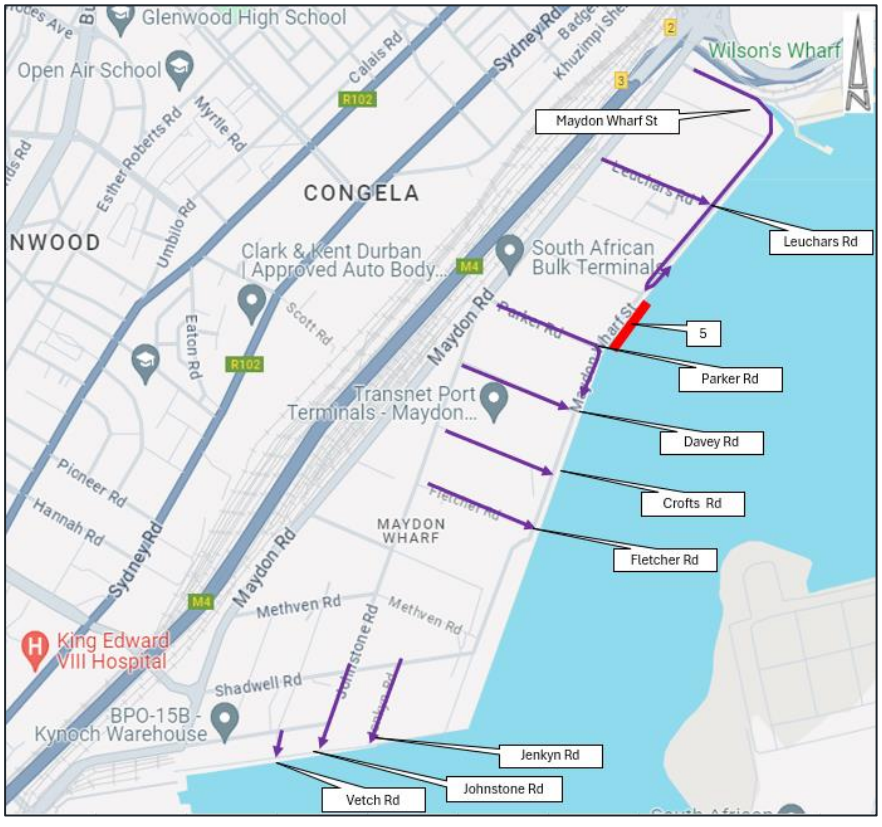

Figure 8-7 - Berth 5 access routes

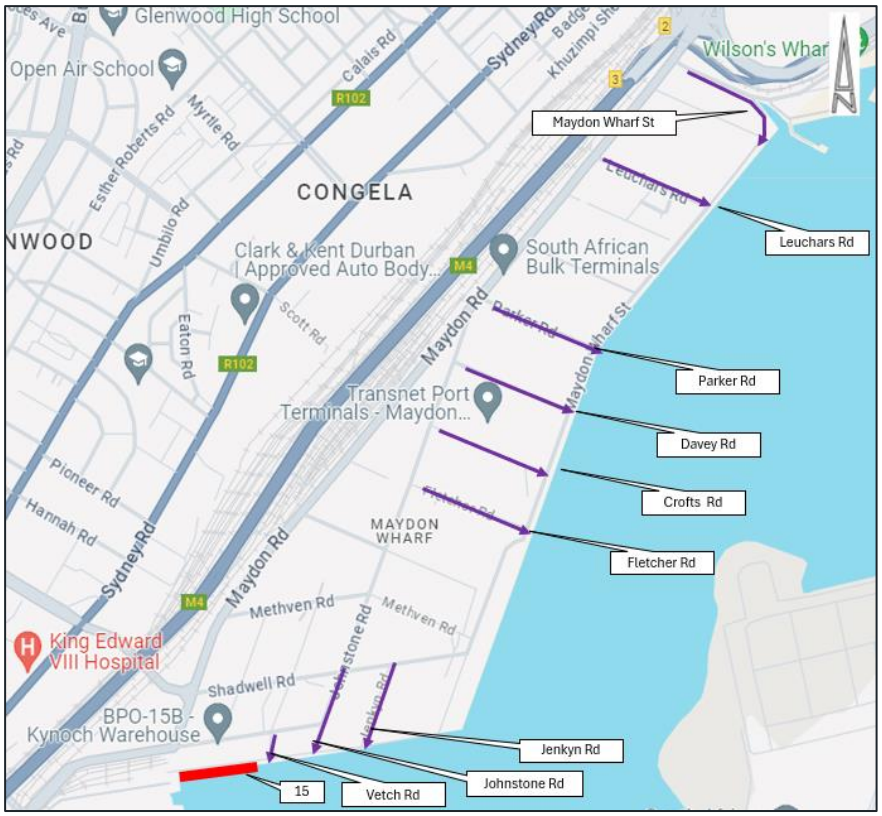

Figure 8-8 - Berth 15 access routes

Property access

The quayside closures per construction phase will impact the quayside accesses to some adjacent properties. Refer to **Table 8-3** for the assessment and recommendations.

Table 8-3 – Maydon Wharf affected property access per construction phase

Phase	Berth	Affected property access
1	Berth 11	▪ The coal storage area located along the berth has access directly to the quayside. ▪ The coal storage area also has direct access to Shadwell Road ▪ The Contractor and the operator of the property will have to make temporary access arrangements on an as-and-when-required basis. ▪ TNPA must be made aware of these access requirements and arrangements in advance.
2	Berth 10	▪ The warehouse located along the berth has direct access to the quayside. ▪ The warehouse also has direct access to Maydon Wharf Street on the western side of the warehouse. ▪ The Contractor and the operator of the warehouse will have to make temporary access arrangements on an as-and-when-required basis. ▪ TNPA must be made aware of these access requirements and arrangements in advance.
3	Berth 9	▪ The coal storage area located along the berth has access directly to the quayside.

Phase	Berth	Affected property access
		▪ Access to the coal storage area may be possible via Herschell Road. ▪ The Contractor and the operator of the property will have to make temporary access arrangements on an as-and-when-required basis. ▪ TNPA must be made aware of these access requirements and arrangements in advance.
4	Berth 8	▪ A warehouse and a silo dry bulk storage area are located along the berth with direct access to the quayside. ▪ The warehouse has direct access to Johnstone Road, and the dry bulk storage property has direct access to Crofts Road. ▪ The Contractor and the operators will have to make temporary access arrangements on an as-and-when-required basis. ▪ TNPA must be made aware of these access requirements and arrangements in advance.
5	Berth 7	▪ Various warehouses are located along the berth with direct access to the quayside. ▪ The warehouses also have direct access to Crofts Road, Johnstone Road and Davey Road. ▪ The Contractor and the operators of the warehouses will have to make temporary access arrangements on an as-and-when-required basis. ▪ TNPA must be made aware of these access requirements and arrangements in advance.
6	Berth 6	▪ A vacant property and a coal storage area are located along the berth with direct accesses onto the quayside. ▪ The vacant property is currently vacant, but a lease has been signed for a new development. Access to this property is also possible via Davey Road. ▪ The coal storage area has access to Parker Road. ▪ The Contractor the future operator and the operator of the coal storage area will have to make temporary access arrangements on an as and when required basis. ▪ TNPA must be made aware of these access requirements and arrangements in advance.
7	Berth 5	▪ The warehouses and bulk storage silos located along the berth have multiple direct accesses to the quayside. ▪ The property also has direct access to Maydon Road. ▪ The Contractor and the operator will have to make temporary access arrangements on an as-and-when-required basis. ▪ TNPA must be made aware of these access requirements and arrangements in advance.
8	Berth 15	▪ The warehouse located along the berth has multiple direct accesses to the quayside. ▪ The warehouse also has multiple direct accesses onto Crabtree Road on the northern side of the warehouse. ▪ The Contractor and the operator of the warehouse will have to make temporary access arrangements on an as-and-when-required basis. ▪ TNPA must be made aware of these access requirements and arrangements in advance.

8.3.1.5 Abnormal load deliveries

The delivery of any abnormal loads to the contractor's laydown area or directly to a berth under construction will require a statutory approval process. This includes route planning to verify that the size and weight of the abnormal load can travel along the planned route safely, taking cognisance of structures that will impact the horizontal or vertical clearance of the road and the maximum weight limit of all bridges and structures along the route.

Depending on the route on a National, Provincial or Local municipal road, the abnormal load application will be directed to the relevant authority for approval. Lastly, an application must also be submitted to TNPA for approval.

8.3.2 OPERATIONAL PHASE

The second potential impact will occur with the full development. The impact of the additional operational heavy vehicles of seven vehicles in the peak hour is of low significance (without the implementation of any mitigation measures), and it does not have a negative impact on the existing intersections as there is ample capacity on the existing road network, based on the data and simulations. No mitigation measures required as the impact of the additional vehicles on the road network does not significantly affect the performance of the road network.

8.4 CLIMATE CHANGE

The following is extracted from the Climate Change Study that was done for the Maydon Wharf Channel Deepening and Widening compiled by Promethium (Promethium, 2023). Although the study was not conducted for the Maydon Wharf berth upgrade and deepening project, the same project risks and adaptation measures apply.

8.4.1 IMPACT OF CLIMATE CHANGE ON THE PROJECT

The main weather-related risks relevant to the project are those that relate to marine and coastal weather: sea surface temperature (SST), ocean pH (acidification), coastal storm activity and impacts, wind and sea level. Air temperature and precipitation are also relevant as general climate indicators and are discussed.

8.4.1.1 Temperature

The climate change projections for the PoD indicate that the median annual mean ambient temperatures are likely to increase by ±0.3˚C by 2030 and 0.5-1.0˚C to potentially reach 22.5 ˚C by 2050 (with significant annual variability) under the different climate scenarios. Very hot days (> 35˚C) are rare at the Durban coastline, with an average of 0.2 days per year in the last 3 decades. An increase in the number of hot days is only predicted under SSP2 (Shared Socioeconomic Pathways) and SSP5, particularly after 2050. By the end of the century, very hot days could increase to an average of 12 per year by the end of the century.

Although the site is located in regions with relatively high temperatures, uncomfortable heat levels impact labour productivity and have a direct bearing on the health and safety of personnel. Heat stress and discomfort may lead to unforeseen incidents that could cause damage to equipment or human injury. This could lead to higher mortality rates, heat-related illnesses, increased injuries, more absenteeism, slow work pace, loss of productive capacity, and poor social well-being.

8.4.1.2 Precipitation

Mean annual precipitation is likely to remain relatively similar to that of the last few years, and dry and wet years beyond a 95% confidence interval are exceedingly difficult to forecast. Annual rainfall is likely to be around 940 (±81) mm/year under the three SSPs with no significant trend up until 2050. The highest mean annual precipitation is under SSP5. The benign trend does not infer a lack of extreme rainfall events. Climate change is expected to increase the number of extreme events with higher rainfall during storms and fewer rain days per annum. Durban has averaged 9.5 days per year with 20mm or more of rainfall. By 2030, this could increase to 20 days per year. Thus, more rainfall in short periods could be expected as seen during the rainfall around 12 April 2022 that led to widespread flooding, infrastructural damage, and loss of life.

8.4.1.3 Storms and storm-related weather impacts

Coastal storms and related impacts such as storm surges are likely to have the foremost impact on the project. There is wide agreement in the climate science community that an increase in global average temperature be commensurate with an increase in weather extremes. Of particular relevance for the PoD is the trend in tropical storms and low-pressure systems such as cut-off lows that bring widespread rain.

8.4.1.4 Tropical storms and cyclones

High intensity tropical storms have become more frequent in the South Indian Ocean since the first record of a category 5 storm in 1994. There is no clear pattern, however, cyclones moving over the subcontinent into the interior of the region are all since 2000. It is also important to note that these tracks represent the centre of these systems, which are much larger and result in weather conditions over large areas well away from the storm centres.

8.4.1.5 Sea surges and wave action resulting from storm activity

One of the key impacts of coastal and tropical storms is the associated storm surges that result from the high-wind speeds interacting with the ocean surface. In the region, the veering away of cyclones from the continent in a south-easterly direction, or those that become semi-stationary, result in the largest swells experienced. A combination of high sustained onshore winds and the storm area are the two primary variables that influence wave impact. Storm surges are among the leading causes of damage and loss of life from tropical storms.

Although less vulnerable than sandy coastlines and coastal plains, harbours and ports remain at risk. Near-shore offshore infrastructure and coastal developments are particularly vulnerable to storm surges. This risk increases with a rise in mean sea level.

At the PoD the mangrove forest area (which should naturally assist in buffering storm surges), parts of the Bluff area and Coal Terminal and Salisbury Island are most likely to be affected by a combination of sea level rise, tides and storm surges as a result of climate change. Coastal infrastructure, including that associated with harbours and ports, will require increased maintenance to withstand increased storm surges. The coastal flooding risk for eThekwini is classified as medium risk, rising to extreme by 2050, with maximum regional wave heights likely to be around 9 m. The PoD area is likely to be less susceptible than other coastal areas in the municipality owing to port infrastructure, but may still experience maximum wave heights that present a challenge to port operations.

8.4.1.6 Ocean pH

Ocean acidification is occurring globally due to increased deposition and dissolution of higher concentrations of atmospheric CO_2. The problem is particularly widespread in the open ocean. At Durban, surface sea water pH has declined from roughly 8.13 to 8.07. Under its current trajectory, pH could drop to 8.02 by 2050. A change in pH of this magnitude and based on a trend of historical data, poses a low risk to the project and associated infrastructure. However, it may pose a risk to marine and coastal biota, particularly corals (e.g., Anthozoa, if present), molluscs and crustacea.

8.4.1.7 Wind

Winds at the PoD are predominantly between 2-5 km/h from the south-east (onshore) with stronger winds mostly out of the east. Wave direction mimics the wind to a large degree. Therefore, the construction of the port behind the Bluff (which runs south-west to north-east), creates a natural break from the ocean winds. Wind velocity is expected to increase across all seasons in South Africa, but to a very small degree (maximum 6% increase). On occasions where a 10% increase in wind speed is experienced, there is a 26% increase in wave height. This compounds the impact during storm surges and can result in significant increases in sediment transport into harbours and ports. Other than during storm events, the risk posed to the project from wind speed under climate change is low. Wind direction is also not likely to shift significantly along the KZN coast.

8.4.1.8 Sea Level

Sea level has increased by varying degrees along the South African coastline. Estimates of sea level rise for the Southern African coastline using three decades' worth of tide gauge data and the longer-term records elsewhere show significant agreement. A recent analysis of sea water levels recorded at Durban confirms that the local rate of sea level rise falls within the range of global trends.

The eThekwini Municipality and researchers from the CSIR found that climate change would result in significant long-term consequences for the city and future planning. Sea level rise was estimated to be around 4.5 cm per decade. The linear trends of monthly mean sea level revealed a sea level rise of 2.7 ± 0.05 mm/year, and the yearly mean sea-level trend revealed a rise of 2.4 ± 0.29 mm/year.

Data from the [South African] Hydrographic Office shows that sea level at Durban increased by approximately 7 cm (1.49 mm/year) between 1971 and 2018 based on a linear trend. According to AR6 projections (medium confidence), the sea level around Durban is expected to rise by 10-40 cm (from a 1995-2014 mean) by 2050.

8.4.1.9 Surface Temperature

Sea surface temperature has largely mirrored terrestrial air temperature, increasing over the last century. The AR6 indicates a global SST increase of between 0.68-1.01˚C across the globe's oceans since the period 1850-1900 to the last decade, most of which has occurred since 1980.66. Since 1993, the global mean SST has increased by ±0.016˚C per annum, with the greater levels of warming being in the Arctic and northern Pacific Oceans. SST near Durban has increased by ±0.69˚C since 1900, with a decadal mean of 23.65˚C at present. By 2030 the mean SST could reach 24.4˚C (24.4-24.9˚C depending on SSP) and 25.4˚C by the late 2040s.

8.4.2 PROJECT ADAPTATION MEASURES

The project should be aligned with the Durban Coastal Management Line[9] and the necessary Coastal management by-laws, which have been adopted by the eThekwini Local Municipality. The strategy proposes programmes for sea-level rise and coastal protection, which are aimed at identifying, informing and regulating all developments located within the hazard zones and coastal management lines; this includes integrating TNPA's emergency contingency plans for sea surges in the PoD with the Municipality's strategic plans. Integration of TNPA's emergency contingency plans for sea surges in the PoD with the municipality's strategic plan is thus critical.

It is important that TNPA ensures that internal early warning systems (EWSs) are in place, with requisite cooperation between the city's disaster management team and the South African Weather Service (SAWS). The early detection of potentially damaging storm and cyclone events can go a long way to increasing the adaptive capacity of port infrastructure and personnel. Normal operational planning procedures should also incorporate the possibility of extreme weather events.

TNPA will need to liaise with the Municipality's relevant department and experts to develop a sea level rise monitoring system that will allow TNPA to adapt any infrastructure that could be impacted by rising sea levels and storm surges.

To reduce the vulnerability to extreme rainfall events and storm surges, stormwater drainage capacity needs to be improved and increased where required in collaboration with the eThekwini Municipality's department responsible for such infrastructure. Water treatment, storage and distribution preparation is already accounted for in the city's climate change strategy. This is primarily in the form of adaptive engineering approaches, which can evolve in response to changing threats. In addition, collaboration with key stakeholders in the catchment area for the two rivers entering the port is recommended with regard to developing pollution and erosion management plans to reduce the impact of debris and sediment inflow, particularly during storm events.

TNPA should ensure that there is a monitoring plan in place for the coastline adjacent to the port that is vulnerable to erosion from storm events and sea level rise, leading to erosion. The plan should contain details on how to respond to sedimentation following extreme events and the slower creep of sediment into the port.

Regular dredging of the port is recommended and has been widely used to increase resilience to climate impacts. Any dredging should be cognisant of impacts on the port floor/basin and undertaken in line with TNPA's existing operating procedures and consultation with relevant aquatic biodiversity specialists.

The Durban Climate Change Strategy has set out proposed programmes and projects relating to sea level rise and coastal protection. In this regard, the findings of the climate change study could be considered within these existing programmes relating to the protection and support of coastal ecological infrastructure.

[9] The eThekwini Municipality in Durban has established a Coastal Management Line as part of its Integrated Coastal Management efforts. This line, defined by the Coastal Management By-law, 2017, aims to manage development and land use within the coastal zone while protecting public safety and the aesthetic value of the area. It's a key component of the municipality's commitment to sustainable coastal development.

8.5 ARCHAEOLOGICAL AND CULTURAL HERITAGE

8.5.1 CONSTRUCTION PHASE

As outlined in Section 6, the following heritage resources are present at the site:

- Historical harbour works (including berths);
- Shipwrecks; and
- Anchorage debris.

The following potential impacts on heritage resources potentially present in the area of the Maydon Wharf precinct were identified:

- Dredging;
- Re-deposition of dredged deposits in places; and
- Repair/upgrading of berths.

The potential consequences of these activities are:

- Exposure of heritage resources;
- Displacement;
- Destruction of contextual information; and
- Damage to or destruction of finds.

The potential nature of impact for the three heritage site types consists of exposure, damage, loss, and/or displacement, but the probability factor, or the likelihood of impact occurring, is low or minimal. The extent of impact is limited to the location where development will take place and can be described as local. The duration of impact, however, is permanent, but this will have no consequences for, or impact on the environment. The potential consequences of the impact do not warrant modification of the work that is being planned. The only exception to this would be when an archaeological site is discovered that can be classified as extremely important. Examples of this would be an Acheulean occupation site or a well-preserved shipwreck. The chances of finding such sites during the course of the proposed development are nevertheless minimal, as the Phase 1 heritage survey indicated. Should this happen, the following impact mitigation measures are recommended:

- Proper lines of communication between the developer (i.e. TNPA, PoD), the consultants (i.e. WSP), the SAHRA, and the specialist for maritime archaeology must be maintained at the project planning and execution stages.
- Any work in designated areas must take the potential presence, general importance, and sensitivity of marine / maritime archaeological sites into consideration. Personnel involved must be briefed accordingly.
- In case any cultural/archaeological material is uncovered, work must cease immediately and the find reported. Further disturbance, damage, or removal must be prevented. Personnel must be informed that it is a legal requirement to report any finding immediately and that under the NHRA, fines, imprisonment or both can be imposed on offenders. [Section 51 of the National Heritage Resources Act, 1999 (Act 25 of 1999).]
- A site supervisor should be appointed who will be personally responsible for reporting any findings.
- Potential future surveys and excavations must be done by suitably trained and qualified personnel. Neither a Phase 2 non-intrusive diver survey nor a Phase 3 survey was undertaken as part of this Specialist study, but will become necessary should any archaeological material be found. In this case, (partial) excavation may be undertaken to save as much information as is reasonably possible. Any material recovered during such operations must be adequately stored and preserved

and must remain accessible for further study. Excavation and recovery can only be done after a license from the Department of Customs and Excise has been issued and a permit from the SAHRA has been granted.
- The various stages of any archaeological survey and all information gained must be properly documented, curated, and made accessible.

8.5.2 OPERATIONAL PHASE

During the operational phase, no further earthworks and therefore accidental discovery of heritage resources are expected.

9 CUMULATIVE IMPACT ASSESSMENT

Although the objective of the NEMA process is to undertake an impact and risk assessment process, inclusive of cumulative impacts, which is essential to assessing and managing the environmental and social impacts of projects, it may be insufficient for identifying and managing the incremental impacts on areas or resources used or directly affected by a given development from other existing, planned, or reasonably defined developments at the time the risks and impacts are identified.

Cumulative impacts are those that result from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones. For practical reasons, the identification and management of cumulative impacts are limited to those effects generally recognised as important based on scientific concerns and/or concerns of affected communities (IFC GPH).

Evaluation of potential cumulative impacts is an integral element of an impact assessment. In reference to the scope for an impact assessment, IFC's Performance Standards specify that "*Risks and impacts will be analysed in the context of the project's area of influence. This area of influence encompasses…areas potentially impacted by cumulative impacts from further planned development of the project, any existing project or condition, and other project-related developments that are realistically defined at the time the Social and Environmental Assessment is undertaken; and (iv) areas potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location."* (IFC 2006).

A cumulative impact assessment is a process of (a) analysing the potential impacts and risks of proposed developments in the context of the potential effects of other human activities and natural environmental and social external drivers on the chosen Valued Environmental and Social Components (VECs) over time, and (b) proposing concrete measures to avoid, reduce, or mitigate such cumulative impacts and risk to the extent possible (IFC GPH).

Cumulative impacts with existing and planned facilities may occur during the construction and operation of the proposed upgrade and deepening of Maydon Wharf Berths 5 - 11 & 15. While one project may not have a significant negative impact on sensitive resources or receptors, the collective impact of the projects may increase the severity of the potential impacts.

9.1 MARINE ECOLOGY

9.1.1 IMPACTS TO GEOLOGICAL RESOURCES AND PROCESSES

There will be an additional, significant, permanent loss of geological resources (sediment) and alteration of geological processes in Durban Bay if the planned Berth 203-205 Expansion, Maydon

Wharf Channel Widening and Deepening, Entrance Channel Deepening and Widening, New Point Container Terminal, Pier I Infill, New Dry Dock, and South African (SA) Navy Satellite Station projects proceed. The contribution of the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 to the loss of geological resources (sediment) and alteration of geological processes in the Bay will be negligible. However, the cumulative effect of the net loss of geological resources (sediment) and alteration of geological processes because of these planned projects.

9.1.2 IMPACTS DUE TO UNDERWATER NOISE DISTURBANCE

Underwater noise generated by dredging and construction activities because of the proposed upgrade and deepening to Maydon Wharf Berths 5 - 11 & 15 will add to the underwater noise generated by other (normal) port activities and operations, such as the movement of tugs, large vessels, and dredging vessels, and loading of cargo onto vessels. This will magnify the degree of disturbance to waterbirds and other biological resources that feed or otherwise use the area near the proposed dredging and construction footprint.

There will be a significant increase in underwater noise through piling and construction operations in Durban Bay if the planned Berth 203-205 Expansion, Maydon Wharf Channel Widening and Deepening, Entrance Channel Deepening and Widening, New Point Container Terminal, Pier I Infill, New Dry Dock, and SA Navy Satellite Station projects proceed and coincide with the proposed upgrades to Maydon Wharf Berths 5-11 and 15. It is difficult to estimate the cumulative effect of underwater noise in the absence of noise modelling, but this is not possible since the details (e.g. construction methods) for some projects are uncertain at this time. However, it is unlikely there will be a significant underwater noise interaction for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 and other projects apart from the Maydon Wharf Channel Widening and Deepening and New Dry Dock projects. The interaction for these projects will be high.

9.1.3 IMPACTS DUE TO ABOVE WATER NOISE DISTURBANCE

Water noise generated by construction activities because of the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 will add to the above water noise generated by other (normal) port activities and operations, such as the movement of tugs, large vessels, dredging vessels, crane noise, loading of cargo onto vessels, and vehicle noise. This will magnify the degree of disturbance to waterbirds that feed or otherwise use the area near the proposed dredging and construction footprint.

There will be an additional significant increase in above water noise through piling and construction operations in Durban Bay if the planned Berth 203-205 Expansion, Maydon Wharf Channel Widening and Deepening, Entrance Channel Deepening and Widening, New Point Container Terminal, Pier I Infill, New Dry Dock, and SA Navy Satellite Station projects proceed. It is difficult to estimate the cumulative effect of the above water noise if these projects and the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 were to coincide in the absence of noise modelling. However, it is unlikely there will be a significant direct noise interaction apart from the Maydon Wharf Channel Widening and Deepening and New Dry Dock projects. However, in the event piling operations for the proposed upgrades to Maydon Wharf Berths 7, 8, and 9 and part of the planned Berth 203-205 Expansion project area coincide, it is probable there could be a substantial cumulative noise disturbance to waterbirds on parts of the Central Sandbank.

9.1.4 LOSS OF HAZARDOUS SUBSTANCES INTO DURBAN BAY DUE TO SPILLAGES AND LEAKS FROM LANDSIDE CONSTRUCTION EQUIPMENT AND MACHINERY AND STORAGE AREAS

If hazardous substances enter Durban Bay because of the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 then this will add to the burden of contaminants that currently enter the Bay from the adjacent urban catchment and from port operations, amongst other sources. The upper part of Durban Bay, where the proposed project will be affected, has the poorest water and sediment quality in the Bay due to the numerous contaminant sources and a channel-like morphology that restricts water column turnover in this part, as discussed above. However, as stated above, with effective mitigation, this impact can be reduced to a very low significance. The cumulative impact posed by spilled and leaked hazardous substances that enter the Bay during the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 is thus anticipated to be low.

Losses of hazardous substances into Durban Bay might occur at dredging and construction sites for other planned infrastructure in the Bay, at the same time as losses during the proposed upgrades to Maydon Wharf Berths 5-11 and 15. It is assumed losses from other dredging and construction sites will be similarly small as those anticipated for the proposed upgrades to Maydon Wharf Berths 5-11 and 15, even though the scale of operations for other projects will be larger. The cumulative impact posed by spilled and leaked hazardous substances that enter the Bay during the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15, and these other projects, is thus also anticipated to be low.

9.1.5 LOSS OF NON-HAZARDOUS SOLID WASTE INTO DURBAN BAY FROM LANDSIDE CONSTRUCTION AREA

If non-hazardous solid waste enters Durban Bay because of the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 this will add to the burden of solid waste that currently enters the Bay from the adjacent urban catchment and from port operations, amongst other sources. Large amounts of non-hazardous solid waste enter the upper part of Durban Bay, where the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 will be affected. The predominant source of this waste is the adjacent urban catchment and is most pronounced when flows in rivers that enter the Bay are high. However, as stated above, with effective mitigation this project-specific impact can be reduced to a low intensity. The cumulative impact posed by the entry of non-hazardous solid waste into the Bay during the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 is thus anticipated to be low.

Non-hazardous solid waste may enter Durban Bay might occur at dredging and construction sites for other planned infrastructure in the Bay, at the same time as losses during the proposed upgrades to Maydon Wharf Berths 5-11 and 15. It is assumed losses from other dredging and construction sites will be similarly small as those anticipated for the proposed upgrades to Maydon Wharf Berths 5-11 and 15, even if the scale of operations for other projects will be larger. The cumulative impact posed by non-hazardous solid waste that enters the Bay during the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15, and these other projects, is thus also anticipated to be low.

9.1.6 ENTRY OF MATERIALS LEAKED FROM PORTABLE ABLUTION FACILITIES INTO DURBAN BAY

The entry of hazardous substances leaked from portable ablution facilities into Durban Bay will add to the burden of contaminants entering the Bay from the adjacent urban catchment and from port

operations, amongst other sources. The upper part of the Bay, where the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 will be affected, has the poorest water and sediment quality due to various sources of contaminants and the morphology of this part, as discussed above. However, as stated above, with effective mitigation, this impact can be reduced to a very low significance (and effectively should be eliminated). The cumulative impact posed by spilled and leaked hazardous substances that enter the Bay during the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 is thus anticipated to be very low.

The entry of hazardous substances leaked from portable ablution facilities into Durban Bay may occur at construction sites for other planned infrastructure projects in the Bay, at the same time as entry during the proposed upgrades to Maydon Wharf Berths 5-11 and 15. It is assumed that the entry of hazardous substances at other construction sites will be similarly low as that anticipated for the proposed upgrades to Maydon Wharf Berths 5-11 and 15, even though the scale of construction operations for other projects will be far larger. The cumulative impact posed by spilled and leaked hazardous substances that enter the Bay during the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15, and these other projects, is thus also anticipated to be very low.

9.1.7 LOSS OF BENTHIC BIOLOGICAL RESOURCES IN THE DREDGING FOOTPRINT

Dredging and construction operations for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 may coincide with maintenance dredging in parts of Durban Bay. Extensive capital dredging campaigns are proposed for the planned Berth 203-205 Expansion, Maydon Wharf Channel Widening and Deepening, Entrance Channel Deepening and Widening, New Point Container Terminal, Pier I Infill, New Dry Dock, and SA Navy Satellite Station projects. If the capital dredging campaigns for these planned projects coincide with dredging for the proposed upgrades to Maydon Wharf Berths 5-11 and 15, they will not interact directly apart from the Maydon Channel Widening and Deepening and New Dry Dock projects. The cumulative effects of these projects will be high. The cumulative effects of multiple capital dredging campaigns on benthic biological resources and benthic ecology in the Bay will also be high. Potential mitigation involves scheduling the projects so they do not overlap, or they overlap temporally to the smallest degree possible.

9.1.8 DETERIORATION IN WATER QUALITY DUE TO INCREASED SUSPENDED SEDIMENT CONCENTRATIONS RELATED TO DREDGING AND IN WATER CONSTRUCTION OPERATIONS

Dredging and construction operations for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 will overlap with ongoing port activities that disturb and resuspend sediment. Vessel traffic in the Congella Basin and Maydon and Esplanade Channels will continue during these upgrades, and maintenance dredging in these areas may coincide with the construction period. The resuspension of sediment from vessel propeller wash and maintenance dredging will amplify the short-term impact of sediment resuspension from the Maydon Wharf upgrades, although the cumulative effect is expected to be minimal due to the spatial separation of these activities. However, if dredging for the Maydon Channel Widening and Deepening project coincides with the Maydon Wharf upgrades, the cumulative increase in suspended sediment concentrations will be significant, particularly in areas close to the projects.

Dredging for other large projects, such as Berth 203-205 Expansion, New Point Container Terminal, and the New Dry Dock, could further magnify the impact on suspended sediment concentrations, especially in ecologically sensitive areas like the Central Sandbank. Numerical modelling suggests

that suspended sediment concentrations in Maydon and Esplanade Channels could increase by up to 17 mg/L under certain conditions during the Berth 203-205 expansion. The cumulative impact of these projects on biological resources and ecological productivity in Durban Bay is expected to be high if multiple dredging and construction activities overlap.

9.1.9 DETERIORATION IN WATER QUALITY DUE TO INCREASED SUSPENDED SEDIMENT CONCENTRATIONS RELATED TO LAND-BASED CONSTRUCTION OPERATIONS

The proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 will coincide with the berthing and de-berthing of vessels and may coincide with maintenance dredging in the port. There is a possibility that sediment mobilised by vessel propeller wash and maintenance dredging will magnify the same impact of increased suspended sediment concentrations caused by construction activities for the proposed upgrades to Maydon Wharf Berths 5-11 and 15, and vice versa. An extensive capital dredging campaign is planned for the proposed Maydon Channel Widening and Deepening project. If dredging operations for this project coincide with construction operations for the proposed upgrades to Maydon Wharf Berths 5-11 and 15, there will be a cumulative increase in suspended sediment concentrations. The suspended sediment concentrations generated by construction operations for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 will be dwarfed by concentrations generated by dredging for the Maydon Channel Widening and Deepening project. The incremental increase and impact from the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 is thus anticipated to be minimal, but the cumulative impact of the projects will be high. A possibly significant interaction might occur during the development of the New Dry Dock in Congella Basin, should this project coincide with dredging and construction operations for Maydon Wharf Berth 15.

9.1.10 EFFECT OF RESUSPENDED SEDIMENT DEPOSITION ON BENTHIC BIOLOGICAL RESOURCES

The proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 will overlap with ongoing port activities, including vessel traffic and maintenance dredging, leading to short-term sediment resuspension and deposition. However, this impact is expected to be minimal and localized, as benthic resources in the area are accustomed to such disturbances. The cumulative effects of sediment deposition will be limited because maintenance dredging will remove disturbed benthic resources. The Maydon Wharf Channel Widening and Deepening project involves extensive dredging, which will overshadow the impact from the proposed upgrades. A significant cumulative effect could occur if dredging for the New Dry Dock coincides with the upgrades. Other large-scale dredging projects, like the Berth 203-205 Expansion, could also increase suspended sediment concentrations, leading to temporary but marked cumulative effects on sediment deposition. If multiple dredging activities overlap, the cumulative impact on benthic biological resources and ecological productivity in Durban Bay could be significant, depending on the timing and extent of the activities.

9.1.11 DETERIORATION IN WATER QUALITY DUE TO THE REMOBILISATION OF OXYGEN DEMANDING SUBSTANCES FROM SEDIMENT

Dredging and construction operations for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 will coincide with port operations that disturb sediment and remobilise oxygen demanding substances into the water column, including the berthing and de-berthing of vessels in Maydon Channel and Congella Basin, and may coincide with maintenance dredging in these parts of the Bay. The remobilisation of oxygen-demanding substances from sediment by maintenance

dredging and the berthing and de-berthing of vessels will magnify the impact of dissolved oxygen depletion due to dredging for the proposed upgrades to Maydon Wharf Berths 5-11 and 15, and vice versa. However, the sediment over most of the Maydon and Esplanade Channels is not significantly enriched by particulate organic matter. The cumulative effect on the dissolved oxygen concentration is thus unlikely to be significant. To mitigate this potential cumulative effect, dredging for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 and maintenance dredging could be scheduled so they do not overlap.

Extensive capital dredging campaigns are proposed for the planned Berth 203-205 Expansion, Maydon Wharf Channel Widening and Deepening, Entrance Channel Deepening and Widening, New Point Container Terminal, Pier I Infill, New Dry Dock, and SA Navy Satellite Station projects. The dredging for these projects will remobilise oxygen-depleting substances from sediment into the water column. Only the Maydon Channel Widening and Deepening and New Dry Dock projects are anticipated to interact directly to any significant degree with the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 in the context of remobilising oxygen-demanding substances from sediment. As stated above, the sediment over most of the Maydon and Esplanade Channels and Congella Basin is not significantly enriched by particulate organic matter. The cumulative effect on the dissolved oxygen concentration is thus unlikely to be significant. To mitigate this potential cumulative impact, dredging for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 and for the Maydon Channel Widening and Deepening and New Dry Dock projects could be scheduled so they do not overlap, but it is acknowledged that this will not be possible considering the estimated 10.5-year project life.

9.1.12 DETERIORATION IN WATER QUALITY DUE TO THE REMOBILISATION OF NOXIOUS CHEMICALS FROM SEDIMENT

Dredging and construction operations for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 will coincide with port operations that also remobilise noxious chemicals from sediment. Vessel traffic in Congella Basin and Maydon and Esplanade Channels cannot be halted while the Maydon Wharf berth upgrades are underway. The upgrade period may coincide with maintenance dredging in these parts of the Bay. Noxious chemicals remobilised from sediment by vessel propeller wash and maintenance dredging will magnify the impact of noxious chemical remobilisation by dredging and construction operations for the proposed upgrades to Maydon Wharf Berths 5-11 & 15, if only in the short term. However, the cumulative effect is unlikely to be significant since the concentrations of noxious chemicals are low in surficial sediment in Maydon Channel outside of the dredging and construction footprint. The cumulative effect may be moderate in Congella Basin since the sediment in this area is more contaminated by noxious chemicals and is more toxic.

Extensive capital dredging campaigns are proposed for the planned Berth 203-205 Expansion, Maydon Wharf Channel Widening and Deepening, Entrance Channel Deepening and Widening, New Point Container Terminal, Pier I Infill, New Dry Dock, and SA Navy Satellite Station projects. The dredging for these projects will remobilise noxious chemicals into the water column. Only the Maydon Channel Widening and Deepening and New Dry Dock projects are anticipated to interact directly to any significant degree with the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 in the context of remobilising noxious chemicals. However, estimating the potential cumulative effect is difficult since the degree to which the noxious chemicals might be in a bioavailable form is not possible. Sediment in most parts of the dredging and construction footprint for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 is not highly contaminated by noxious chemicals and is not toxic to sea urchin embryo-larvae, the notable exception being near the Moore

Road Culvert and parts of Congella Basin. This suggests the cumulative effect will be low. A potentially significant interaction might occur during the development of the New Dry Dock in Congella Basin should this project coincide with dredging and construction operations for Maydon Wharf Berth 15, since sediment in parts of Congella Basin is contaminated to a fairly high degree by noxious chemicals. The sediment in some parts of the basin is also toxic, in some cases severely so

9.1.13 BIOACCUMULATION OF NOXIOUS CHEMICALS BY FISH AND SHELLFISH

Dredging for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 will coincide with the berthing and de-berthing of vessels in Maydon and Esplanade Channels and may coincide with maintenance dredging in other parts of Durban Bay. It is possible that noxious chemicals remobilised from sediment into the water column by vessel propeller wash and maintenance dredging could enhance the accumulation of noxious chemicals by fauna and flora by dredging for the proposed project, and vice versa. However, the cumulative effect is unlikely to be significant since the concentrations of noxious chemicals in sediment in Esplanade and Maydon Channels and elsewhere in Durban Bay are typically low, and the sediment elsewhere in the Bay, where maintenance dredging is probable, was not toxic. The exception is an area of sediment near the Moore Road Culvert in Maydon Channel, where the sediment was severely toxic. A further possible exception is Congella Basin, since the sediment in parts of Congella Basin is contaminated to a fairly high degree by noxious chemicals.

Extensive capital dredging campaigns are planned for the Berth 203-205 Expansion, Maydon Wharf Channel Widening and Deepening, Entrance Channel Deepening and Widening, New Point Container Terminal, Pier I Infill, New Dry Dock, and SA Navy Satellite Station projects. Should dredging for the Maydon Wharf Channel Widening and Deepening and New Dry Dock projects overlap with that for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 there is a possibility that noxious chemical concentrations remobilised by each project will magnify the impact of the other. Sediment in most parts of the dredging and construction footprint for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 is not highly contaminated by noxious chemicals and was not significantly toxic, the notable exception being near the Moore Road Culvert and parts of Congella Basin. This suggests the cumulative effect will be low. A potentially significant interaction might occur during the development of the New Dry Dock in Congella Basin should this project coincide with dredging and construction operations for Maydon Wharf Berth 15, since the sediment in parts of Congella Basin is contaminated to a fairly high degree by some noxious chemicals.

Noxious chemicals remobilised from sediment by dredging will add to the load of contaminants introduced into the water column in Durban Bay from sources external to the Bay (e.g. via river flows, surface runoff). It is difficult to assess the significance of this cumulative effect since it will depend on the load of contaminants introduced from external sources, which is not possible to speculate on but is known to be significant.

9.1.14 DETERIORATION IN WATER QUALITY DUE TO AN INCREASE IN THE SUSPENDED SEDIMENT CONCENTRATION DURING DREDGED SEDIMENT DISPOSAL

There is a strong probability that capital dredging time for the proposed upgrades for Maydon Wharf Berths 5-11 and 15 will coincide with the disposal of sediment maintenance dredged in Durban Bay. Extensive capital dredging campaigns are proposed for the planned Berth 203-205 Expansion, Maydon Wharf Channel Widening and Deepening, Entrance Channel Deepening and Widening, New Point Container Terminal, Pier I Infill, New Dry Dock, and SA Navy Satellite Station projects. There is

a strong probability that capital dredging for the proposed upgrades for Maydon Wharf Berths 5-11 and 15 will coincide with one or more of the capital dredging campaigns planned for these projects. In this event, the cumulative effect will be a potentially marked increase in suspended sediment concentrations at and near the dredged spoil disposal site. It is, however, difficult to speculate on the significance of these increases to biological resources in the absence of three-dimensional numerical modelling apart from stating that the contribution arising from the disposal of sediment dredged for the proposed upgrades for Maydon Wharf Berths 5-11 and 15 will be negligible.

9.1.15 DETERIORATION IN WATER QUALITY DUE TO THE RELEASE OF OXYGEN DEPLETING SUBSTANCES AND NOXIOUS CHEMICALS FROM DREDGED SEDIMENT DURING DISPOSAL

Capital dredging for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 may coincide with maintenance dredging in other parts of Durban Bay. Extensive capital dredging campaigns are proposed for the planned Berth 203-205 Expansion, Maydon Wharf Channel Widening and Deepening, Point Berth Expansion, and Pier I Phase 2 Infill projects. There is a strong probability that capital dredging for the proposed upgrades for Maydon Wharf Berths 5-11 and 15 will coincide with one or more of the capital dredging campaigns planned for these projects. In this event, the dissolved oxygen depression in the water column caused by dredged sediment disposal for each project will magnify the impact of other projects. It is, however, not anticipated there will be a major depression in the dissolved oxygen concentration in the marine environment associated with sediment disposal for the planned projects, even were they all to occur together, but there might be a prolonged minor depression in the concentration. However, the depression arising from the disposal of sediment dredged for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 will be negligible

9.1.16 TRANSFER OF NOXIOUS CHEMICALS TO THE DREDGED SPOIL DISPOSAL SITE

Capital dredging for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 may coincide with maintenance dredging in parts of Durban Bay. Extensive capital dredging campaigns are proposed for the planned Berth 203-205 Expansion, Maydon Wharf Channel Widening and Deepening, Entrance Channel Deepening and Widening, New Point Container Terminal, Pier I Infill, New Dry Dock, and SA Navy Satellite Station projects. There is a strong probability that capital dredging for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 will coincide with one or more of the capital dredging campaigns planned for these projects. In this event, the impact of noxious chemicals transferred to the dredged spoil disposal site by the projects individually may be enhanced. However, this is unlikely to be significant since sediment in the lower part of Durban Bay, where most of the planned projects are to be affected, is less contaminated than in the upper part. However, the contribution to the cumulative effect arising from the disposal of sediment dredged for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 will be negligible.

9.1.17 PHYSICAL IMPACT OF DREDGED SEDIMENT DISPOSAL ON BENTHIC BIOLOGICAL RESOURCES

There is a strong probability that capital dredging for the proposed upgrades for Maydon Wharf Berths 5-11 and 15 will coincide with the disposal of sediment maintenance dredged in Durban Bay. Extensive capital dredging campaigns are proposed for the planned Berth 203-205 Expansion, Maydon Wharf Channel Widening and Deepening, Entrance Channel Deepening and Widening, New

Point Container Terminal, Pier I Infill, New Dry Dock, and SA Navy Satellite Station projects. There is a strong probability that capital dredging time for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 will also coincide with one or more of the capital dredging campaigns for these projects. If several large capital dredging campaigns coincide, the cumulative effect of sediment deposition on benthic biological resources and benthic ecology on and near the dredged spoil disposal site arising from the disposal of dredged sediment will be high. However, the contribution to the cumulative effect arising from dredged sediment disposal for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 will be negligible in the context of other planned projects.

9.1.18 ENHANCEMENT OF SHORELINE EROSION DUE TO THE ACCUMULATION OF SEDIMENT ON THE DREDGED SPOIL DISPOSAL SITE

There is a strong probability that capital dredging for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 will coincide with the disposal of sediment maintenance dredged in Durban Bay. Extensive capital dredging campaigns are proposed for the planned Berth 203-205 Expansion, Maydon Wharf Channel Widening and Deepening, Entrance Channel Deepening and Widening, New Point Container Terminal, Pier I Infill, New Dry Dock, and SA Navy Satellite Station projects. There is a strong probability that capital dredging time for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 will also coincide with one or more of the capital dredging campaigns for these projects. If several large capital dredging campaigns coincide, the cumulative effect on wave regimes, currents, and sediment transport arising from the disposal of dredged sediment accumulating on the dredged spoil disposal site may be high and will need to be understood through three-dimensional numerical modelling. TNPA has initiated modelling for some of the planned projects. However, modelling is not considered necessary for the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 due to the essentially negligible amount of sediment that will be disposed of for this project in the context of other planned projects.

9.1.19 TEMPORARY LOSS OF QUAY WALL BIOLOGICAL RESOURCES

The planned Entrance Channel Deepening and Widening, New Point Container Terminal, Pier I Infill, New Dry Dock, and SA Navy Satellite Station projects amongst others will lead to the temporary loss of quay wall or other similar hard substrate biological resources, and in the case of some of the planned projects a net loss of such biological resources in the Durban Bay. The cumulative effect of these losses on the ecological functioning of Durban Bay will likely be moderate to high, depending on the overlap of projects.

9.1.20 PERMANENT LOSS OF DEEPWATER SEDIMENT AND OPEN WATER HABITAT

Estuaries, especially those in KZN, are the most threatened of any coastal habitat in South Africa. The ever-decreasing environmental quality of estuaries in the eThekwini Municipal area, brought on by a myriad of anthropogenic activities and disturbances, has constrained populations of estuarine-dependent biological resources and the benefits that society derives from them to the few systems where there is still reasonable habitat availability and quality. The loss of deepwater sediment and open water habitat, associated biological resources, and related ecological productivity in Durban Bay will compound the loss of biological resources and ecological productivity in other estuaries in the eThekwini Municipal area. Although the area of deepwater sediment habitat, associated biological resources, and related ecological productivity that will be permanently lost because of the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 is small, when the loss is considered cumulatively with projected habitat (various types) losses related to the planned Berth 203-205

Expansion, Maydon Wharf Channel Widening and Deepening, Entrance Channel Deepening and Widening, New Point Container Terminal, Pier I Infill, New Dry Dock, and SA Navy Satellite Station projects amongst others then the ecological consequence is high. The planned changes will fundamentally alter the available habitat and ecological processes in Durban Bay.

9.1.21 ALTERATIONS TO THE HYDRODYNAMIC FUNCTIONING OF DURBAN BAY

The planned Berth 203-205 Expansion, Maydon Wharf Channel Widening and Deepening, Entrance Channel Deepening and Widening, New Point Container Terminal, Pier I Infill, New Dry Dock, and SA Navy Satellite Station projects will lead to wholesale changes to the hydrodynamic functioning of Durban Bay. It is difficult to evaluate the cumulative effect of these projects on the hydrodynamic functioning of the Bay in the absence of three-dimensional numerical modelling (this will be done for the projects as they are planned in more detail). However, the contribution of the proposed upgrade and deepening of the Maydon Wharf Berths 5 - 11 & 15 will be negligible.

9.2 SOCIO-ECONOMICS

This assessment examines if the construction and operation of the proposed upgrade and deepening of the Maydon Wharf Berths 5 – 11 & 15 will result in:

- An unacceptable risk to the environment or surrounding communities,
- An unacceptable loss of environmental quality, resources, or biodiversity,
- Complete or large-scale changes to the environment or the community's sense of place, and
- An unacceptable increase in overall impact levels in the area.

The cumulative impact assessment results, presented below, illustrate the proposed project's combined effects alongside existing and anticipated activities in the vicinity.

9.2.1 INCREASED DEMAND FOR UTILITY AND SERVICES

The cumulative impact of increased demand for utility services and infrastructure, arising from the Maydon Wharf upgrades and other concurrent developments in eThekwini and KZN, could strain regional capacity across multiple sectors. The amplified activity in freight handling, logistics, and industrial operations will likely escalate demands on water supply, electricity grids, waste management systems, roads, rail networks, and related supplementary services. This heightened usage may exceed current capacity, leading to service disruptions, infrastructure degradation, and potential inefficiencies in meeting operational and community needs. Stakeholders, including local governments, utility providers, businesses, and residents, will face challenges such as delays, increased maintenance costs, and reduced quality of services unless proactive measures are taken to enhance infrastructure resilience and resource management. The impact underscores the necessity for coordinated planning to balance economic growth with sustainable service delivery and infrastructure development.

9.2.2 ENHANCED TRADE COMPETITIVENESS

The combined developments of the Maydon Wharf upgrade and other projects such as the Westown Industrial Precinct, the Cato Ridge Dry Port and the other PoD upgrades are anticipated to significantly enhance the region's trade competitiveness by improving logistical infrastructure. These improvements will facilitate faster and more efficient cargo handling and distribution, reducing operational bottlenecks and minimising transit delays. As a result, businesses operating within the logistics, export, and manufacturing sectors will benefit from reduced supply chain costs and enhanced reliability. This transformation is expected to position KZN as a prominent trade hub in

regional and international markets, attracting new investments and enabling businesses to expand their market reach. The cumulative impact will foster economic growth, benefiting private sector stakeholders, government revenues, and the broader community reliant on trade-driven economic activities.

9.2.3 STRENGTHENED SUPPLY CHAIN NETWORKS

The upgraded Maydon Wharf is expected to strengthen the supply chain, integrating multiple logistical and industrial facilities. This will create a robust and interconnected supply chain network. This synergy can attract additional investments, lower operational costs for businesses, and establish KZN as a key logistics and industrial hub in Southern Africa.

10 ENVIRONMENTAL IMPACT STATEMENT

The essence of any impact assessment process is aimed at ensuring informed decision-making, environmental accountability, and to assist in achieving environmentally sound and sustainable development. In terms of NEMA, the commitment to sustainable development is evident in the provision that “development must be socially, environmentally and economically sustainable…. and requires the consideration of all relevant factors…”. NEMA also imposes a duty of care, which places an obligation on any person who has caused, is causing, or is likely to cause damage to the environment to take reasonable steps to prevent such damage. In terms of NEMA’s preventative principle, potentially negative impacts on the environment and on people’s environmental rights (in terms of the Constitution of the Republic of South Africa, 1996 (Act 108 of 1996) should be anticipated and prevented, and where they cannot be prevented altogether, they must be minimised and remedied in terms of “reasonable measures”.

In assessing the environmental feasibility of the proposed construction of the proposed project, the requirements of all relevant legislation have been considered. Potential impacts have been identified using the large wealth of data available for the PoD, as well as the findings of Specialist studies commissioned particularly for the proposed project.

Mitigation measures have been developed for identified impacts and are presented within the EMPr (**0**). The identification and development of appropriate mitigation measures have been informed by best practice principles, experience, and the relevant legislation (where applicable).

Considering the findings of the respective studies, no fatal flaws were identified for the proposed project. Should the avoidance and mitigation measures prescribed be implemented, the significance of the considered impacts for all negative aspects pertaining to the environmental aspects is expected to be **medium** to **low**. It is thus the opinion of the EAP that the project can proceed and that all the prescribed mitigation measures and recommendations are considered by the issuing authority.

The draft BAR will be subject to public review, which will be undertaken in accordance with the requirements of NEMA, with every effort made to include representatives of all stakeholders within the process. The BAR will be updated and finalised, taking into consideration all comments received during the public review period before being submitted to the CA for consideration.

10.1 IMPACT SUMMARY

A summary of the identified impacts and corresponding significance ratings for the proposed project is provided in **Table 10-1** below. With the implementation of the mitigation measures prescribed by

the Specialists, the impacts are rated as Low. **Figure 10-1** below illustrates the overall sensitivity of the site in relation to the proposed project.

Table 10-1 – Impact Summary

Aspect	Impact Description	Phase	Without Mitigation	With Mitigation
Marine Ecology	Loss of non-hazardous solid waste into Durban Bay from dredging, construction, and support vessels	C	Screened out	
	Loss of hazardous substances into Durban Bay due to spills and leaks from dredging, construction, and support vessels	C	Screened out	
	Navigation hazard posed by dredging, construction, and support vessels leading to accidents that cause environmental harm	C	Screened out	
	Risk of marine megafauna strikes by dredging, construction, and support vessels	C	Screened out	
	Loss of construction material and demolition debris into Durban Bay	C	Screened out	
	Impact of artificial lighting and shading	C & O	Screened out	
	Impact of altered vessel traffic	O	Screened out	
	Impact of vessel noise and presence	O	Screened out	
	Impacts to geological resources and processes	C	Medium	Medium
	Impacts due to underwater noise disturbance	C	High	Medium
	Impacts due to above water noise disturbance	C	High	Medium
	Loss of hazardous substances into Durban Bay due to spillages and leaks from landside construction equipment and machinery and storage areas	C	Medium	Very Low
	Loss of non-hazardous solid waste into Durban Bay from landside construction	C	High	Medium

Aspect	Impact Description	Phase	Without Mitigation	With Mitigation
	Entry of materials leaked from portable ablution facilities into Durban Bay	C	Very Low	Very Low
	Loss of benthic biological resources in the dredging footprint	C	Medium	Low
	Deterioration in water quality due to increased suspended sediment concentrations related to dredging and in water construction operations	C	Very Low	Very Low
	Deterioration in water quality due to increased suspended sediment concentrations related to land-based construction operations	C	Very Low	Very Low
	Effect of resuspended sediment deposition on benthic biological resources	C	Low	Very Low
	Deterioration in water quality due to the remobilisation of oxygen demanding substances from sediment	C	Very Low	Very Low
	Deterioration in water quality due to the remobilisation of noxious chemicals from sediment	C	Very Low	Very Low
	Bioaccumulation of noxious chemicals by fish and shellfish	C	Low	Low
	Deterioration in water quality due to an increase in the suspended sediment concentration during dredged sediment disposal	C	Low	Low
	Deterioration in water quality due to the release of oxygen depleting substances and noxious chemicals from dredged sediment during disposal	C	Very Low	Very Low
	Transfer of noxious chemicals to the dredged spoil disposal site	C	Low	Low
	Physical impact of dredged sediment disposal on benthic biological resources	C	Low	Very Low

Aspect	Impact Description	Phase	Without Mitigation	With Mitigation
	Enhancement of shoreline erosion due to the accumulation of sediment on the dredged spoil disposal site	C	Very Low	Very Low
	Temporary loss of quay wall biological resources	C	Very Low	Very Low
	Permanent loss of deepwater sediment and open water habitat	O	Medium	Medium
	Alterations to the hydrodynamic functioning of Durban Bay	O	Very Low	Very Low
Socio-Economics	Temporary disruption of business activities at the Maydon Wharf Precinct	C	Medium	Low
	Temporary Stimulation of the Regional and Local Economy	C	High	Very High
	Temporary employment creation	C	Medium	High
	Temporary increase of household income	C	Medium	Medium
	Temporary increase in production	C	Medium	Medium
	Changes to the sense of place	C	Medium	Low
	Impact on local economic development	O	High	High
	Improved trade competitiveness	O	High	High
	Impact: employment creation	O	Medium	Medium
	Impact of surrounding tenants and communities during the operational phase	O	Medium	Low
Archaeological and Cultural Heritage	Exposure and displacement of and destruction of heritage resources - shipwrecks	C	Medium	Low
	Exposure and displacement of and destruction of heritage resources – berths and anchorage debris	C	Low	Low

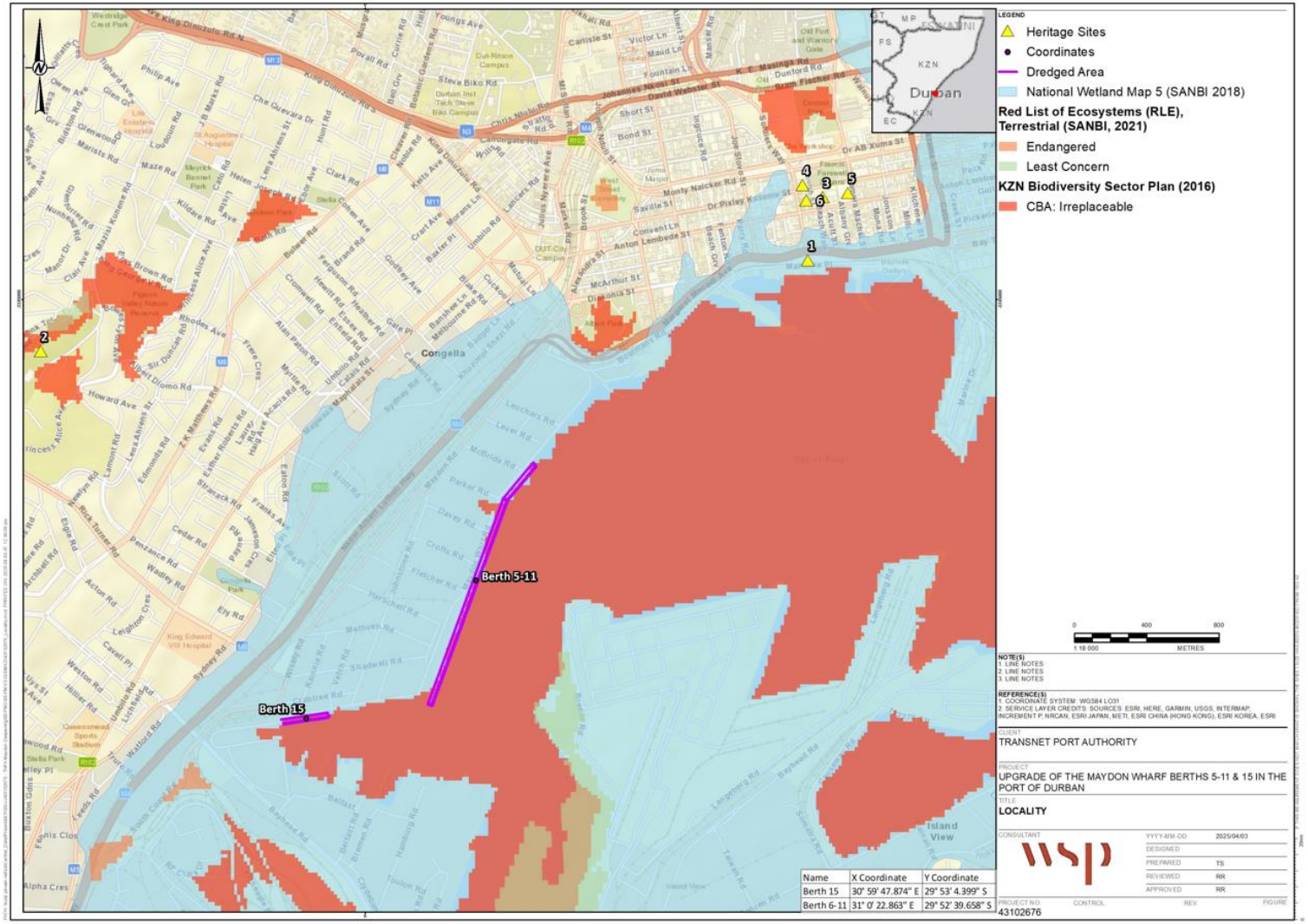

Figure 10-1 – Site Sensitivity Map

10.2 SPECIALIST CONCLUSIONS

10.2.1 MARINE ECOLOGY

The proposed project will result in the permanent loss of a small amount of deepwater sediment and open water habitat in the PoD. A total of 29 environmental impacts were identified for the proposed project, of which eight were scoped out from detailed assessment because they should be relatively easy to control or because they are difficult to assess with the information available. Of the remaining impacts, most are anticipated to be of a low (four impacts) to very low (12 impacts) environmental significance with mitigation. Five are anticipated to be of medium environmental significance. However, if mitigation is ineffective, three impacts could have a high significance.

10.2.2 SEDIMENT QUALITY

The sediment sampled in some parts of the proposed Maydon Wharf berth deepening dredging footprint in May 2024 was slightly contaminated by chromium. Metal concentrations in the sediment are below the sediment quality guidelines used by the DFFE to decide if sediment identified for dredging in South African ports is suitable for open water disposal. The toxicity testing of elutriates prepared from sediment sampled in the proposed dredging footprint also suggests that toxicity to pelagic organisms is not anticipated when the dredged material is disposed of at the open water dredged material disposal site off Durban.

TNPA is also considering the potential use of the dredged material beneficially within Durban Bay. The sediment is unlikely to pose a toxic risk if it is placed elsewhere in Durban Bay; however, this was not assessed as part of the study. Based on historical data, the sediment used for placement in Durban Bay should exclude that dredged in Congella Basin, where contamination has been pronounced in the past.

10.2.3 SOCIO-ECONOMICS

The upgrade of the Maydon Wharf precinct within the PoD is a strategic infrastructure development aimed at addressing critical operational inefficiencies and enhancing the port’s capacity to handle increasing cargo volumes.

The socio-economic impacts during the construction phase are expected to be moderate, with the creation of temporary employment opportunities across various skill levels providing a short-term boost to the local economy. Additionally, increased demand for materials and services will stimulate the regional supply chain and contribute to business income and GVA. Challenges such as strain on local infrastructure and potential disruptions to the community's daily activities are anticipated during the construction phase, but can be mitigated through proactive planning and stakeholder engagement.

During the operational phase, the upgraded Maydon Wharf will strengthen Durban's position as a key trade and logistics hub, enhancing the port’s competitiveness in regional and global markets. Long-term benefits include sustained employment in logistics and warehousing, improved trade efficiency, and strengthened local and regional economic networks. The development aligns with municipal and provincial strategic objectives, supporting sustainable urban development and inclusive economic growth.

Overall, while the upgrade poses some manageable challenges, it represents a critical investment in the future of South Africa’s trade infrastructure. The project’s capacity to foster economic resilience,

reduce inequality, and contribute to regional development makes it a valuable asset for KZN and the nation.

10.2.4 TRAFFIC

It is intended that while each berth is under construction, it will be closed for all through traffic and persons. Therefore, no non-construction vehicles or persons will be able to traverse the construction area of the berth between the quayside and the properties behind the berth.

The reconstruction of each berth is limited to an area approximately 15 m wide from the quay wall, with an additional 5 m wide area required within this construction area. The general quayside area at each berth varies from +/- 25 m to 30 m. There will therefore be limited space between the construction area and the adjacent properties. The use of these areas will be restricted to only construction vehicles and personnel, and for the operators of the adjacent properties to access the quay side entrances to their properties.

The operational berths south of the berth under construction will only be accessible to operators via the southern vehicle accesses to the quayside, and those located north will only be accessible from the northern accesses to the quayside.

This will require minor accessibility and access route changes to the operational berths.

Successful implementation of the construction traffic management plan will be key.

10.2.5 CLIMATE CHANGE

Climate change is expected to increase the annual temperature and number of extreme events with higher rainfall during storms and fewer rain days per annum. Port of Durban indicate that the median annual mean ambient temperatures are likely to increase by ±0.3˚C by 2030 and 0.5-1.0˚C to potentially reach 22.5 ˚C by 2050. Furthermore, Durban has averaged 9.5 rain days per year with at 20 mm or more of rainfall. By 2030, this could increase to 20 rain days per year. Thus, more rainfall in short periods could be expected such as was seen during the rainfall around 12 April 2022 that led to widespread flooding, infrastructural damage and loss of life.

The main weather-related risks relevant to the project are those that relate to marine and coastal weather: sea surface temperature, ocean pH (acidification), coastal storm activity and impacts, wind and sea level. Coastal storms and related impacts such as storm surges are likely to be the foremost impact on the project. Of particular relevance for the PoD, is the trend in tropical storms and low-pressure systems such as cut-off lows1 that bring widespread rain, which as a result could cause infrastructure damage and decrease in operational processes. Furthermore, increase in wind intensity and sea level rise has the potential to amplify the storm surges during extreme weather events. Whilst several weather-related risks are unlikely to have a material impact on the project up to 2050, they could have a direct influence on beyond this and on operations at the Port and at Maydon Wharf specifically.

Climate change is also likely to compound existing impacts and impacts from dredging on the biodiversity of the sandbanks in the Maydon Wharf Channel. These impacts include increased scouring and disturbance of habitats through greater water flows into the port, greater exposure to solid waste, suspended solids, pollutants (including potentially hazardous materials and compounds) and salinity changes which may result from increased flows during flood events and displacement and

potential loss of habitat due to increased wave action during potentially more frequent storms and low pressure systems impacting the PoD.

10.2.6 ARCHAEOLOGICAL AND CULTURAL HERITAGE

The desktop study indicated that the probability of significant heritage resources being present in the area of interest is low. Historical harbour works, specifically berths, are present. As most of these are over 60 years old, they automatically fall under the protection of the National Heritage Resources Act, 1999 (Act 25 of 1999).

Nevertheless, the oldest berth, berth 15, was constructed in 1923 and berth 8 as recently as 1985. The majority of the other berths date to the 1960s. No indication has been found that these structures are in any way unique or have special historical, technological, or aesthetic value. Besides that, their technical details have been documented. For these reasons, it seems that the current need to refurbish these berths outweighs any potential tendency to preserve them as is.

Two other types of maritime archaeological sites that may potentially be present in the area are anchorage debris and shipwrecks. Nevertheless, no direct indications have been found that such sites are indeed present in the Maydon Wharf precinct. The possibility remains, however, that such resources may be encountered during future development activities. By introducing mitigating measures as described in this report, negative impacts on these resources will be reduced significantly. The specialist concluded that the potential consequences of the impact on heritage i.e., maritime archaeological resources, do not warrant modification or postponement of the construction work that is being planned, and that development may continue.

10.3 CONDITIONS AND RECOMMENDATIONS

10.3.1 GENERAL

The following general aspects are recommended to be included as conditions of authorisation:

- The layouts submitted in the Draft BAR are not finalised. The final layouts are to be submitted to the DFFE for approval before construction;
- The site-specific EMPr submitted in the Draft BAR is to be approved. The EMPr is to be updated to include the final layout map once finalised and approved by DFFE;
- The EMPr and BAR mitigation measures must be adhered to;
- If any recommendations for the layout are provided by the relevant Specialists, this must be implemented as far as possible;
- The final EMPr must form part of all contractual documents with contractors during the construction and operational phases of the project. Furthermore, a dedicated Environmental Control Officer (ECO) must be appointed to ensure compliance to all EA conditions and EMPr commitments throughout the construction phase, with monthly/two-monthly inspections and reporting to DFFE; and
- Appropriate reporting must be submitted to Amafa as per Permit Ref: SAH23/22240 & 23/507, issued on 18 April 2024.

The following Specialist recommendations have been made in respect of the project:

10.3.2 MARINE ECOLOGY

No additional recommendations were made, over and above the recommended mitigation measures provided in Section 8 and the EMPr, except for the implementation of a water quality monitoring programme for the aquatic environment in Durban Bay. A conceptual sampling design for the water quality monitoring programme is described in the EMPr and **0**. The monitoring stations are positioned near sandbanks since these are the most sensitive habitats that could be affected by dredging operations. The water quality indicator of prime concern is turbidity, acting as a surrogate measure for the more ecologically meaningful suspended sediment concentration. The turbidity should be measured in situ at a one-week interval, depending on the anticipated dredging duration, using an automated water quality monitoring instrument. The temperature, salinity, pH, dissolved oxygen concentration and saturation, and chlorophyll-a concentration should be measured at the same time, to aid in identifying water quality impairment, or the lack thereof. Turbidity limits should be defined from the most up-to-date turbidity and suspended sediment measurements available for the upgrade area at the time construction and dredging operations proceed.

10.3.3 SEDIMENT QUALITY

Should TNPA consider the beneficial use of the dredged material within Durban Bay, the sediment dredged in Congella Basin should be excluded, since contamination of the sediment in this area has been pronounced in the past.

10.3.4 SOCIO-ECONOMICS

No additional recommendations were made, over and above the recommended mitigation measures provided in Section 8 and the EMPr.

10.3.5 TRAFFIC

Enforcement and revision of the construction TMP. The TMP, informed by monitoring actions, is key, given the limited space between the construction area and the adjacent properties.

10.3.6 CLIMATE CHANGE

The project must align with the existing programmes with the Durban Climate Change Strategy, which focuses on the management and enforcement of coastal management lines in eThekwini Municipality, and the development of coastal planning schemes to manage developments within the coastal zones. The adaptation actions, described in the Specialist report at a high level, should be implemented to various degrees in consultation with various stakeholders.

10.3.7 ARCHAEOLOGICAL AND CULTURAL HERITAGE

No recommendations were made by the specialist, over and above the recommended mitigation measures provided in Section 8 and the EMPr.

11 CONCLUSION AND WAY FORWARD

The overall objective of the BA is to provide sufficient information to enable informed decision-making by the competent authorities. This was undertaken through consideration of the proposed project components, identification of the aspects and sources of potential impacts and subsequent provision of mitigation measures.

It is the opinion of WSP that the information contained in this document (read in conjunction the EMPr) is sufficient for DFFE to make an informed decision for the environmental authorisation being applied for in respect of this proposed project.

Mitigation measures have been developed, where applicable, for the above aspects and are presented within the EMPr. It is imperative that all impact mitigation recommendations contained in the EMPr, of which the environmental impact assessment took cognisance, are legally enforced.

Considering the findings of the respective studies, no fatal flaws were identified for the proposed project. Should the avoidance and mitigation measures prescribed be implemented, the significance of the considered impacts for all negative aspects pertaining to the environmental aspects is expected to be **medium** to **low**. It is thus the opinion of the EAP that the project can proceed and that all the prescribed mitigation measures and recommendations are considered by the issuing authority.

The construction period is expected to last for about 10 years, followed by operation for the foreseeable future. Therefore, it is requested that this authorisation remain in effect for at least 30 years to due to the long-term nature of port infrastructure and operations.

Maintenance activities for the port will be conducted in accordance with the established Maintenance Management Plan (MMP). It is recommended that the MMP be integrated into the EA to support the long-term operational efficiency and sustainability of the port.

12 WAY FORWARD

This draft BAR will be available for review from **21 May 2025** to **23 June 2025**. All issues and comments submitted to WSP will be incorporated into a Comments and Responses Report.

The draft BAR will be updated with comments received and submitted as a final BAR to the competent authority for this project.

If you have any further enquiries, please feel free to contact:

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Appendix A

EAP CV AND DECLARATION

Appendix B

I&AP DATABASE

Appendix C

KWAZULU-NATAL AMAFA & RESEARCH INSTITUTE PERMIT & DMOSS LETTER FROM ETHEKWINI MUNICIPALITY

Appendix D

DFFE SCREENING TOOL REPORT

Appendix E

SPECIALIST STUDIES

Appendix E.1

ASSESSMENT OF SEDIMENT QUALITY IN DURBAN BAY

Appendix E.2

ESTUARINE ECOLOGY IMPACT ASSESSMENT

Appendix E.3

SOCIO-ECONOMIC ASSESSMENT

Appendix E.4

MARITIME ARCHAEOLOGICAL IMPACT ASSESSMENT

Appendix E.5

TRAFFIC MANAGEMENT PLAN

Appendix F

EMPR

Appendix G

UPGRADE DESIGN DRAWINGS

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