

Coega Development Corporation

Port of Durban Validation | Demolition Phase 1

Demolition Strategy – Rev B

Reference: RP-N-0003

B | 28 October 2022



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Job number 287007

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Document Verification

Project title Port of Durban Validation | Demolition Phase 1
Document title Demolition Strategy
Job number 287007
Document ref RP-N-0003
File reference PDV-ARUP-ZZ-XX-RP-N-0003

Revision	Date	Filename	Demolition Strategy		
A	02 September 2022	Description	Work in progress draft issued to TNPA for comment		
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B	28 October 2022	Filename	Demolition Strategy		
		Description	Updated and issued as final		
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Issue Document Verification with Document



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1. Introduction

The purpose of this document is to outline a proposed demolition strategy and method statement for the demolition of the structures located within phase 1 of the demolition area. This document is to be read in conjunction with the other reports produced as part of the demolition study.

The demolition strategy has been developed taking into consideration the various site constraints and stakeholder requirements, as discussed in previous reports. The strategy has been developed in conjunction with the input a well-established demolition specialist to help inform numerous aspects of this report.



Figure 1: Key Plan of structures to be demolished during both phases

2. Scope of Demolition

The extent of demolition, as well as description of each building, is provided in a separate report. These are reproduced in the images below for ease of reference.

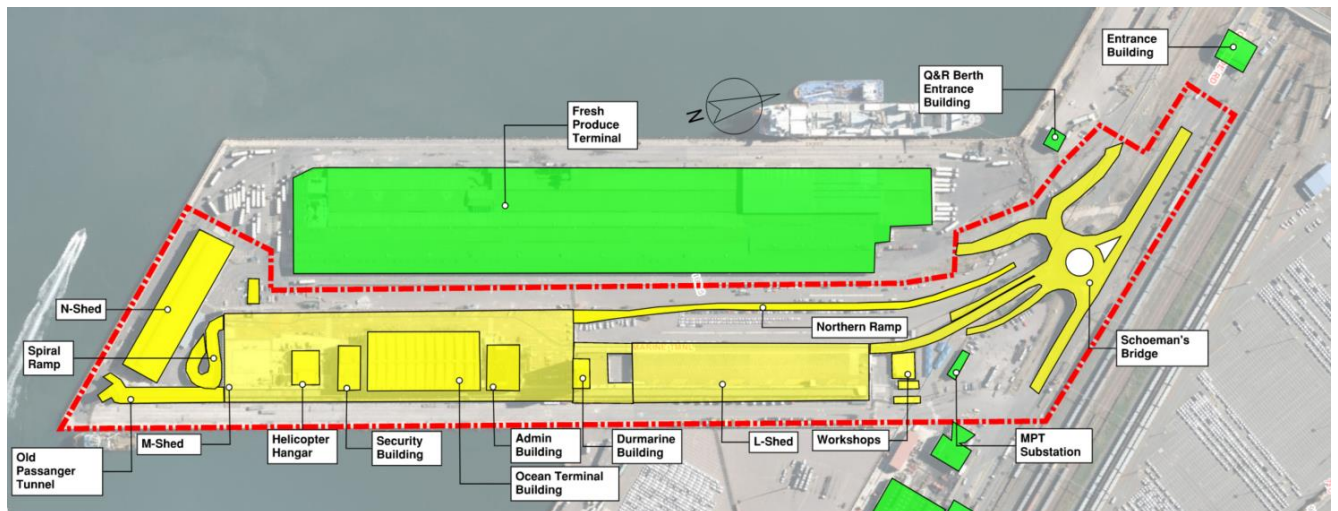


Figure 2: Key plan of buildings to be demolished on T- Jetty, focus on phase 1

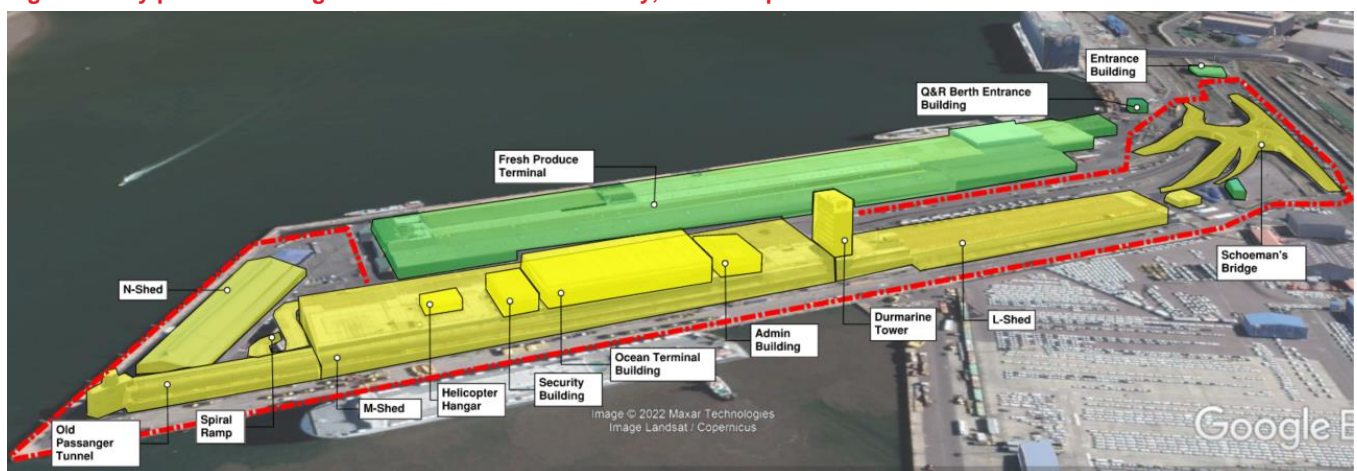


Figure 3: 3d Render of structures to be demolished during phase 1

The demolition involves the superstructure only, up to the top of foundation. Substructure is not to be demolished and removed. Furthermore, all inground services to remain, and not be removed.

3. Demolition Sequence

3.1 Phasing

As described in the previous reports, various stakeholders are impacted by the demolition works, and as such, demolition is to be carried out within the framework agreed with stakeholders, to limit negative impact on port operations.

- Demolition is to commence on the southern tip of T-jetty, progressing in a northerly direction, beginning with N shed and the old passenger tunnel, M shed and associated structures, Durmarine tower, and finally L-shed and adjacent structures. This will complete phase 1a of demolition.
- Phase 1b will be the demolition of Schoeman's bridge and elevated roads.

This is illustrated in the figures below.

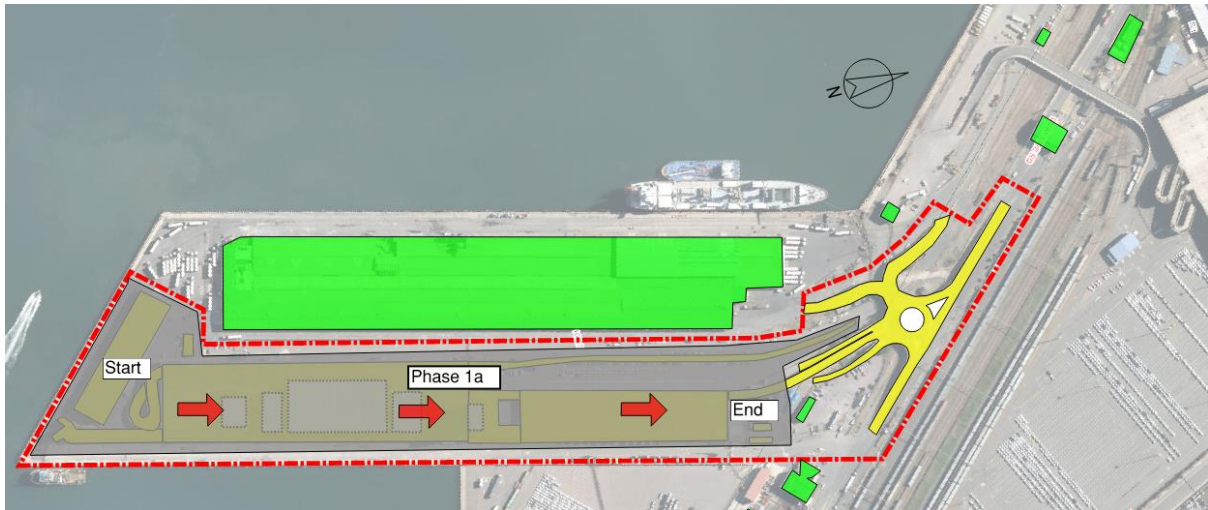


Figure 4: Illustration of buildings demolished during phase 1a

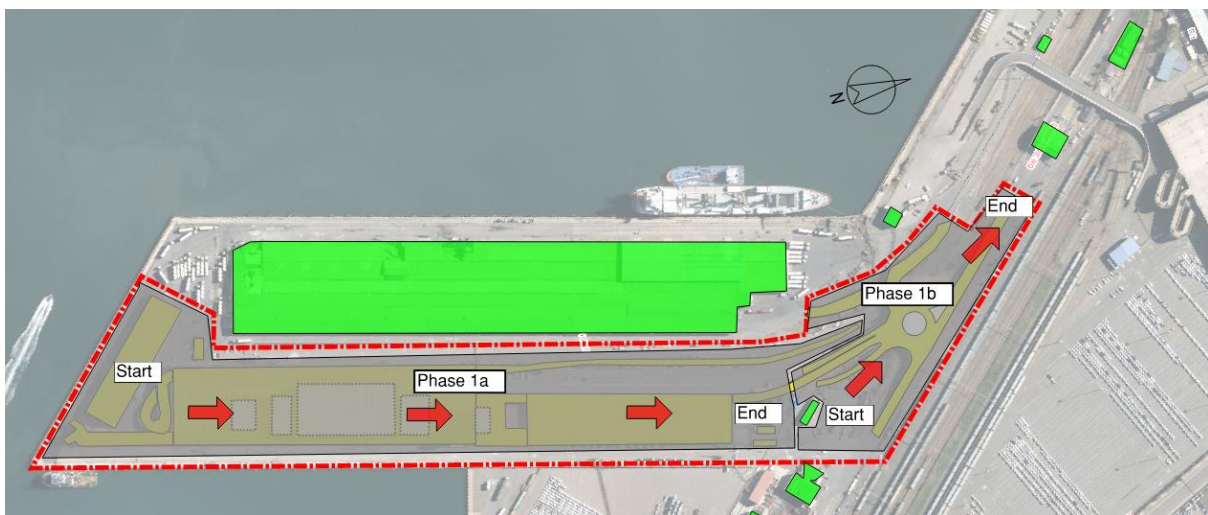


Figure 5: Illustration of buildings to be demolished during phase 1b

3.2 Hoarding & Proposed Site Layout

The image below illustrates the proposed hoarding layout and site plan during phase 1. Areas have been demarcated for site offices and stores, laydown and plant areas, as well as a sorting, processing, and crushing area. It is recognised that the proposed laydown area coincides with the FPT staging and parking area. Engagement with FPT revealed that for a short period, in the order of a few weeks, FPT area able to stage trucks at the old Durban Airport site. During this time, the intention is for N-Shed, Spiral Ramp, and Old Passenger Tunnel to be demolished, and the laydown area moved to this pace, thus freeing up the FPT staging area for handover to FPT. An area larger than the initial FPT staging area can be handed back to include space for parking.

The hoarding line is shown indicatively in the images below. It is understood that due to proximity of demolition works, and the required working space, M & N Berth will require to cease operations during the demolition period, and thus hoarding along these lines can be placed closer to the quay edge to facilitate ease of demolition, including demolition traffic corridor.

The hoarding line along FPT is indicatively shown. Whilst it is envisaged that temporary hoarding will be installed along the full length, an opportunity exists to utilise the existing fence between the

FPT ring road and L/M sheds as the hoarding. Maximising demolition space along this line is also key to facilitate demolition of higher structures, particularly the Durmarine Tower.



Figure 6: Phase 1a hoarding and site plan



Figure 7: Phase 1a hoarding and site plan post demolition of N-shed, Spiral ram, and passenger tunnel



Figure 8: Phase 1b hoarding and site plan

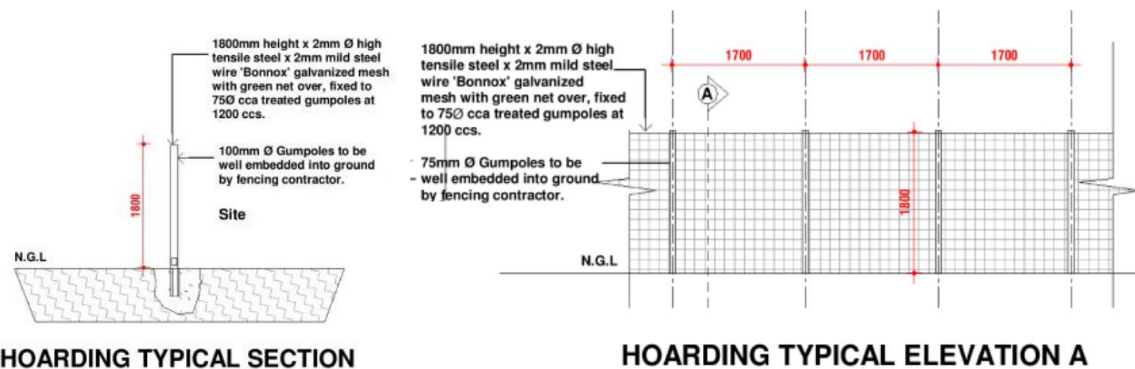


Figure 9: Typical Detail of Hoarding

4. Salvageable Material

In an attempt to reduce demolition waste and with the overall view and instilling circular economy principles into the project, it is proposed that salvaging materials from the buildings is maximised. It is expected that TNPA will remove all required equipment and kit prior to demolition contractor establishing site. Prior to demolition, the contractor should remove all salvageable building related material. This will ensure that material is not damaged during demolition, as well reduce contamination with rubble material. Based on site inspections, the following materials are expected to be salvaged from the buildings:

- Steel and aluminium roof sheeting and cladding
- Windows and window frames
- Doors and door frames
- Electrical cables and fittings
- Plumbing fixtures and piping
- Roller shutter doors
- Structural steel (from steel columns, beams, trusses, mezzanines etc)
- Steel reinforcing separated from demolished concrete
- Air conditioners
- Sprinkler piping
- Balustrades
- Steel gates
- Elevators (lifts)
- Paving
- Steel fencing
- Steel grating

The general assumption is that all removable material to be salvaged will be done prior to demolition commencing.

It is proposed that the value of these items is deducted from the final tender price.

5. Detailed Method Statement

5.1 Site preparation

Some of the typical tasks to be undertaken prior to demolition works being carried out include:

- Ensuring all inground services are terminated/isolated, or where required, diverted, by TNPA, prior to demolition contractor establishing site presence.
- Site establishment including bringing onto site required machinery, tools, equipment, stores, containers etc.
- Hoarding to be erected as per hoarding plan

5.2 Primary demolition technique

Numerous demolition techniques have been considered for the demolition of the buildings. Of key consideration are the following:

- Proximity of structures to be demolished to live FPT facility which is understood to contain ammonia
- Proximity of structures to be demolished to TPT operations including stored/parked vehicles
- Proximity of surrounding residential and retail structures.

Blasting as a technique for the demolition is generally considered to lead to time benefits. However, considering the onerous regulatory restrictions and approval process, coupled with the risks noted above, blasting was not considered a feasible technique of demolition. Therefore, conventional mechanical demolition using excavators with mountabert hammer attachments was considered the most feasible and cost-effective solution, whilst achieving an acceptable programme

5.3 N-Shed

Being a relatively standard single storey steel framed building, the demolition is expected to be straightforward.

The roof sheeting and related cladding could then be manually removed, followed by the purlins. Care should be taken to maintain structural stability and integrity of the overall structure during removal of purlins and roof sheeting. The contractor is to appoint a suitably qualified temporary works designer to advise. The building could then be mechanically demolished from the highest point using a mountabert hammer attached to an excavator. The structural steelwork is to be separated from the general building rubble and cut into suitable sizes for transportation to recycling yards.

All concrete and masonry should be stockpiled, with reinforcing separated from concrete. All organic and undesirable items that may have mixed with the rubble shall be removed, and the rubble shall be suitably stockpile. The material is expected to be required to creating working platforms for the excavators during the demolition of subsequent buildings.



5.4 M-Shed & related structures

The M-Shed building comprises of the M-shed two storey structure, as well as pop-up buildings off the second floor deck including the helicopter hangar, ocean terminal building, admin building, and security building. Additionally, the old passenger tunnel and spiral ramp are considered part of M-Shed for the purposes of demolition.

The sequence proposed is for demolition to begin with the tower structure at the southern tip of the old passenger tunnel. A stockpiled ramp could be created using the rubble of M-Shed to create a platform in order for the excavator to work off, and provide sufficient elevation to reach the highest point of the tower. Demolition could then progress in a northerly direction, to include the old passenger tunnel, and eventually the spiral ramp. **At no point should excessive loads be placed on suspended slabs.**

Demolition could then continue to the M-Shed structure. It is proposed that demolition of the second floor slab, supporting columns, and first floor slab be carried out simultaneously to avoid overloading the first floor slab and leading to potential slab collapse. This will also create an opening in the structure for the excavator to move inwards, as well as increase the height of the stockpiled ramp to gain height advantage. The demolition of the remaining M-shed, as well as perched Ocean Terminal Building and other structures could continue in this fashion.

As with N-shed, the post processing of demolished material shall take place.

5.5 L-Shed & Durmarine Tower

The L-shed structure comprises of Post Tensioned beams, which pose a challenge in terms of demolition. PT tendons need to be de-stressed, potentially in a phased manner, prior to demolition to avoid accidental release of tendons, or excessive stress reversal. The decommissioning and de-stressing of the PT tendons is to be carried out by a specialist PT contractor prior to the demolition works commencing. It is also important for the PT specialist to confirm if the existing structure is capable of resisting its self-weight without the assistance of the PT tendons, as this will inform if temporary propping may be required. It is however expected that the existing reinforcing within the beams will be sufficient to support the structural self-weight.

The Durmarine tower is also a significant challenge in terms of demolition due to its height of ~42m from ground. The excavator has a reach of approximately 10m, and a platform needs to be created for the excavator of a height equivalent to approximately level 6 of the building (~32m high). This is illustrated in the image below.

The sequence of work envisaged is for the Southern portion of L-shed and the related ramps to be demolished in advance of Durmarine tower. This will allow for the required access ramps and batters for the Durmarine tower demolition to be constructed. The L-shed structure demolition, being a single storey RC frame, is expected to be relatively straightforward (apart from the PT de stressing requirements mentioned earlier). Demolition can begin from the upper most section of the building progressing down the structure, ensuring no excessive loads applied to slabs. **The excavator is not to traverse the suspended slabs during excavation.**

The ramp for the Durmarine demolition is to be created using the available rubble on site. The ramp and associated batters will need to be designed by the demolition contractors' temporary works designer to ensure safety and stability.

The post processing of demolished material shall take place as explained previously.

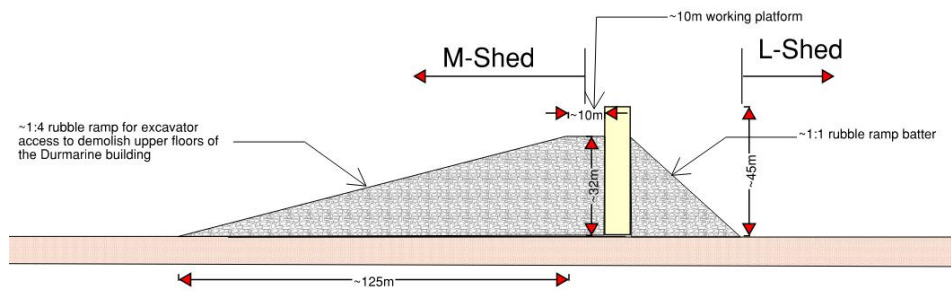


Figure 10: Illustrative Long section through ramp for Durmarine Demolition

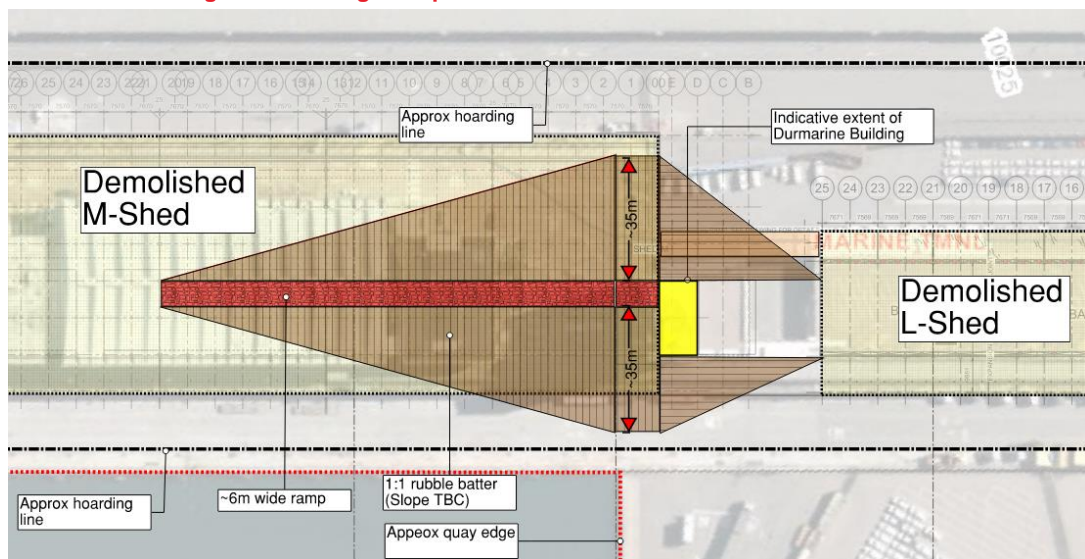


Figure 11: Illustrative Plan indicating ramp extents

5.6 Schoeman's Bridge

Demolition of the bridge and elevated road structures shall follow a similar principal to the previous structures. The bridge deck typically has a movement joint at each column location, with adjacent decks isolated, thus each deck span can be demolished individually with the adjacent span remaining intact.

The post processing of demolished material shall take place as explained previously.

5.7 Crushing of demolished material

Based on preliminary measurements, it is anticipated that approximately **40 500m³** of demolition will result from the demolition works. In order to minimise the amount of material to be hauled off site, it has been proposed that the suitable demolition material be sorted and **crushed on site**, to a suitable specification. The material can then be re-used on site as layerworks to roads/parking surfaces/hardstands. It is understood that majority of T-jetty is to be used as parking space, and a at a footprint of approximately 150 000m², it is conceivable that this material could be depleted in the process of surfacing such a large area. However, it is noted that without a final design in hand, it is not possible to accurately predict the material demand for the final configuration.



6. Waste Management Plan



It is expected that best practice will be implemented in dealing with waste generated through the demolition process. A comprehensive waste management plan is expected to be produced by the contractor incorporating principles of recycling as illustrated in the image below.

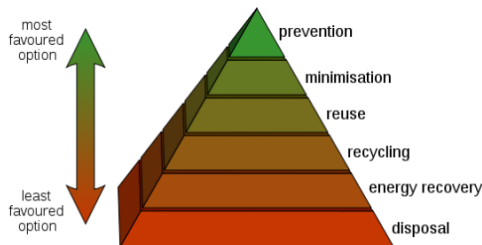


Figure 12: Waste management strategy

As discussed earlier in this report, the intention is for the contractor to maximise the salvageable material obtained through the demolition. This will naturally result in the incorporation of the waste management strategy.

7. Equipment & Site Personnel

7.1 Equipment & Machinery

Below is a typical list of equipment anticipated to be utilised during the demolition process include:

- 50ton Mechanical Shear
- 33ton Hydraulic Hammer
- 33ton Excavators
- 29ton Excavator
- 20ton Excavators Hydraulic Hammer
- 20ton Excavators Bucket
- JCB tlb
- Bobcat
- C&D Waste Crusher
- Screen
- Tipper Trucks
- Compressors
- Lowbed
- Crane Truck
- Roller



- Mobile Crane
- Cherry Picker
- Grader
- Pneumatic Breakers
- Gas cutting torches
- Gas Cylinders – as required
- Electric chippers
- Hand tools
- Flags
- Signage
- Barricading
- Drip trays

7.2 Site Personnel

It is anticipated that the following key personnel will be on site during the demolition process:

- 1 x Project Site Manager as a 16.2 appointee
- 1 x Construction Manager Construction Regulation 8.1
- 2 x Demolition Supervisor as a Construction Regulation 14.1 appointee
- 1 x Subordinate Supervisors
- 1 x Consulting Structural Engineer/Temporary works designer (Part Time)
- 1 x PT specialist (Part Time)
- 1 x Site Safety Officer as a Construction Regulation 8.5 appointee
- 2 x Safety Representative
- 20 x Skilled workers
- 13 x Tipper Truck Drivers where required
- 6 x Flame cutters
- 12 x Mobile Plant Operators
- 1 x Environmental Officer

8. Programme

Based on the proposed demolition sequence, a baseline programme has been developed to provide an indication of the approximate time required for the demolition works to be completed.

The estimated total programme period has been calculated to be approximately **254 working days**, which equates to approximately 11 months This is based on

Total Duration: 254 days

Working Hours: 07h30 to 16h00 Monday to Friday

07h30 to 14h00 Saturday

The programme document as been included in appendix of this report. It is noted that the project commencement date provided is arbitrary, assumed to be at the start of 2023, more specifically 03 January 2023, with completion and close out on 22 December 2023.

9. Budget

An indicative cost has been determined for the works based on the methodology and sequencing described earlier. The total cost has been calculated at approximately **R51.5 million**. This includes a contingency of 15%. A credit of approximately R2.5 million has been allowed for salvageable material.

The costing document is included in the appendix of the report. It is noted that no escalation has been incorporated in the numbers presented.

10. Risks

Deconstruction, by its nature, inherently poses numerous hazards and risks. These can be broken down into operational risks related to the actual demolition works, as well as hazards posed by the demolition work to the general port operations.

10.1 Operational Risks

An extensive baseline risk assessment has been carried out and presented in the appendix A4 of this report, identifying the numerous risks associated with the demolition work, as well as proposed mitigation measures to control these.

10.2 Hazard and Operability Analysis (HAZOP)

As part of this study, a Hazard Identification Register has been created through engagement with TNPA and stakeholders. This register is presented in appendix A3 of this report and highlights potential hazards with proposed mitigation measure.

10.3 Hazardous Waste

As part of the study, an asbestos identification and risk assessment was commissioned. This report can be found in appendix A5 of this report. A summary of identified asbestos is provided in the table below:

Table 1: Summary of asbestos identified

Building	Asbestos Identified
L Shed	Louvres found on parking level
FPT	No asbestos identified
M Shed Exterior	No asbestos identified
N Shed	No asbestos identified
N Shed Ablutions	Roof sheeting and fascia/barge boards
Durmarine Building	Louvres above canteen
Ocean Terminal Building	Pipes and fascia boards

11. Traffic Management

Traffic management is acknowledged to be a key aspect to consider during the demolition works, both within the site boundaries, as well as external to the site. Reference is to the Traffic Management Plan Framework report (PDV_ARUP_D_XX_RP_YT_1001-1) for further details. The demolition proposals herein have been developed in close coordination and consultation with the traffic engineers to ensure compatibility with the various traffic related constraints and restrictions.

12. Environmental & Social Impacts

It is noted that a separate environmental study is being undertaken as part of the overall study and reference is made to the “Port of Durban – Environmental Screening” report for detailed analysis of potential environmental impacts and mitigation measures. This section of the report will focus on potential environmental impacts of the demolition works and propose mitigation measures.

12.1 Temporary stormwater controls

The demolition of the sites will result in large amounts of dust and debris being generated, some of which will be temporarily stockpiled on site and others carted off site to licensed facilities for either storage for use elsewhere or to landfill sites.

During this time frame it is expected that the site will experience periodic rainfall which will result in surface runoff. This runoff will contain contaminants from the demolition process, it is there for vital that strict stormwater control measures are implemented to:

- Protect the existing stormwater infrastructure for future use

- Prevent runoff into the harbour and limit pollutants from entering the water
- Prevent water pollution
- Ensure safety and prevent the site from local flooding
- Ensure the safe movement of people, plants, and vehicles always.

Stormwater control methodology

Stormwater control must be implemented prior to any demolition work commencing.

The perimeter of the site must be secured with control berms to both contain stormwater within the site and prevent runoff.

Preferred method would be the use of longitudinal sausage-like and filled canvas, water tubes or similar approved. Water tubes may be a more viable option as water can be pumped from the harbour, subject to environmental approval.

All existing stormwater gratings to be fitted with sand/silt screen to prevent debris from entering the system.

All stormwater runoff must be directed towards the existing stormwater inlet sand gratings within the site boundary.



Image of water tube protecting grating



Image of silt screen



Image of water tube

Figure 13: Proposed Berm extents (left) and berm options (right)

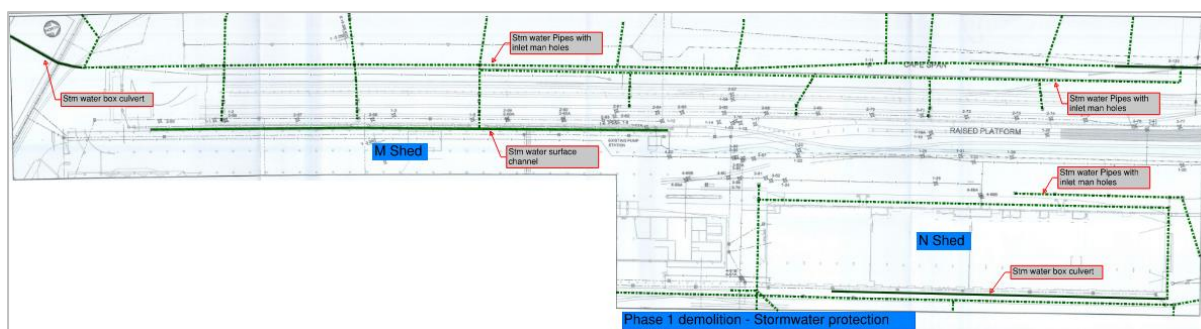


Figure 14: Stormwater management during demolition

12.2 Heritage Restrictions

It is acknowledged that a number of the buildings earmarked for demolition are considered ‘Heritage Buildings’ and will require AMAFA approval. It is understood that there is a parallel study being carried out by TNPA relating to this. A draft heritage scoping report has been shared with Arup on 07 October 2022, in which a number of the earmarked buildings identified for demolition have been highlighted as being rich in heritage value, and demolition not supported by the heritage practitioner.

The demolition study has not taken into consideration the recommendations of the heritage scoping report due to the late nature of its submission. It is understood that TNPA will engage with the relevant authorities prior to progressing further on the demolition plans.

12.3 Dust



Demolition activities will have the potential to generate emissions in the form of dust. Due to adjacent site operations, the sensitivities surrounding dust generation and control are understood. In addition to the proposal of standard dust control measures summarised in the tables below, a dust screen is proposed between the demolition site and FPT as an additional control measure. However, it is noted that whilst these proactive steps are proposed during the demolition works, controlling dust is a difficult task and additional steps may need to be taken by Transet to limit any potential impact dust may have on operations.

Activities to be conducted during the demolition activities which have the potential to generate dust, and the respective potential dust control measures, are described in the summary table below.

Table 2: Dust generating Activities

Activity	Proposed Dust Control
Truck traffic	Wet down road ways. Keep roads clean or wet down if damaged and cracked and cannot be kept clean.
Demolition using excavators	Water hose spray, adjust demolition activities, suspend work under unfavorable conditions (Monitor high wind speeds).
Stockpiling	Water hose spray. Use of airborne dust wet suppression system as required. Cover stockpiles during High wind speeds at the end of each day.

Material handling operations	Always keep the number of handling operations to a minimum by ensuring that dusty material isn't moved or handled unnecessarily.
Transport of dusty materials and aggregates	Use enclosed or tarped vehicles.
Vehicle loading	Use material handling methods that minimise the generation of airborne dust. Damp down using water.
Loading materials onto vehicles	Drop heights must be kept to a minimum and enclosed wherever possible. Damp down with water.
Dust dispersing over the site boundary	Use hand held hoses and other watering methods, as necessary.
Storage or stockpiling of material	Store materials away from the site boundary and sensitive areas, wherever possible. Ensure adequate protection from the wind eg by using Tarping
Small and short-term stockpiles – protecting from wind erosion	Where possible, ensure stockpiles are kept enclosed or under tarping. Dusty materials can be damped down using suitable and sufficient water hose sprays. Wind barriers (protective fences) of similar size and height to the stockpile may be used
Cleaning up	Methods and equipment should be in place for immediate clean-up of spillages of dusty or potentially dusty materials.

12.4 Emissions

Table 4: Vehicle Emissions

Potential Emission Source	Proposed Dust Control
Visible exhaust smoke	Vehicles and equipment should not emit black smoke from exhaust systems except during ignition at start-up.
Maintenance	Engines and exhaust systems should be maintained so that exhaust emissions do not breach statutory emission limits set for the vehicle/equipment type and mode of operation.
Servicing	This should be routinely scheduled, rather than just following breakdowns
Operating time	Internal combustion plant should not be left running unnecessarily.
Exhaust direction	Vehicle exhausts should be directed away from the ground and other surfaces and preferably upwards to avoid road dust being re-suspended to the air.
Exhaust heights	Exhausts should be positioned at a sufficient height to ensure adequate local dispersal of emissions

Location of plant and equipment	Plant and equipment should be operated away from residential areas or sensitive areas near to the demolition site.
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12.5 Noise

The process of demolition is inherently noisy and the contractor should aim to adhere to relevant noise regulations and limits. Some of the proposed mitigation measures could include:

- Construction activities will be contained to reasonable hours during the day and early evening. Night-time will not be allowed.
- Prior warning will be provided to the community when a noisy activity will commence
- Noise suppression measures shall be applied to all construction equipment. Construction equipment shall be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the contractor shall be instructed to remove the offending vehicle or machinery from site
- Noise survey shall be conducted to check noise levels does not exceed as per regulation


13. Assumptions

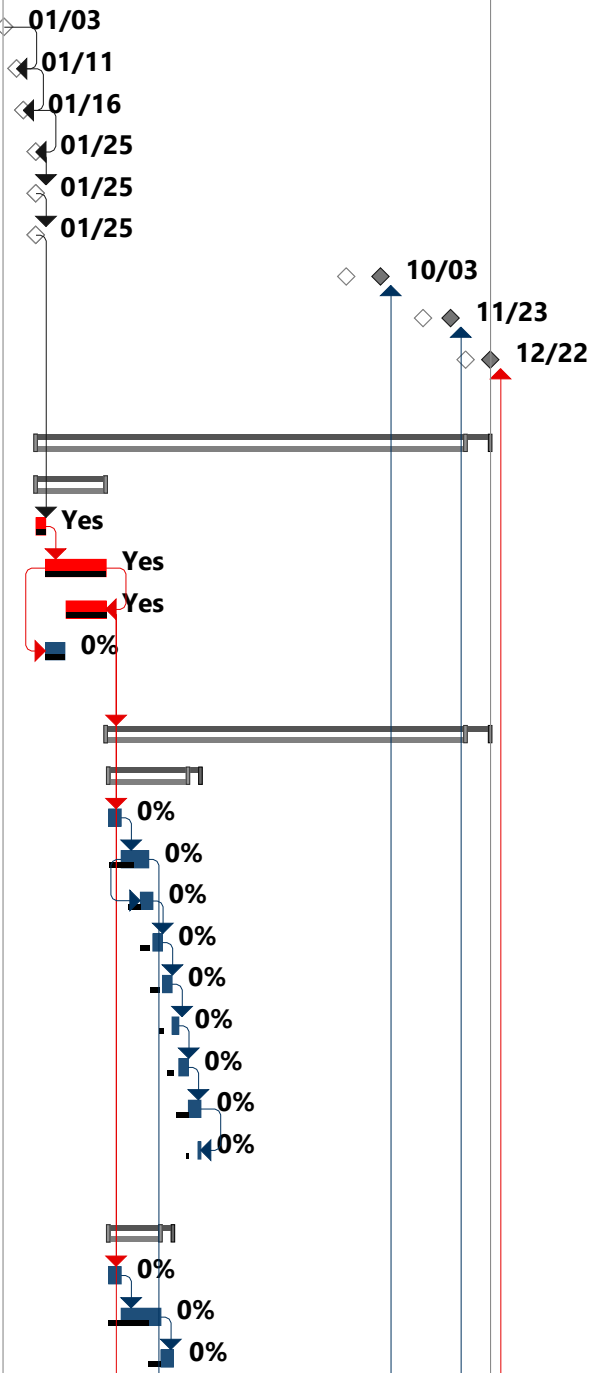
In the development of this demolition methodology and related outputs, numerous assumptions are made which are listed below.

- All Inground services to be diverted/capped off by others to ensure no live services within the site footprint prior to the demolition contractor establishing site.
- Unrestricted access will be provided to the site as per the site plan presented in this report. All relevant occupants will be removed and the buildings will be handed over empty to the demolition contractor.
- All MEP or other equipment required by the client, as captured in a previous report, to be removed prior to demolition contractor establishing site.
- It is assumed that the existing quay is ground bearing, and the quay wall is capable of resisting and surface loading resulting from demolition and related works.
- It is noted that the re-surfacing of the demolition footprint a surfacing process shall be informed by a detailed design which is consistent and compatible with the overall port masterplan in terms of levels, traffic circulation, layerworks designs etc.
- Substructure and foundations to be demolished. Where piles are present, demolition to take place to top of piles.
- Apart from any inground services identified as a risk remaining underground, or considered salvageable by TNPA and removed by them, the scope excludes the removal of any underground services. All inground services to remain.

























A.1 Programme, Manhours, & resource histogram








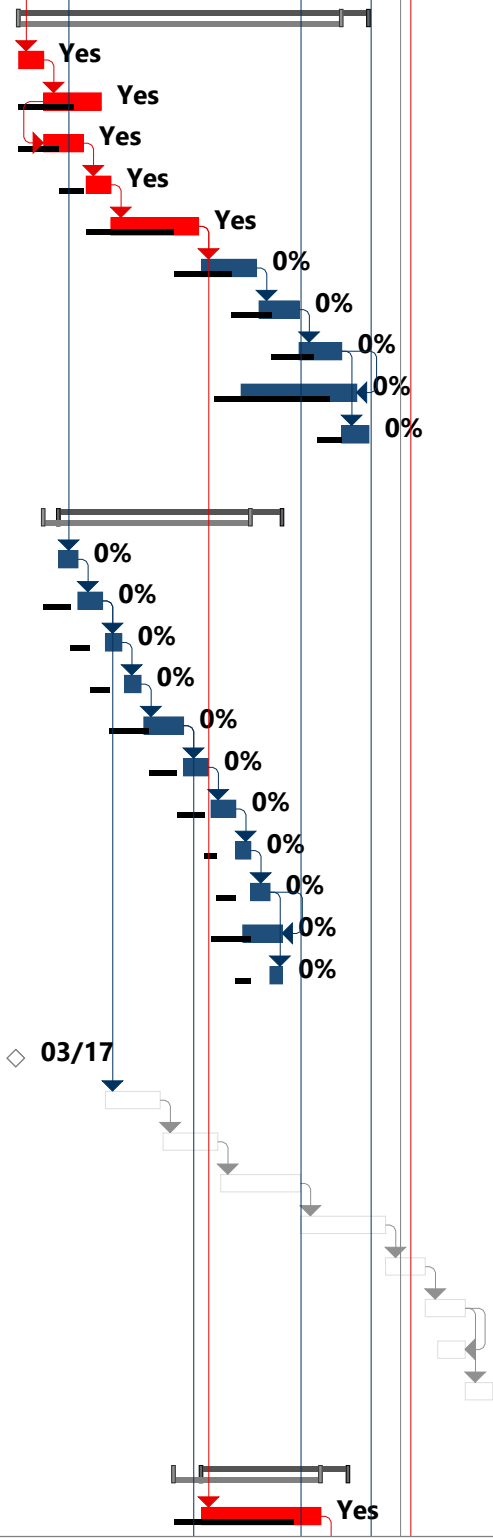
ID		Task Mode	Task Name	Duration	% Complete	Start	Finish	Predecessors	Resource Names	r 4	2023 Dec	2023 Jan	2023 Feb	2023 Qtr 1 Mar	2023 Qtr 2 Apr	2023 Qtr 2 May	2023 Qtr 2 Jun	2023 Qtr 3 Jul	2023 Qtr 3 Aug	2023 Qtr 3 Sep	2023 Qtr 4 Oct	2023 Qtr 4 Nov	2023 Qtr 4 Dec	2024 Qtr 1 Jan	2024 Qtr 1 Feb
1			Deconstruction of Existing Facility - Baseline 1 - Rev 02	254 days	0%	23/01/03	23/12/22																		
2																									
3			Milestones	254 days	0%	23/01/03	23/12/22																		
4			Tender Submission	0 days	0%	23/01/03	23/01/03		Project Manager																
5			Letter of Intent	0 days	0%	23/01/11	23/01/11	4FF+7 days	Project Manager																
6			Contract Award	0 days	0%	23/01/16	23/01/16	5FF+3 days	Project Manager																
7			Submission of HSE File	0 days	0%	23/01/25	23/01/25	6FF+7 days	Safety Officer,SHE																
8			Engagement with Local Business Forums	0 days	0%	23/01/25	23/01/25	7	Project Manager																
9			Site Establishment	0 days	0%	23/01/25	23/01/25	8	Crane Truck,Gene																
10			Practical Completion	0 days	0%	23/10/03	23/10/03	79																	
11			Works completion	0 days	0%	23/11/23	23/11/23	83																	
12			Site Handover	0 days	0%	23/12/22	23/12/22	87																	
13																									
14			Activity Schedule	237 days	0%	23/01/26	23/12/22																		
15			Site Establishment	37 days	0%	23/01/26	23/03/17																		
16			Mobilization of Plant and Equipment	5 days	0%	23/01/26	23/02/01	9	Crane Truck,Gene																
17			Erecting of Hoarding	32 days	0%	23/02/02	23/03/17	16	Bobcat,General La																
18			Erecting of Internal Barriers& Hoarding	21 days	0%	23/02/17	23/03/17	17FF	Bobcat,General La																
19			Termination of Services by others	10 days	0%	23/02/02	23/02/15	17SS																	
20																									
21			Demolitions	200 days	0%	23/03/17	23/12/22	18																	
22			N-SHED	49 days	0%	23/03/20	23/05/25																		
23			Certified Asbestos Removals and Disposals	7 days	0%	23/03/20	23/03/28	18																	
24			Stripping of Existing Building to Expose the Structural Shell	14 days	0%	23/03/29	23/04/17	23	General Labour,Ju																
25			Removal of Complete Roof	7 days	0%	23/04/12	23/04/20	24SS+10 days	General Labour,Ju																
26			Rigging or Shear Existing Structure	5 days	0%	23/04/21	23/04/27	25	50ton Mechanical																
27			Breaking up of Concrete surfaces	5 days	0%	23/04/28	23/05/04	26	33ton Hydraulic H																
28			Exposing of Foundations	3 days	0%	23/05/05	23/05/09	27	20ton Bucket																
29			Breaking up of Foundations	5 days	0%	23/05/10	23/05/16	28	33ton Hydraulic H																
30			Relocation of Rubble to Crushing Stockpile	7 days	0%	23/05/17	23/05/25	29	29ton Excavator,T																
31			Backfill and Compact	2 days	0%	23/05/24	23/05/25	30FF	Grader,Roller																
32																									
33			M SHED SPIRAL VECHICULAR RAMP	35 days	0%	23/03/20	23/05/05																		
34			Certified Asbestos Removals and Disposals	7 days	0%	23/03/20	23/03/28	18																	
35			Mechanical Demolition of Existing Structure	21 days	0%	23/03/29	23/04/26	34	33ton Hydraulic H																
36			Relocation of Rubble to Crushing Stockpile	7 days	0%	23/04/27	23/05/05	35	29ton Excavator,T																
37																									



























Project: Durban Logistics Hub D
Date: 22/09/16















Task		Inactive Task		Manual Summary Rollup		External Milestone		Baseline Milestone	
Split		Inactive Milestone		Manual Summary		Deadline		Baseline Summary	
Milestone		Inactive Summary		Start-only		Critical		Progress	
Summary		Manual Task		Finish-only		Critical Split		Manual Progress	
Project Summary		Duration-only		External Tasks		Baseline			

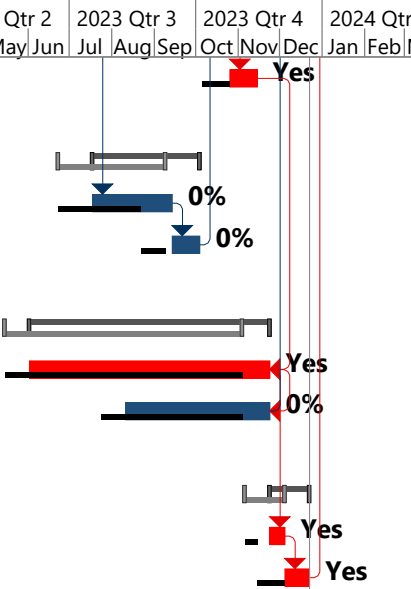
ID		Task Mode	Task Name	Duration	% Complete	Start	Finish	Predecessors	Resource Names																												
38			Ocean Terminal Building	183 days	0%	23/03/20	23/11/29																														
39			Certified Asbestos Removals and Disposals	14 days	0%	23/03/20	23/04/06	18																													
40			Stripping of Existing Building to Expose the Structural Shell	30 days	0%	23/04/07	23/05/18	39	General Labour,Ju																												
41			Removal of Complete Roof to Multi Storey Structure	21 days	0%	23/04/07	23/05/05	40SS	General Labour,Ju																												
42			PT De-tension	14 days	0%	23/05/08	23/05/25	41	PT Specialist,Struc																												
43			Mechanical Demolition of Existing Structures	46 days	0%	23/05/26	23/07/28	42	33ton Hydraulic H																												
44			Breaking up of Concrete Multi Level Slab	30 days	0%	23/07/31	23/09/08	43	33ton Hydraulic H																												
45			Exposing of Foundations	21 days	0%	23/09/11	23/10/09	44	20ton Bucket																												
46			Breaking up of Foundations	23 days	0%	23/10/10	23/11/09	45	33ton Hydraulic H																												
47			Relocation of Rubble to Crushing Stockpile	60 days	0%	23/08/29	23/11/20	46FF+7 days	29ton Excavator,T																												
48			Backfill and Compact	14 days	0%	23/11/10	23/11/29	46	Grader,Roller																												
49																																					
50			L Shed	117 days	0%	23/04/18	23/09/27																														
51			Certified Asbestos Removals and Disposals	10 days	0%	23/04/18	23/05/01	24																													
52			Stripping of Existing Building to Expose the Structural Shell	14 days	0%	23/05/02	23/05/19	51	General Labour,Ju																												
53			Uplift Existing Paving	10 days	0%	23/05/22	23/06/02	52	Bobcat,General La																												
54			PT De-tension	10 days	0%	23/06/05	23/06/16	53	PT Specialist																												
55			Mechanical Demolition of Existing Structures	21 days	0%	23/06/19	23/07/17	54	33ton Hydraulic H																												
56			Breaking up of Concrete Multi Level Slab	14 days	0%	23/07/18	23/08/04	55	33ton Hydraulic H																												
57			Breaking up of Concrete surfaces	14 days	0%	23/08/07	23/08/24	56	33ton Hydraulic H																												
58			Exposing of Foundations	7 days	0%	23/08/25	23/09/04	57	20ton Bucket																												
59			Breaking up of Foundations	10 days	0%	23/09/05	23/09/18	58	33ton Hydraulic H																												
60			Relocation of Rubble to Crushing Stockpile	21 days	0%	23/08/30	23/09/27	59FF+7 days	29ton Excavator,T																												
61			Backfill and Compact	7 days	0%	23/09/19	23/09/27	59	Grader,Roller																												
62																																					
63			Fresh Produce Terminal	0 days	0%	23/03/17	23/03/17																														
64			Stripping of Existing Building to Expose the Structural Shell	30 days	0%	23/05/22	23/06/30	52																													
65			Removal of Complete Roof	30 days	0%	23/07/03	23/08/11	64																													
66			Rigging or Shear Existing Structure	42 days	0%	23/08/14	23/10/10	65																													
67			Breaking up of Concrete surfaces	44 days	0%	23/10/11	23/12/11	66																													
68			Exposing of Foundations	21 days	0%	23/12/12	24/01/09	67																													
69			Breaking up of Foundations	21 days	0%	24/01/10	24/02/07	68																													
70			Relocation of Rubble to Crushing Stockpile	14 days	0%	24/01/19	24/02/07	69FF																													
71			Backfill and Compact	14 days	0%	24/02/08	24/02/27	69																													
72																																					
73			Common Area - Hardstand Surfaces	77 days	0%	23/07/31	23/11/14																														
74			Mechanical Demolition of Existing Surfaces out of Building footprint	63 days	0%	23/07/31	23/10/25	43	33ton Hydraulic H																												



























Project: Durban Logistics Hub D
Date: 22/09/16

Task		Inactive Task		Manual Summary Rollup		External Milestone		Baseline Milestone	
Split		Inactive Milestone		Manual Summary		Deadline		Baseline Summary	
Milestone		Inactive Summary		Start-only		Critical		Progress	
Summary		Manual Task		Finish-only		Critical Split		Manual Progress	
Project Summary		Duration-only		External Tasks		Baseline			

ID		Task Mode	Task Name	Duration	% Complete	Start	Finish	Predecessors	Resource Names	r 4	2023 Qtr 1	2023 Qtr 2	2023 Qtr 3	2023 Qtr 4	2024 Qtr 1										
											Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
75			Relocation of Rubble to Crushing Stockpile	14 days	0%	23/10/26	23/11/14	74	29ton Excavator,1																
76																									
77			SCHOEMAN Bridge	56 days	0%	23/07/18	23/10/03																		
78			Mechanical Demolition of Existing Structure	42 days	0%	23/07/18	23/09/13	55	33ton Hydraulic H																
79			Relocation of Rubble to Crushing Stockpile	14 days	0%	23/09/14	23/10/03	78	29ton Excavator,1																
80																									
81			Processing	125 days	0%	23/06/02	23/11/23																		
82			Crush and Screen Demolition Debris for Suitable Backfill	125 days	0%	23/06/02	23/11/23	75FF+7 days	20ton Bucket,Cru																
83			Loading and Removal of Waste not suitable for Crushing	75 days	0%	23/08/11	23/11/23	82FF	29ton Excavator,1																
84																									
85			Close out	21 days	0%	23/11/24	23/12/22																		
86			De-establishment	7 days	0%	23/11/24	23/12/04	82	Crane Truck,Gene																
87			Prepare and Issue out Close out Documentation	14 days	0%	23/12/05	23/12/22	86	Safety Officer,SHE																



Project: Durban Logistics Hub D
Date: 22/09/16

Task		Inactive Task		Manual Summary Rollup		External Milestone		Baseline Milestone	
Split		Inactive Milestone		Manual Summary		Deadline		Baseline Summary	
Milestone		Inactive Summary		Start-only		Critical		Progress	
Summary		Manual Task		Finish-only		Critical Split		Manual Progress	
Project Summary		Duration-only		External Tasks		Baseline			

PROJECT MANHOURS REPORT

	INCIDENT SUMMARY
FATALITY	0
LOST TIME INJURIES	0
MEDICAL TREATMENT CASE	0
FIRST AID TREATMENT CASE	0
PROPERTY DAMAGE	0
ENVIRONMENTAL	0
NEAR MISS	0
Totals:	0

1 SHIFT PER DAY

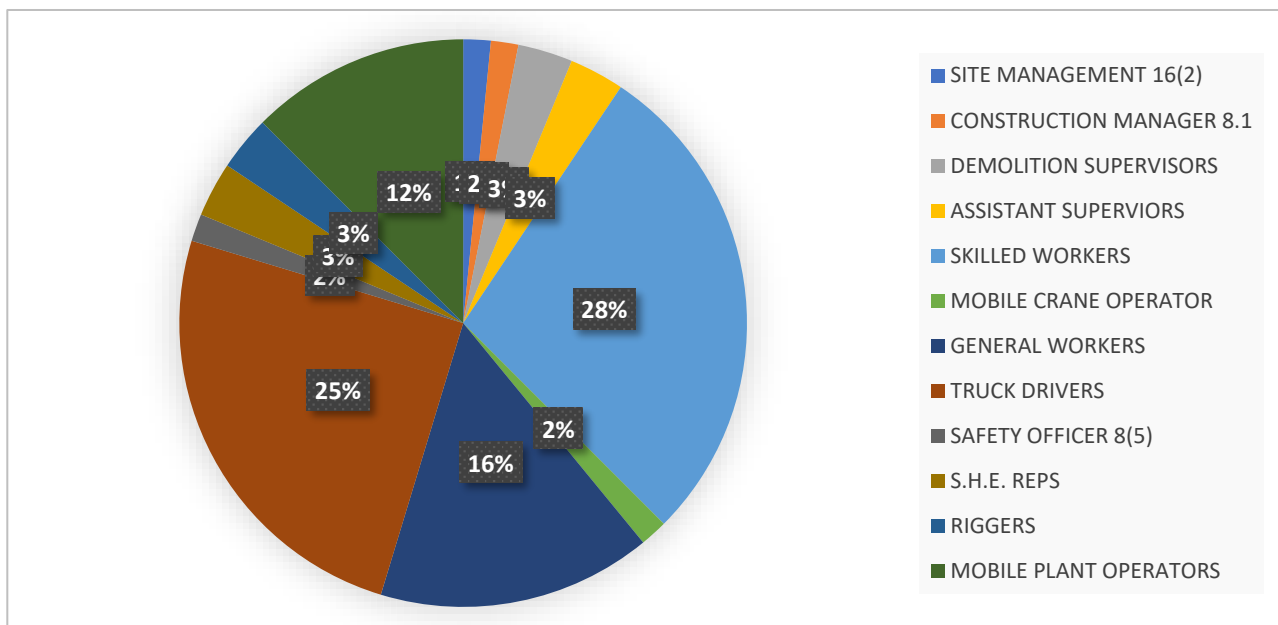
NO OF PEOPLE/DAY	SHIFTS	HOURS – 9 HOURS
64	1	9

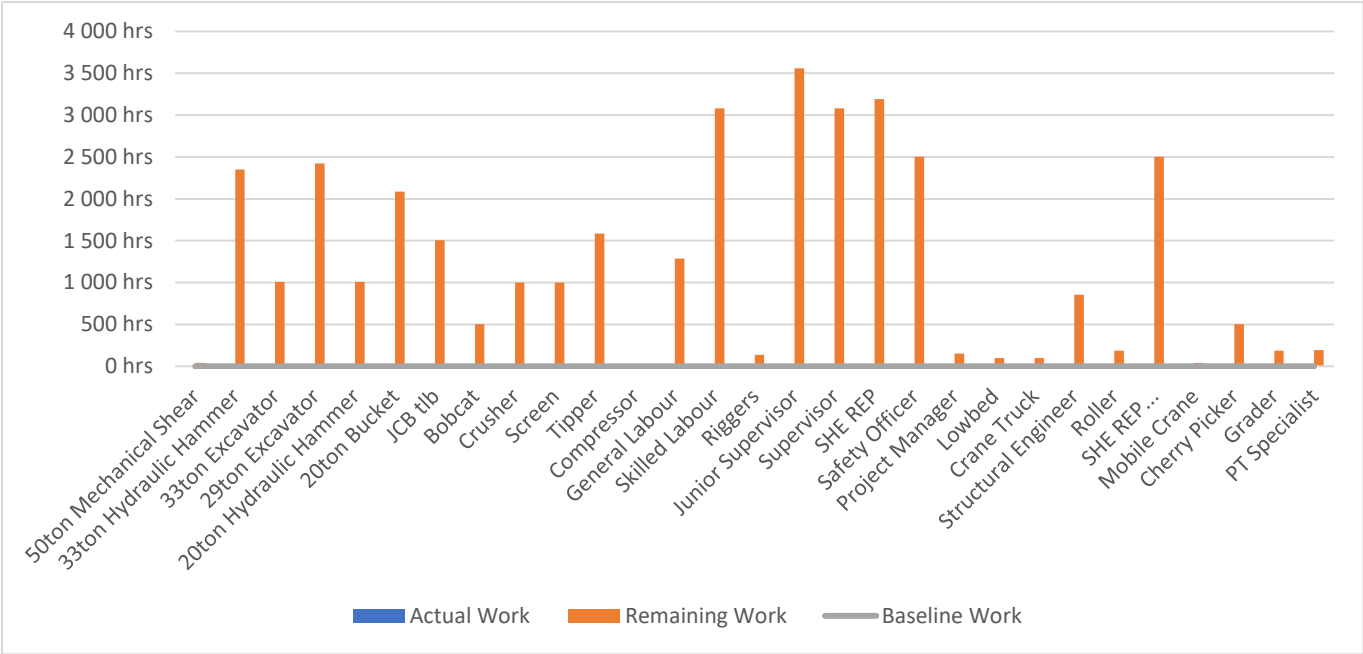
MANHOURS TO PRIDICTED

TOTAL HOURS MANHOURS TO BE WORKED	138816
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LABOUR REPORT

SITE MANAGEMENT 16(2)	1	GENERAL WORKERS	10
CONSTRUCTION MANAGER 8.1	1	TRUCK DRIVERS	16
DEMOLITION SUPERVISORS	2	SAFETY OFFICER 8(5)	1
ASSISTANT SUPERVIORS	2	S.H.E. REPS	2
SKILLED WORKERS	18	RIGGERS	2
MOBILE CRANE OPERATOR	1	MOBILE PLANT OPERATORS	8





Name	Start	Finish	Remaining Work
50ton Mechanical Shear	23/04/12	23/04/18	40 hrs
33ton Hydraulic Hammer	23/03/20	23/10/20	2 352 hrs
33ton Excavator	23/03/20	23/10/05	1 008 hrs
29ton Excavator	23/04/18	23/11/03	2 424 hrs
20ton Hydraulic Hammer	23/03/20	23/10/05	1 008 hrs
20ton Bucket	23/04/26	23/11/03	2 088 hrs
JCB tlb	23/02/02	23/11/03	1 504 hrs
Bobcat	23/02/02	23/05/10	504 hrs
Crusher	23/05/15	23/11/03	1 000 hrs
Screen	23/05/15	23/11/03	1 000 hrs
Tipper	23/04/18	23/11/03	1 584 hrs

Compressor	NA	NA	0 hrs
General Labour	23/01/25	23/11/14	1 288 hrs
Skilled Labour	23/03/20	23/10/20	3 080 hrs
Riggers	23/01/26	23/11/14	136 hrs
Junior Supervisor	23/01/25	23/11/14	3 560 hrs
Supervisor	23/03/20	23/10/20	3 080 hrs
SHE REP	23/01/25	23/12/04	3 192 hrs
Safety Officer	23/01/25	23/12/04	2 504 hrs
Project Manager	23/01/03	23/12/04	152 hrs
Lowbed	23/01/26	23/11/14	96 hrs
Crane Truck	23/01/25	23/11/14	96 hrs
Structural Engineer	23/04/12	23/08/21	856 hrs
Roller	23/05/15	23/11/09	184 hrs
SHE REP...	23/01/25	23/12/04	2 504 hrs
Mobile Crane	23/04/12	23/04/18	40 hrs
Cherry Picker	23/03/20	23/04/28	504 hrs
Grader	23/05/15	23/11/09	184 hrs
PT Specialist	23/04/18	23/05/24	192 hrs

A.2 Budget

Port of Durban Validation-Demolition Phase 1

BILL	Item	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT	COMMENTS
1		Bill No.1 Preliminaries					
1	1	Allowance for P&G	Item	1	R915 631.23	R915 631.23	
	2	Erecting of Hoarding comprising Weld Mesh and Shadecloth as per Hoarding Layout	m	2597	R225.00	R584 325.00	
	3	Allowance for Suitable Dust Screen at FPT siding	m	500	R1 500.00	R750 000.00	
	4	Allowance for 2 X Double Gates on Metal Frame and 2 Pedestrian Gates	item	1	R12 000.00	R12 000.00	
2		Bill No.2 Demolition and Removal					
2	1	9 Storey RC concrete frame structure with flat concrete roof,25.87 x 14.64 measurements on site and 29m high overall comprising of the structure being on a concrete hardstand,V-shaped column structures , 2 basement levels RC concrete frame structure comprising downstand stand beams 21.02 x 20.25 (Demolition to be done to top of Pile cape/footing and in accordance with Demolition plan)	item	1	R2 215 610.28	R2 215 610.28	
2	2	L-Shed double storey RC structure, 46.65 x 189,20 and 10m High overall comprising RC Columns supporting precast and prestressed concrete beams,1st floor consist of a Ribbed PT Slab and the top surface of the first floor slab consist of interlocking pavers with bedding.(Demolition to be done to top of Pile cap/footing and in accordance with Demolition plan)	item	1	R3 089 163.00	R3 089 163.00	Includes link bridge to M -shed, as well as 4 No. workshop buildings adjacent to L-shed. This will impact salvagable credit.
2	3	Ocean Terminal-Administration Building double storey concrete structure,35,46 x 27,46 and 9m high overall comprising of a concrete flat roof,internal concrete mezzanine,Awning on the top of roof slab 10.31 x 14,52.(Demolition to be done to top of Pile cap/footing and in accordance with Demolition plan)	item	1	R1 022 418.18	R1 022 418.18	
2	4	Ocean Terminal- double volume concrete structure,91.80 x 46,63 and 12m high overall comprising of a concrete flat roof,V-shaped beams with a span of 20m supported by perimeter columns,internal steel mezzanine supporting concrete floors with partitions.(Demolition to be done to top of Pile cap/footing and in accordance with Demolition plan)	item	1	R2 996 443.80	R2 996 443.80	
2	5	Ocean Terminal-Security Building double storey concrete structure,37.98 x 19.06 and 9m high overall comprising of a concrete flat roof,internal concrete mezzanine,concrete structure on the top of roof slab 14.01 x 8,77.(Demolition to be done to top of Pile cap/footing and in accordance with Demolition plan)	item	1	R505 134.00	R505 134.00	
2	6	Helicopter Hangar-Single Storey Steel structure,18.79 x 14.59 and 5m high overall comprising of ibr roof sheets and masonry brickwork.	Item	1	R70 000.00	R70 000.00	

2	7	M-Shed-Double storey reinforced concrete structure,277.64 x 69.15 and 9m High overall comprising of reinforced concrete columns to support 2 levels of suspended slabs, the 1st level of suspended flat slab is is approximatly 300mm thick and the 2nd level of suspended coffer slab is approximatly 450mm thick,the structure is mostly on pad footings,A reinforced concrete spiral ramp 83.28 x 9.92 and 9m high (Demolition to be done to top of Pile cap/footing and in accordance with Demolition plan)	item	1	R6 719 582.10	R6 719 582.10	Spiral Ramp + Souther Pier included
2	8	N-Shed-Single Storey Steel structure,120.44 x 23.76 and 9m High overall comprising of steel trusses and purlins,lbr roof sheets and masonry walls,the structure is on a concrete hardstand which is 120.44 x 29.98 and 0.800m High,lightweight steel canopy attached to one side of the structure 120.44 x 6.22 (Demolition to be done to top of Pile cap/footing and in accordance with Demolition plan)	item	1	R997 920.00	R997 920.00	
2	9	Toilets-Single Storey structure,21.23 x 3.87 and 3m High overall comprising of flat concrete roof and masonry walls (Demolition to be done to top of foundation and in accordance with Demolition plan)	item	1	R16 500.00	R16 500.00	
2	10	Fresh Produce Terminal-Single Storey structures, (83.21 x 461.35) + (46.79 x 47.65) and approximatly 9m high comprising of lightweight steel and roof sheets (Demolition to be done to top of foundations and in accordance with Demolition plan)	item	1	R0.00	R0.00	NOTE - As Agreed this is now part of phase 2, and can be consdered as such
2	11	Shoeman Bridge-Reinforced concrete box girder bridge comprising of asphalt tar,with steel balustrades on either sid,the bridge is supported by columns estimated 500mm in diamters and spaced out at 12m centres (Demolition to be done to top of foundations and in accordance with Demolition plan)	item	1	R5 330 000.00	R5 330 000.00	Northern Ramp to L-shed + Main entrance building included in this line item
2	12	Entrance Building to Q&R Berth-Single Storey Steel structure,15.85 x 15.75 and 6m high overall comprising of roof sheets,the North and south entrance is open (Demolition to be done to top of Pile and in accordance with Demolition plan)	item	1	R162 264.37	R162 264.37	
2	13	Demolition of Concrete Hardstands and Surfaces located beyond the Footprint of Existing Buildings and Structures including placing on Stockpile for Crushing (Measured Elsewhere) (Demolition to be done to top of Pile and in accordance with Demolition plan)	m2	65000	R130.00	R8 450 000.00	
2	14	Allowance for Crushing of Material to a G7 Spec including all neccessary testing	m3	40500	R120.00	R4 860 000.00	
2	15	Cartage of Unsuitable material located from the Demolition process	m3	11570	R95.00	R1 099 150.00	
2	16	Compact Existing Ground (Insuitu) , Lay 2 x 100mm Layers of C3 Stablizer including temporary making good surface by Priming and laying 25mm Asphalt (Rate only)	m2	1	R380.00		Rate Only
2	17	Allowance for AIA appointment including all necessary Monitoring and Close outs	sum	1	R101 309.60	R101 309.60	
	18	Certified Asbestos Removal and Disposal	m2	3618	R150.00	R542 700.00	
	19	Allowance for Temporary S/W controls	sum	1	R1 120 000.00	R1 120 000.00	
	17	Credit for Salvage	credit	1	-R2 592 020.00	-R2 592 020.00	Value reduced by R1m as FPT removed from Phase 1 scope
		Sub-total				R38 968 131.56	
		Contingency		15%		R5 845 219.73	
		Sub-total 2				R44 813 351.29	
		VAT				R6 722 002.69	
		Total				R51 535 353.99	



A.3 Hazard Identification Register

Hazard Identification Register
Date of Meeting - 04 August 2022

Number	Hazard	Deviation	Possible cause	Consequence	Safeguards	Comments	Action Required	Action Assigned
1	Demolition traffic coexisting with ro-ro	Ro-ro vehicle hits demolition vehicle	High speed, wrong lane	Injuries to staff and damages to cars	Adequate signalling in place	The proposal is if demolition vehicle leaves the site needs flagmen present from origin to port exit	Signalling design and set-up	Demolition contractor
2	FPT traffic to C gate	Interference with ro-ro and container operations	Wrong access or lanes	Impact on the port operations	Adequate signalling in place		Signalling design and set-up	TNPA
3	Freight trains operating in nearby tracks	Clash between temporarily diverted traffic and rail operations	Reduced space	Collision, damage, injuries	Rail to cease operations temporarily during demolition works		Agreement with relevant stakeholders	TNPA
4	Dust	Excessive dust in quay and storage areas	Poor management on site	Damage to cargo and impact on port operatives	Measures to control dust		Environmental management plan	Demolition contractor
5	Storm water	Polluted storm water spillage	Poor management on site	Contamination and impact on port operatives	Storm water collection and treatment on site		Environmental management plan	Demolition contractor
6	Noise	Noise pollution	Poor management on site	Impact on officers	Method Statement to allow for methods to limit noise to reasonable levels		Environmental management plan	Demolition contractor
7	Demolition waste	Rubble falling from demolition trucks	Overloading of trucks	Impact on port operations and vehicles	Manage waste adequately. Cover trucks were required		Waste management plan	Demolition contractor
8	Demolition waste	High volume not able to be stored on site	Lack of space	Impact on port operations and vehicles	Manage waste adequately And take offsite		Waste management plan	Demolition contractor
9	Demolition waste	Contaminated waste on site	Not adequate disposal site found	Impact on port users	Adequate waste management		Waste management plan	Demolition contractor
10	Chemicals and biological agents	In contact with port staff	Not adequate measures in place to manage hazardous materials	Impact of port staff health	Adequate waste management		Waste management plan	Demolition contractor
11	Equipment, falling materials	Not working within site limits	No clear delimitation	Damage to cargo and impact on port operatives	Hoarding and clear signalling		Hoarding and Signalling design and set-up	Demolition contractor
12	High intensity traffic in city roads			Impact on city traffic	Limiting traffic during peak hours	400 truck movements per day is currently allowed	Engagement with city	TNPA
13	Working with High Voltage Electrical Equipment		Proper isolation procedures not followed	Injuries to staff and damages to equipment	Adequate procedures to be followed		Engagement with city and qualified personnel	eThekweni Electricity Department & TNPA
14	Demolition Waste	Potential Asbestos	Found within existing structures	Health and safe disposal	AIA appointed to identify asbestos. Approved contractor to be employed	Plans to be put in place once the AIA report is received and recommendations understood	Hazardous waste management plan	Demolition contractor
15	Sub surface contamination	Potential sub surface contamination / pipelines encountered during the demolition process	Encountering unknown contamination / pipelines	Pollution and associated clean-up. Impact to H&S, environment and programme	Emergency response and Incident plan. Spill clean up procedure		Development of plans in advance of commencement of demolition activities. Approval of plans by TNPA Environmental	Demolition contractor
16	Long term stockpiling of waste / builders rubble for reuse	Safe storage and protection against weather	siting of storage stockpiles could impact ongoing port operations	dust pollution, visual impacts, impacts to movement of vehicles	early identification of stockpile areas		Develop waste stockpile management plan. To be approved by TNPA environmental	Demolition contractor

RISK MATRIX FOR OPERATIONAL RISK ASSESSMENTS

RISK MATRIX FOR OPERATIONAL RISK ASSESSMENTS						
		Consequence / Severity (Where an event has more than one 'impact'. Choose the 'Consequence' with the highest rating)				
Impact / Category		1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
(H&S) Injury or harm to people		First aid case / Exposure to minor health risk	Lost time injury or health effects / Reversible impact on health	Serious / Reportable injury. Potential irreversible impact on health	Single fatality or loss of quality of life / Irreversible impact on health	Multiple fatalities / Impact on health ultimately fatal
(E) Environmental Impact		Minimal environmental impact Level 1 incident	Limited environmental impact Level 2 incident Remediable short term	Significant environmental impact Level 3 incident Remediable within short to medium term	Major environmental impact Level 4 incident Remediable short, medium or long term	Catastrophic environmental impact Level 5 incident Remediable short, medium or long term
(D) Damage / Loss-business interruption		No disruption to operation / <R75K	Brief disruption to operation / R75K – R1m	Partial shutdown / R1m – R10m	Partial loss of operation / R10m – R500m	Substantial or total loss of operation / <R500m
(R) Reputation – Community / Government / Media		Slight impact – public awareness may exist but no public concern	Limited impact – local public concern	Considerable impact – regional public concern	National impact – national public concern	International impact – international public attention
Likelihood / Probability	Guideline	Risk Rating				
5 Almost Certain	Daily	11 (M)	16 (M)	20 (H)	24 (H)	25 (H)
4 Likely	Weekly	7 (L)	12 (M)	17 (M)	22 (H)	23 (H)
3 Possible	Quarterly	4 (L)	8 (M)	13 (M)	18 (M)	21 (H)
2 Unlikely	6 monthly	2 (L)	5 (L)	9 (M)	14 (M)	19 (H)
1 Rare	Yearly	1 (L)	3 (L)	6 (L)	10 (M)	15 (M)
Guidelines for risk rating outcome						
Risk Rating	Risk Level					
19 to 25	(H) – High	Escalate to a higher level and implement specific action plans				
8 to 18	(M) – Medium	Proactively manage via appropriate management system				
1 to 7	(L) – Low	Monitor and manage as appropriate via management system				

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
		Could have adverse effects depending on the emergency.	A list of emergency contact numbers must be available for use by the personnel; Two-way radios must be available for use at all times.				List of emergency contact numbers available; Two radios shall be available. Correct PPE to be worn			
Driving inside the port	Driving on uneven Roads. Excessive speeds/ Driving Recklessly. Fatigue. Other vehicles driving unsafely. Dust. Slow moving plant. Traffic congestion Material Transport and Traffic Management	Severe Injuries (broken bones, lacerations, etc) Death. Dust being inhaled/ getting in eyes. Dust obscuring the drivers view while driving. Damage to Vehicles, Equipment/ Property. Vehicle Collision and Damage Hydrocarbon Spills cause ground water, rivers and water way contamination. Hydrocarbon Spills Creating Slippery Road surfaces. Motorist collisions with slow moving plant. Vehicle accident-causing death or serious injury and Property damage.	All Drivers Licences must be valid in order to drive any vehicle. All drives are to be warned about the road conditions. All passengers are to remain seated at all times with seatbelts fastened. At no time will passengers be allowed to ride on the back of an open van, truck or trailer. Riding on Plant will not be permitted. Drivers are to be wide awake and should not be allowed to	5	3	15	Detailed risk assessment and training on RA; toolbox talks; supervision; Constant reinforcement and specific instructions to operators and drivers; Certificates of competency of the operators and driver to be on file; Valid medical certificates on file; Operator appointment on file. Plan task observations Written Safe Work Procedures to be followed Helps to avoid collision with object, vehicle and personnel Reduces the risk of impact injury occurring Will make others aware of the presence of danger	1	3	3

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
		Collision of construction vehicles or heavy-duty plant and people and or construction vehicles or heavy-duty plant to construction vehicles or heavy-duty plant	<p>drive if they are feeling tired or sleepy. Regular breaks</p> <p>Drivers need to be aware of weather conditions and how it affects the handling of vehicles on the road. Allowance for an advanced driving course for drivers would be ideal.</p> <p>Recommended to have an alternative driver available to share driving time (where required on long commutes).</p> <p>Do Not exceed Speed Limits, and ensure speeds are kept to a safe limit giving the driver enough time to make an emergency stop (i.e. drive to the conditions, not to the speed limit of the road, and keep your distance from the vehicle in front of you using the 2-3 second rule). Keep to safe speed limit when driving on site.</p> <p>Drivers are to drive a safe distance away from the roads</p>				Supervision shall sign off inspection registers on construction vehicles or heavy-duty plant			

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
			<p>edge to avoid the vehicle losing control</p> <p>If visibility is impaired your headlights must be on to see and to be seen.</p> <p>Vehicles must have Warning Triangles and reflective vests in the event of a breakdown.</p> <p>All Vehicles and Plant must be regularly serviced and in good working order.</p> <p>Inspection Records must be kept for all vehicles and plant.</p> <p>All workers, Drivers and Operator must have a valid Medical</p> <p>No drivers/Operators to be under the influence of alcohol or drugs of any kind.</p> <p>Construction vehicles or heavy duty plant to be fitted with reverse alarm, flashing alarm and amber beacon</p>							

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
			<p>"Construction Vehicle" Sign to be placed on rear of vehicle.</p> <p>Flagman to be posted at work area to facilitate access and egress</p> <p>Construction vehicles or heavy-duty plant to use agreed routes and traffic management plan is adhered to</p> <p>Construction vehicles or heavy-duty plant to be banked at all times while on site. Loading or unloading</p>							
Driving underneath overhead powerlines	Electrocution from overhead powerlines/Property damage	Electrocution Tyre explosion	Install height indication signs at a distance on approach side of the powerline	5	3	15	<p>Detailed risk assessment and training on RA; toolbox talks; supervision; Constant reinforcement and specific instructions to operators and drivers; Certificates of competency of the operators and driver to be on file; Valid medical certificates on file; Operator appointment on file.</p> <p>Plan task observations</p>	1	3	3

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
							<p>Written Safe Work Procedures to be followed</p> <p>Direct supervision when machinery needs to pass underneath lines. Pre measurement of load to be done.</p> <p>Instruct Drivers not to disembark or touch metallic parts when contact occurs with power line. Warn bystanders to stand clear - safe distance (tyre explosions)</p>			
Carrying out tasks on site requiring specific Personal Protective Equipment to be worn.	Incorrect or no Personal Protective Equipment worn.	Persons not wearing the correct Personal protective Equipment Can result in serious injuries or death.	<p>The following Personal Protective Equipment must be issued to all personnel and worn when on site:</p> <p><u>Hard hats</u> to prevent head injuries from falling objects;</p> <p><u>Safety boots</u> to protect against falling Objects, ground conditions, slippery surfaces etc.;</p> <p><u>Eye Protection</u> appropriate for the task;</p> <p><u>Gloves</u> appropriate for the task; <u>Reflective vests</u> for visibility;</p> <p><u>Ear protection</u>: for noise</p> <p><u>Safety Harnesses</u> for fall protection; <u>Any other</u></p>	4	3	12	<p>Detailed risk assessment and training on RA; toolbox talks; supervision.</p> <p>Personal Protective Equipment (P.P.E) Requirements Matrix; Record of P.P.E issued to Personnel;</p> <p>Record of training on the correct use of the P.P.E.</p> <p>Written Safe Work Procedure</p>	1	3	3

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
			P.P.E which may be required.							
Use of Hand Tools	Using tools which have the potential to cause injury.	Possible serious injury if used incorrectly.	Only trained competent persons with the knowledge in the use, limits and hazards pertaining to a specific tool may work with the tools; Workers trained on the correct use of personal protective equipment issued for use with the tools; Regular inspections carried out to ensure the tools are in a good condition, safe to work with and used properly.	2	3	6	Detailed risk assessment and training on RA; toolbox talks; supervision; Only trained competent persons to have access to the tools; Tools on register and checked on a regular basis; visually inspect tools for damage before use; Inspection registers Plan Task Observations Written Work Safe Procedures	1	2	2
Use of Portable Electrical tools.	Using portable electrical tools which have the potential to cause injury. Insufficient or poor quality portable electrical tools. Unsafe portable electrical tools due to broken switches, damaged cables, plugs and missing machine guards.	Possible injury, electrical shock or electrocution if used incorrectly. Possible injury, electrical shock or electrocution due to failure or incorrect/ unsafe use of tools.	Only trained competent persons with the knowledge in the use, limits and hazards pertaining to a specific portable electrical tool may work with the tools; Workers trained on the correct use of personal protective equipment issued for use with the tools; The person using the portable electrical tool must ensure it is in a safe working condition.	2	3	6	Detailed risk assessment and training on RA; toolbox talks; supervision; Only trained competent persons to have access to the portable electrical tools; Portable electrical tools on register and checked on a regular basis; Portable electrical tools visually inspected for damage before use.	1	2	2

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
			The correct good quality portable electrical tools for the job must be available for use; Only trained competent persons with the knowledge in the use, limits and hazards pertaining to a specific portable electrical tool may work with the tools; Workers trained on the correct use of personal protective equipment issued for use with the tools; The person using the portable electrical tool must ensure it is in a safe working condition.				Only the correct good quality portable electrical tools for the job must be available for use on site; Only trained competent persons to have access to the portable electrical tools; Plan Task Observations Written Work Safe Procedures			
Using of flame cutting torches	No hot work permit No pre start checklist Not wearing proper PPE, resulting in burns Untrained workers, not competent No supervision No firefighting equipment / person trained Cylinders not standing upright on a trolley and chained up No soap leak test	Injury to person Burns Damage to property Fires	Hot work permit to be obtained before any hot work commences Cutter is to inspect gas cutting torch daily before commencing with work. Checklist to be completed. PPE to be used: full face shield with dark safety glasses, hard hat, leather gloves, apron, spats, shoulder pieces, safety boots and flame retardant overall. Ensure appointments are in order and cutters are competent Ensure proper continuous supervision is done by the appointed site supervisor in the work area Ensure suitable fire	3	3	9	Detailed risk assessment and training on RA; toolbox talks; supervision; Only trained, certified, competent persons to use flame cutting torches Records of training on use of a flame cutting torch on file; Plan Task Observations Written Work Safe Procedures Permit	1	2	2

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
			extinguishers are available and a trained fire fighter is available at all times monitoring the work Cutters to ensure gas cylinders are always on trolleys and chained up Soap leak test be on torches Flash back arrestors to be on torch and cylinders							
Using of ladders.	Defective ladders; ladders used by workers not trained in the safe use and maintenance of ladders; unsafe placing, climbing or securing of ladders; using the wrong ladder for the job; using ladders in unfavourable weather conditions; work done from a ladder.	All potential hazards can result in serious injuries or Fatality. Injury to person Falling from ladder Falling tools	Only ladders in compliance with MHSA may be used and used in the manner as set out in the regulation; No homemade ladders are allowed on site; Only workers trained in the safe use and maintenance of ladders are allowed to use ladders; ladders must be numbered and listed in a register; ladders must be inspected on a scheduled basis by an appointed competent person who has the training and the knowledge on the safe use and maintenance of ladders in compliance with MHSA and the results of the findings recorded in the register; damaged ladders which cannot be repaired must	3	3	9	Detailed risk assessment and training on RA; toolbox talks; supervision; Only trained competent persons to have access to the portable ladders; Records of training on use of ladders on file; Ladder inspection registers. Plan Task Observations Written Work Safe Procedures	1	2	2

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
			be cut up and discarded; before using a ladder, the person trained in the use of ladders who is going to use the ladder, must inspect the ladder to ensure that it is safe to use; Ladders must not be used in inclement weather conditions; both hands to be used to climb the ladder; Carry tools in a tool bag that's secured to the waist; The ladder must always be secured when used, either by tying the top end of the ladder to the structure with a rope or being held in position by another person; The ladder must where possible ,always protrude 900mm past the working platform; Where work is to be carried out whilst standing on a ladder, a safety harness must be used anchored to a point above the point of work; place a ladder so that its feed is a quarter of its own length from the object it is resting against; Only wooden ladders or ladders specifically constructed for the purpose should be used							

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
			where there is a danger of coming into contact with electricity.							
Manual Handling.	Lifting heavy loads i.e. picking up material, heavy tools or equipment. Loads with sharp edges/corners Wrong posture when lifting/placing down items	Employees could injure their backs when picking up heavy loads on their own. Sharp edges and corners could cause lacerations to hands and other body parts Employees that pick items up with their legs straight and back bent can sustain serious back and muscle injuries.	Employees must never pick up anything that is too heavy for one person. If they battle to lift an item, they must get assistance. Where possible mechanical lifting equipment. must be used to pick up heavy equipment. Load to be inspected before lifting to check for sharp edges and corners. To wear leather gloves when picking up equipment and materials to protect against hand injuries. Employees must ensure that they keep their back straight and bend their knees when they lift any load, this prevents strain on the lower back. Physical demonstrations should be given to all employees.	2	3	6	Detailed risk assessment and training on RA; toolbox talks; supervision; Constant reinforcement and specific instructions to employees; Plan Task Observations Written Work Safe Procedures	1	2	2

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
Hazardous Chemicals and Flammable Liquids used on site.	Exposure to source of ignition; inhaling vapours / fumes; contact with the skin; accidental ingestion; Chemicals splashing into eyes; spillage of chemicals on ground and in water.	Fire or explosion when ignited; respiratory irritation from fumes and vapours which can cause injuries to the respiratory system, dizziness, nausea and loss of consciousness if inhaled constantly. Irritation and possible skin disorders like Dermatitis, infection, allergy and poisoning when skin is exposed constantly to chemicals; low viscosity material if swallowed may enter the lungs and cause lung damage; eye injuries from chemicals splashing into the eyes; Ground and water pollution.	Keep flammable liquids away from high energy ignition sources, heat, sparks, pilot lights, static electricity and open flames; Avoid skin contact with chemicals by wearing PVC gloves; Wear respirators if exposed to the inhalation of vapours or mists; Use chemicals in a well ventilated area away from all ignition sources; no smoking or open flames in close proximity of flammable liquids; firefighting equipment must be available at the point of storage and use of flammable chemicals; flammable substances must be stored separately from other materials in a well ventilated area with a bund wall to contain leaks or inside a flammable liquid cage specific for that purpose with suitable warning signs displayed; Do not ingest any chemicals; wear splash goggles when handling chemicals; Eye wash to be available; Workers trained on the correct use of personal	3	3	9	Detailed Risk Assessment; Training on MSDS sheets; Toolbox talks; MSDS Sheets available for all chemicals; Constant Supervision and Reinforcement of Preventative Action; Proper storage facility for chemical and the necessary warning signs displayed; Hazardous Chemical substances Co-ordinator appointed in writing; PPE registers Plan task observations Written safe work procedures to be followed	1	2	2

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
			protective equipment issued; Material Safety Data Sheets available for all Hazardous chemical substances; Spill kit to be available; Hazardous Chemical substances Co-ordinator to be appointed in writing.							
Stacking and Storage.	Unstable stacking and storage	Collapsing stack and material falling off the stack can fall on employees resulting in multiple injuries; damaging of stored items.	Competent person appointed in writing with the duty to supervise all stacking on site; Demarcated storage area; Stacking area must be stable and levelled to avoid material falling;				Supervision by a competent person appointed in writing; Constant reinforcement; Toolbox talks. Maintain clear access route Display safety information signs Allow people to know of possible dangers and safe walkways Plan task observations			
	Stacking material of different sizes, shape and mass together	Collapsing stack and material falling off the stack can fall on employees resulting in multiple injuries; damaging of stored equipment.	Storage area must be kept neat and under control. Competent person appointed in writing with the duty to supervise all stacking on site; Demarcated storage area; Stacking area must be stable and levelled to avoid material falling;	2	5	10		1	4	4
	Stacking exceeding 3m in height.	It can cause material to fall and serious injuries and damage to equipment can occur	Storage area must be kept neat and under control. Material of the same size, shape / mass must be stacked and stored together to avoid the material falling. Competent person appointed							

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
			in writing with the duty to supervise all stacking on site; Demarcated storage area; Stacking area must be stable and levelled to avoid material falling; Storage area must be kept neat and under control; Total height of stack must not exceed a certain height to avoid material from falling onto the ground.							
Operating cherry pickers. (Mobile Elevated Work Platform)	Incompetent operator.	Improper operation can cause the cherry picker to strike structures, other equipment or other persons which can result in serious injuries or death to the operator, assistant worker or other persons struck by the platform, boom or moving cherry picker and also damage to the machine and/or property.	Only certified competent, medically fit and legally appointed employees may operate mobile plant and construction vehicles; Cherry picker must be operated by a trained and competent person who has been appointed in writing by the employer in compliance with the MHSA Unauthorised persons must not operate the cherry picker on site at all; Certificates of competency of the operators Must be filed in the safety file on site	4	3	12	Detailed risk assessment and training on RA; toolbox talks; supervision; Constant reinforcement and specific instructions to operators; Certificates of competency of the operators on file; Valid medical certificates on file; Operator appointment on file. Plan task observations Written safe work procedures to be followed	1	2	2
Working at Heights and Elevated Positions.	Not wearing safety harnesses / safety harnesses not secured; Taking an	Severe injury or even death when falling from an elevated position. Severe injuries or even	Training on the Fall Protection plan Training on the correct use of safety harnesses and fall	4	3	12	Training of the fall protection plan Detailed risk assessment and training on RA; toolbox talks; supervision; Constant	1	2	2

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
	unsafe position whilst working in an elevated position. Improper identification and issuing of Personal Protective Equipment requirements resulting in slipping and falling; improper head, hand and eye protection. Open edges on decks / platforms.	death. Employees could walk off or be accidentally bumped off an open edge	arrest equipment; ensuring that trained competent persons are carrying out the work and understand the hazards of working at height; always use the 100% tie off method while moving around at height. Survey to be carried out to identify PPE requirements; issuing of correct PPE as identified i.e., safety shoes, hardhat, overall, gloves, safety glasses, safety harnesses with dual lanyards; Workers trained in the correct use of PPE issued; record of all training to be kept on file; record of PPE issued to be kept on file; safety harness inspector to be appointed. Open edges are not allowed on site, all open edges that are created must immediately be barricaded with solid barricading and made visible to prevent anyone from falling over, If employees are required to work on an open edge then they need to wear a harness and attach it to a life line.				reinforcement and specific instructions to employees; Daily pre-inspection to be carried out; training on the correct use of a safety harness and fall arrest equipment on file. Competent to do the job; Monthly safety harness register to be completed. Training on the correct use of PPE on file; record of PPE issued on file; Plan task observations Written safe work procedures to be followed .			

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
Key controls for equipment and lock out procedures	Unauthorized personnel operating mobile plant / construction vehicles.	Causing accidents involving people, other mobile plant and construction vehicles, existing structures causing serious injuries, fatalities or damage.	Operators to return keys to the site manager at the end of the shift A key control register shall be implemented for issuing and returning keys Lost keys to be reported to the site supervisor	3	4	12	Key control register Lock out procedure Constant reinforcement and specific instructions to operators; Toolbox talks; Planned maintenance programme; Plan task observations Written safe work procedures to be followed	1	3	3
Operation of mobile plant / construction vehicles.	Untrained operators operating mobile plant and construction vehicles. Poor condition of mobile plant and construction vehicles.	Causing accidents involving people, other mobile plant and construction vehicles, existing structures causing serious injuries, fatalities or damage. Spillages resulting in ground contamination. Failure of mobile plant and construction vehicles can result in injury to the operator, other workers, damage to mobile plant, or structures. Oil leaks resulting in ground contamination.	Only trained certified competent, medically fit and legally appointed employees may operate mobile plant and construction vehicles; Certificates of competency of the operators Must be filed in the safety file on site. Ensure that all plant is maintained, and records thereof kept; A planned maintenance schedule must be followed, and operators must record daily inspections and report deviations immediately to the supervisor.	3	4	12	Detailed risk assessment and training on RA; toolbox talks; supervision; Constant reinforcement and specific instructions to operators; Certificates of competency and appointments and medical certificates of the operators on file. Toolbox talks; Supervision; Planned maintenance programme; Daily inspection checklists on construction vehicles or heavy-duty plant Plan task observations	1	3	3

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
							Written safe work procedures to be followed			
Using of mobile crane	<p>Incompetent operator</p> <p>No inspection done on mobile crane</p> <p>No inspection done on lifting equipment</p> <p>Uneven ground, Bad rigging practices.</p> <p>Employees/visitors struck by swinging load.</p> <p>Operator not compliant to site PPE standards</p> <p>Not using guide ropes.</p> <p>Unauthorized personnel operating mobile plant / construction vehicles.</p>	<p>Damage to property, injure other workers</p> <p>Defects found, crane failure</p> <p>Defects found, chains snap</p> <p>Mobile crane capsizing</p> <p>Multiple injuries, death</p> <p>Injury to operator</p> <p>Load swings</p> <p>Standing and working under, suspended load.</p>	<p>Competent, Appointed and certified mobile crane operator is to operate mobile crane</p> <p>Operator is to an inspection on the mobile crane and complete a daily inspection register</p> <p>All chains and shackles to be inspected before lifting and a lifting equipment register to be completed by a appointed rigger</p> <p>Ground must be graded level / sleepers or dunnage must be placed underneath the out riggers.</p> <p>Employees/visitors to be instructed to keep a safe distance during lifting and offloading of the containers</p> <p>Operator is to wear the necessary PPE required for the task being done</p>	4	3	12	<p>Continuous Risk Assessment training; toolbox talks; supervision; Constant reinforcement and specific instructions to operators; Certificates of competency and appointments and medical certificates of the operators on file.</p> <p>Toolbox talks;</p> <p>Supervision;</p> <p>Planned maintenance programme;</p> <p>Daily inspection checklists on mobile crane</p> <p>Plan task observations</p> <p>Written safe work procedures to be followed</p> <p>Key control register</p> <p>Lock out procedure</p>	1	2	2

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
			<p>Rigger assistants shall be supervised by the rigger and shall be equipped with leather hand protection when slinging loads.</p> <p>Guide ropes to be in place to prevent container getting out of control.</p> <p>No lifting to take place if the high wind exceeds and inclement weather.</p> <p>Task specific PPE to be worn at all times (Chrome rigger gloves, overalls, reflector vest, safety boots, hard hat etc.)</p> <p>No persons to stand under suspended load.</p> <p>In the event of an emergency, the operator shall ensure that the load is carefully brought down to ground level (where possible) and that the crane is completely isolated.</p> <p>Operators to return keys to the</p>							

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
			<p>site manager at the end of the shift</p> <p>A key control register shall be implemented for issuing and returning keys</p> <p>Lost keys to be reported to the site supervisor</p>							
Manual and mechanical Demolition of buildings	<p>Debris falling onto employees; Debris / Building material laying all over</p> <p>Weakened structures falling over onto employees.</p> <p>Exposure to excessive noise during demolition.</p> <p>Possible exposure to live electricity.</p> <p>Possible exposure to sewage system.</p>	<p>Debris could fall through openings or over edges onto employees causing multiple injuries;</p> <p>Employees could trip and fall sustaining multiple injuries;</p> <p>Multiple injuries / death</p> <p>Excessive noise could cause hearing loss over a period of time.</p> <p>Employees could be shocked or electrocuted by live electrical cables.</p> <p>Employees can be exposed to health hazards; Ground or water contamination.</p> <p>Dust pollution</p>	<p>All areas where debris can possibly fall from heights to lower levels must be barricaded and controlled.</p> <p>Housekeeping must be done on a daily basis and access ways kept clear from obstructions. Appropriate and safe methods of removing the material should be followed (rubble chute);</p> <p>Overalls, hardhats, safety boots, eye protection, ear protection and dust masks must be worn by employees.</p> <p>Watering down of the area is also required to minimize dust clouds created on site</p> <p>Competent person appointed in writing to supervise demolition work.</p>	5	5	25	<p>All employees taking part in the demolition and all employees working around the demolition area must be trained in the method statement / risk assessment and safe work procedure before commencing with the activity to ensure that all understand what is expected of them. A register of attendance must be signed by all employees.</p> <p>PPE register;</p> <p>Competent person appointed in writing to supervise demolition work.</p> <p>Toolbox Talks;</p> <p>Structure declared safe before commencing with the demolition operations.</p>	1	3	3

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
			<p>Snow netting must be used to barricade demolition area with signage posted up in strategic positions to ensure no unauthorised entry,</p> <p>Supervision must be present at all times to ensure that employees work according to the method statement drawn up for the specific demolition;</p> <p>Any unstable walls need to be covered with timber sheets and propped to ensure that it does not fall over onto employees;</p> <p>Props / supports may only be removed on the Site Managers / Engineers instruction;</p> <p>Demolition must take place under strict supervision and management's instruction</p> <p>Correct and safe to use tools to be used; Employees must be trained in the use of these tools;</p> <p>Competent person appointed in writing to supervise demolition work.</p> <p>The area must be declared a noise zone and appropriate signage must be erected. All services and</p>				<p>Daily Demolition Inspection Checklist</p> <p>Isolation / lock out of electricity and water</p> <p>Plan task observations</p> <p>Written safe work procedures to be followed</p>			

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
			their locations must be identified and blanked off or de-energised before demolition may commence. All services and their locations must be identified and blanked off before demolition may commence. Survey to be carried out to determine if there is any asbestos present anywhere in or on the structure to be demolished; If there is any doubt regarding the contents of the materials i.e. cement based roofing sheeting, piping insulations etc., samples to be send away for analysis; No demolition of the structure to take place until it is declared safe Compliance with the OHSA							
Loading and hauling of rubble	Truck driver not competent, appointed or inducted. Excessive Dust. Flying debris particles coming into contact with workers eyes.	Crushing of employees Tipping of vehicle Contact with overhead services Falling objects	Truck Drivers to be appointed, have valid certification and license and inducted before commencement of work. Watering down of the area is also required to minimize dust clouds created on site. Dust	5	3	15	Detailed risk assessment and training on RA; toolbox talks; supervision; Constant reinforcement and specific instructions to operators; Certificates of competency and appointments and medical	1	3	3

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
	No housekeeping. No flagman guiding the drivers. Environmental - oil spills. Truck overloaded. Collisions with other construction vehicles or heavy duty plant No inspection done on construction vehicles or heavy-duty plant		mask to be worn by all the employees working in that area Safety eyewear to be worn at all times. Ensure all tripping hazards are minimized on site to prevent people falling. Housekeeping to be maintained. Supervision to ensure that a flagman is assisting the driver and controlling the traffic movement at all times Drip tray to be utilized in case of an oil spill. Drip tray to be placed beneath the mobile plant at the end of the shift. Supervisor to ensure trucks are not overloaded when departing the work area Flagman to assist the truck driver when departing the work area and also the control traffic. Mobile Plant operators and truck drivers to ensure a daily pre inspection on the plant has been done and record onto a checklist before start of work Loading should be away from the overhead services Load to be levelled prior to and sheeted prior to leaving site Employees to wear all				certificates of the operators on file. Will keep person away from falling objects/swinging load Reduce risk of vehicle overturning Reduce risk of electrocution Supervision to monitor activity to avoid collision with objects, vehicle and personnel Plan task observations Written safe work procedures to be followed			

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
			necessary PPE on site A spotter to be based on the loading area							
Public and site visitor safety.	Unauthorised entry to the demolition work area.	Can result in serious injuries or death to members of the public. Possible damage to adjacent property	Unauthorised entry prohibited in English and in the language of the surrounding community to be displayed at conspicuous locations on the fence surrounding the demolition area; The site to be demarcated off and any other hazardous locations on site to be barricade off and warning signs displayed; Controlled access points to the demolition to be in place; Visitors to the site to undergo safety induction training before allowed to go on site; Visitors to be accompanied by employees at all time when on site.	2	3	6	Detailed risk assessment and training on RA; toolbox talks; supervision Site to be fenced off; Warning signs displayed; All hazardous locations on site fenced off; Controlled access to the site; Visitors undergoing Safety induction training; Visitors accompanied by employees whilst on site.	1	2	2
Carrying out work on site where there are poisonous reptiles, arthropods and	Poisonous Snakes, Spiders, Scorpions.	Snake bites, scorpion stings, spider can result in blood poisoning which can be very serious and even lead to death if not treated correctly and timeously.	Ensure the wearing of safety boots is enforced; The wearing of snake gaiters is recommended when walking in long grass, bushy or rocky areas;	4	3	12	Detailed risk assessment and training on RA; toolbox talks; supervision. Personal Protective Equipment (P.P.E) Requirements Matrix;	1	3	3

Activity	Hazard Identified	Risk(s)	Existing Controls	Without implementation of controls/recommendations/mitigation measures			Controls/Recommendations/Mitigation measures	With implementation of controls/recommendations/mitigation measures		
				C	L	R		C	L	R
arachnids present.			Don't attempt to approach or try to catch any of the creatures mentioned; The First Aider is to attend to the affected Person; Any person bit by a snake, stung by a scorpion or bit by a spider must receive medical attention as soon as possible; Safety talks to be carried out.				Record of P.P.E issued to Personnel; Record of training on the correct use of the P.P.E.			
Housekeeping.	Poor housekeeping and storage practises can result in various items lying around. Injury to people working around the area Poor housekeeping Loose rubble Uneven floors and ground Obstructions unguarded excavation and open edges where there is a risk of fall	Materials and paper lying around creates an untidy appearance; items lying around are tripping hazards and can cause employees to trip and fall resulting in injuries; Plastic bags when eaten by cattle can result in the animal dying; Pollution of the Environment. Slips, Trips and Falls	Housekeeping must be based on a place for everything and everything in place; Refuse bins must be available to place all waste in; Redundant material or equipment must be sorted and stored in designated areas; All workstations must be kept tidy; Employees should be trained through risk assessments and toolbox talks to practise housekeeping on a daily basis; Regular inspections by Supervisors. All waste must be removed from	2	5	10	Detailed risk assessment and training on RA; toolbox talks; supervision; Refuse bins in place; Designated storage areas; All waste removed from site. Good housekeeping to be maintained on site Maintain clear access route Display safety information signs Allow people to know of possible dangers and safe walkways Plan task observations	1	5	5

[illegible]

A.4 Baseline Risk Assessment

A.5 Asbestos Identification and Risk Assessment Report

A large, stylized graphic composed of yellow and blue geometric shapes. A large yellow triangle is positioned at the top, with its base resting on a dark blue horizontal bar. To the left of this bar is a smaller dark blue triangle. The entire graphic has a 3D effect with shadows.

Asbestos Inventory and Risk Assessment Report

2nd August 2022



APEX
ENVIRONMENTAL

QUICK REFERENCE GUIDE

Date/s of Assessment:	2 nd August 2022
Next Survey Due:	August 2024
Date Report Issued:	1 st September 2022
Project Number:	A21442
Order Number:	7265
Assessment Physical Address:	Ocean Terminal Building Complex
Client Contact/s:	Muhammed Khan
Revision:	00

APEX REFERENCES

Department of Employment and Labour AIA Number:	OH 0084-CI 034
Company Name:	Apex Environmental cc
Physical Address:	40 Beechgate Crescent, Southgate Business Park, Umbogintwini, 4126
Postal Address:	P.O. Box 2079, Amanzimtoti, 4125
Contact Details:	Tel: +27 (0)31 9141004 www.apexenviro.co.za
Your Inspector:	Mr. Byron Frankish: byronf@apexenviro.co.za P.G. Diploma in Occupational & Environmental Health (UKZN) BSoc Sci: Geography & Environmental Management (UKZN) Registered Occupational Hygiene Technologist (SAIOH) Legal Knowledge: Occupational Hygiene (Cert 7223) (DUT)
Technical Signatory:	

Apex Environmental cc, Co Reg: CK 98/44018/23 VAT Reg: No 4330176167
Members: R.W. Randolph MPH Occ.Hyg. (Wits), ROH (SAIOH); S.J. Chester MPH Occ.Hyg. (Wits), ROH (SAIOH); K. Seeram B-Tech Env.Health ROH (SAIOH)

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ATTACHED ITEMS:

- AIA APPROVAL CERTIFICATE
- SAIOH CERTIFICATE (OCCUPATIONAL HYGIENIST REGISTRATION)

LIST OF DEFINITIONS AND ABBREVIATIONS

ACM	Asbestos Containing Material
Asbestos dust	Airborne or settled dust, which contains or is likely to contain, regulated asbestos fibres.
Asbestos Removal Work	Work that exposes or is likely to expose a person to asbestos dust.
Clearance Limit	Taken as < 0.01 f/ml. This is the lowest level of detection for analysis by Phase Contrast Microscopy (PCM) HSG 248 (HSE-UK).
Exposed to asbestos	Exposed to or likely to be exposed to asbestos dust
HEPA Filter	High efficiency particulate arresting filter
OEL	Occupational Exposure Limit
OEL for asbestos	0.1 regulated fibres per cubic centimetre of air or 0.1 f/ml, averaged over a 4-hour working period, measured in accordance with HSG 248 (HSE-UK).
Regulated Fibres	Particles of asbestos with a length-to-diameter ratio greater than 3 to 1, a length greater than 5 micrometres and a diameter less than 3 micrometres.
Routine Removal Activities	<ol style="list-style-type: none"> 1) Removing fasteners attached to any Asbestos Containing Materials (ACM) or minor breaks to asbestos cement products 2) Lowering to ground, carrying, stacking, and bagging of any ACM 3) Sweeping, wiping, cleaning, or vacuuming (HEPA filter) ACM or dust likely to contain asbestos 4) Transport of ACM

1. EXECUTIVE SUMMARY

An Asbestos Identification and Risk assessment was undertaken at the Ocean Terminal Building Complex to identify and determine the quantity and condition of any asbestos containing material on this premises.

This complex is slated for demolition, with works expected to begin 2022/2023. It is important to note that some asbestos material (such as underground piping) may be present beneath the building slabs. Hidden material can pose a risk to employees/contractors performing the demolition work and members of the public (friable fibres becoming airborne). Should material be discovered in this way, demolition work should cease so that the asbestos can be properly identified, risk assessed, and safely removed.

Table 1: Summary of findings

Building	Asbestos Type	Condition	Likelihood of Disturbance	Risk Rating
L Shed	Louvres – found on parking level	Moderately Bonded	Medium Disturbance	Medium Risk
FPT	No asbestos identified.			
M Shed – Exterior				
N Shed				
N Shed – Ablutions	Roof sheeting and fascia/barge boards.	Moderately bonded	Rare Disturbance	Low Risk
9 Storey Building	Louvres above Canteen		Low Disturbance	
Ocean Terminal Building	Cement pipe of unconfirmed length. Asbestos Fascia.		Low Disturbance	
	Broken sheeting.	Poorly Bonded	Low Disturbance	Medium Risk

The recommendations presented in the tables of this report, if correctly implemented, should prevent contractors and the public in general, from exposures to regulated asbestos fibres.

2. PURPOSE

To compile a comprehensive asbestos inventory and risk assessment report that identifies the location, approximate quantity, condition, and potential health risk of any Asbestos Containing Materials (ACM) existing within the Ocean Terminal Building Complex premises, in order to satisfy the requirements of the Asbestos Abatement Regulations, 2020, in particular Regulations 4. Also, to assist SHEQ management with the information necessary to develop of an Asbestos Management Plan.

3. METHOD

A **Condition Rating** was obtained by inspecting the physical condition (friable), type and nature of these products, its use and location.

A **Probability of Disturbance Rating** was obtained by anticipating the likelihood that the asbestos containing material will be disturbed as well as the way it could be disturbed, that would result in the release of airborne fibres.

A **Risk Rating** was derived from an assessment of the overall condition of the asbestos or ACM and the likelihood that the ACM will be disturbed which would result in the release of airborne fibres. See Table 3 below.

TABLE 1: CONDITION OF ASBESTOS

1	Good	No visible damage or lichen growth
2	Moderately bonded	Low damage, a few scratches or surface marks, a few broken edges on boards, tiles etc., some lichen growth observed
3	Poorly bonded	Medium damage, significant breakage or several small areas of damage revealing asbestos fibres, significant lichen growth
4	Highly Friable	High damage or delamination, visible asbestos debris, Friable Asbestos fibres or Asbestos containing material

TABLE 2: PROBABILITY OF DISTURBANCE

A	Rare Disturbance	Inaccessible, pipework, water pipes etc.
B	Low Disturbance	Minor disturbance possibility of disturbance when gaining access and during maintenance
C	Medium Disturbance	Occasional maintenance and repairs of asbestos cement products
D	High Disturbance	Frequent handling of asbestos cement products, removing lagging for repairs or access to valves or pipework. Asbestos and asbestos containing materials in high activity areas.

TABLE 3: RISK MATRIX

Condition of Asbestos				
Probability of disturbance	Good 1	Moderately Bonded 2	Poorly Bonded 3	Highly Friable 4
A Rare Disturbance	A1	A2	A3	A4
B Low Disturbance	B1	B2	B3	B4
C Medium Disturbance	C1	C2	C3	C4
D High Disturbance	D1	D2	D3	D4

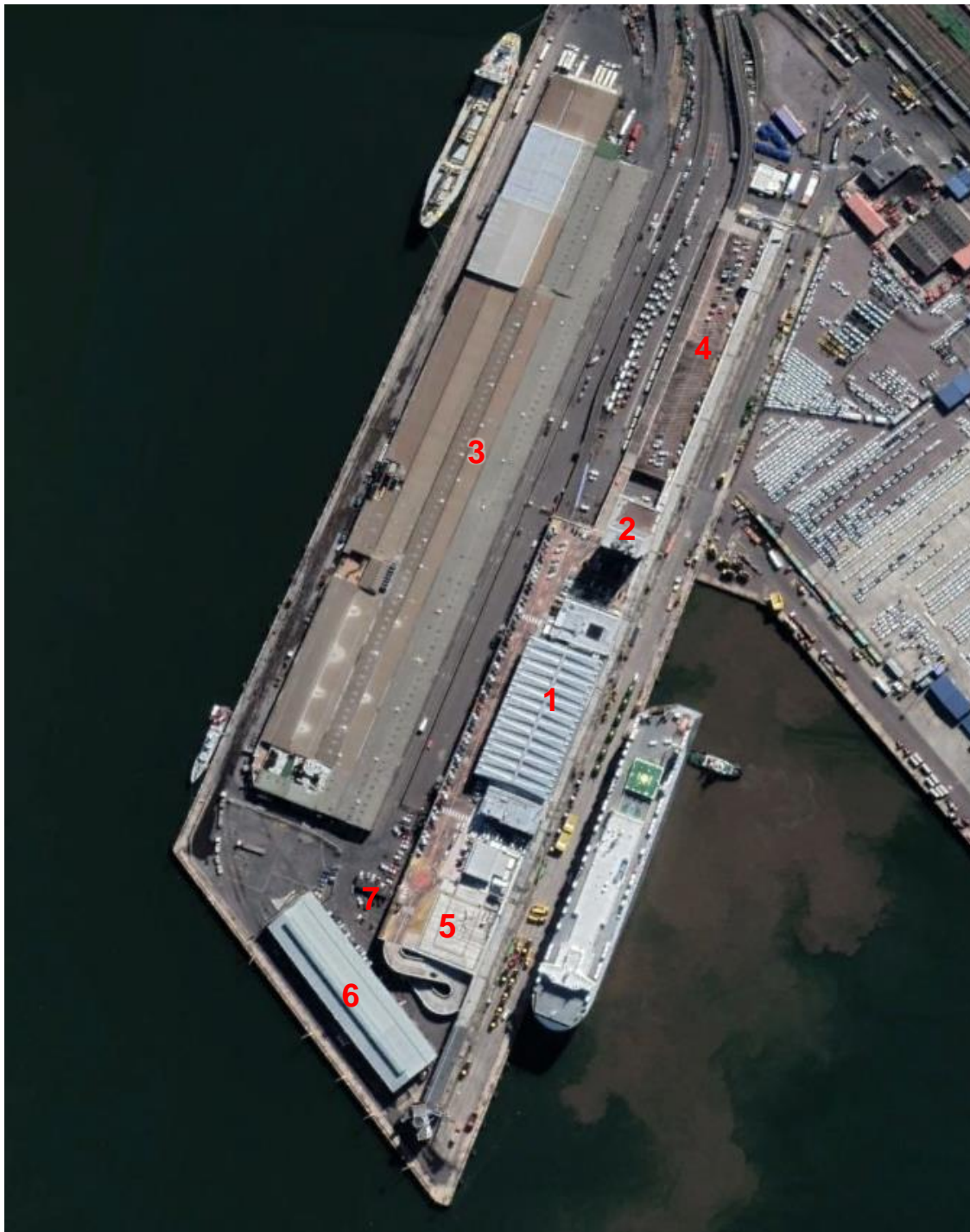
Risk Rating

High

Medium


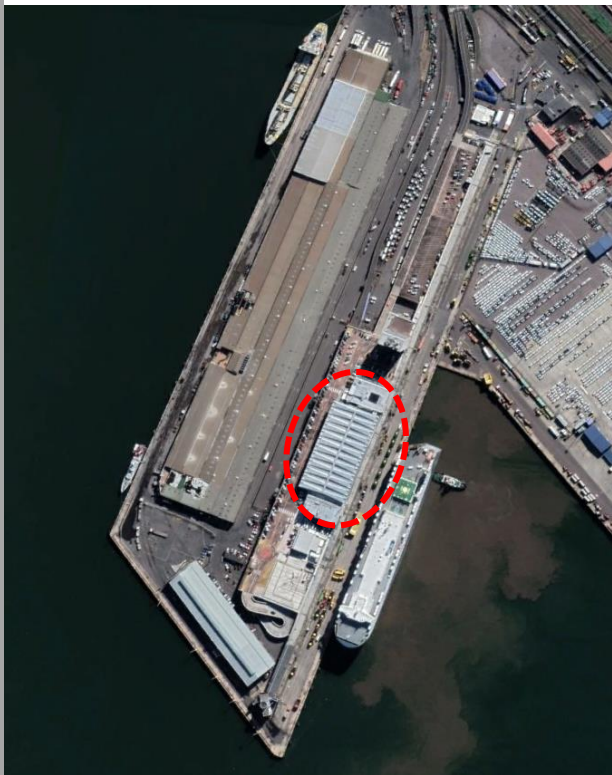
Low

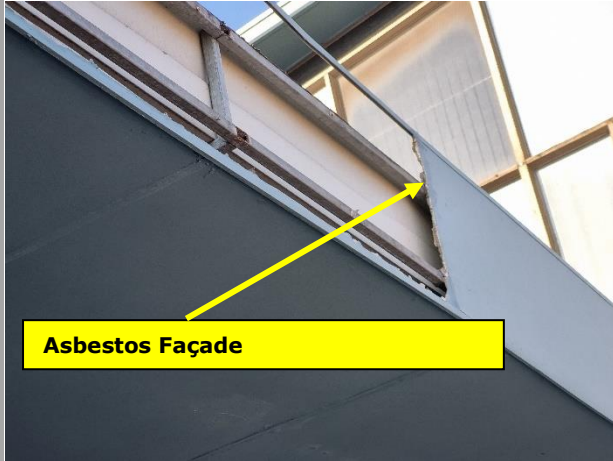
4. DEPARTMENT / WORK AREAS ASSESSED



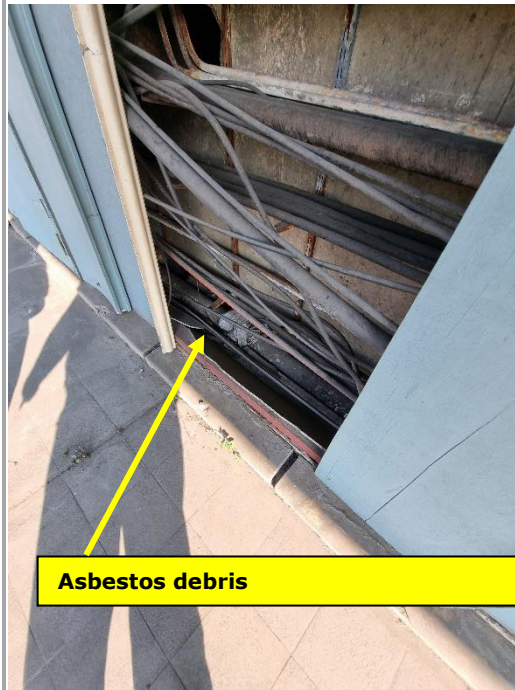
1. Ocean Terminal Building
2. 9 Storey Building
3. FPT
4. L Shed
5. M Shed
6. N Shed
7. N Shed Ablutions

5. FINDINGS

Department / Building name:	Ocean Terminal Building				
Location of Asbestos:	Material Type:	Approximate Quantity in m ² / LNM (Linear Metre):	Condition of Asbestos:	Probability of Disturbance:	Risk Rating:
Along wall	Asbestos containing Pipe	Unknown, suspected 200LNM	Well bonded	Rare	A1
Façade Boards	Asbestos containing Façade Boards	<10 LNM	Poorly Bonded		A3
Asbestos Debris	Broken pieces of Asbestos cement board	<10 m ²	Poorly bonded	Low	B3
Observations:					
1) ACM is not sign-posted / labelled as recommended in the Asbestos Abatement Regulations, 2020. 2) Length of pipe could not be quantified. It is suspected that this pipe connects the Ocean Terminal Building to the 9-Storey Building for plumbing purposes.					
Recommendations:					
1) If possible, leave undisturbed.					
					
<div>Asbestos Cement Pipe</div>					


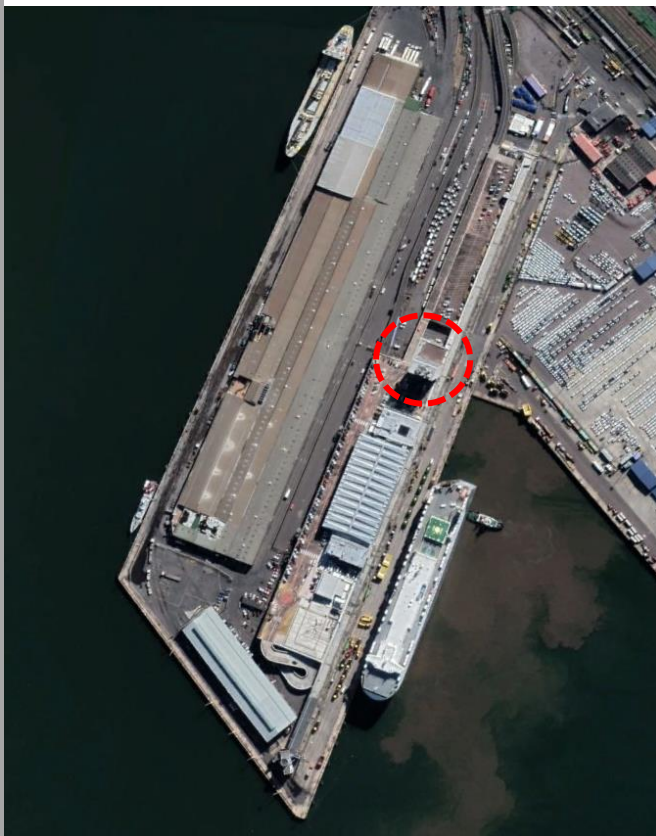


Asbestos Façade

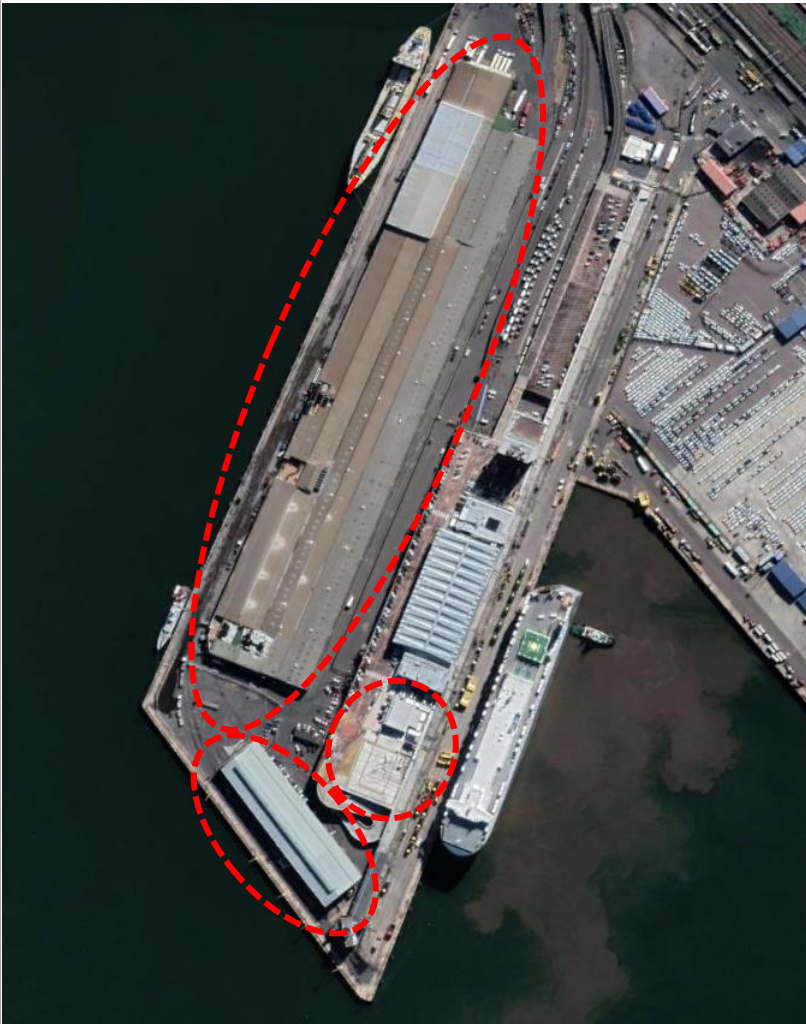


Asbestos debris


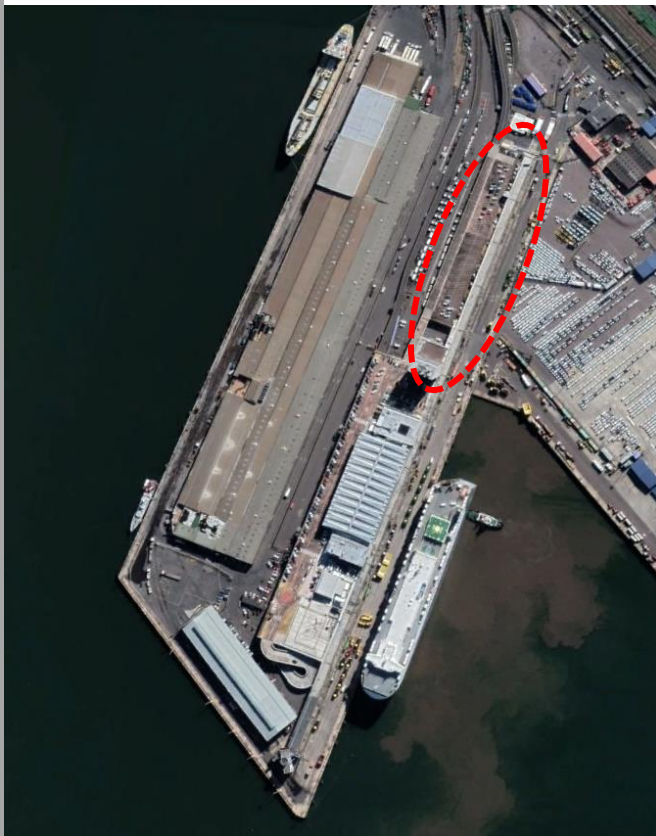
5. FINDINGS (CONTINUED...)

Department / Building name:	9 Storey Building				
Location of Asbestos:	Material Type:	Approximate Quantity in m² / LNM (Linear Metre):	Condition of Asbestos:	Probability of Disturbance:	Risk Rating:
Side louvres – Above Canteen	Asbestos containing Louvres	80m ²	Moderately Bonded	Rare	A2
Observations:					
ACM is not sign-posted / labelled as recommended in the Asbestos Abatement Regulations, 2020. Some damage to louvres observed (see photo below)					
Recommendations:					
If possible, leave undisturbed. Affix signage in a conspicuous location, refer to Annexure 1 for signage requirements.					
 <p>Asbestos Containing Louvres</p>					

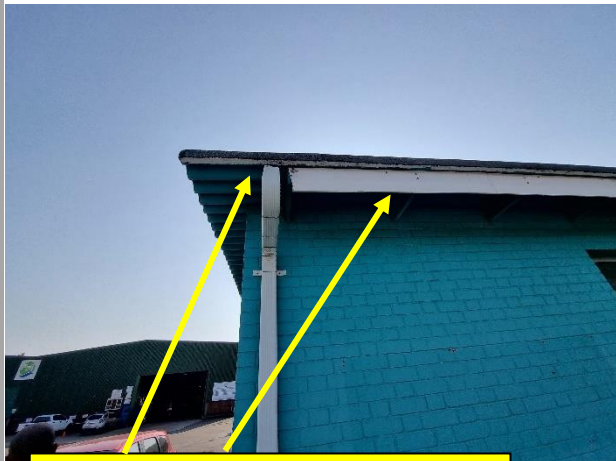
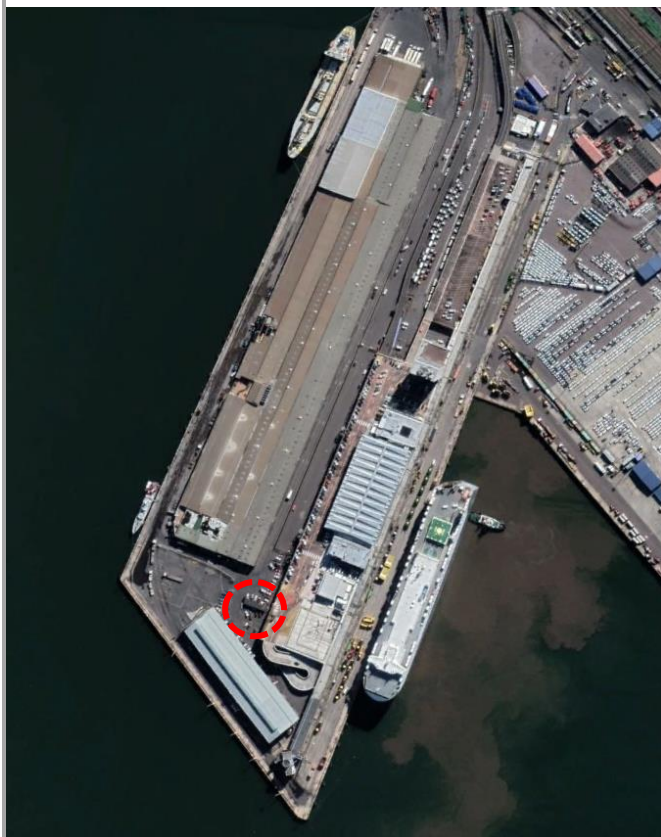
5. FINDINGS (CONTINUED...)

Department / Building name:	FPT, M Shed, N Shed				
Location of Asbestos:	Material Type:	Approximate Quantity in m ² / LNM (Linear Metre):	Condition of Asbestos:	Probability of Disturbance:	Risk Rating:
No Asbestos material was found on these buildings.					
					

5. FINDINGS (CONTINUED...)

Department / Building name:	L Shed				
Location of Asbestos:	Material Type:	Approximate Quantity in m² / LNM (Linear Metre):	Condition of Asbestos:	Probability of Disturbance:	Risk Rating:
Side louvres –	Asbestos containing Louvres	140 LNM	Poorly to Moderately Bonded	Medium Disturbance	C3
Observations:					
ACM is not sign-posted / labelled as recommended in the Asbestos Abatement Regulations, 2020. Some damage was noted on some of the louvres.					
Recommendations:					
If possible, leave undisturbed. Replace broken pieces with non-asbestos containing material. Affix signage in a conspicuous location, refer to Annexure 1 for signage requirements.					
					
Asbestos Containing Louvres					

5. FINDINGS (CONTINUED...)

Department / Building name:		N Shed - Ablutions			
Location of Asbestos:	Material Type:	Approximate Quantity in m ² / LNM (Linear Metre):	Condition of Asbestos:	Probability of Disturbance:	Risk Rating:
Roof	Corrugated Asbestos Cement Sheets	90m ²	Well to Moderately Bonded	Rare	A2
Fascia/Barge Boards	Asbestos containing Fascia Boards	40 LNM			A2
Observations:					
ACM is not sign-posted / labelled as recommended in the Asbestos Abatement Regulations, 2020.					
Recommendations:					
If possible, leave undisturbed. Affix signage in a conspicuous location, refer to Annexure 1 for signage requirements.					
 <div>Asbestos Containing Barge Boards and sheeting</div>					

6. PROHIBITIONS

Regulation 24 of the Asbestos Abatement Regulations, 2020, list the following as prohibitions.

No person may –

- a) sell, donate, reuse, reinstall or recycle any asbestos or asbestos containing materials.
- b) clean or prepare surfaces of asbestos cement materials;
- c) temporarily store any asbestos or asbestos-containing materials for longer than three months after completion of asbestos removal work, before final disposal;
- d) temporarily store asbestos-containing materials destined for disposal, which are uncovered or unprotected or stored in a manner that may contaminate ground or water systems or may cause the release of asbestos dust;
- e) use compressed air or permit the use of compressed air to remove asbestos dust from any surface or person;
- f) use electrical power tools, such as angle grinders, or any other fast-moving equipment to cut, grind or drill asbestos-containing materials.

7. LIMITATIONS

- 7.1 Positive identification of asbestos can only be confirmed by the analysis of a representative sample using a microscope. However, it is internationally accepted that an experienced asbestos surveyor should be able to make an informed presumption that a material may contain asbestos, or alternatively, does not. These presumptions are made based on their knowledge and experience of likely asbestos products together with indications such as surface texture, appearance and hardness. In the absence of any analytical or other evidence to support a reasoned argument that they are highly unlikely to be an ACM, then the material must be presumed to contain asbestos “default position.”
- 7.2 Recommendations in this report are made in good faith. The final responsibility lies with management to ensure the correctness and suitability of these recommendations. Apex Environmental shall not in any way be liable for any loss suffered by the client because of such recommendations/observations.
- 7.3 This survey does not include any asbestos (such as piping) that may be hidden beneath concrete flooring/underground or within walls. Apex Environmental takes no responsibility for the under-reporting of this asbestos, as it is the duty of the owner/landlord to ensure that all asbestos is correctly identified. During demolition, it is acknowledged that this material may be uncovered during the demolition process. In that instance, the Identification and Risk Assessment will need to be updated to include the new findings.

8. CERTIFICATION STATEMENT

This is to certify that the attached report has been compiled and issued under the authority, direction, and the responsibility of an Apex Occupational Hygienist.

9. REPRODUCTION OF REPORTS

This report may not be reproduced, except in full, without the written approval of an Apex Occupational Hygienist.

10. IN-HOUSE DOCUMENT CONTROL

Document No.:	APEX-RT-006
Compiled by:	Robert Randolph
Approved by:	Sean Chester
Revision No:	008
Document date:	5 th July 2021

11. ANNEXURE 1: ASBESTOS WARNING SIGNS

11.1 Asbestos Warning Sign





employment & labour

Department:
Employment and Labour
REPUBLIC OF SOUTH AFRICA

National Department of Employment and Labour Republic of South Africa

APPROVED INSPECTION AUTHORITY

Registered in accordance with the provisions of the Occupational Health and Safety Act, Act 85 of 1993, as amended.

This is to certify that:

APEX ENVIRONMENTAL CC

has been approved by the Department of Employment & Labour as a Type A, Approved Inspection Authority: Occupational Health and Hygiene under the following regulations:

- Asbestos Abatement Regulations 4(2), 5(7), 13, 15(2)(c), 16 & 22
- Hazardous Chemical Agents Regulations 6 & 12.
- Lead Regulations 7 & 14.
- Noise Induced Hearing Loss Regulation 7

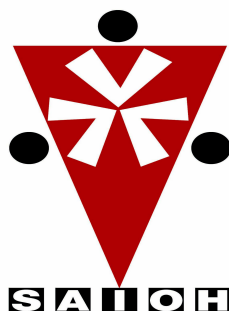

CHIEF INSPECTOR

Valid from: **03 June 2021**

Expires: **05 March 2023**

Certificate Number: **OH0084- CI 034**





The Southern African Institute for Occupational Hygiene

This is to certify that

Robert Randolph

ID Number: 6601185126082

Has satisfied the requirements of
the Constitution of the Institute
and on recommendation of the Professional Certification Committee
is registered as an

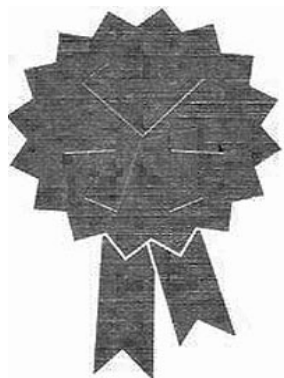
Occupational Hygienist (OH)

Member Number: 0163

Valid until: 31 January 2023

Elsie Cornelia Peens

Chairperson: Professional Certification Committee



Member ID: 33914529

Certificate ID: 33914529-23315

Issued by the Southern African Institute for Occupational
Hygiene

SAQA Professional Body ID: 844

**IOHA Recognised
Certification Scheme**

