

Project Number	RCB.ENG 00199
Project Name	New Port Entrances and Road Access Packages 3,4&5 Project (Access Control and CCTV Surveillance Package)
Design Manager/Designer	
Date (Creation or Update)	21 April 2022

NOTE

This Baseline Risk Assessment provides recommendations regarding the control measures, it is however the Principal Contractor duties to ensure that detailed control measures are addressed in the applicable unique Risk Assessment by the Principal Contractor or their appointed Contractor. The risk rating is deliberately rated high because there are no controls in this and without the required controls the possibility of the potential risk is very high, as indicated.


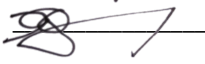

SCOPE

The scope of the Contractor is to further provide a detailed design, supply, installation, construction, integration between new and to existing, testing and commissioning of equipment and associated infrastructure for the Access control and CCTV systems which are to be provided in the following areas of the Port:

- Bayview Gate
- East Gate
- West Gate

Geographical locations: The Project site is situated at Port of Richards Bay - Security Entrances

Risk Assessment Team

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Risk ID No	Business Area	Process/ Activity	Hazard / Risk Source Classification	Hazard/Aspect	Risk/Impact	Mitigation/Control	Category	Likelihood	Consequence	Risk/Rating	Legal Reference	Risk Owner
A. PRE-CONSTRUCTION ADMINISTRATIVE												
A-01	Pre-Construction	Administrative	N/A	File Approval as per OHS Requirements and TNPA Specification	Work commencing prior to file being available and approved - No valid registration with COID. Expired Documentation (e.g. competencies, equipment load test, medicals, ork permits) Documentation not available or approved as per required TNPA Spec and OHS act.	No Work Commencement until approval has been signed off & site access certificate issued TNPA Health and Safety Specification. Baseline Risk Assessment Site Conditions evaluation	Legal	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	TNPA
A-02	Pre-Construction	Administrative	N/A	Legal Appointments and Competency	Employees appointed not in possession of required or valid competencies as per TNPA Spec and OHS Act. Appointment not as per legal requirements. Lack of experience for appointed position.	No Work Commencement until approval has been signed off & site access certificate issued TNPA Health and Safety Specification. Baseline Risk Assessment	Legal	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
A-03	Pre-Construction	Administrative	N/A	Required legal documentation as per OHS act	Documentation not Site Specific. Policies and Procedure not in place and approved. Employees not trained in Policies and Procedures and legal requirements.	No Work Commencement until approval has been signed off & site access certificate issued TNPA Health and Safety Specification. Baseline Risk Assessment Training Needs analysis to be conducted by Contractor. Communication of required documentation	Legal	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
A-04	Pre-Construction	Administrative	N/A	Notification to the DOL	Contractor not submitting notification to the DOL as required by legal requirement. Notification not containing the correct information as required by the DOL. Notification of construction not submitted in the prescribed timeframe.	Contractor to provide the DOL with the required Notification as legislated. Annexure 2 Notification to contain the minimum required information and to be submitted as legislated to prevent work stoppages from DOL.	Legal	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
A-05	Pre-Construction	Administrative	N/A	Risk Identification	Method of works not site specific Risk identification not in place or conducted Risk identification not site specific Risk controls not sufficient Risk Assessor not competent Continues Risk evaluation not conducted	No Work Commencement until approval has been signed off & site access certificate issued TNPA Health and Safety Specification. Baseline Risk Assessment Method Statement of Tasks Site conditions Evaluation	Legal	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
A-06	Pre-Construction	Administrative	N/A	Induction & Medical certificate of fitness	Employees entering site not being inducted. Visitors entering site not being inducted / signing visitors' induction form. Visitors not being provided with the necessary personal protective equipment. Induction being conducted on employees without them being in possession of a valid medical certificate of fitness in the form of an Annexure 3. The medical must be conducted by a registered Occupational Health Practitioner. Construction vehicles and mobile plant operators entering the site without being inducted. Driver of delivery vehicles not made aware of the specific site conditions. Employees being inducted without valid work permits / certified ID Copies.	Site induction can only be done with an employee if the required up to date medical is presented at the induction, and safety file has been approved. Medical fitness certificates must be validated by the principle contractor to ensure adherence to the minimum requirements and validity of the document. Each person's ID or valid work permit must be inspected before induction can be allowed on site for the individual. Induction arrangements to be done through TNPA PM	Legal	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	TNPA PM Principal Contractor
A-07	Pre-Construction	Administrative	N/A	List of employees and Contractors	Number of employees on site not listed on employee list. Number of contractors on site not listed on contractor list. Employee and contractor list not being updated as required	Keep all employees working on site on a employee list. Keep all contractors on site on an update contractor list. Enter new employees and contractors on the list as soon as they have received the site induction.	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
A-08	Pre-Construction	Administrative	N/A	TNPA and Designer Duties	TNPA not following requirements as stipulated in the regulations. Designers not appointed in writing and not made aware of their duties. Designers not following their legal duties throughout the project.	TNPA to follow legal requirements as stipulated in the regulations before and during the construction process. Designers on the project to sign agreement in acknowledgement of their duties on the project and be professionally registered. Designers to conduct the required inspections and review the required documentation as stipulated in the regulations.	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	TNPA Principal Contractor
A-09	Pre-Construction	Access to port	Personal behaviour / Interfaces	Non-compliance with port rules and national key point Act.	Port entry denied.	All Contractor employees including visitors, suppliers and deliveries must undergo port induction before entering the Port. TNPA Project managers to arrange for access permits and inductions	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards. National road traffic Act (Act 93 of 1996) and regulations National Ports Act of 2005	Principal Contractor
A-10	Pre-Construction	Access to port	Personal behaviour / Interfaces	Driving under the influence of alcohol and drugs.	Injury to persons and damage to property. Disruption of Port Operations.	All employees entering the port shall submit to alcohol Breathalyzer or drug test if requested to do so. The contractor's drivers shall abide by all general road traffic rules	Safety	5	4	20	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards. National road traffic Act (Act 93 of 1996) and regulations National Ports Act of 2005	Principal Contractor
A-11	Pre-Construction	Access to port	Personal behaviour / Interfaces	Speeding	Injury to persons and damage to property Disruption to port operations.	All drivers to abide by the speed limit of 40 km/h inside the port. The contractor's drivers shall abide by all general road traffic rule	Safety	5	4	20	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards. National road traffic Act (Act 93 of 1996) and regulations National Ports Act of 2005	Principal Contractor
A-12	Pre-Construction	Access to port	Personal behaviour / Interfaces	Parking in areas not designated for parking.	Obstruction of the road and lead to injuries to persons/property damage.	Contractor shall ensure that all their drivers park in designated areas to avoid obstruction on the road.	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards. National road traffic Act (Act 93 of 1996) and regulations	Principal Contractor
B. SITE ESTABLISHMENT												

B-01	Site Establishment	Site Clearing	Dust /Inhalable Particulates	Exposure to Dust	Inhalation exposure to solid dust results in Respiratory infection (potentially permanent health impact). Lung Irritation / damage to eyes/ red eyes.	Health and Safety Specification Occupational health assessment Hygiene monitoring Medical surveillance. FFP2 dust masks and safety goggles.	Health	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
B-02	Site Establishment	Site Clearing	Mechanical	Use of unsafe mobile plant or machinery. Employees being struck by moving plant working in the area. Removing tall trees unsafely. Damage to neighboring properties. Several construction vehicles and mobile plant operating in confined space area and unsafe / uncontrolled interaction with employees on site. Unsafe stockpiles of soil or other materials on site. Unauthorized removal of indigenous & endangered fauna & flora.	Possible damage to underground services and other properties Possible fatalities Struck by moving mobile equipment - possible fatalities Environmental pollution	All services on site will be pointed out by TNPA to the principal contractor. Safe distance from site fence and services must be established by contractor and must be maintained and marked. Dust control measures must be implemented by the principal contractor as determined by the environmental requirements. All construction vehicles on site must be inspected when delivered to site to ensure adherence to the legal requirements before any usage of the plant . No stockpiling will be allowed on site	Safety	5	5	26	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor TNPA
B-03	Site Establishment	Site Preparation	Biological	Insect stings (e.g. bee, wasp, etc.).	Person stung by an insect resulting in allergic reaction.	Long trousers and long-sleeved shirts to be worn. Bee removal service arrangements to be in place. Allergies to be reported during entry occupational medical examinations. Persons with insect allergies to carry self-injectable epinephrine (e.g. EpiPen Auto-injector). Emergency Response Plan to be implemented (including procedures for responding to a medical emergency). An adequate number of trained First Aiders to be in place.	Health	4	3	12	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
B-04	Site Establishment	Site Preparation	Biological	Venomous snakes, spiders	Person bitten by a venomous spider or snake. Possible fatality	Safety boots to be worn, gloves, eye protection Snake removal service arrangements to be in place. Snake identification chart and snake bite emergency response procedure to be displayed on notice boards. Emergency Response Plan to be implemented (including procedures for responding to a medical emergency). An adequate number of trained First Aiders to be in place.	Health	5	5	26	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
B-05	Site Establishment	Site Preparation	Biological	Animals (baboons, vervet monkeys, etc.).	Person bitten by an animal, possibly resulting in the person contracting rabies.	Construction site to be fenced off. Awareness training to be provided. Emergency Response Plan to be implemented (including procedures for responding to a medical emergency). An adequate number of trained First Aiders to be in place.	Health	3	4	12	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
B-06	Site Establishment	Site Preparation	Biological	Contracting COVID-19	Getting infected with COVID-19, or infecting others with COVID-19 Fatality due to Covid-19	Compliance Officer to be appointed & COVID-19 management plan COVID-19 immunisation Cough or sneeze into a tissue and dispose thereof safely into a bin provided. Wear your face mask at all times Wash your hands frequently with soap and running water for no less than 20 seconds. If you have none available use a hand sanitizer with at least 70% alcohol. Apply social distancing principles, stay at least 1.5m away from people/employees were possible. Avoid crowds and gatherings.	Health	5	5	26	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards. Disaster Management Act of 2002	Principal Contractor
B-07	Site Establishment	Employee Facilities	Biological	Bacteria and viruses. Polluting the environment. Facilities not being cleaned and maintained. No changing facilities available for employees on site. No canteen / dining / sheltered eating areas available for employees on site. No inspections conducted and no checklist completed	Exposure to bacteriological / viral hazards associated with portable chemical toilets and ablution facilities resulting in illness.	Toilets for each sex to be supplied at a minimum ratio of one toilet per 30 employees. Units to be serviced regularly (twice weekly). Disposal records kept Units to be inspected and cleaned daily. Water, soap, paper towels to be provided to enable a person to wash his or her hands	Health	5	5	26	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
B-08	Site Establishment	Electrical Installations/ disconnections	Electrical	Low / medium voltage electricity.	Electric shock or electrocution due to the use of unsafe electrical equipment (including generators) Burns	All electrical equipment to be supplied electricity through (i.e. to be protected by) an approved and tested residual current device (earth leakage device). For every permanent or temporary electrical installation installed or modified, a certificate of compliance to be issued by a competent and appropriately registered electrician. With the exception of double-insulated equipment, all electrical equipment to have an equipment grounding (earthing) conductor that connects the frame of the equipment being utilised to the grounding (earthing) conductor of the electricity supply system. All generators to be fitted with suitable overcurrent protective devices (i.e. circuit breakers or fuses). If recommended by the manufacturer, an earth pin and an associated bonding cable to be used. All portable electrical hand tools to be double-insulated. The IP rating of an item of electrical equipment to be suitable for the environment in which the equipment is to be used. All portable electrical equipment (including generators) to be inspected, tested and tagged on a quarterly basis by competent and appropriately qualified electricians who have been appointed in writing. Inspection and testing to include a continuity test of the grounding (earthing) conductor (as applicable) and a complete examination of the equipment to assure safe use. Details of these inspections and tests to be recorded in a register. Electrical equipment to be inspected by competent operators on a daily basis prior to use. Electrical repair work or diagnostic work on electrical installations / equipment to only be performed by personnel who are competent and authorised to perform this work (i.e. qualified electricians). All work involving the use of electrical equipment to be carried out under the personal supervision of a competent supervisor who has been appointed in writing. Task-Based Risk Assessment to be conducted, and job and equipment-specific Safe Work Procedures to be in place. All persons required to use electrical equipment to receive training on all relevant Safe Work Procedures. Each person potentially exposed to electrical hazards to receive electrical hazard awareness training.	Safety	5	5	26	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor TNPA
B-09	Site Establishment	Transporting containers /temporary offices to site. Offloading containers/ offices & placement Demobilisation Cleaning	Gravitational	Safety signs and notice boards not placed close to entrance of main gate. Lay down areas not off sufficient size. No toilets provided as per requirements. Not informing employees and public what the site rules are. Damaged / loose wires exposed at site offices. Material handling can cause crush injuries and falling objects. Incorrect placement / position of containers / site offices. Swinging of loads/falling of containers Tripping hazards / Fall risk	Traffic disruption, injuries to people, damage to vehicles and property Injuries to people, damage to materials and property Spillages, unhygienic conditions Injuries to workers and visitors Electrocution, production delays, death; damage to infrastructure and assets; discontinuation of operations; delay in project schedule Rodents and insects infestations	Plan deliveries, drivers aware of other road users, use of flagmen, plan laydown areas, materials management procedure in place, competent operators/drivers required Competent supervisor must be present for offloading activities Competent supervisor must be present for offloading activities Permit to be granted by TNPA for all electrical installations, installations to be done only by competent electrician COC issued for temporary electrical installations Pest control program in place	Safety	5	5	26	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
B-10	Site Establishment	Staking and storage	Gravitational	Collapse of stacked items or materials.	Serious injuries Possible fatalities Property damages	Task-Based Risk Assessment to be conducted and Safe Work Procedures to be in place. All stacking operations to be carried out under the personal supervision of a competent Supervisor who has been appointed in writing. All stacks to be stable. The base of each stack to be level and capable of withstanding the weight exerted on it by the stack. The articles in the lower tiers of a stack to be capable of withstanding the weight exerted on them by the articles stacked on top of them. All of the articles, making up any single tier to be the same size, shape and mass. All pallets and containers to be in good condition. Any support structure used for the stacking of articles to be structurally sound and to be capable of supporting the articles that are to be stacked on it. No article to be removed from a stack, except from the uppermost tier. No person to climb onto a stack. Stacking and storage areas to be clearly demarcated & sign posted	Safety	5	5	26	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor

B-11	Site Establishment	Security/Access control	Personal behaviour / Interfaces	Unauthorized entry onto site due to lack of access control measures. Theft of materials and equipment.	Possible theft and vandalism Damage to property	Principal contractor to monitor and unauthorised access and implement adequate control measures The principal contractor must appoint full time security personnel to control the access onto site at all times. Dedicated access control sign books to be available for visitor sign-ins.	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
B-12	Site Establishment	Waste Management	Personal behaviour / Interfaces	Insufficient bins allocated in designated, prominent areas on site for employees to make use of to throw their domestic waste in. Employees burning waste on site. Hazardous waste being removed from site as normal waste.	Improper discarding of waste Pollution	Proper waste facilities and waste separation, waste management plan Waste to be segregated Supervision Adequate awareness training on waste management Adequate provision of supplies of material and consumables Provision of sealable disposal containers/bags through appropriate waste removal company	Environment	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards. NEMA	Principal Contractor
B-13	Site Establishment	Vehicles and mobile equipment/power tools/ generators	Sensory/Acoustic	Noise exposure to trucks and vehicles	Noise induced hearing loss	Safety boots, earplugs, dust masks, eye protection, overalls, reflector vests Equipment inspected Medical surveillance in place Safety signage posted up	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C. CONSTRUCTION												
C-01	Construction	Usage of Mobile equipment	Chemical	Diesel exhaust emissions.	Exposure to diesel exhaust emissions (inhalation) resulting in an occupational illness.	Mobile equipment to be fitted with an enclosed and tight-sealing air-conditioned cabin. Preventative maintenance programme to be implemented for all mobile equipment and light vehicles to minimise emissions. Pre-use inspections to be carried out by drivers / operators. Diesel-powered equipment and machinery to be used only in open, well-ventilated areas. Medical surveillance programme to be in place.	Health	5	4	20	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-02	Construction	Handling of HCS	Chemical	Diesel, petrol, shutter release agents and or curing compound.	Exposure to diesel, petrol, shutter release agents or curing compound (skin contact, ingestion or vapour inhalation).	Task-Based Risk Assessments to be conducted and Safe Work Procedures to be in place. For each chemical substance, Material Safety Data Sheet (MSDS) to be obtained and used to assess the hazardous properties and risks associated with the substance, and to determine the PPE, first aid and emergency response requirements. Each container containing a chemical substance to be properly labelled. Suitable PPE and associated training to be provided. Water and soap to be provided to enable a person to wash his or her hands. Medical surveillance programme to be in place.	Health	5	4	20	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-03	Construction	Concrete work/ Pumping operations/ Small mixing plants/ Pouring with ready mix trucks/ Cement bags (storage & usage) Pouring concrete using banana bucket	Chemical	Wet concrete Truck parking or moving into wrong position, falling into excavation. Moving into incorrect position and concrete chute not correctly positioned. Slipping and falling trying to control vibrator. Danger offloading (concrete) falling or bucket hitting people. Operator of concrete pump not appointed and not competent. Exposure to silica while handling cement. Excessive noise and vibration particularly with vibrating poker, power floats and mechanical screed boards. Pinch point - Manual handling - particularly movement of material by spade / shovel. Gross spillage of concrete. Overloading of temporary works on a specific point / point load with concrete. Blocking of concrete pipes. Concrete splashing into eyes of employees during casting of concrete activities. High pressure concrete and aggregate going into eyes, face or any exposed skin due to standing or working in front of end hose, or opening up pipe joints when pumping. No safe access for employees to area where concrete needs to be poured. Temporary works shutters moving out of position while casting concrete. All tools and equipment not cleaned thoroughly after concrete has been cast. If casting concrete with banana bucket, employees moving underneath suspended load. Basket not fitted to end of pipe when cleaning with sponge ball. Concrete pipe not assembled correctly. Incorrect cleaning method of pipe.	Exposure to wet concrete skin contact can lead to dermatitis, serious skin burns Hand injuries Silica Dust	Task-Based Risk Assessments to be conducted and Safe Work Procedures to be in place. Suitable gloves, gumboots, safety goggles to be provided and worn. Barrier cream for skin protection	H&S	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-04	Construction	Exposure to Cement dust	Dust /Inhalable Particulates	Exposure to Dust/Cement dust	Inhalation exposure to solid dust results in Respiratory infection (potentially permanent health impact). Lung irritation / damage to eyes/ red eyes.	Health and Safety Specification Occupational health assessment Hygiene monitoring Medical surveillance. FFP2 dust masks and safety goggles.	Health	5	4	20	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-05	Construction	Usage of cement Vibrating machinery	Vibrational	Exposure to hand-arm vibration (e.g. drilling, chipping or compacting) resulting in an occupational illness. Vibrations Manual handling. Noise exposure Electrical shock Foreign objects entering employees' eyes. Damage to existing services.	Hand and arm vibrations can cause white finger syndrome Injury to back and joints Noise induced hearing loss Electrocution Eye injuries	Task-Based Risk Assessments to be conducted and Safe Work Procedures to be in place. Suitable work / rest (or job rotation) cycles to be established. Construction Baseline Risk Assessment to be reviewed by an AIA (as and when required), recommendations concerning control measures to be implemented, and medical surveillance programme to be in place.	Health	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-06	Construction	Computerised and electrical systems	Climatic/Natural Events	Lightning strike Equipment defects/failure	Person(s) struck by lightning, can lead to severe burns and possible fatality	Protect against lightning strikes and power surges.	Safety	5	4	20	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-07	Construction	Identification and protection of existing services	Electrical	Live electricity cables Damage to piping and IT services	Fatality Serious injury Electrocution Damage to property	All services to be identified by means of scanning and isolated Detection equipment to be used Proof trenching and services clearly marked, no pegs or stakes shall be driven or any excavation made before the contractor has established that there are no underground services which might be damaged Permit to work	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor TNPA

C-08	Construction	Electrical Connection / disconnection	Electrical	Low / medium voltage electricity.	Electric shock or electrocution due to the use of unsafe electrical equipment (including generators) Burns	All electrical equipment to be supplied electricity through (i.e. to be protected by) an approved and tested residual current device (earth leakage device). For every permanent or temporary electrical installation installed or modified, a certificate of compliance to be issued by a competent and appropriately registered electrician. With the exception of double-insulated equipment, all electrical equipment to have an equipment grounding (earthing) conductor that connects the frame of the equipment being utilised to the grounding (earthing) conductor of the electricity supply system. The IP rating of an item of electrical equipment to be suitable for the environment in which the equipment is to be used. Electrical repair work or diagnostic work on electrical installations / equipment to only be performed by personnel who are competent and authorised to perform this work (i.e. qualified electricians). All work involving the use of electrical equipment to be carried out under the personal supervision of a competent supervisor who has been appointed in writing. Task-Based Risk Assessment to be conducted, and job and equipment-specific Safe Work Procedures to be in place. All persons required to use electrical equipment to receive training on all relevant Safe Work Procedures. Each person potentially exposed to electrical hazards to receive electrical hazard awareness training. TNPA isolation and lockout procedures to be adhered to. Permit to work	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor TNPA
C-09	Construction	Manual handling	Ergonomics	Awkward movement / posture / overexertion	Musculoskeletal injury due to awkward body positioning, improper manual handling / lifting practices.	Correct tools for the job to be provided and used. Task-Based Risk Assessments to be conducted and Safe Work Procedures to be in place. Awareness training to be provided regarding correct manual handling, lifting and carrying techniques	Health	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-10	Construction	Hotwork, cutting, grinding, soldering	Ergonomics	Manual handling. Foreign objects entering employees' eyes.	Serious injuries Eye injuries Sprains and strains	Safety boots, earplugs, dust masks, eye protection Equipment inspected	Health	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-11	Construction		Respiratory	Dust inhalation	Silicosis	Safety boots, earplugs, dust masks, eye protection Equipment inspected Medical surveillance in place	Health	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-12	Construction		Sensory/Acoustic	Noise exposure	Noise induced hearing loss	Safety boots, earplugs, dust masks, eye protection Equipment inspected Medical surveillance in place	Health	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-13	Construction		Fire	Sparks Non-ionising Radiation Molten metal Electromagnetic Energy Emissions Fumes No flash back arrestors installed on gas welding equipment. Explosion Fire	Burns, Sickness, eye injury Fire - damage to property Inhalation of fumes	Hotwork permit to be obtained from TNPA fire department Fire fighting equipment / Fire blankets Welding gloves, spats, flameproof overalls, welding helmet, safety shoes Welding screens	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor TNPA
C-14	Construction	Light vehicles / mobile equipment	Fire	Mobile equipment / vehicle fire.	Burns and / or smoke inhalation due to a mobile equipment / vehicle fire.	Each light vehicle to carry a suitable fire extinguisher, and each item of mobile equipment to be fitted with a suitable and properly mounted fire extinguisher. No smoking to be permitted while driving a light vehicle or operating an item of mobile equipment. Preventative maintenance programme to be in place for all mobile equipment and light vehicles. Pre-operation safety checks to be carried out by operators / drivers and supervisors. Training in fire-fighting procedures and the use of fire-fighting equipment to be provided	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-15	Construction		Gravitational	Mobile equipment / light vehicle toppling over.	Serious injuries Possible fatalities Property damages	Each light vehicle and each item of mobile equipment brought onto the project site(s) to have a record of inspection and maintenance as well as a suitable checklist (derived from the vehicle / equipment manufacturer's inspection recommendations) for use by the driver(s) / operator(s) when carrying out pre-operation safety checks. Preventative maintenance programme to be implemented to ensure that all light vehicles are maintained in a safe and roadworthy condition. Preventative maintenance programme to be implemented to ensure that each item of mobile equipment is maintained in a safe and serviceable condition. Each light vehicle to be fitted with seat belts for all occupants, cargo barriers / load restraints (for vehicles designed for carrying loads), and a driver-side air bag. No transportation of employees on back of vehicles and tools. Each item of mobile equipment to be fitted with seat belts for all occupants, and unless an approved risk assessment stipulates otherwise, a Roll-Over Protective Structure (ROPS). Task-Based Risk Assessments to be conducted and Safe Work Procedures to be in place. All mobile equipment operations to be carried out under the personal supervision of a competent supervisor who has been appointed in writing. All drivers and operators to receive suitable training. A permitting and appointment system to be in place to ensure that each light vehicle driver or mobile equipment operator is competent to drive or operate the specific vehicle or equipment that he is required to drive or operate. Each driver / operator to be in possession of a valid licence or certificate of competency.	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-16	Construction	Excavations/trenching/mechanical/ manual	Gravitational	Collapsing excavation. Spilling too close to the edge of the excavation Material/ equipment falling into excavation Slips and trips Falling into	Injury, fatality	Site-specific geo-technical investigation to be carried out and a registered professional geo-technical engineer to issue a report with recommendations concerning the excavation work to be carried out. Excavation sides to be suitably battered, benched, or shored, in accordance with the recommendations made by a registered professional geo-technical engineer (for excavations more than 1.2 metres deep). Shoring requirements to be determined and designed by a competent person for the specific conditions encountered at the excavation site. Only approved shoring systems and equipment to be used. Shoring to be installed and removed using a predetermined safe method. All excavation work to be carried out under the personal supervision of a competent Excavation Supervisor who has been appointed in writing. Permit to Work to be obtained before any excavation work is carried out. Task-Based Risk Assessment to be conducted and Safe Work Procedures to be in place. All excavation work to be properly planned taking site-specific conditions and hazards into consideration. Each excavation (as well as the areas around it) to be inspected by a competent person (i.e. an appointed Excavation Supervisor) at the start of each day before work commences within the excavation, after any alteration is made to the excavation or shoring, after rainfall, after any blasting activity carried out in the vicinity of the excavation, and after any event that may have affected the strength or stability of the excavation or the shoring. Excavation sides to be carefully inspected for signs of instability including fissures (cracks), slumping, and bulging. Shoring to be carefully inspected for signs of overloading (e.g. distortion). Rigid barricading to be erected (or safety berm to be constructed) around every excavation deeper than 500mm. Warning signage to be prominently displayed and, if necessary, flashing warning lights to be used at night.	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-17	Construction		Gravitational	Loose soil/rocks falling from the sides of an excavation. Persons falling into excavations	Engulfment Possible fatalities	Scaling to be carried out on the sides of all excavations to remove loose material. Protective shields or barriers to be erected (when required) between the sides of an excavation and the work area in order to protect employees from falling, rolling or slumping rock, soil, or materials. Task-Based Risk Assessment to be conducted and Safe Work Procedures to be in place. Each excavation to be inspected by a competent person (i.e. an appointed Excavation Supervisor) at the start of each day before work commences within the excavation, after any alteration is made to the excavation or shoring, after rainfall, and after any event that may have affected the strength or stability of the excavation or the shoring.	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-18	Construction		Gravitational	Collapsing temporary works structure.	Serious injuries Damage to property Downtime	Temporary works to be designed, inspected and approved before use by a competent person (designer) who has been appointed in writing. Each temporary works structure to be constructed, used and removed under the personal supervision of a competent supervisor who has been appointed in writing. Only approved components, materials and systems to be used. Prior to use, each component to be inspected by the competent supervisor to ensure that it is in good condition. Task-Based Risk Assessment to be conducted and Safe Work Procedures to be in place. Each temporary works structure to be inspected by the relevant competent supervisor immediately before any concrete is poured, during and after the pouring of concrete, after inclement weather, after any load has been imposed, and at least on a daily basis until the temporary works structure has been removed. Results to be recorded in a register. No concrete to be cast until authorised in writing by the competent supervisor. No temporary works structure to be removed until authorised in writing by the competent supervisor.	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor

C-19	Construction		Musculoskeletal	Awkward movement / posture / overexertion	Musculoskeletal injury due to awkward body positioning, improper manual handling / lifting practices.	Correct tools for the job to be provided and used. Task-Based Risk Assessments to be conducted and Safe Work Procedures to be in place. Awareness training to be provided regarding correct manual excavation, handling, lifting and carrying techniques	Health	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-20	Construction	Manual Backfilling of soil	Musculoskeletal	Awkward movement / posture / overexertion	Musculoskeletal injury due to awkward body positioning, improper manual handling / lifting practices.	Correct tools for the job to be provided and used. Task-Based Risk Assessments to be conducted and Safe Work Procedures to be in place. Awareness training to be provided regarding correct manual excavation, handling, lifting and carrying techniques	Health	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-21	Construction	Backfilling of soil using compactor	Vibrational	Whole body and hand arm vibration due to operating vibrating machinery or plant. Noise exposure Dust	Overexposure can result in conditions such as musculoskeletal injuries, vibration-induced white finger (VWF) and Reynaud's disease.	To minimise vibration levels, the operator's seat in each item of mobile equipment is to be maintained in compliance with the OEM specifications. Formal acceptance (authorisation) process to be implemented for all light vehicles and mobile equipment (new to site, and when being returned to service following any modification or repair). Acceptance process to be based on an inspection and risk assessment. Construction Baseline Risk Assessment to be reviewed by an AIA, vibration surveys to be carried out (where required), recommendations concerning control measures to be implemented, and medical surveillance programme to be in place.	Safety	5	4	20	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-22	Construction	Crane operations / lifting and placement of equipment	Gravitational	Mobile crane toppling over. The loading of the crane including the outriggers can do damage to underground services. Unsafe lifting methods. No competent banks man / rigger appointed and present during lifting processes. Operator of crane not appointed and not competent. Operator not conducting pre-start check on crane before operating. Load being lifted is too heavy. Employees walking underneath a suspended load. Operators' visibility restricted during the lifting process. Incorrect lifting tackle used to lift materials. Load swinging / load out of control – employees being struck by load. Toppling over / falling over of one due to overloading. Mobile crane / crane truck positioned on uneven surface / close to excavation edge. No spreader plates / sole plates placed underneath the outriggers of the mobile crane / crane truck if require	Load falling due to failure to secure Damage to property Serious injuries / possible fatalities Hand injuries	Formal acceptance (authorisation) process to be implemented for all mobile cranes (new to site, and when being returned to service following any modification or repair). Acceptance process to be based on an inspection and risk assessment, taking the crane's safety features into account. Each mobile crane to be fitted with a load cell and a load limiting device to prevent the crane from being operated outside of its safe working limits. Each mobile crane to be fitted with a stability monitoring device to prevent it from toppling over. Each mobile crane brought onto the project site(s) to have a current test certificate and record of inspection and maintenance as well as a suitable checklist (derived from the crane manufacturer's inspection recommendations) for use by the operator(s) when carrying out pre-operation safety checks. All mobile cranes and lifting tackle to be inspected, tested and confirmed fit for purpose (i.e. safe for use) before being operated or put into service, before being returned to service following any repair or modification, and periodically as follows: - Each crane to be thoroughly examined every 6 months; - Each crane to be subjected to an annual performance test (i.e. a load test); and - All lifting tackle to be thoroughly inspected every 3 months. Each item of lifting tackle to be tagged following each quarterly (3-monthly) inspection. Details of these inspections to be recorded in a lifting tackle register. Access into an area where lifting operations are being carried out to be restricted. Area to be barricaded and only authorised persons (i.e. those directly involved with the lifting operations) to be permitted to enter. Warning signage (i.e. "Lifting Operations in Progress" and "No Unauthorised Entry") to be conspicuously displayed. Before a mobile crane is moved into position to carry out a lift, the area to be inspected by a suitably qualified person who must verify that the underfoot conditions are satisfactory. If any uncertainty exists, Load spreaders or packing under the outriggers to be used irrespective of the underfoot conditions. A documented and detailed lift plan and risk assessment to be prepared for each critical lift. No critical lift to commence until the lift plan and risk assessment have been authorised and a Permit to Work has been issued. Lifts that are not subject to detailed lift plans (i.e. lifts that are not considered critical) to nevertheless be subject to a risk assessment, and be properly planned and executed. Task-Based Risk Assessments to be conducted and Safe Work Procedures to be in place for all lifting operations. All lifting operations to be carried out under the personal supervision of a competent supervisor who has been appointed in writing. Dedicated spotters to be in place during lifting operations to observe and provide warning (if necessary) to prevent incidents and ensure that safety protocols are adhered to. An effective method of communication (i.e. two-way radios) to be in place between the crane operator and those assisting with a lift. Persons evaluating and planning critical lifts; supervising lifting operations; operating cranes; using lifting tackle and rigging (slinging) loads; providing signals for controlling lifts; and inspecting, maintaining or testing cranes and lifting tackle to be suitably competent and experienced, and to be appointed in writing. Suitable competency based training to be provided. Each person to be in possession of a valid qualification or certificate of competency.	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-23	Construction		Gravitational	Falling of suspended load / swinging of load	Serious injuries Possible fatalities Property damages	Access into an area where lifting operations are being carried out to be restricted. Area to be barricaded and only authorised persons (i.e. those directly involved with the lifting operations) to be permitted to enter. Warning signage (i.e. "Lifting Operations in Progress" and "No Unauthorised Entry") to be conspicuously displayed. A documented and detailed lift plan and risk assessment to be prepared for each critical lift. No critical lift to commence until the lift plan and risk assessment have been authorised and a Permit to Work has been issued. Lifts that are not subject to detailed lift plans (i.e. lifts that are not considered critical) to nevertheless be subject to a risk assessment, and be properly planned and executed. Task-Based Risk Assessments to be conducted and Safe Work Procedures to be in place for all lifting operations. Persons involved in lifting operations to receive training on all relevant Safe Work Procedures. All lifting operations to be carried out under the personal supervision of a competent supervisor who has been appointed in writing. A lift to be directed and controlled by a single person (a suitably competent and experienced rigger). Dedicated spotters to be in place during lifting operations to observe and provide warning (if necessary) to prevent incidents and ensure that safety protocols are adhered to. An effective method of communication (i.e. two-way radios) to be in place between the crane operator and those assisting with a lift. Tag lines to be used in situations where a load needs to be steadied or guided while suspended. When using tag lines, persons on foot to remain in sight of and in communication with the crane operator (through the appointed rigger) at all times, to never walk between the crane and the load, and to remain clear of the load and the crane at all times (at least 5 metres). Persons evaluating and planning critical lifts; supervising lifting operations; operating cranes and hoists; using lifting tackle and rigging (slinging) loads; providing signals for controlling lifts; and inspecting, maintaining or testing cranes, hoists and lifting tackle to be suitably competent and experienced, and to be appointed in writing. Suitable competency based training to be provided. Each person to be in possession of a valid qualification or certificate of competency.	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-24	Construction		Personal behaviour / Interfaces	Unauthorized entry onto site due to lack of access control measures.	Serious injuries Possible fatalities	Area to be barricaded off and no unauthorised entry signage posted up	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-25	Construction	Working on heights/scaffolding /adder/cheripicker	Gravitational	Falling objects Not hooking safety harness catch to anchor point. Anchor point not secure or strong enough. Deliberately dropping materials or equipment. Not keeping all debris, rocks, scraps and rubble away from the work area edges. Employees working at heights not certified to work at heights in accordance with the SANS requirements for working at heights training. Employees allowed to work at heights who is not medical fit and not in possession of a valid medical certificate of fitness.	Falling from heights, sustaining injuries such as loss of limbs and possible fatalities	Contractor must ensure that working at heights activities do not take place in inclement weather and or when the wind speed is high. Fall protection plan to be developed by appointed competent person and implemented , rescue plan Demarcation of areas where there is work at heights PPE safety harness The Contractor must ensure that all employees working at heights undergo Medical Surveillance to ensure fitness for duty. All scaffolding must conform to SANS 0085 standard All ladders inspected and fit for use Cheripickers inspected and fit for use	Safety	5	5	25		Principal Contractor
C-26	Construction	Stacking and storage of materials	Gravitational	Collapse of stacked items or materials.	Serious injuries Possible fatalities Property damages	Task-Based Risk Assessment to be conducted and Safe Work Procedures to be in place. All stacking operations to be carried out under the personal supervision of a competent Supervisor who has been appointed in writing. All stacks to be stable. The base of each stack to be level and capable of withstanding the weight exerted on it by the stack. The articles in the lower tiers of a stack to be capable of withstanding the weight exerted on them by the articles stacked on top of them. All of the articles making up any single tier to be the same size, shape and mass. All pallets and containers to be in good condition. Any support structure used for the stacking of articles to be structurally sound and to be capable of supporting the articles that are to be stacked on it. No article to be removed from a stack, except from the uppermost tier. No person to climb onto a stack. Stacking and storage areas to be clearly demarcated	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor

C-27	Construction	Usage of Power tools	Mechanical	Contact with moving parts of power tools (e.g. saw, drill or grinder).	Hand injuries Cuts and bruises Painful wrists and arms (upper limb disorders) from frequent twisting usage of tools	Effective guarding to be in place to prevent inadvertent contact with moving parts. Manufacturer-fitted guarding to only be removed for maintenance, repair, cleaning, and clearing purposes, and only after the tool has been isolated and locked out. Guarding to be replaced prior to the tool being put back into operation. Fail-to-safe switches or devices to be installed on all power hand tools. Power tools to be inspected and safety devices to be tested on a monthly basis by competent persons who have been appointed in writing. Details of these inspections and tests to be recorded in a register. All work involving the use of power tools to be carried out under the personal supervision of a competent supervisor who has been appointed in writing. Power tools to be inspected by competent operators on a daily basis prior to use. Suitable competency based training to be provided to all persons required to work with power tools. Task-Based Risk Assessments to be conducted and Safe Work Procedures to be in place. All persons required to work with power tools to receive training on all relevant Safe Work Procedures. Suitable PPE to be provided and worn.	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-28	Construction	Usage of Hand tools	Mechanical	Person struck by a hand tool due to workplace congestion or failure of the tool Broken handles Tools slipping Poor quality uncomfortable handles "Home-made" hand tools being used. Ergonomics - frequent twisting	Hand injuries Cuts and bruises Painful wrists and arms (upper limb disorders) from frequent twisting usage of tools	Task-Based Risk Assessments to be conducted and Safe Work Procedures to be in place. Good communication and awareness to be maintained between team members to ensure coordination. Work to be carried out under the personal supervision of a competent Supervisor who has been appointed in writing. Hand tools to be inspected on a daily basis prior to use. Only good quality factory-manufactured hand tools to be used.	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-29	Construction	Usage of Power driven Machinery	Mechanical	Pinch / nip points (machinery). Entanglement Heat	Hand injuries Cuts and bruises Burns	Effective guarding to be in place to prevent inadvertent contact with moving machinery. Where required, guarding interlocks (that prevent machine operation when a guard has been to be in place. Machinery to be equipped with emergency stop devices (to enable the machinery to be stopped immediately in the event of an emergency). Fail-to-safe switches or devices to be installed on all manually-operated rotating plant and equipment. Guarding to only be removed for maintenance, repair, cleaning, and clearing purposes, and only after the machinery has been isolated and locked out. Guarding to be replaced prior to the machinery being put back into operation. If required, machinery to be equipped with devices (alarms and flashing lights) that provide warning for a minimum period of 10 seconds that the machinery is about to be set into motion. Machinery to be inspected and safety devices (interlocks, emergency stop devices, etc.) to be tested on a monthly basis by competent persons who have been appointed in writing. Details of these inspections and tests to be recorded in a register. All work involving the use of machinery to be carried out under the personal supervision of a competent supervisor who has been appointed in writing. Machinery to be inspected by competent operators on a daily basis prior to use. No loose clothing to be worn where it may become caught in moving machinery. No necklaces, dangling earrings, or bracelets to be permitted. Hair that is longer than the top of the shoulders to be tied up and restrained within the person's safety helmet or within the collar of his or her overalls, shirt or jacket. Suitable competency based training to be provided to all persons required to work with machinery. Task-Based Risk Assessments to be conducted and Safe Work Procedures to be in place. All persons required to work with machinery to receive training on all relevant Safe Work Procedures	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-30	Construction	Handling of materials	Mechanical	Contact with sharp edges and ends (tools, materials, work pieces and waste).	Hand injuries Cuts and bruises	Task-Based Risk Assessments to be conducted and Safe Work Procedures to be in place. Suitable PPE to be provided and worn	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-31	Construction	Traffic Management	Mechanical	Moving mobile equipment / light vehicles/ heavy vehicles Collisions, struck by Person on foot struck by or run over by an item of mobile equipment or a light vehicle, heavy duty vehicles	Serious injuries Possible fatalities Property damages	Pedestrian, light vehicle, and mobile equipment traffic to be segregated wherever reasonably practicable. Designated walkways to be provided for pedestrians wherever reasonably practicable. Rigid barricading to be used (where possible) to separate pedestrians from moving vehicles / mobile equipment. Site-specific Traffic Management Plan to be implemented. Flagmen to be in place whenever a risk assessment determines that flagmen are required. High visibility, reflective clothing to be worn by all persons at all times. Task-Based Risk Assessments to be conducted and Safe Work Procedures to be in place. All drivers and operators to receive suitable training.	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-32	Construction	Change Management	Personal behaviour / Interfaces	Inadequate interfaces.	Injury or incident due to inadequate management of the interface between contractor activities and operations, or between the activities of one contractor and the activities of another.	Interfaces to be actively managed and coordinated by nominated project management representatives. Interface meetings to be held on a daily or weekly basis as required. Where an interface exists, all parties to be involved in the associated risk assessments and planning (including operations). Clear communication channels and protocols to be established. An effective change management process to be implemented. An effective handover process to be implemented between the project and operations. Wherever possible, project work areas to be barricaded. Wherever possible, access into project work areas to be controlled.	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-33	Construction	Fatigue Management	Physiological	Lack of sleep Physical stress	Injury or incident due to fatigue. Headaches Fatigue	Shift system to be designed such that the impact on sleep cycles is minimised as far as possible. Employee accommodation to be within a specified distance of the project site. Employee transportation to be provided by the contractor. Working hours to be managed and monitored to ensure compliance with legal requirements. Legal requirements concerning maximum working hours per day and minimum rest periods between shifts to be complied with.	Health	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-34	Construction	Exposure to sunlight	Non ionising Radiation	Exposure to Sunlight (UV radiation).	Sunburn Skin cancer	Long trousers and long-sleeved shirts to be worn. Hard hat shade brims, sunscreen and lip balm to be supplied to persons working outdoors. Where work is carried out in the open, shelters to be provided for use during breaks Access to water	Health	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-35	Construction	Noise exposure	Sensory/Acoustic	Exposure to noise levels above 85dBA resulting in NIHL, or exposure to noise levels above 130dBA (impact noise).	Noise induced hearing loss	Noise levels to be considered when purchasing or hiring machinery or equipment. Where practicable, less noisy options to be selected. All possible noise attenuation modifications to be made to machinery or equipment prior to delivery. Noise control maintenance to be included as part of the preventative maintenance programme(s) for plant and equipment. Suitable personal Hearing Protection Devices to be provided and to be worn correctly. Training to be provided. Construction Baseline Risk Assessment to be reviewed by an AIA, area surveys and personal exposure monitoring to be carried out (where required), recommendations concerning control measures to be implemented, and medical surveillance programme (audiometry) to be in place. Noise Zones to be clearly demarcated.	Health	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
C-36	Construction	Extreme temperatures	Thermal	Hot conditions & humidity	Heat stroke Possible fatality Heat stress Dehydration	Where practicable, each site office to have an air conditioner. Where work is carried out in the open, shelters to be provided for use during breaks. Construction Baseline Risk Assessment to be reviewed by an AIA, area surveys and personal thermal stress exposure monitoring to be carried out (where required), recommendations concerning control measures to be implemented, and medical surveillance programme to be in place. Suitable work / rest cycles to be established. Plenty of drinking water to be provided to persons working outdoors (400ml to be consumed per hour). Hard hat shade brims, sunscreen and lip balm to be supplied to persons working outdoors. Heat stress awareness training to be provided	Health	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
D. DEMOLITION / DISPOSAL												
D-01	Demolition/Disposal	Demolition/ road surface breaking/cutting/jack hammer	Dust /Inhalable Particulates	Debris Dust and fumes Noise and vibration from heavy plant and equipment Building rubble Flying particals from pneumatic tools such as jackhammers Dust	Possible fatalities/injuries Property and equipment damage Noise induced hearing loss Hand, arm, finger syndrome Water Pollution Eye injuries Respiratory illness, inhalation of dust	Detailed structural engineering survey of structure carried out by a competent person and method statement developed. During the demolition, a competent person shall check the structural integrity of the structure at intervals determined in the method statement in order to avoid any premature collapses. PPE The contractor shall ensure that all waste and debris is as soon as reasonably practicable removed and disposed of from the site in accordance with the applicable legislation	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor

D-02	Demolition/Disposal	Demolition/ road surface breaking/cutting	Fire	Sparks Non-ionising Radiation Molten metal Electromagnetic Energy Emissions Fumes No flash back arrestors installed on gas welding equipment. Explosion Fire	Burns, Sickness, eye injury Fire - damage to property Inhalation of fumes	Hotwork permit to be obtained from TNPA fire department Fire fighting equipment / Fire blankets	Safety	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
D-03	Demolition/Disposal	Handling of building/cement/ rubble	Musculoskeletal	Awkward movement / posture / overexertion	Musculoskeletal injury due to awkward body positioning, improper manual handling / lifting practices.	Correct tools for the job to be provided and used. Task-Based Risk Assessments to be conducted and Safe Work Procedures to be in place. Awareness training to be provided regarding correct manual excavation, handling, lifting and carrying techniques	Health	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
D-04	Demolition/Disposal	Demolition waste	Personal behaviour / Interfases	Poor housekeeping Rubble waste	Improper discarding of waste Pollution	Proper waste facilities and waste separation, waste management plan Supervision, correct disposable methods Adequate awareness training on waste management Adequate provision of supplies of material and consumables Provision of disposal containers through appropriate waste removal company	Environment	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards. NEMA	Principal Contractor
D-05	Demolition/Disposal	Demolition/ road surface breaking/cutting/jack hammer	Vibrational	Exposure to hand-arm vibration (e.g. drilling, chipping or compacting) resulting in an occupational illness. Vibrations Manual handling. Noise exposure Electrical shock Foreign objects entering employees' eyes. Damage to existing services.	Hand and arm vibrations can cause white finger syndrome Injury to back and joints Noise induced hearing loss Electrocution Eye injuries	Task-Based Risk Assessments to be conducted and Safe Work Procedures to be in place. Suitable work / rest (or job rotation) cycles to be established. Construction Baseline Risk Assessment to be reviewed by an AIA (as and when required), recommendations concerning control measures to be implemented, and medical surveillance programme to be in place.	Health	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor
E. OPERATIONAL / MAINTENANCE												
E-01	Operations & Maintenance	Testing and commissioning	N/A	Failure of systems Substandard equipment, materials Unavailability of spares	Downtime Financial impact	All installations shall be inspected and witnessed in accordance with this specification, the manufacturer's instructions and recommendations and the approved quality control plans for each activity. All calibration and test equipment shall hold valid, traceable calibration certificates, which shall be held on Site and shall form part of the quality control dossiers. All equipment, instruments and accessories shall, where appropriate, be calibrated and tested at the manufacturer's premises or by a duly authorised representative of the manufacturer. All test and calibration certificates shall be included in the on Site quality control dossiers and the as-constructed data packs. All equipment used shall come with a certified warranty with a minimum 2 years, with an option to extend (with a letter from the manufacturer which shall be issued to Transnet with the end user being TNPA, stating warranty/extended-warranty periods and guarantees on those periods, independent of the Contractor). The system implementing Contractor must be accredited and certified by the manufacturer as an EXPERT (or equivalent) integrator, whether as a direct or indirect contractor. System warranty shall take effect from date of first use, after site acceptance testing. Contractor shall supply commissioning and operational spares required for a period of one year after commissioning, and special tools required for maintenance purposes	Quality	5	5	25	Occupational Health and Safety Act and Regulations (85 of 1993) and incorporated safety Standards.	Principal Contractor

HAZARD EFFECT/ CONSEQUENCE						
Hazard and Aspect Category & Value		Insignificant 1	Low 2	Medium 3	High 4	Extreme 5
Safety		Occupational Injuries attended to by a First Aider.	Minor and Medical treatment injuries. No lost time.	Lost time incident/reversible incident where the employee is booked off for less than 14 days	Lost time incident/reversible incident where the employee is booked off for more than 14 days	Fatality and permanent/irreversible disability
Health		Occupational Illness Case attended to by a First Aider. Minor Occupational Illness that seeks a medical treatment. No Lost Time	Minor Occupational Illness that seeks a medical treatment. Potential Time loss.	Lost time occupational illness e.g. Work induced Asthma.	Reversible Occupational Diseases E.g. Temporal Threshold Shift, Skin irritation.	Fatal Occupational disease e.g. cancer, asbestosis, leukemia and Irreversible Occupational Diseases eg. Noise Induced Hearing Loss
Environment		Insignificant impact, threat or disturbance to the environment. Minor spill that is easily contained on site and does not pose serious threat to the environment. Considerable usage of natural resources within operations.	Minor localised spill or release to the environment that may pose a risk to the environment . E.g. Level 3 and 4 environmental incident Unsustainable use of natural resources that may cause causes pressure at the local scale.	Medium spill or impact that poses a significant threat to the environment (such as level 2 environmental occurrences) Onsite short to medium term environmental impacts (6 to 12 months). Unsustainable use of natural resources that may cause pressure at a regional scale.	Prolonged environmental damage (>12 months) Large impact or disturbance on the environment and nearby sensitive environments but can be reversed in relative short time (<1 year). Unsustainable use of natural resources that may cause pressure at a national scale	Irreversible long term environmental damage to a highly valued species or location. Pollution difficult to contain or impact difficult to eliminate and taking time to clean or eliminate. Impact might only cease after operational life of activity such as a level 1 environmental incident. Unsustainable use of natural resource that may cause pressure at a global scale.
Compliance & Legal		Minor breach of legal and other requirements but there is no legal penalty i.e. Improvement Notices, Directives and NCR's, etc.	Minor breach of legal and other requirements with a penalty.	Major litigation or prosecution with damages up to R 10 million. Short term closure of operations by authorities.	requirements, permit or authorization conditions resulting in a potential withdrawal of an operating permit. Major litigation or prosecution with damages of R 50 million + plus significant costs or imprisonment. Medium term closure of operations by authorities	Major litigation or prosecution with damages of R 100 million + plus significant costs resulting in the withdrawal of an operating permit. Long term/ Total closure of operations by authorities.
LIKEHOOD		RISK RATING				
5. Almost Certain	Almost certain to occur within the foreseeable future or within the project lifecycle	5	10	15	20	25
4. Likely	Likely to occur within the foreseeable future, or within the project lifecycle	4	8	12	16	20
3. Possible	May occur within the foreseeable future, or within the project lifecycle	3	6	9	12	15
2. Unlikely	Not likely to occur within the foreseeable future, or within the project lifecycle	2	4	6	8	10
1. Rare	Will only occur in exceptional circumstances	1	2	3	4	5