



OCCUPATIONAL HEALTH & SAFETY (OHS) SPECIFICATION: BASELINE RISK ASSESSMENT

PROJECT NUMBER:	JW 14455
PROJECT LOCATION:	Diepsloot, Riverside, and Dainfern
PROJECT DESCR:	Diepsloot Sewage Aqueduct

BASELINE RISK ASSESSMENT



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ACTIVITY: TRANSPORTATION OF MATERIALS TO SITE

Task	Hazard	Risk	Consequence	Rating	Controls
Transportation of material to site	<ul style="list-style-type: none"> ✓ Unsafe road conditions ✓ Un-road worthy vehicles ✓ Equipment and material not safely secured ✓ Incompetent drivers ✓ Driving under the influence of alcohol ✓ Inclement weather ✓ Speeding ✓ Slippery road 	<ul style="list-style-type: none"> ✓ Overturning vehicles ✓ Vehicle collisions ✓ Bumping pedestrians / employees 	<ul style="list-style-type: none"> ✓ Injuries ✓ Property damages ✓ Third party liability 	M	<ul style="list-style-type: none"> ✓ Adherence to the speed limit ✓ Only competent/ authorised drivers should operate the vehicle ✓ Inspection of vehicles ✓ Equipment and material to be properly secured ✓ Alcohol testing to be done ✓ The road to be paved to prevent accidents ✓ Traffic control to be implemented to avoid collisions
Offloading of material	<ul style="list-style-type: none"> ✓ Faulty lifting machinery & equipment ✓ Suspended load ✓ Poor housekeeping 	<ul style="list-style-type: none"> ✓ Malfunctioning ✓ Falling on employees ✓ Obstructed walkways by materials 	<ul style="list-style-type: none"> ✓ Injuries 	M	<ul style="list-style-type: none"> ✓ Inspect lifting equipment prior to use. ✓ Ensure the safe working load prior to use ✓ Train the employees in manual lifting ✓ Ensure proper housekeeping ✓ The correct PPE must be worn ✓ Designate the stacking areas and put signs ✓ Stacking and storage inspector must be appointed and in charge



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ACTIVITY: SITE ESTABLISHMENT

Task	Hazard	Risk	Consequence	Rating	Controls
Site establishment	<ul style="list-style-type: none"> ✓ Sharp objects/ wires ✓ Uneven surface ✓ Faulty connection ✓ Poor ergonomics ✓ Falling objects ✓ Inadequate security services ✓ Not enough welfare facilities e.g. toilets, change rooms and lockers 	<ul style="list-style-type: none"> ✓ Cuts ✓ Slips and trips ✓ Damage to services ✓ Using the environment as ablution facilities 	<ul style="list-style-type: none"> ✓ Injuries ✓ Back strains and injuries ✓ Crime, theft, fights ✓ Contracting of communicable diseases ✓ Soil, water pollution 	M	<ul style="list-style-type: none"> ✓ Supervisors to plan during site set up and induct employees ✓ A competent electrician must be appointed to connect electrical wires to the site offices and Distribution Board. ✓ Ensure there are welfare facilities on site for health and hygiene purposes ✓ Awareness on hygiene and use of ablution facilities ✓ Detailed Risk Assessment must be drawn before any work commences on site.
Installing containers	<ul style="list-style-type: none"> ✓ Using lifting equipment ✓ Faulty equipment ✓ Faulty slings / chains 	<ul style="list-style-type: none"> ✓ Wind ✓ Incompetent personnel ✓ Heavy load ✓ Failing of lifting equipment 	<ul style="list-style-type: none"> ✓ Serious injuries ✓ Property damage 	H	<ul style="list-style-type: none"> ✓ Check wind speed prior to using the crane. ✓ Inspect the crane, slings and chains before use. ✓ Load test the crane before use ✓ Only carry loads certified to be carried by the crane
Entry and exit	<ul style="list-style-type: none"> ✓ No access control 	<ul style="list-style-type: none"> ✓ Unauthorised entry into the construction site 	<ul style="list-style-type: none"> ✓ Injuries ✓ Theft 	M	<ul style="list-style-type: none"> ✓ Appoint a full time, registered security guard on site



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ACTIVITY: SITE ESTABLISHMENT

Task	Hazard	Risk	Consequence	Rating	Controls
Electrical installation	<ul style="list-style-type: none"> ✓ Electricity ✓ Incompetent personnel ✓ Wrong tools ✓ Damaged cables 	<ul style="list-style-type: none"> ✓ Contact with live electricity ✓ Incompetent person connecting electricity ✓ Electric shocks 	<ul style="list-style-type: none"> ✓ Electrocution ✓ Serious injuries 	H	<ul style="list-style-type: none"> ✓ Follow lock out procedure ✓ Ensure that equipment are earthed to an approved earthing point ✓ Ensure a zero potential test is performed for electricity is isolated ✓ Inspect all tools ✓ Use correct tools for the job ✓ Appoint a competent electrician/ technician ✓ Wear task specific PPE ✓ Ensure that there are no exposed wires on the cables
Stacking and storage	<ul style="list-style-type: none"> ✓ Unsafe stacks of materials or pallets 	<ul style="list-style-type: none"> ✓ Falling of pallets and material on employees 	<ul style="list-style-type: none"> ✓ Injuries ✓ Property damage 	H	<ul style="list-style-type: none"> ✓ Supervision of all stacking of materials on site ✓ Materials of same base and heights stacked together ✓ Barricade the stacking area ✓ Unsafe stacks to be removed immediately ✓ Never stack materials during knocking off time or late at night ✓ Use task specific PPE



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ACTIVITY: EXCAVATION

Task	Hazard	Risk	Consequence	Rating	Controls
Excavation	<ul style="list-style-type: none"> ✓ Deep excavations 	<ul style="list-style-type: none"> ✓ Collapse ✓ Falling ✓ Unsafe entry and exit 	Fatalities	H	<ul style="list-style-type: none"> ✓ Geotechnical surveys to be conducted prior to construction ✓ Shoring of the excavation ✓ No unauthorised entry into the project site. ✓ Fencing off of the excavation and prompt supervision of the area. ✓ Full time security on site to monitor entry and exit. ✓ Safe method of entry and exit to be provided for employees ✓ Spoil material to be stored at least 2m away from the excavation ✓ Signage to be displayed indicating deep excavations
	<ul style="list-style-type: none"> ✓ Incompetent operator ✓ Faulty excavator 	<ul style="list-style-type: none"> ✓ Overturning ✓ Bumping against people 	✓ Serious injuries	H	<ul style="list-style-type: none"> ✓ Only competent personnel may operate the excavator ✓ All excavators must be inspected prior to use
Mechanical excavation	<ul style="list-style-type: none"> ✓ Ignition on 	<ul style="list-style-type: none"> ✓ Accidental movement 	<ul style="list-style-type: none"> ✓ Fatalities ✓ Property damages 	H	<ul style="list-style-type: none"> ✓ Operators should ensure that the ignition is off prior to leaving the plant.



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ACTIVITY: EXCAVATION

Task	Hazard	Risk	Consequence	Rating	Controls
					✓ Keys should be removed from the ignition and returned to the office for safekeeping,
Mechanical excavation	<ul style="list-style-type: none"> ✓ Deep excavation ✓ Lack of safety signage 	<ul style="list-style-type: none"> ✓ Employees falling into excavations 	<ul style="list-style-type: none"> ✓ Fatalities 	H	<ul style="list-style-type: none"> ✓ Ensure that deep excavation signage is placed and visible. ✓ Deep excavations must be fenced off and access controlled.
	<ul style="list-style-type: none"> ✓ Spoil material 	<ul style="list-style-type: none"> ✓ Collapse of excavation walls. ✓ Entrapment 	<ul style="list-style-type: none"> ✓ Fatalities 	H	<ul style="list-style-type: none"> ✓ Excavated soil to be placed at least 2m away from the excavation wall.
	<ul style="list-style-type: none"> ✓ Underground service 	<ul style="list-style-type: none"> ✓ Contact with plant 	<ul style="list-style-type: none"> ✓ Injuries ✓ Property damages ✓ Electrocution 	H	<ul style="list-style-type: none"> ✓ All underground services to be identified and marked prior to excavation.
	<ul style="list-style-type: none"> ✓ Unsafe access and exit 	<ul style="list-style-type: none"> ✓ Falling 	<ul style="list-style-type: none"> ✓ Injuries 	H	<ul style="list-style-type: none"> ✓ TLB / Excavator may not be used by employees to access and exit the excavation



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ACTIVITY: CONTACT WITH UNDERGROUND / OVERHEAD SERVICES

Task	Hazard	Risk	Consequence	Rating	Controls
Working close to Eskom line	✓ High voltage	✓ Electrocution	<ul style="list-style-type: none"> ✓ Fatalities ✓ Power cuts ✓ Property damages 	H	<ul style="list-style-type: none"> ✓ Proper scanning of services prior to starting with excavations ✓ Obtain wayleaves from Eskom prior to starting with work ✓ Do not use lifting equipment in close proximity to power lines unless authorized to do so. ✓ Appoint an OHRVS to supervise all work done in close proximity to power lines ✓ Contact Eskom if services are identified for isolation ✓ Develop a method statement and risk assessment ✓ Train employees in the method statement as well as risk assessment ✓ Develop emergency response procedures for explosions
Working close to gas lines	✓ Gas leaks	<ul style="list-style-type: none"> ✓ Explosion ✓ Suffocation ✓ Inhalation 	<ul style="list-style-type: none"> ✓ Fatalities ✓ Property damages 	H	<ul style="list-style-type: none"> ✓ Proper scanning of services prior to starting with excavations ✓ Obtain wayleaves from service provider prior to starting with work ✓ Develop a method statement and risk assessment ✓ Develop emergency response procedures for leaks and explosions



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ACTIVITY: PUMPING OUT WATER

Task	Hazard	Risk	Consequence	Rating	Controls
Pumping out water using machinery	✓ Vibration	✓ Over exposure	✓ Raynaud's syndrome	M	<ul style="list-style-type: none"> ✓ Regular maintenance of all equipment ✓ Provide employees with anti-vibration gloves ✓ Provide rest periods for every 1hr worked
	✓ Noise	✓ Over exposure	✓ Noise induced hearing loss	M	<ul style="list-style-type: none"> ✓ Regular maintenance of all equipment ✓ Provide employees with proper hearing protection ✓ Provide rest periods for every 1hr worked
	✓ Damaged pump / valves	✓ Sewer spillages	✓ Land and water pollution	M	<ul style="list-style-type: none"> ✓ Inspect all equipment prior to starting work ✓ Perform bioremediation in case of spillages
	✓ Steep slopes	✓ High flow velocities	<ul style="list-style-type: none"> ✓ Blockages ✓ Erosion (water forced around the pipe) 		<ul style="list-style-type: none"> ✓ Ensure that the flow is diverted to mitigate high velocities. ✓ Implement staged lining approach where smaller sections of the pipe are lined incrementally.
	✓ Mud	✓ Slip and falls	✓ Injuries	L	<ul style="list-style-type: none"> ✓ Demarcate areas that are affected by pumping.
	✓ Formation of ponds	✓ Employees / public falling inside	✓ Fatalities	H	<ul style="list-style-type: none"> ✓ Ensure that approval is given for formation of ponds. ✓ Ensure that ponds are fenced of



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ACTIVITY: PIPE LAYING & WELDING

Task	Hazard	Risk	Consequence	Rating	Controls
Pipe laying	✓ Exposed hands	✓ Rough edges ✓ Heavy pipe ✓ Hit by pipe	✓ Injuries	M	✓ Provide gloves to employees ✓ Heavy pipes to be lifted mechanically
Pipe laying	✓ Crane	✓ Failure of the crane ✓ Employees	✓ Fatalities	H	✓ Inspect the crane prior to use. ✓ Only trained and competent person to operate the crane ✓ Employees to steer clear of lifting operations ✓ Faulty cranes to be tagged and not used ✓ Wind speed and direction to be considered before using the crane ✓ Crane to be load tested ✓ Only certified loads to be carried on the crane
Cutting	✓ High Noise Levels ✓ Cutting Grinder/Disc	✓ Vibration ✓ Cutting edges ✓ Eye penetration ✓ Finger cuts ✓ Expose to high noise level area ✓ Uncontrolled disc ✓ Electrical equipment failure ✓ Sharp edges	✓ Damaged hearing ✓ Carpal tunnel syndrome ✓ Cuts/ injuries ✓ Eye irritation / blindness ✓ Injuries ✓ Eye injuries	M	✓ Use hearing protection when exposed to excessive noise levels (greater than 85 dB over an 8-hour work period) ✓ Assess manual guide carefully to ensure correct usage of portable electrical devices.



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ACTIVITY: PIPE LAYING & WELDING

Task	Hazard	Risk	Consequence	Rating	Controls
Pipe installation next to the road	<ul style="list-style-type: none"> ✓ Moving vehicles and pedestrians ✓ Improperly placed signage ✓ Incorrect signage displayed ✓ Poor communication between flagmen 	<ul style="list-style-type: none"> ✓ Road accidents ✓ People getting knocked down by cars ✓ 	<ul style="list-style-type: none"> ✓ Fatalities ✓ Serious injuries ✓ Property damages 	H	<ul style="list-style-type: none"> ✓ Adhere to traffic management procedures ✓ Proper training of flagpersons ✓ Ensure good communication between flagmen ✓ Display correct road signage, and put reflective barricades for additional visibility, especially at night and when it is dark / foggy. ✓ Employees should wear reflective PPE ✓ Keep area clean & clear of obstacles. ✓ Obtain wayleaves from the roads agency (JRA)
Tie-in to existing line	<ul style="list-style-type: none"> ✓ Raw sewer 	<ul style="list-style-type: none"> ✓ Skin contact ✓ Ingestion ✓ Splashing into eyes 	<ul style="list-style-type: none"> ✓ Waterborne diseases 	H	<ul style="list-style-type: none"> ✓ Provide employees with proper PPE, and ensure that the mouth, nose and eyes are covered. ✓ Vaccinate employees and ensure that they are medically fit to work in confined spaces.
	<ul style="list-style-type: none"> ✓ Live sewer 	<ul style="list-style-type: none"> ✓ Drowning 	<ul style="list-style-type: none"> ✓ Fatalities 	E	<ul style="list-style-type: none"> ✓ Sewer over-pumping ✓ Ensure that the line is isolated and there is no flow of sewer in the line. ✓ Ensure that several manholes are opened at a time to ensure that there is sufficient exits. ✓ Ensure that there is a trained first aider competent in resuscitation, and there is equipment for rescuing employees in cases of emergencies.



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ACTIVITY: PIPE LAYING & WELDING

Task	Hazard	Risk	Consequence	Rating	Controls
Pipe welding (Butt welding)	✓ Welding equipment	✓ Pinch points	✓ Injuries	L	✓ Welding equipment is visually checked before each use;
	✓ Welding equipment	✓ Heat	✓ Burns	L	✓ Provide employees with gloves ✓ Only trained employees to operate the butt welding machine ✓ Develop method statement for butt welding
Backfilling	✓ Soil	✓ Entrapment	✓ Serious injuries	M	✓ Backfilling to be done by mechanical means where excavations are deep ✓ No unauthorized entry ✓ The correct types of backfilling material to be used for backfilling
	✓ Unstable ground	✓ Excavation collapse	✓ Serious injuries ✓ Fatalities	H	✓ Ensure that backfilling is done according to relevant standards. ✓ Ensure that the area is well barricaded. ✓ Compaction tests to be done ✓ Put relevant signage ✓ No unauthorized entry to the construction site
Compacting	✓ Compactor ✓ Noise ✓ Dust ✓ Vibration	✓ Overexposure to noise and vibration ✓ Collapsing excavation wall ✓ Inhalation of dust	✓ Noise induced hearing loss ✓ Raynaud's Syndrome ✓ Injuries ✓ Respiratory problems	M	✓ Use of earmuffs by compactor operator ✓ Dust mask to be worn by compactor operator ✓ Compactor operator to be declared competent before using the machine ✓ Provide operator with anti-vibration gloves and provide rest periods in between. ✓



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ACTIVITY: PIPE JACKING

Task	Hazard	Risk	Consequence	Rating	Controls
✓ Pipe jacking	✓ Working in confined spaces	✓ Lack of oxygen ✓ Harmful gases ✓ Entrapment	✓ Asphyxiation ✓ Serious injuries ✓ Fatalities	H	✓ Develop a confined space procedure. ✓ Develop a permit to work system. ✓ Only authorized and trained personnel to enter confined spaces. ✓ Ensure that the gases are purged before entry. ✓ Provide employee with oxygen mask ✓ Have an employee trained in first aid ready. ✓ Confined space may not be smaller than 800mm in diameter.
	✓ Working at heights	✓ Falling	✓ Fatalities ✓ Serious injuries	H	✓ Proper PPE to be issued ✓ Provide rigid edge protection.
	✓ Lifting operations	✓ People hit by load ✓ Collapsing of pipe ✓ Incorrect slinging	✓ Injuries	M	✓ No people are allowed to be at the jacking site. ✓ Slinger to be identifiable and wear reflective PPE. ✓ Lifting machinery to be inspected prior to use. ✓ Lifting machinery to be load tested.
	✓ Deep excavation	✓ Falling	✓ Fatalities	H	✓ Barricade the jacking pit ✓ No unauthorized entry ✓ Site should be fenced off and locked out. ✓ Signage should be put up
	✓ Jetting rig	✓ Crushing by horizontal move of the rig; ✓ People hit by drop load	✓ Injuries	M	✓ Enter the shaft only once the load has reached the bottom. ✓ Signaler to make the people in the shaft aware of the moving load.



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WORKING INSIDE CONFINED SPACES

Task	Hazard	Risk	Consequence	Rating	Controls
Opening of manholes	Heavy covers	Falling on employees	Injuries		<ul style="list-style-type: none"> ✓ Provide employees with tools for lifting the manhole covers. ✓ For heavy lids above 15kg, at least two people should lift.
Entry inside manholes	Slippery steps	✓ Falling	Injuries	M	✓ Inspect the steps prior to entering
	Poor lighting	✓ Falling	Injuries	M	✓ Ensure that there is sufficient lighting in the confined space
	Small entrance	Bumping against walls	<ul style="list-style-type: none"> ✓ Injuries ✓ Damages to equipment 	L	✓ Train employees in confined space entry / techniques
	Working inside the confined space	<ul style="list-style-type: none"> ✓ No air circulation ✓ Exposure to heat ✓ Ergonomic factor 	<ul style="list-style-type: none"> ✓ Ill health ✓ Body pains ✓ Breathing difficulties ✓ Collapse /Fatality 	H	<ul style="list-style-type: none"> ✓ Suitable PPE and Breathing apparatus. ✓ Rescue procedure ✓ Full supervision ✓ Method statement ✓ Competent person appointed ✓ Ensure that employees are trained in confined spaces entry. ✓ Ensure that employees are medically fit to enter the confined space.
	Gasses	Inhalation of asphyxiants	Suffocation	H	<ul style="list-style-type: none"> ✓ Test gasses prior to employees entering the confined space using a suitable gas detector. ✓ Purge offensive gases for at least 15 minutes prior to employees entering. ✓ Provide employees with suitable gas masks ✓ Ensure that gas detectors are calibrated ✓ Develop an SOP for entry and rescue in the event of an incident / emergency inside the confined space.



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WORKING INSIDE CONFINED SPACES

Task	Hazard	Risk	Consequence	Rating	Controls
					<ul style="list-style-type: none"> ✓ Ensure that employees go inside the confined space with their gas detectors attached to them, and exit as soon as the detectors raise an alarm. ✓ Ensure that employees get at least 10 minutes rest outside the confined space for every 30 minutes worked.



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ACTIVITY: MECHANICAL LIFTING

Task	Hazard	Risk	Consequence	Rating	Controls
Lifting using a crane	✓ Overhead lines	✓ Contact with crane	✓ Electrocution ✓ Property damages	H	✓ All lifting activities to be planned at least 2m away from overhead lines ✓ Obtain wayleaves from Eskom ✓ Appoint ORHVS
	✓ Wind / Unfavourable weather	✓ Deflection ✓ Loss of control	✓ Injuries ✓ Property damages	H	✓ Do not use during unfavourable weather conditions
	✓ Incompetent operator	✓ Loss of control ✓ Hitting structures and people	✓ Injuries ✓ Property damages	H	✓ Only trained and competent operators may operate the crane
	✓ Overloading	✓ Collapse of material	✓ Injuries ✓ Property damages	H	✓ Display safe working load on the crane
	✓ Faulty crane	✓ Malfunctioning	✓ Injuries ✓ Property damages	H	✓ Cranes to be inspected by competent persons prior to being used ✓ All faulty cranes to be tagged and locked out



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ACTIVITY: FALSE WORK

Task	Hazard	Risk	Consequence	Rating	Controls
Transporting shutters	<ul style="list-style-type: none"> ✓ Defective strapping ✓ Incompetent driver ✓ No inspection ✓ Overloading of truck 	<ul style="list-style-type: none"> ✓ Falling load ✓ Loss of control of vehicle 	<ul style="list-style-type: none"> ✓ Injuries ✓ Property damages 	M	<ul style="list-style-type: none"> ✓ Ensure that the load is properly secured in the truck. ✓ Driver must have a valid PDP ✓ Driver must inspect truck and ensure that it is roadworthy ✓ Driver must keep the speed limit while driving
Offloading of shutters	<ul style="list-style-type: none"> ✓ No stop blocks ✓ Ignition on ✓ Untrained crane operator ✓ No load testing 	<ul style="list-style-type: none"> ✓ Accidental movement of truck ✓ Falling loads ✓ Uncontrollable movement of crane 	<ul style="list-style-type: none"> ✓ Fatalities ✓ Property damages 	H	<ul style="list-style-type: none"> ✓ Place stop blocks behind the wheels. ✓ Operators should ensure that the ignition is off prior to leaving the plant. ✓ Keys should be removed from the ignition and returned to the office for safekeeping. ✓ Ensure that crane operator and rigger are trained and medically fit to operate the crane. ✓ Ensure that the crane and all lifting equipment are load tested and SWL is displayed.
Installing shutters	<ul style="list-style-type: none"> ✓ Untrained personnel ✓ No PPE ✓ Poor housekeeping ✓ Defective hand tools ✓ Defective shutters 	<ul style="list-style-type: none"> ✓ Falling shutters ✓ Cuts ✓ Hitting employees 	<ul style="list-style-type: none"> ✓ Injuries 	M	<ul style="list-style-type: none"> ✓ Ensure that shuttering is only done by trained personnel. ✓ Provide employees with relevant PPE. ✓ Ensure proper housekeeping on site ✓ Inspect tools and shutters prior to installing
Dismantling shutters	<ul style="list-style-type: none"> ✓ No PPE ✓ No supervision 	<ul style="list-style-type: none"> ✓ Falling shutters ✓ Cuts 	<ul style="list-style-type: none"> ✓ Injuries 	M	<ul style="list-style-type: none"> ✓ Ensure that dismantling is done under supervision of a competent person.



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ACTIVITY: FALSE WORK

Task	Hazard	Risk	Consequence	Rating	Controls
	<ul style="list-style-type: none"> ✓ Untrained personnel ✓ Defective tools 	<ul style="list-style-type: none"> ✓ Hitting employees 			<ul style="list-style-type: none"> ✓ Ensure that dismantling is only done by trained personnel. ✓ Provide employees with relevant PPE. ✓ Ensure proper housekeeping on site. ✓ Inspect tools and shutters prior to installing



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ACTIVITY: STEEL FIXING

Task	Hazard	Risk	Consequence	Rating	Controls
Offloading of steel with mobile crane	<ul style="list-style-type: none"> ✓ Untrained operator ✓ Untrained rigger ✓ SWL of crane not indicated ✓ No guide ropes to control load 	<ul style="list-style-type: none"> ✓ Collapse of load onto people ✓ Uncontrollable movement of the crane 	<ul style="list-style-type: none"> ✓ Serious injuries ✓ Fatalities ✓ Property damages 	H	<ul style="list-style-type: none"> ✓ Ensure that the crane operator and rigger are trained and medically fit. ✓ Ensure that inspection on crane is conducted prior to use. ✓ Ensure that SWL is indicated ✓ Ensure that there is good communication and visibility between the operator and rigger. ✓ Guide ropes must be in place to control overhead loads ✓ Ensure that truck is parked in a zero-energy position and have stop blocks in place. ✓ Unauthorised persons not allowed when crane is in operation
Dismantling & installation of steel	<ul style="list-style-type: none"> ✓ Untrained personnel ✓ No PPE ✓ Poor housekeeping ✓ Defective hand tools ✓ Incorrect pushing and pulling of steel 	<ul style="list-style-type: none"> ✓ Steel falling on feet and legs ✓ Trips and falls 	<ul style="list-style-type: none"> ✓ Injuries 	M	<ul style="list-style-type: none"> ✓ Ensure that only trained employees are dismantling the steel ✓ Ensure that employees have the relevant PPE. ✓ Ensure proper housekeeping ✓ Ensure that hand tools are used prior to use. ✓ Ensure that the pulling and pushing system is correctly done and monitored.
Cutting steel with a grinder	<ul style="list-style-type: none"> ✓ Grinder ✓ Faulty connection points 	<ul style="list-style-type: none"> ✓ Electrocution ✓ Cuts 	<ul style="list-style-type: none"> ✓ Injuries ✓ Amputation 	M	<ul style="list-style-type: none"> ✓ Ensure all grinders and connections are inspected



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ACTIVITY: STEEL FIXING

Task	Hazard	Risk	Consequence	Rating	Controls
	<ul style="list-style-type: none"> ✓ No inspections ✓ Untrained operator ✓ No PPE ✓ Damaged cutting disc 				<ul style="list-style-type: none"> ✓ Ensure that safety guards are in place on the grinder ✓ Handle and switch of the grinder should be inspected and tested prior to use. ✓ Only trained employees may use grinders ✓ Proper PPE to be used ✓ Inspect cutting disc prior to use
Binding steel with wire (using nip pliers)	<ul style="list-style-type: none"> ✓ Defective tools ✓ No PPE 	✓ Cuts	✓ Injuries	L	<ul style="list-style-type: none"> ✓ Inspect tools prior to using ✓ Ensure that the wire used to bind steel is bent at the end to prevent eye injuries ✓ Ensure that proper PPE is provided



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ACTIVITY: CONCRETE WORKS

Task	Hazard	Risk	Consequence	Rating	Controls
Concrete works	✓ Moving bucket	✓ Hitting employees	✓ Injuries	M	<ul style="list-style-type: none"> ✓ Workers to stand clear of the path of the bucket ✓ Banksman to direct the loading and offloading activities
	✓ Working at heights	✓ Falls from heights	✓ Injuries	H	<ul style="list-style-type: none"> ✓ Only work on platforms that are fully boarded and handrails installed
	✓ Concrete splashing	✓ Skin contact	<ul style="list-style-type: none"> ✓ Dermatitis ✓ Skin burns 	M	<ul style="list-style-type: none"> ✓ Use of skin protection ✓ Provide gloves and safety boots ✓ Have MSDS
	✓ Concrete splashing	✓ Eye contact	✓ Eye injuries	M	<ul style="list-style-type: none"> ✓ Provide safety goggles
Operating concrete truck	✓ Incompetent operator	<ul style="list-style-type: none"> ✓ Hitting employees; ✓ Bumping vehicles and properties 	<ul style="list-style-type: none"> ✓ Injuries ✓ Property damages 	M	<ul style="list-style-type: none"> ✓ Only trained, competent and appointed operators may operate a concrete truck ✓ Flagman to be posted to direct the operator
	✓ Speeding	<ul style="list-style-type: none"> ✓ Hitting employees; ✓ Bumping vehicles and properties 	<ul style="list-style-type: none"> ✓ Injuries ✓ Property damages 	M	<ul style="list-style-type: none"> ✓ Site speed limits to be adhered to at all times
	✓ Manual handling of chutes	✓ Incorrect handling	✓ Injuries	M	<ul style="list-style-type: none"> ✓ Training in correct handling methods ✓ Provide employees with gloves. ✓ Provide leather gloves for concrete chute



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PROJECT DESCR:	Diepsloot Sewage Aqueduct

ACTIVITY: CONCRETE WORKS

Task	Hazard	Risk	Consequence	Rating	Controls
Pouring concrete with a bucket by means of a mobile crane	Incompetent operator	<ul style="list-style-type: none"> ✓ Hitting employees; ✓ Bumping vehicles and properties 	<ul style="list-style-type: none"> ✓ Injuries ✓ Property damages 	M	<ul style="list-style-type: none"> ✓ Only trained, competent and appointed operators may operate a concrete truck. ✓ Flagman to be posted to direct the operator
	Unauthorised / unsuitable crane	<ul style="list-style-type: none"> ✓ Hitting employees; ✓ Collapse of material 	<ul style="list-style-type: none"> ✓ Injuries ✓ Property damages 	M	<ul style="list-style-type: none"> ✓ Crane to be inspected by a competent person prior to use. ✓ Unsuitable crane to be tagged and locked out
Crane parking	Unstable ground	<ul style="list-style-type: none"> ✓ Crane overturning 	<ul style="list-style-type: none"> ✓ Injuries ✓ Property damages 	M	<ul style="list-style-type: none"> ✓ Crane to be established on solid ground with outriggers fully extended and pads in place



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ACTIVITY: WORKING AT HEIGHTS

Task	Hazard	Risk	Consequence	Rating	Controls
Working at heights	<ul style="list-style-type: none"> ✓ Heights ✓ Unfit employees ✓ Using hand tools ✓ Unsecured tools and equipment 	<ul style="list-style-type: none"> ✓ Falls ✓ Falling onto employees 	<ul style="list-style-type: none"> ✓ Injuries 	M	<ul style="list-style-type: none"> ✓ Employees to use proper PPE including safety harnesses when working at heights. ✓ Inspect all tools prior to use. ✓ Provide training for using safety harnesses correctly. ✓ Employees working at heights must be certified fit to work. ✓ Hand tools must be attached to lanyards when working at heights. ✓ Use tool bags ✓ Use netting system below each level. ✓ No work should be done on the ground when work at heights is in progress. ✓ Proper signage to be displayed.



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ACTIVITY: SCAFFOLD WORK

Task	Hazard	Risk	Consequence	Rating	Controls
Scaffold work	Improper erection	<ul style="list-style-type: none"> ✓ Collapse ✓ Falling of employees and equipment 	<ul style="list-style-type: none"> ✓ Property damages ✓ Fatalities 	H	<ul style="list-style-type: none"> ✓ Only a competent scaffold erector may erect a scaffold. ✓ Scaffold to be erected on firm, stable base ✓ Check the stability of the scaffold prior to allowing employees to climb on them. ✓ Mobile scaffolds must have their wheels locked before any person is allowed to climb on them. ✓ All parts of the work platform and scaffold must have safe means of access ✓ Unattended or incomplete scaffold should be prevented against unauthorized access. ✓ Suitable access ladder must be provided ✓ A fall arrest harness must be worn. ✓ Never use worn out fall arrest equipment. ✓ Suitable equipment for rescue must be available ✓ Proper bracing of the scaffold ✓ Scaffold to be securely tied to a structure
Working on scaffold	Overloading	<ul style="list-style-type: none"> ✓ Collapse 	<ul style="list-style-type: none"> ✓ Property damage 	H	<ul style="list-style-type: none"> ✓ Display the safe working load of the scaffold



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ACTIVITY: SCAFFOLD WORK

Task	Hazard	Risk	Consequence	Rating	Controls
		✓ Falling of employees and equipment	✓ Fatalities		✓ Never exceed the SWL of the scaffold
Working on scaffold	Overhead lines	✓ Contact with overhead lines ✓ Contact with employees	✓ Property damages ✓ Electrocution	H	✓ Erect the scaffold away from power lines ✓ Keep tools away from overhead lines ✓ Fall arrest equipment to be attached
	Unstable ground conditions	✓ Collapsing of scaffold	✓ Injuries ✓ Property damage	H	✓ Ensure that the foundation / footing of the scaffold is stable and levelled ✓ Only trained and competent persons may erect a scaffold
	Non-compliant scaffolding	✓ Collapsing of scaffold	✓ Injuries ✓ Property damage	H	✓ All platforms to be fully boarded and boards used to comply with SANS 085 ✓ All components of the scaffold must comply with SANS 085
Work platform	Inadequate space	✓ Falling persons and objects	✓ Fatalities ✓ Property damages	H	✓ Work platform should be at least 1m wide and capable of carrying the load that the type of work carried out may require



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ACTIVITY: SCAFFOLD WORK

Task	Hazard	Risk	Consequence	Rating	Controls
					<ul style="list-style-type: none"> ✓ To prevent persons from falling from the outside edges of work platforms, guardrails and mid-rails must be fitted. ✓ If loose objects or other materials may be present on the platform, edge protection/ toe boards must be provided on work platforms.
Edge protection	Working close to edges	✓ Falling	✓ Fatalities	H	<ul style="list-style-type: none"> ✓ To prevent persons from falling, edge protection must be erected around the perimeter of the work. This must comprise the guardrail and mid-rail designed to withstand any reasonable force, which is expected to fall against it. ✓ Only a competent person may erect an edge protection system ✓ Edge protection can be in the form of hook on boards used as toe boards



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ACTIVITY: WORKING NEAR A STREAM / WETLAND

Task	Hazard	Risk	Consequence	Rating	Controls
Working near a stream	✓ Water	✓ Drowning	✓ Fatality	H	<ul style="list-style-type: none"> ✓ Provide employees with life jackets where activities will take place in close proximity to the stream / wetland ✓ Barricade the area and put appropriate signage ✓ Develop a method statement and a risk assessment for working near a stream / wetland ✓ Divert water where required to ensure that work is carried out in a safe manner
	✓ Snakes	<ul style="list-style-type: none"> ✓ Bites ✓ Poisoning 	✓ Fatalities	H	<ul style="list-style-type: none"> ✓ Inspect the area before and while working ✓ Look around the surroundings for snakes ✓ Train employees in snake awareness ✓ Provide employees with lashers



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ACTIVITY: USING THE GENERATOR

Task	Hazard	Risk	Consequence	Rating	Controls
Fueling the generator	✓ Spillages	✓ Slips, trips, falls	✓ Injuries	L	✓ Prevent spillages ✓ Use drip trays ✓ Use funnels for fueling
		✓ Fire	✓ Injuries	M	✓ No smoking allowed near the generator
	✓ Diesel fumes	✓ Inhalation	✓ Respiratory problems	L	✓ Provide employees with respirators
		✓ Skin contact	✓ Skin irritation	L	✓ Provide employees with gloves, safety boots and overalls
	✓ Running engine	✓ Explosion	✓ Injuries	M	✓ Switch engine off before refueling and make sure fuel cap is replaced. ✓ No smoking allowed near the generator
Running the generator engine	✓ Noise	✓ Over-exposure	✓ Noise-induced hearing loss	M	✓ Provide employees with hearing protection ✓ Provide rest periods for employees
	✓ Vibration	✓ Over exposure	✓ Raynaud's Syndrome	L	✓ Provide employees with vibration gloves. ✓ Rotate employees or provide rest periods.
	✓ Fumes	✓ Inhalation	✓ Respiratory problems	L	✓ Provide employees with respirators ✓ Never use indoors



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ACTIVITY: JETTING THE LINE

Task	Hazard	Risk	Consequence	Rating	Controls
Jetting	<ul style="list-style-type: none"> ✓ Pressurized water ✓ Pipe moving uncontrollably 	<ul style="list-style-type: none"> ✓ Hitting employees ✓ Burst 	<ul style="list-style-type: none"> ✓ Injuries 	M	<ul style="list-style-type: none"> ✓ Develop a method statement ✓ Inspect the jetting truck prior to operation ✓ Clear the area while jetting is performed ✓ The operators of High-Pressure jetting systems must be trained to use the equipment that they will operate ✓ Don't exceed pipe operating pressure, ensure pipe is correct diameter and is not damaged. ✓ Hoses should be tested when they have been repaired, or when they have been re-ended. ✓ Hoses must be visually inspected at regular intervals defined by the Operational Unit, not exceeding 6 months. This requirement must be integrated into an operational procedure (and included in operators training). ✓ Employees must be provided with proper PPE ✓ Work activities should be planned to provide safe access to the equipment and item or surface being jetted. ✓ Overhead work should be avoided where possible, as this may cause unstable worker positioning and increase the risk of musculoskeletal disorders.



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ACTIVITY: JETTING THE LINE

Task	Hazard	Risk	Consequence	Rating	Controls
					<ul style="list-style-type: none"> ✓ Operators using manually operated jetting systems should be in a safe and well-balanced position before starting jetting operations. ✓ Jetting operations should not be performed from ladders or other surfaces not intended for use by workers, as this can lead to loss of control of the jetting equipment. ✓ Operators should check there is no interruption or interference to the release mechanism of any hand or foot controls that could stop the equipment operating safely and consistent with the manufacturer's specifications. ✓ Jetting systems should be depressurised and secured when: not in use and left unattended, and components are being replaced or repairs are being made to the system.



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ACTIVITY: OPERATING CONSTRUCTION VEHICLES

Task	Hazard	Risk	Consequence	Rating	Controls
Operating construction vehicles and mobile plant	✓ Moving bucket / arm	✓ Hitting employees	✓ Injuries	M	✓ Workers to stand clear of the path of the construction vehicles and mobile plant ✓ Rigger to direct the loading and offloading activities
	✓ Incompetent operator	✓ Hitting employees; ✓ Bumping vehicles and properties	✓ Injuries ✓ Property damages	M	✓ Only trained, competent and appointed operators may operate a concrete truck ✓ Flagman to be posted to direct the operator
	✓ Unhealthy operator	✓ Collapsing whilst operating	✓ Fatalities ✓ Injuries to other people ✓ Property damages	H	✓ All operators to undergo annual medical examinations prior to resumption of duties ✓ All sick employees must report to their supervisors, and not be allowed to operate construction vehicles and mobile plant.
	✓ Speeding	✓ Hitting employees; ✓ Bumping vehicles and properties	✓ Injuries ✓ Property damages	M	✓ Site speed limits to be adhered to at all times
Parking	✓ No visibility ✓ Parking on a blind spot ✓ Uncontrollable movement	✓ Collision with other vehicles ✓ Bumping into people	✓ Fatalities ✓ Property damages	H	✓ Ensure that construction vehicles are parked at safe areas while conducting operations ✓ Use signage where trucks are parked in / near the road ✓ Place stop blocks to prevent any movement. ✓ Ensure that the key is removed from the ignition when parked.
Maintenance & inspection	✓ Suction hose ✓ Vacuum pump	✓ Heating up during operations	✓ Severe burns	M	✓ Avoid contact with the vacuum pump during or immediately after operation. ✓ Do not touch hot fluid or equipment ✓ Do not touch exhaust pipe of truck unless you are a trained professional carrying out maintenance or repairs



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ACTIVITY: OPERATING CONSTRUCTION VEHICLES

Task	Hazard	Risk	Consequence	Rating	Controls
	✓ Hydraulic oil	✓ Contact with skin	✓ Severe burns ✓ Skin disease	M	✓ Refueling to be carried out in designated areas. Ensure spill kits are available and shutdown valve of the pump is available. ✓ Conduct a risk assessment of the refueling station ✓ All pipe clamps fitted ✓ Pressure protection valves and Anti Drop valves fitted to hydraulic system. ✓ High pressure warning decals ✓ Hydraulic fluid lines to be inspected daily; cracks, tears and deformed lines must be reported and repaired prior to use.



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ACTIVITY: GENERAL ACTIVITIES ON SITE

Task	Hazard	Risk	Consequence	Rating	Controls
✓ Working on site	✓ Unhappy community	✓ Community coming to survey site ✓ Violence against employees	✓ Property damages ✓ Serious injuries	H	✓ Develop an emergency response procedure ✓ Meet with the community and all stakeholders prior to commencement of the project ✓ Have the contact details of the nearest police station / JMPD offices
	✓ Unfavourable weather conditions	✓ Exposure to temperature extremes	✓ Heat exhaustion ✓ Frost bite	M	✓ Provide employees with water for cooling down. ✓ Provide employees with warm jackets and gloves during winter ✓ Provide 5-minute rest periods for every 30 minutes of exposure to temperature extremes. ✓ No work to be undertaken in rainy conditions
	✓ Housekeeping	✓ Trips and falls	✓ Injuries	M	✓ Ensure that proper housekeeping is maintained on site at all times.
✓ Working near open spaces	✓ Snakes	✓ Bites ✓ Poisoning	✓ Fatalities ✓ Serious injuries	H	✓ Inspect the area for snakes prior to entering ✓ Conduct snake awareness training ✓ Know the do's and don'ts of what to do when coming across snakes
	✓ Bees	✓ Bites	✓ Allergic reaction	M	✓ Inspect the area for bees / wasps prior to entering ✓ Conduct bees awareness training ✓ Know the do's and don'ts of what to do when coming across bees
	✓ Sharp objects	✓ Getting pricked by sharp objects	✓ Tetanus ✓ Injuries	M	✓ All employees to get Tetanus vaccination. ✓ Provide employees with proper safety boots



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ACTIVITY: GENERAL ACTIVITIES ON SITE

Task	Hazard	Risk	Consequence	Rating	Controls
	✓ Criminals	✓ Getting mugged	✓ Loss of personal possession	M	<ul style="list-style-type: none"> ✓ Personal belongings such as phones and car keys to be safely put in pockets while working. ✓ Employees to report any suspicious activities to the local police. ✓ Equipment to be safely stored while not in use
	✓ Criminals	✓ Employees being attacked	<ul style="list-style-type: none"> ✓ Injuries ✓ Fatalities 	H	<ul style="list-style-type: none"> ✓ Ensure that employees do not work in isolation. ✓ Employees to report any suspicious activities to the local police. ✓ Develop an emergency response procedure
	✓ Open excavations (other works)	✓ Falling inside	✓ Injuries	M	<ul style="list-style-type: none"> ✓ Employees to be vigilant while working on site
	✓ Water bodies	✓ Falling inside	<ul style="list-style-type: none"> ✓ Serious injuries ✓ Fatalities 	H	<ul style="list-style-type: none"> ✓ Employees to be vigilant while working on site ✓ Emergency procedures to be developed
	✓ Rotating equipment	<ul style="list-style-type: none"> ✓ Entrapment ✓ Getting caught by 	<ul style="list-style-type: none"> ✓ Serious injuries ✓ Fatalities 	H	<ul style="list-style-type: none"> ✓ Ensure that machinery is isolated or locked out while working on it.
	✓ Raw sewer	<ul style="list-style-type: none"> ✓ Skin contact ✓ Ingestion ✓ Splashing into eyes 	<ul style="list-style-type: none"> ✓ Waterborne diseases 	H	<ul style="list-style-type: none"> ✓ Provide employees with proper PPE, and ensure that the mouth, nose and eyes are covered. ✓ Vaccinate employees and ensure that they are medically fit to work in confined spaces.



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RISK ASSESSMENT MATRIX

Likelihood	Consequences				
	Insignificant (minor problem easily handled by normal day to day processes)	Minor (Some disruption possible e.g., damage equal to R150k)	Moderate (significant time / resources required. E.g., damage equal to R500k)	Major (Operations severely damaged. E.g., damages equal to R1m)	Catastrophic (business survival is at risk. Damage equal to R5m – 10m)
Almost certain (90% chance)	High	High	Extreme	Extreme	Extreme
Likely (between 50-90%)	Moderate	High	High	Extreme	Extreme
Moderate (between 10-50%)	Low	Moderate	High	Extreme	Extreme
Unlikely (between 3-10%)	Low	Low	Moderate	High	Extreme
Rare (<3%)	Low	Low	Moderate	High	High