

**APPOINTMENT OF AN EPC CONTRACTOR TO CARRY OUT ENGINEERING,  
PROCUREMENT AND CONSTRUCTION OF A 50 TON PER DAY BIODIGESTER PILOT  
PLANT AT ROBINSON DEEP LANDFILL SITE, JOHANNESBURG AND OPERATING AND  
MAINTAINING IT FOR A PERIOD OF 3 YEARS**

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CONSTRUCTION OF A 50 TON PER DAY BIODIGESTER PILOT PLANT AT ROBINSON DEEP LANDFILL SITE, JOHANNESBURG AND OPERATING AND MAINTAINING IT FOR A PERIOD OF 3 YEARS



## Assessment

## Baseline Risk

### Implementing Agent:

Development Bank of Southern Africa Limited  
1258 Lever Road  
Midrand Johannesburg  
Gauteng  
1685

No.	Task or activity	Potential hazard (potential danger)	Possible consequence Likely to happen	Initial risk score				Proposed control measures	Final risk score	
				C	L	F	RR		MF	FRR
BRA-01	COVID-19	· Employees are not aware of the risks of COVID-19 and become infected due to lack of awareness of control measures.	· Severe dry coughing, fever, tiredness, sneezing	100	6	6	3600	· Outbreak is monitored daily.	0,2	720
		· Affecting other employees next to you	· Spreading the virus					· Cover your mouth when coughing and sneezing.		
		· Employees getting affected due to contact with each other or the visitor, sharing documents or pen.	· Spreading the virus					· Display COVID-19 workplace guidelines issued by Department of Labour		
		· Exposure to infected individuals.	· Spreading the virus					· Wash your hands with soap and water for at least 20 seconds after touching surface or any person.		
		· Heavy difficulty breathing	· Death					· Display charts showing symptoms identification of COVID-19.		
								· Reminders to be broadcasted to all the employees every two days via SMS and WhatsApp.		
		· Wear mask at all times.								
		· Use hand sanitizer to kill the virus in your hands								
		· Use gloves from the direct contact with the virus.								
		· Do not shake hands, hugs or kiss.								
		· Always stand away from the next person (Social distancing).								
		· All visitors to comply with the methods drafted by the management to control the spread of a virus.								
		· Screening of employees and visitors at the entrance daily.								
		· Reporting of suspected cases.								
		· Maintain good personal hygiene								
		· Advice on how to self-isolate has been passed onto the employees. This means not going to social gatherings outside work, shopping centres, use of public transport or any other public area outside work.								
BRA-02	Design of the biogas plant	· Designs not conforming to the applicable safety standards i.e. high-pressure gas or liquid leaks and structural failure	· Fire explosion	0,5	3	100	150	· Appointment of a competent design team registered with the relevant professional bodies.	0,2	30
			· Asphyxiation					· Provision of valid and adequate professional indemnity (insurance)		
			· Poisoning					· Provide all relevant signoffs for gas, pressure, civil, structural, and electrical system designs.		

<b>BRA-03</b>	<b>Transporting of organic waste from the fresh produced market</b>	- Truck accidents/ incidents	- Damage to property and environment	15	6	2	180	- All operators to be appointed in writing and competencies to be attached	0,4	72
		- Contact with organic waste	- Serious injuries					- All trucks to be inspected before each use		
		- Obnoxious smells & Accidental dropping of waste on route	- Fatalities					- Speed limit to be managed		
		- Sharp objects inside the waste	- Occupational health disease/ infection					- All activities to be managed by qualified and trained supervisor		
		- Containers overturning and hitting something	- Cuts					- Installing traffic control measures on site (Speed limit signs, Speed humps and traffic lights)		
<b>BRA-04</b>	<b>Use and storage of biogas</b>	- Gas leak	- Risk of fire	40	10	2	800	- Adequate ventilation to be in place	0,4	320
		- Exposure to gases such as Methane, Carbon dioxide, Hydrogen sulphide, Ammonia, Hydrogen, Carbon monoxide, Volatile organic compounds	- Burns					- SWP's and SOP's to be communicated		
		- Operation of gas storage equipment	- Risks of inhaling gas resulting in occupational health disease					- Adequate personal protective clothing and equipment		
			- Risks associated with pathogens (diseases)					- Supervisors' presence		
			- Physical injury and spillage through accidents							
			- Fatalities							
			- Environmental pollution							
	- Risk of gas poisoning (H2S, NH3)									
<b>BRA-05</b>	<b>Installation of air compressor</b>	- Exposure to rotating or moving parts	- Serious injuries	40	6	2	480	- All necessary guards to be in place	0,4	192
		- Fire triggered by the unexpected release of stored gases and substances	- Fatalities					- All air compressors to be tagged with the lockout tags and warning signs to be in place		
			- Slips and falls					- Supervisors' presence		
			- Damage to property and environment					- All employees to remove jewellery to avoid being entangled with the moving parts		

<b>BRA-06</b>	<b>Major hazardous installations</b>	.Unsafe lifting practices,	Falling	6	1	100	600	Use of well maintained lifting machinery	0,4	240
		Work at heights,	Damage to property					Use of competent operators and riggers		
		Exposure to HCS	Other physical injury/death					Lifting method statement, DSTI'S and SO/WP		
								Medical examination and training of all workers working at heights . Submission of Major Hazardous Installation Assessment Report to DoL.		
<b>BRA-07</b>	<b>Removal of diesel tanks</b>	. Spillages	. Fire risks	40	10	2	800	. Decommissioning license	0,4	320
		. Tank falling apart	. Occupational diseases from the dust					. Supervisors' presence at all times		
		. Old tank still having diesel	. Damage to property and environment					. Task specific PPE to be provided		
		. Old pipes connected to the tanks having windborne dust	. Serious injuries/ permanent injuries					. Site induction to be conducted		
		. Cutting of tanks using heavy power grinders								
		. Existing underground services								
<b>BRA-08</b>	<b>Decommissioning of medical waste incinerator</b>	.Possible exposure to medical waste	Occupational diseases and cuts	40	10	2	800	. Decommissioning plan with risk assessment and method statement	0,4	320
		Transportation to landfill site	Possible environmental contamination					Decommissioning license		
		Structural collapse	Physical injury and damage to property					Use of demolition specialist		
		. Steel cutting	Fire					Use of protective equipment/clothing		
		. Mechanical lifting	Use of competent operator and riggers					Disposal at designated landfill site (medical waste with disposal certificate)		
		. Disposal	Use of compliant vehicles							

<b>BRA-09</b>	<b>Oxygen / acetylene and LPG cylinders</b>	· Sub-standard storage areas	· Fire risks	40	6	3	720	· Housekeeping checklist to be done daily.	0,4	288
			· Burns					· All cylinders to be chained to a solid structure when stored.		
			· Damage to property and environment					· Only authorized personnel to have access to cylinder storage area.		
			· Serious injuries/ permanent injuries					· Correct signage's to be displayed outside the store area.		
			· Fatalities					· HCS stores not to be placed close to cylinder store.		
								· MSDS to be available on site.		
						· All stores to be built according to OSH act standards.				
							· All cylinders to be marked clearly.			

BRA-10	Hazardous substances and control	Incorrect handling of chemicals and hazardous substances	Fire risks	7	3	2	42	<ul style="list-style-type: none"> <li>- Hazardous substance procedures to be given in toolbox talks.</li> <li>- Task Specific DSTIs to be done with all employees working with Hazardous substances.</li> <li>- Risk assessments to be reviewed regularly and communicated by Construction Safety Officer.</li> <li>- Employees to be inducted and trained in the Hazardous handling and disposal procedure.</li> <li>- Supervisors to ensure all containers are labelled properly and copies of MSDS are available.</li> <li>- If in doubt suppliers to be contacted for information on proper labelling and MSDS for relevant chemicals.</li> <li>- Inspections to be carried out to ensure handling and storage of hazardous chemicals are done according to regulations and specifications.</li> <li>- Principal contractor emergency procedures for hazardous substances and spillages to be communicated to all employees.</li> <li>- All relevant facilities for cleaning and treating of incidents related to hazardous substances to be readily available and all employees to be trained in the use thereof.</li> <li>- Emergency response plan to be displayed in areas where visible. Fire extinguishers to be placed strategically with visible signs showing their position.</li> <li>- No chemical to be used on site without availability of relevant MSDS.</li> <li>- Only competent personnel to use hazardous substances under the supervision of an appointed hazardous chemical supervisor. Employees to be required to sign for the hazardous substances before collecting them from store areas as a control measure.</li> <li>- Automatic plant control systems should be in place in hazardous material facilities to eliminate the need for operator intervention and maintain operation within the required parameters.</li> <li>- Periodical emergency drills to be carried out and training on evacuation procedures to be given from time to time.</li> <li>- Emergency coordinators to be appointed in writing with names displayed on notice boards.</li> <li>- Identified assembly points to stay clear of any material/stacks</li> <li>- Emergency equipment to be maintained, inspections to be carried out and deviations rectified. Emergency teams to be selected and the appointees to undergo necessary training i.e. fire fighting.</li> <li>- Emergency telephone numbers of all relevant departments and services to be displayed on site.</li> <li>- Activities will not be carried without the necessary documentation like MSDS, Issue based Risk assessments and relevant procedures.</li> <li>- Supervisor to ensure correct PPE is issued and used, regular PPE inspections to be carried out by Construction Safety Officer.</li> <li>- Only authorized personnel to be allowed in areas.</li> </ul>	0,2	8,4	
		Chemicals not stored correctly	Burns								
		Damage to property and environment	Serious injuries/permanent injuries								
		Fatalities									

BRA-11	Use of mobile cranes	· Unsafe movement of the crane	· Serious injuries	15	6	6	540	· Competent operator to be appointed in writing	0,4	216
		· on site	· Damage to property and environment					· Inspection of the crane before each use		
		· Crane operated by incompetent person	· Fatalities					· Load testing to be conducted yearly and certificate to be produced		
		· Crane tipping over or falling of the load from heights						· Bank's man or riggers to control the crane		
		· Exposure to excess heat while operating the crane						· SWP and SOP to be adhered to		
BRA-12	Hot work (gas cutting, welding and grinding)	· Unsafe use of heavy power grinder	· Serious injuries	15	1	2	30	· DSTI's to be conducted by the supervisor and communicated to all the personnel involved.	0,4	12
		· Flying particles from grinding	· Damage to property and environment					· Firefighting equipment to be easily accessible by the competent appointed fire fighters		
		· Employees not trained or inducted	· Fatality					· Supervisors' presence		
		· Employees not using the correct PPE	· Slips and fall					· PTO s to be conducted daily and necessary control measures to be put in place after the findings.		
		· Fire Risks						· PPE Survey to be done on all tasks and relevant PPE to be issued to employees.		
		· Burns						· Employees to be trained on PPE use.		
		· Energy release						· All DSTI, risk assessments and SWP to be communicated to all employees.		
		· High noise level (32 dB)						· Working area to be clean from combustible material		
		· No radiation or spark containment						Housekeeping checks to be done daily before task starts.		
		· Extension cable cords running around						· Hot works permit system to be implemented, permits to be issued and when task is completed fire watcher to sign off hot works permit after checking for any smouldering.		
		· Hot objects from Welding and Gas Cutting						· Firefighting inspection registers to be completed monthly.		
		· Noise induced hearing loss								
		· Foreign bodies in eyes								
· Impaired vision										

<b>BRA-13</b>	<b>Delivery of equipment/material</b>	· Interaction with other vehicles and people	· Vehicle Accidents / Possible collisions	40	6	3	720	· Trained flaggers to be utilized for traffic control.	0,2	144
		· Driver not certified, competent and appointed	· Property Damage and environment					· Emphasis to be put on the segregation of pedestrians, light vehicles and heavy mobile equipment through tool box talks and DSTI's, this will help to achieve optimum results from the system.		
		· Vehicles not inspected	· Physical Injuries					· Vehicles will not be allowed to depart from loading zone with unsecure load, this will be ensured by the supervisor that is supervising the activity.		
		· Load not properly secured / overloaded	· Serious injury/ permanent disability					· Delivery arrangements to be communicated to supervisor so that proper procedures maybe followed and delivery areas prepared for delivery.		
		· Unsecured laydown area	· Fatalities					· Drivers to produce proof competency with ID copies and proof of medical fitness upon arrival.		
		· Unauthorized personnel in the laydown area						· Drivers and delivery personnel to undergo site induction upon arrival.		
		· Inadequate communication between Operator / Flagman						· Security Officers to insist on viewing driver's license.		
		· Non-compliance to Traffic Management Plan						· Formal communication to be made to dedicated suppliers on the requirements for inspections.		
								· All off-loading activities shall be subjected to a DSTI completion and shall include the route plan; positioning and load restrain detachment and off-loading method.		

<b>BRA-14</b>	<b>Off-loading of equipment / material</b>	<ul style="list-style-type: none"> <li>Sub-standard / unsafe stacking practices</li> </ul>	<ul style="list-style-type: none"> <li>Pinching / scratching</li> </ul>	15	6	6	540	<ul style="list-style-type: none"> <li>Competent stacking and storing supervisor to be appointed in writing</li> </ul>	0,4	216
		<ul style="list-style-type: none"> <li>Unsafe manual handling Insufficient / incorrect dunnage</li> </ul>	<ul style="list-style-type: none"> <li>Back injuries</li> </ul>					<ul style="list-style-type: none"> <li>Designated areas for stacking to be identified and stacking and storage supervisor to monitor.</li> </ul>		
		<ul style="list-style-type: none"> <li>Sub-standard Housekeeping practices</li> </ul>	<ul style="list-style-type: none"> <li>Damage to property and environment</li> </ul>					<ul style="list-style-type: none"> <li>Observe correct lifting technique i.e. use legs and not back for lifting operations. Observe safe stacking practices i.e. even stacks, max height 3 X shortest base (stacking supervisor). Deliveries are to be supervised by site supervisor. Continually monitor the erection and dismantling of stacks (stacking supervisor). Required PPE: Overalls, safety shoes, hard hat, leather gloves and glasses.</li> </ul>		
			<ul style="list-style-type: none"> <li>Fatalities</li> </ul>					<ul style="list-style-type: none"> <li>Training to be provided on stacking and storage through toolbox talks and DSTI's.</li> </ul>		
								<ul style="list-style-type: none"> <li>Inspections to be carried out and unsafe equipment to be removed from the premises.</li> </ul>		
								<ul style="list-style-type: none"> <li>Stacking and storage supervisor to monitor and enforce safe stacking procedures.</li> </ul>		
								<ul style="list-style-type: none"> <li>Good housekeeping to be ensured through daily inspections which will be conducted twice a day.</li> </ul>		
								<ul style="list-style-type: none"> <li>After stacks are completed, an inspection should be carried out to ensure stacking and storage procedures are followed.</li> </ul>		
		<ul style="list-style-type: none"> <li>Toolbox talks to be done and all employees to attend and records to be kept.</li> </ul>								

BRA-15	Use of electrical equipment (Leads/ portable electrical tools)	<ul style="list-style-type: none"> <li>Inspecting the work area and handling material without appropriate PPE (gloves)</li> </ul>	<ul style="list-style-type: none"> <li>Slips and falls</li> </ul>	40	10	3	1200	<ul style="list-style-type: none"> <li>Competent electrical supervisor to be appointed in writing</li> </ul>	0,4	480
		<ul style="list-style-type: none"> <li>Poor housekeeping/ stacking of the material and tools</li> </ul>	<ul style="list-style-type: none"> <li>Hand cuts and bruises</li> </ul>					<ul style="list-style-type: none"> <li>Supervisor to ensure that all employees are wearing gloves when handling the equipment and tools</li> </ul>		
		<ul style="list-style-type: none"> <li>Unsafe access and egress</li> </ul>	<ul style="list-style-type: none"> <li>Serious head or finger injuries</li> </ul>					<ul style="list-style-type: none"> <li>Supervisor to ensure that all walkways are clear and material is packed neatly</li> </ul>		
		<ul style="list-style-type: none"> <li>Use electrical tools (grinders and drillers)</li> </ul>	<ul style="list-style-type: none"> <li>Other serious injuries</li> </ul>					<ul style="list-style-type: none"> <li>All employees to be informed of the in the working area as the DSTI's conducted</li> </ul>		
		<ul style="list-style-type: none"> <li>Using electrical faulty equipment</li> </ul>	<ul style="list-style-type: none"> <li>Fire risks</li> </ul>					<ul style="list-style-type: none"> <li>Only trained employees can use the grinder. When the grinder is switched on it must run free for 30 seconds to check the integrity of the grinder</li> </ul>		
		<ul style="list-style-type: none"> <li>Incorrect use of bending pipe</li> </ul>	<ul style="list-style-type: none"> <li>Damage to property and environment</li> </ul>					<ul style="list-style-type: none"> <li>All mains that power portable electrical equipment operating above extra low voltage shall be protected by a Residual Current Devices RCD.</li> </ul>		
		<ul style="list-style-type: none"> <li>Cutting disc not inspected before cutting</li> </ul>	<ul style="list-style-type: none"> <li>Burns</li> </ul>					<ul style="list-style-type: none"> <li>Portable Electrical Equipment shall be double insulated, registered on the contractor's equipment register and tagged showing the date of the last inspection. RCDs shall be numbered and registered. The frequency of inspection shall be monthly.</li> </ul>		
		<ul style="list-style-type: none"> <li>Electrocution</li> </ul>					<ul style="list-style-type: none"> <li>Electrical Cables / hoses and electrical leads must be suspended and routed orderly at least 2m above walkways and working areas.</li> </ul>			
		<ul style="list-style-type: none"> <li>Fatalities</li> </ul>					<ul style="list-style-type: none"> <li>Test for "Zero Energy" in any situation where unexpected motion of equipment undergoing repair, installation etc. could result in an accident or injury.</li> </ul>			
							<ul style="list-style-type: none"> <li>Implement Safe Operating Procedure</li> </ul>			
							<ul style="list-style-type: none"> <li>All hired portable electrical equipment shall be tested, inspected and tagged by the contractor or the hiring company before being brought on site. The project shall not be responsible for the testing, inspection and tagging of this equipment.</li> </ul>			

<b>BRA-16</b>	<b>Working at heights/ roof work</b>	· Inability to identify hazards associated with work in elevated positions	· Serious injuries	100	6	3	1800	· Fall protection planner/ supervisor will be appointed in writing	0,4	720
		· Inadequate "Working at heights" training	· Fatalities					· Project specific Fall Protection plan to be communicated to all employees.		
		· Sub-Standard/ unsafe working platforms	· Damage to property and environment					· Fall relief procedure to be communicated to all managers and workers working at heights.		
		· Life-lines not erected / not erected to standard						· All employees to undergo working at height training. No employee to be allowed to work at elevated positions without working at heights training.		
		· Employees working at heights not medically fit for task.						· A buddy system to be implemented for all work performed at heights, (employees to work in pairs or groups).		
		· Unsafe access and egress/ sub-standard ladders						· Wrist lanyards to be utilized for all hand tools used at elevated position.		
		· Falling objects						· Where lifelines will be used an approved service provider to be appointed and to ensure inspections are done on all equipment by a competent person.		
		· Overhead work						· All employees to undergo medical fitness examination before coming on site.		
		· Inspections to be done twice per day and deviations corrected immediately.								
		· Drop zones to be implemented.								
		· Training in the use of Safety harnesses and inspection to be given to all employees performing tasks at heights.								
		· DSTI's, toolbox talks and risks assessments to be conducted and communicated								

BRA-17	Use of scaffolding	<ul style="list-style-type: none"> <li>Using rusted and damaged scaffold material</li> </ul>	<ul style="list-style-type: none"> <li>Damage to property and equipment</li> </ul>	100	6	3	1800	<ul style="list-style-type: none"> <li>Only SANS approved scaffold material will be allowed on site. No uncertified scaffold material to be used on site.</li> </ul>	0,4	720
		<ul style="list-style-type: none"> <li>Incompetent scaffold erectors, supervisors/ inspectors</li> </ul>	<ul style="list-style-type: none"> <li>Serious injuries</li> </ul>					<ul style="list-style-type: none"> <li>Competent scaffold supervisor to be appointed in writing.</li> </ul>		
		<ul style="list-style-type: none"> <li>Scaffolds not inspected</li> </ul>	<ul style="list-style-type: none"> <li>Fatalities</li> </ul>					<ul style="list-style-type: none"> <li>All scaffolding to be inspected before use and be recorded on scaffolding inspection register, deviations to be reported to site management / supervisor.</li> </ul>		
		<ul style="list-style-type: none"> <li>Modifications</li> </ul>						<ul style="list-style-type: none"> <li>No incompetent employee to be allowed to erect scaffolding on site, appointed qualified erectors will be identified.</li> </ul>		
								<ul style="list-style-type: none"> <li>Scaffold ticket to be placed on hard hats to identify scaffold erectors or inspectors.</li> </ul>		
								<ul style="list-style-type: none"> <li>Scaffold erection to be carried out under supervision of a competent supervisor appointed in writing.</li> </ul>		
								<ul style="list-style-type: none"> <li>Scaffold Inspectors will place red tags on scaffolding at the end of each shift and inclement weather</li> </ul>		
								<ul style="list-style-type: none"> <li>Scaffolding will be inspected before work starts at the start of the shift or after inclement weather and a green tag will be placed back on the scaffolding.</li> </ul>		
								<ul style="list-style-type: none"> <li>Inspection register must be completed and signed off by the appointed scaffold inspector.</li> </ul>		
								<ul style="list-style-type: none"> <li>Contractors shall use SGB and or similar type approved tags for identification of scaffold inspection findings.</li> </ul>		
								<ul style="list-style-type: none"> <li>Ladders to be staggered every 3 meters inside scaffold frame with safe landing platform and a trap door fitted on the working platform</li> </ul>		

<b>BRA-18</b>	<b>Use of ladders / step ladders</b>	· Using sub-standard ladders / step ladders	Slips and falls	40	6	2	480	· Ladder inspector to be appointed in writing	0,4	192
		· Unstable ground / floor	Serious injuries					· Ladders must be hung on the inside of the storage area		
		· Incorrect Body Position	Damage to property and environment					· All ladders must be inspected and registered before use on site.		
		· Incorrect storing of the ladders	Fatalities					· No faulty ladders will be allowed on site.		
								· SWP (safe Working Procedure) and Risk assessments will be communicated to all workers forming part of the task.		
								· No wooden ladders are allowed to be used on site		
								· Planned job observation will be done daily by supervisor/ manager.		
								· Risk assessments and safe working procedures must be communicated to all workers that form part of the task.		
								· Utilize scaffolding/ safe work platform if body position cannot be properly positioned during execution of task.		
								· Supervisors to inspect sub-contractor documents to ensure compliance.		
		· PTO's to be conducted by a competent person daily and necessary control measures to be taken.								

BRA-19	Form and support work	<ul style="list-style-type: none"> <li>Employees working with Form and support work material not wearing correct PPE</li> </ul>	<ul style="list-style-type: none"> <li>Serious injuries</li> </ul>	40	6	2	480	<ul style="list-style-type: none"> <li>PPE survey to be done and correct PPE issued to employees. Employees to sign for PPE and inspections on PPE to be carried out before and after work.</li> </ul>	0,4	192
		<ul style="list-style-type: none"> <li>Sub-standard tools and formwork and support work equipment</li> </ul>	<ul style="list-style-type: none"> <li>Damage to property and environment</li> </ul>					<ul style="list-style-type: none"> <li>Supervisors to conduct PTO's on the activity and monitor the use of tools</li> </ul>		
		<ul style="list-style-type: none"> <li>Employees not competent to perform allocated duties</li> </ul>	<ul style="list-style-type: none"> <li>Fatalities</li> </ul>					<ul style="list-style-type: none"> <li>Tools and equipment inspected daily / prior to use and in accordance to SANS requirement standards by an appointed hand tool inspector</li> </ul>		
		<ul style="list-style-type: none"> <li>Inspections and hazard identification not conducted prior to work commencement</li> </ul>						<ul style="list-style-type: none"> <li>Supervisor to ensure correct tools are issued and used by competent, trained employees.</li> </ul>		
								<ul style="list-style-type: none"> <li>All defects on tools and formwork equipment to be rectified by either repair or replacement.</li> <li>Daily tool inspection and formwork and support work equipment to be carried out by an appointed competent person as per construction regulation.</li> <li>Risk Assessments and safe work procedures to be communicated to all employees.</li> <li>PTO (Plan Task Observations) to be conducted and poor performers to be re-inducted or trained in the execution of task.</li> <li>Incompetent employees must not be allowed to carry out activities.</li> <li>Employees must sign the acknowledgement form in acceptance of the communicated risk assessments and safe work procedures.</li> <li>Edge protection to be installed</li> <li>Employees must be encouraged to report any hazardous situations as soon as reasonably practicable.</li> </ul>		

<b>BRA-20</b>	<b>Excavations</b>	- No Excavation Permit	- Serious injuries	100	6	3	1800	- Competent supervisor to be appointed in writing
		- Sub-Standard Barricading	- Damage to property and environment					- Relevant issue-based risk assessments shall be completed and communicated to relevant employees.
		- Sub-Standard Notices/ Signs	- Fatalities					- No excavation work to be carried out without excavation permit.
		- Slip/ trip and Fall						- Barricading standards must be complied with as per specifications. Inspections on all well barricaded excavations shall be conducted twice a day and deviations rectified immediately.
		- Sub-Standard Access and Egress						- Excavation supervisor to ensure relevant signs are correctly positioned all the time.
		- Underground Services not identified						- DSTI's to be done after a physical inspection has been conducted in areas where activities will take place. Whenever necessary Risk assessments will be reviewed and re-communicated to the employees.
		- Excavation collapse						- Regular inspections to be carried out on all excavation access ladders and no one to be allowed to access excavations by any other means.
		- Inspections and hazard identification not conducted prior to work commencement						- Plans and permits to be obtained from the client indicating where there are underground services. Where services are identified, ensure marking is done by a competent person before commencing excavation activities.
		- Working without proper PPE						- Supervisor to be available during excavation of areas where there are existing services and employees must exercise caution during excavations.
		- Use of incorrect tools/ defects on tools/ no tools						- Competent and qualified professionals to be engaged in using detection equipment to identify existing services locations.
		- Laying Steel manually without correct PPE						- Digging by hand in service areas to be done by competent personnel with excavation supervisor present.
		- Laying Steel in 600mm deep excavated foundation						- Underground services shall be located by hand digging to locate the exact position. Mechanical digging is allowed only to within one metre of a service. Hand digging will be utilized for the last 1m of excavation and to expose the service.
		- Slip/ Trip and Fall						- Supervisor to inspect and ensure there is no material or people inside excavations before backfilling can be done.
		- Sub-Standard Access and Egress						- All shoring and bracing to be done by a competent person and inspected before any person can be allowed to work in any excavation.
		- Pinching/ scratching						- Toolbox talks and DSTI's to be communicated to all employees working in excavations.
								- Walking on edges of excavations must be avoided.
		- After inclement weather excavations must be inspected before employees can be allowed to carry out any work.						
		- Supervisor to ensure good housekeeping is maintained onsite and no material or tools shall be left inside excavations.						

BRA-21	Steel fixing	· Inspections and hazard identification not conducted prior to work commencement	Cuts on hands	7	3	2	42	· No work to commence without the presence of a competent and appointed supervisor.	0,2	8,4
		· Working without proper PPE						· Safe Operating Procedures / Safe Working Procedures to be communicated and supervisor to ensure implementation.		
		· Use of incorrect tools /defects on tools/ no tools						· Ensure good housekeeping is maintained to prevent trips and falls.		
		· Laying Steel manually without correct PPE						· Risk assessments to be done and communicated to all employees		
		· Laying Steel in 600mm deep excavated foundation						· PPE survey to be conducted and necessary PPE issued to all employees. Employees must sign for PPE and the records shall be kept on record.		
		· Slip/Trip and Fall						· All defects on tools to be rectified by either repair or replacement.		
		· Sub-Standard Access and Egress						· Daily tool inspections to be carried out by an appointed competent person and records kept in file. All unsafe tools to be repaired or replaced.		
		· Pinching / scratching						· Supervisor to conduct PTO's on various tasks, monitor and enforce safe use of tools.		
		· Poor housekeeping						· Supervisor to ensure correct tools are issued and used by trained employees. Tool inspections to be done before shift commences and after the shift. 3		
								· All defects on tools to be rectified by either repair or replacement.		
	· No task is to commence without DSTI and relevant Risk Assessments being communicated to employees.									
	· Site specific inductions to be done when workers start on site									
	· Communication of safe lifting procedures to be done before commencement of task.									
	· Ensure convenient and safe means of access to every excavation in which persons are required to work.									

<b>BRA-22</b>	<b>Concrete discharge work</b>	<ul style="list-style-type: none"> <li>Employees not competent to perform Manual discharge of concrete into small (500mm) excavated foundations.</li> </ul>	<ul style="list-style-type: none"> <li>Physical changes</li> </ul>	6	6	3	108	<ul style="list-style-type: none"> <li>(SWP) Safe working procedures and risk assessments must be conducted with all the employees involved in the task before the commencement of the task. PTOs (Plan Task Observations) to be conducted and training initiated for the poor performers.</li> </ul>
		<ul style="list-style-type: none"> <li>Slip / Trip and Fall</li> </ul>	<ul style="list-style-type: none"> <li>Damage to property and environment</li> </ul>					<ul style="list-style-type: none"> <li>Appointed site supervisor to ensure DSTI is conducted prior to work commencing.</li> </ul>
		<ul style="list-style-type: none"> <li>Employees working with or inside concrete not wearing correct PPE</li> </ul>						<ul style="list-style-type: none"> <li>Ensure the Risk Assessment is developed for the tasks associated.</li> </ul>
		<ul style="list-style-type: none"> <li>Sub-standard Tools And Equipment</li> </ul>						<ul style="list-style-type: none"> <li>PPE survey to be done and correct PPE issued to employees. i.e. Water boots, Overall and hardhat. Employees to sign for PPE and inspections on PPE to be carried out before and after work.</li> </ul>
		<ul style="list-style-type: none"> <li>Sub-Standard Access and Egress</li> </ul>						<ul style="list-style-type: none"> <li>Supervisor to ensure correct tools are issued and used by employees. Tool inspections to be done before commences and after work.</li> </ul>
		<ul style="list-style-type: none"> <li>Pinching / scratching</li> </ul>						<ul style="list-style-type: none"> <li>Supervisors to conduct PTO's on the activity and monitor the use of tools</li> </ul>
								<ul style="list-style-type: none"> <li>Task specific induction on PPE use must be conducted</li> </ul>
								<ul style="list-style-type: none"> <li>Issue based risk assessments to be communicated</li> </ul>
		<ul style="list-style-type: none"> <li>SWP to be conducted and communicated.</li> </ul>						
		<ul style="list-style-type: none"> <li>Only competent and authorized personnel to utilize tools / equipment</li> </ul>						
		<ul style="list-style-type: none"> <li>Tools and equipment inspected daily / prior to use and in accordance to SANS requirement standards By the Appointed hand tool inspector</li> </ul>						

<b>BRA-23</b>	<b>Stacking and storage</b>	· Sub-standard / unsafe stacking practices	· Serious injuries	6	6	3	108	Stacking and storage supervisor to be appointed in writing
		· Insufficient / incorrect dunnage	· Damage to property and environment					Designated areas for stacking to be identified and stacking and storage supervisor to monitor.
		· Sub-standard Housekeeping practices						Training to be provided on stacking and storage through toolbox talks and DSTI's.
								· Inspections to be carried out and unsafe equipment to be removed from the premises.
								· Stacking and storage supervisor to monitor and enforce safe stacking procedures.
								· Good housekeeping to be ensured through daily inspections which will be conducted twice a day.
								· DSTI's to be conducted by supervisor and proof of communication to be kept on record.
								· After stacks are completed, an inspection should be carried out to ensure stacking and storage procedures are followed.
								· Toolbox talks to be done and all employees to attend and records to be kept.
								· Observe correct lifting technique i.e. use legs and not back for lifting operations. Observe safe stacking practices i.e. even stacks, max height 3 X shortest base (stacking supervisor). Deliveries are to be supervised by site supervisor. Continually monitor the erection and dismantling of stacks (stacking supervisor). Required PPE: Overalls, safety shoes, hard hat, leather gloves and glasses.

BRA-24	<b>Brick work and Plastering</b>	<ul style="list-style-type: none"> <li>Employees not competent to perform brickwork and plastering and allocated duties</li> <li>Employees working with Plaster and bricks without correct PPE</li> <li>Sub-standard Tools and Equipment</li> <li>Environmental Contamination/impact</li> </ul>	<ul style="list-style-type: none"> <li>Physical injury and damage to property</li> <li>Damage to property and environment</li> </ul>	3	3	2	18	<ul style="list-style-type: none"> <li>Risk Assessment communicated to all team members</li> <li>SWP Safe working procedures and Risk assessments to be conducted. PTO (Plan Task Observations).</li> <li>PPE survey to be done and correct PPE issued to employees. Employees to sign for PPE and inspections on PPE to be carried out before and after work.</li> <li>Regular inspections on PPE to be carried out by supervision team.</li> <li>Supervisor to ensure only competent and authorized personnel utilize tools / equipment.</li> <li>Environmental plan to be discussed with all site management / supervisors.</li> <li>Site specific inductions on environmental issues to be communicated to all employees.</li> <li>Supervisor to ensure waste disposal procedures are adhered to.</li> <li>Different colour skips must be provided for disposal of waste.</li> <li>Solid waste to be separated from liquids.</li> <li>Hazardous waste to be separated from non-hazardous waste.</li> </ul>
BRA-25	<b>Use of hand tools</b>	<ul style="list-style-type: none"> <li>Sub-standard hand tools utilized</li> </ul>	<ul style="list-style-type: none"> <li>Physical injury and damage to property</li> </ul>	3	3	2	18	<ul style="list-style-type: none"> <li>Daily tool inspection to be carried out by an appointed competent person and records kept in file. If any deviations are noted, tools must be repaired or replaced.</li> <li>Supervisors to conduct PTO's on different activities to ensure task are executed properly and safe.</li> <li>Tools found with serious defects during daily inspections to be removed from the premises immediately.</li> <li>Tools must not be allowed to deteriorate to an extent of mushroom heads in case of chisels and exposed tags for hammers; this can be ensured by daily inspections and reporting of unsafe tools to supervisors.</li> <li>Safe work procedures to be developed and communicated as a follow up on the crafts training and induction to ensure safe use of tools and encourage employees to inspect their own tools and report any defects.</li> <li>Ensure employees understand their basic duties as stipulated in the OHS Act 85 of 1993.</li> </ul>

<b>BRA-26</b>	Removal of waste	. Contamination of general waste	Environmental pollution	6	6	7	252	. Waste management plan, segregation of general waste from hazardous/medical waste	0,6	151,2
		. Site heavy vehicle traffic	Physical injuries					Standard working procedures		
		. Exposure of employees to hazardous waste	Damage to property					Training on spill kits		
			Occupational diseases and cuts							
<b>BRA-26</b>	People currently living on the target construction site	. Physical threat to the construction team and property	. Physical injury and damage to property	6	10	7	420	. Relocation of the people	0,4	168
<b>BRA - 27</b>	Site access	. Trespassing, theft	. Physical injury and damage to property	6	10	7	420	. Enclosure of the whole construction site with access point.		
			Death					. Placing of security guard		
<b>BRA-28</b>	Manual handling	. Unergonomic postures, Inadequate manual handling training	. Back strain, damage to property	6	6	7	252	Training , safe work procedures, medical examination	0,2	50,4
<b>BRA-29</b>	Operation of the emergency flare	. Fire , gases, environmental compliance to air quality regulations	Asphyxiation and burns, air pollution	6	10	15	900	Operation to comply with gas regulation and demarcation as danger zone, fire risk assessment and provision of relevant equipment there of	0,4	360

<b>BRA-30</b>	Work carried out inside confined spaces	Drop in oxygen content, build up of flammable gases	Asphyxiation, physical injury, fire	6	0,5	15	45	Regulations for confined spaces in terms of monitoring of oxygen levels, provision of breathing apparatus and more	0,4	18
<b>BRA-31</b>	Leachate management	Contamination	Poisoning, skin irritation, water pollution	6	10	15	900	Storage and management of leachate to comply with water quality regulations	0,4	360
<b>BRA32</b>	Connection to sewer	Use of hand tools, excavations, exposure to bio hazards	Poisoning and infection	6	6	7	252	Use of PPE, Training and safe work procedures	0,2	50,4
<b>BRA-33</b>	Management of pumprooms	Noise, Components	Noise induced hearing, machine guard	6	6	7	252	Designated storage, accessed controlled and use of relevant PPE/C	0,2	50,4
<b>BRA-34</b>	Emergency preparedness	.Lack of communication of emergency plan, No emergency drills, no competent team	Delayed response time to emergency, death	6	6	7	252	Communication of emergency procedures and competent teams' contact details, Conduction of emergency drills	0,2	50,4
<b>BRA -35</b>	Managing compost sales	Exposure to robbery	Physical injuries, damage to property and death	6	10	15	900	Access control, provision of security guard, armed response service, site safety rules, cashless operations	0,2	180
<b>BRA -36</b>	Use of processing aids	Exposure to HCS and bio-hazards	Occupational illness and environmental contamination	6	6	7	252	Vaccination, training and medical examination	0,2	50,4

Risk Rating (RR = Lx Ex Cx M)		Required action to control risk	L		Likelihood of hazard occurring	Exposure		Frequency of exposure to hazard (and Activity)
			10		Almost certain	10		Continuous
RR ≤ 20		No further attention required (tolerate but monitor)	6		Very well possible	6		Daily during work hours
20 < RR ≤ 70		Some attention required (some treatment)	1		Only at longer term	2		Monthly
70 < RR ≤ 200		Low risk -attention required (apply treatment)	0.5		Possible, but unlikely	1		Few times per year
200 < RR ≤ 400		Reduce medium risk (some formal treatment required)	0.2		Highly unlikely	0.5		Highly exceptional
400 < RR ≤ 800		Reduce high risk immediately (major treatment or transfer)	0.1		Virtually impossible			
800 < RR > 10000		Extreme risk - Stop activity (transfer or terminate)						
C		Consequence of damage, if hazard occurs	Mitigation Factor (M)		Anticipated risk mitigation impact from risk control activities			
100		Catastrophic, many death, uncontrolled release/spill	0.2		Major impact (75 -100 % improvement)			
40		Disaster, several deaths, >2 hr release/huge spill	0.4		Significant impact (50 – 75% % improvement)			
15		Very serious, 1 death, <2hr release/large spill	0.6		Minor impact (25 - 50 % improvement)			
7		Considerable, severe injuries, hr. release/med spill	0.8		Minimal impact (0 - 25 % improvement)			
3		Important, lost workdays, <0.5hr release/ small spill						
1		Meaningful, possibly first aid required, little spillage						



CONSTRUCTION OF A 50 TON PER DAY BIODIGESTER PILOT PLANT AT ROBINSON DEEP LANDFILL SITE, JOHANNESBURG AND OPERATING AND MAINTAINING IT FOR A PERIOD OF 3 YEARS



**DOCUMENT CONTROL**

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