5.5.7 Issuing I&APs and Stakeholders with a Draft Scoping Report

The draft Scoping Report was sent to all Departments and Organs of State as well as all registered I&APs in order to obtain their comments and notices. The report was also submitted to the National Department of Environmental affairs for review. The review period for the draft Scoping Report was from the 26th of June 2012 to the 13rd of August 2012 (30th of August 2012 for the Department of Water Affairs).

5.5.8 Comments on the Draft Scoping Report

The following table summarises the comments that were received on the draft Scoping Report.

Raised by	Date	Issue / comment / concern
Mpumalanga Department of Education	26-07-2012	A request from your office dated 26 June 2012 is acknowledged and referred to. The Department of Education has no objection towards establishment of the Wastewater Treatment Works in the AFGRI Poultry Delmas Abattoir. It is noted that the intention is to increase the capacity of an existing Wastewater Treatment Works Plant. The extension of an existing activity will not have an impact on the need for school sites. It is hoped that you will find this in order.

5.5.9 Consideration of the final Scoping Report

The final Scoping Report was submitted to the responsible officer at the National Department of Environmental Affairs for consideration on the 18th of October 2012. On the 23rd of November 2012, a letter confirming acceptance of the final Scoping Report was received from the responsible officer at the National Department of Environmental Affairs (shown in the figure below).

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

Private Bag X 447, PRETORIA, 0001· Fedsure Building, 315 Pretorius Street, PRETORIA

Ref No.: 12/9/11/L875/6
Enquiries: Ms Nnditsheni Ramuhulu
Tel: (012) 310 3029 **Fax:** (012) 310 3753 **Email:**NRamuhulu@environment.gov.za
www.environment.gov.za

Shangoni Management Services
P O Box 74726
Lynwood Ridge
0040

Fax: (012) 807 1014

Attention: Ms Patricia van der Walt

ACCEPTANCE OF FINAL SCOPING REPORT FOR PROPOSED ABBATOIR WASTEWATER TREATMENT WORKS IN DELMAS, MPUMALANGA PROVINCE.

The Department confirms having received the Final Scoping Report (FSR) for the abovementioned activity on 15 October 2012.

The Department has evaluated the submitted Final Scoping Report and is satisfied that the documents are in compliance with the minimum requirements of the Scoping Report as required by regulation 28 of GN No.R.543 of 18 June 2010. The Final Scoping Report is hereby accepted by the Department.

You may proceed with the Environmental Impact Assessment process in accordance with the tasks contemplated in the Plan of Study for Environmental Impact Assessment as required in terms of the EIA Regulation, 2010.

You are hereby reminded that the activity may not commence prior to Waste Management Licence being granted by the Department.

Yours sincerely

Ms Nolwazi Cobbinah
Acting Deputy Director-General
Chemicals and Waste Management
Letter signed by: Mr Lucas Mahlangu
Designation: Control Environmental Officer Grade B: Systems
Date: 2012/11/23

Received
via email
23/11/2012

Figure 66: Proof of acceptance of the final Scoping Report

5.5.10 Issuing I&APs and stakeholders with the Draft Environmental Impact Assessment Report

This draft Environmental Impact Assessment report will be sent, via registered mail, to all Departments and Organs of State as well as all registered I&APs in order to obtain their comments and notices. This report will also be submitted to the responsible officer at the National Department of Environmental Affairs.

5.5.11 Public Meetings

No public meetings were held during the Public Participation Phase.

5.5.12 Conclusions of the Public Participation Exercise

In conclusion, the Public Participation exercise has provided adequate information to enable an understanding of what the proposed wastewater treatment works would entail and also to address the concerns and comments of this Environmental Assessment.

6. NEED AND DESIRABILITY FOR THE ACTIVITY

A need and desirability for this project is evident from the following perspectives:

6.1 Developer

Abattoir wastewater produced at the AFGRI Poultry Delmas abattoir is currently treated as follows:

- The wastewater is screened by a rotary screen to remove the solids. The solids are then sent to the Dryden rendering plant.
- The water is pumped to a storage vessel where manual fat skimming occurs.
- The water is pumped to an aeration pond and is then discharged into a natural drainage line.

The current treatment practise is not sufficient and is polluting the environment. AFGRI Poultry is therefore proposing an integrated ponding and artificial wetland system for the proper treatment of the abattoir wastewater.

The proposed wastewater treatment system will provide excellent buffer capacity for handling organic and hydraulic shock loads and by using algal ponds instead of conventional mechanical aerators, a substantial saving will be made in terms of the electrical demand.

The efficient treatment of the abattoir wastewater will decrease the liability currently faced by AFGRI Poultry due to their pollution of the environment.

6.2 Local Community

Dependency and unemployment rates are very high in the Victor Khanye Municipal area. The relatively low income levels are an indication of high poverty levels and result in an increased dependency on social aid e.g. housing subsidies and child grants.

The proposed project will create employment opportunities for unskilled labourers during the construction phase and the proposed WWTW system will require two semi-skilled operators during its operational phase.

7. IDENTIFIED ALTERNATIVES

Typically, alternative assessments are conducted to assist in comparing various projects or attributes of projects that will occur. The most critical comparison is evaluating any proposed project against the No-Go option. The alternatives assessment then considers alternatives to project site selection for the proposed development; alternatives to layout of the development; and alternatives to construction methodologies and/or materials used for the development.

The alternatives assessment was conducted using a simple cost-benefit analysis of each proposed alternative, through assessing various environmental attributes. These attributes can include physical (geology and soils, surface water quality and quantity, groundwater quality and quantity); biophysical (flora and fauna, sensitive environments); and social (site of archaeological or cultural importance, land use issues, social health and welfare).

The impact of the each alternative was then evaluated in terms of whether it has a positive, negative, or no impact. In this instance, the impact is not evaluated in terms of significance but rather whether or not it will arise. Positive impacts are assigned a value of 1; no impact a value of 0; and a negative impact a value of -1.

By adding all of the attribute scores for each alternative, a suitability score is derived that indicates the preferred alternative. A total positive score indicates the project benefits outweigh the potential negative impacts, while a total negative score indicates the project environmental costs outweigh the potential benefits. Essentially, the highest scoring alternative is then carried forward for full impact evaluation.

7.1 No-Go Option

The potential impact of the preferred project option on environmental and socio-economic attributes – identified during the assessment phase – is evaluated against the potential impact of the no-go option on the same attributes. The summary of this assessment is provided in Table 16 hereafter.

Table 16: Development vs. No-Go Option.

Attribute	Development Option	No-go Option 2
Physical environment		
Air Pollution	-1	-1
Noise Pollution	-1	0
Water Quality	1	-1
Water Quantity	1	-1
Visual Aesthetics	-1	0
Biophysical environment		
Fauna and Flora	1	-1
Sensitive Environments	1	-1
Social environment		
Traffic	-1	0
Impact on property values	0	0
Safety and security	0	0
National and regional economy	1	0
Infrastructure development	0	0
Total	1	-5

The no-go alternative is the option wherein the wastewater treatment works is not implemented. This cannot be considered a viable option as the environmental impacts are too high. The overall impact of the proposed WWTW is positive and the negative environmental impacts can be mitigated to acceptable limits. The proposed WWTW is therefore the preferred option.

The AFGRI Poultry Delmas abattoir is part of a primary economic sector in the Mpumalanga Province. Seen in context of the principle of local economic development, the following benefits will occur:

- An expansion of the abattoir is planned so that the current production rate of 360 000 chickens per week can be increased to 1.3 million chickens per week. The abattoir contributes significantly to South Africa's food supply.
- The wastewater generated by the abattoir is currently treated inefficiently. To accommodate the current and future abattoir wastewater, a new wastewater treatment works (WWTW) is proposed. This treatment system will be capable of treating 2 500m^3 of abattoir wastewater per day. The wastewater will be treated to the Department of Water Affair's General Limit standards (Refer to Table 1).
- After treatment of the wastewater, an estimated 50% of the treated, clean water will be re-used in the abattoir process.

- The remaining water will be provided to adjacent farmers for crop irrigation. The use of treated water for irrigation will reduce the amount of water that the farmers need to abstract from groundwater sources, thereby decreasing the demand on groundwater resources.
- The re-use of water will also reduce the burden on the immediate groundwater system.
- The proposed WWTW will create employment opportunities for unskilled labourers during the construction phase and the proposed system will require two semi-skilled operators during its operational phase.

7.2 Alternatives to Site Selection

Firstly, it must be stated that the proposed development aims at utilizing the applied property to its full economic potential, taking the natural as well as socio-economic environment into consideration.

The property on which the proposed project will take place belongs to AFGRI Poultry. During the preliminary design phase for the WWTW, different areas on the property were considered. The area where the WWTW will be built has been selected so that optimal use can be made of gravity flow between the ponds and artificial wetland cells. A geotechnical investigation was conducted on the site to verify the suitability of the site for the construction of the proposed WWTW. The chosen site is also in close proximity to the abattoir which reduces the required pipe length. This will reduce the cost of materials required during the construction phase and reduce the amount of electricity required to pump the wastewater to the treatment works.
Having a shorter pipe system also reduces the exposure area and allows for easier inspection and maintenance to prevent leakages of wastewater.

The costs of pumping treated water back to the abattoir for re-use is also minimised by having the WWTW close to the abattoir building.

7.3 Construction Alternatives

7.3.1 Alternative Design

The proposed technology, design and process of the proposed WWTW was determined by the applicant to be the most economic, social and environmental sustainable option for this specific venture.
The design was chosen for the following reasons:

- It makes use of gravity flow between the ponds where possible, thereby decreasing the electrical demand of the WWTW.
- The system will provide excellent buffer capacity for handling organic and hydraulic shock loads.

- By using algal ponds instead of conventional mechanical aerators, a substantial saving will be made in terms of the electrical demand.
- The final outlet from the treatment works will be in compliance with the Department of Water Affairs' General Limit standards.

7.3.2 Activity Alternatives

The activity is the treatment of abattoir wastewater. The alternative would be the continued inefficient treatment of the wastewater and disposal of this wastewater into the environment. This practise is not environmentally acceptable and therefore the construction of the WWTW is proposed as the preferred alternative.

7.3.3 Location Alternatives

No location alternatives were considered because the proposed property is owned by the applicant and there is a need for the WWTW to be close to the abattoir that generates the wastewater.

7.3.4 Process Alternatives

The proposed technology, design and process of the project was determined by the applicant to be the most economic, social and environmental sustainable option for this specific venture. The same rationale was used as described under section 7.3.1.

7.3.5 Scheduling Alternatives

It is recommended that construction take place during the drier months to avoid any complications in wet weather. No detailed information regarding the proposed time frame for the project is available yet, however it is anticipated that construction will start as soon as possible after all the necessary approvals have been obtained.

7.3.6 Input Alternatives

Wastewater from the abattoir is the only input into the WWTW, therefore, no input alternatives can be considered.

8. ENVIRONMENTAL IMPACT ASSESSMENT

8.1 Introduction and approach followed

The proposed wastewater treatment works can have a variety of impacts. These can occur over different spatial and temporal scales. The nature of each impact can also vary widely depending on the physical environment and the perceptions and values of the affected parties. An assessment of the potential impacts on the social and natural environment should be conducted in a methodical manner.

Assessment and evaluation of environmental impacts is often complicated by the subjective nature of the impacts. Ideally, the degree of severity or significance of a particular impact should be expressed in quantitative terms. There must also be some expression as to whether a particular impact is desirable or not. As the desirability of an impact will depend largely on the attitude and experience of the assessment practitioner, subjectivity is unavoidable. To address these problems, a standard set of definitions were used for the entire impact assessment process.

It is believed that the approach followed will adequately fulfill the environmental authorities' requirements, the requirements of the EIA Regulations (2010) and the objectives of the environmental best practice, so as to ensure transparency and to enable an informed decision regarding the proposed project.

8.2 Methods used to identify impacts

Ecological and other available information was reviewed to assess the present status of the natural environment and the extent to which it has already been modified. The potential impacts were then identified based on the activities associated with the proposed wastewater treatment works.

In general, the environmental impacts associated with the proposed development will tend to decrease with increasing distance from the activity. The most noticeable impacts are therefore present on the site of operation or on adjacent properties.

8.3 Environmental Impact Assessment

All activities related to the proposed abattoir wastewater treatment works that could have some impact on the environment were identified. These impacts can be of environmental, socio-

economic or cultural nature. Impacts are often not only confined within the direct scope of the proposed activity and can accumulate as a network of indirect impacts on the surrounding area.

Different impacts are associated with the construction and operational phases of the proposed activity. The significance was determined by the extent, duration, and intensity and reversibility of the impact.

The environmental risk of any aspect was determined by multiplying the significance of the impact by the probability of the impact occurring. Each parameter connects the physical characteristics of an impact to a quantifiable value in order to rate the environmental risk. A description of the parameters used in this impact assessment is given in Table 17 below.

The suitability and feasibility of all proposed mitigation measures are included in the assessment of significant impacts. This was achieved through comparison of the significance of the impact before and after the proposed mitigation measure is implemented.

Table 17: Environmental impact assessment parameters

Parameters	Description
Extent	Refers to the physical or geographical size that is affected by the impact. It can be categorised into the following ranges: • Onsite – Within specific site boundary (weight value – 1) • Local – Within municipal boundary (weight value – 2) • Regional – Outside municipal boundary (weight value – 3)
Duration	Time span associated with impact: • Short term – 1 Year or less (weight value – 1) • Medium term – 1-5 Years (weight value –2) • Long term – Longer than 5 Years (weight value – 3)
Intensity and reversibility	The severity of an impact on the receiving environment: • Low – Natural and/or cultural processes continue in a modified way and is reversible (weight value – 1) • Medium – Natural and/or cultural processes stop and is partially reversible (weight value – 2) • High – Natural and/or cultural processes disturbed to an irreversible state (weight value – 3)
Significance of Impact / Consequence	Adding the extent, duration and intensity together provides the significance of the impact (High, Medium or Low). **Extent + Duration + Intensity = High/Medium/Low Impact**

Probability	The likelihood of an impact occurring: • Unlikely – 0% - 45% chance of the potential impact occurring (weight value – 1) • Possible – 46% - 75% chance of the potential impact occurring (weight value – 2) • Likely - >75% chance of the potential impact occurring (weight value – 3)
Environmental Risk Refer to Table 18 below	Multiplication of the significance of the impact by the probability of the impact occurring produces a final conclusion of the overall risk that an impact poses to the surrounding environment. **High/Medium/Low Impact X Probability = High/Medium/Low Environmental Risk**

Table 18: Environmental Risk Matrix

	Significance of Impact		
	Low Impact (3 → 5)	Medium Impact (6 → 8)	High Impact (9)
Probability: Definite / Very Likely 3	9 - 15 L - M	18 - 24 M - H	27 H
Probability: Possible 2	6 - 10 L - M	12 – 16 M	18 M - H
Probability: Unlikely 1	3 - 5 L	6 – 8 L	9 L

ENVIRONMENTAL RISK	Guidelines for Control Strategies
(H) - High	Proactively reduce risk level, short term response.
(M- H) Medium to High	Proactively reduce risk level, short term response.
(M) – Medium	Management strategies to reduce risk level, short to medium term response.
(L – M) Low to Medium	Management strategies to reduce risk level, short to medium term response, operational control and housekeeping.
(L) - Low	Operational control and housekeeping.

8.3.1 Environmental Impact Assessments – Construction Phase

Tables 19 to 33 provide the environmental impact assessments for all construction phase activities.

Table 19: Environmental risk assessment: Construction activities

Activity: Construction activities required to build the wastewater treatment plant	
Nature of Environmental Impact: • Potential sinkhole and doline (compaction subsidence) formation; and • Potential harm to the environment due to workers or contractors being unaware of how their activities may impact the environment or due to unauthorised access to the site.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	3
Intensity of the Impact	3
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**8**

Probability	3
Environmental Risk = Significance of Impact X Probability	24
Objective of Mitigation Measures	
• To prevent the formation of sinkholes and doline. • To prevent harm to the environment through the actions of uneducated workers or contractors	
Proposed Mitigation	
• The design and construction of the WWTW must take cognizance of the presence of dolomite in close proximity to the site. • Normal drainage precautionary measures and special installation measures for underground wet services, applicable for dolomite terrain and in compliance with the requirements of the local municipality, must be adhered to. This will ensure that no significant accumulation of surface water occurs as a result of inadequate storm water canalization. Poor water control is unacceptable. • A competent person must inspect all foundation excavations. • The placement of engineered fills must be controlled with suitable field tests to ensure that the required densities are achieved during compaction and that the quality of the fill material is within specification. Chemical stabilization or mechanical modification of the soil may improve its compaction strength. • All wastewater containment ponds and artificial wetland cells must be lined with a 1.5mm HDPE liner. • Any buried pipes must be plastic or non-ferrous due to the potentially chemically aggressive nature of the foundation materials. • The contractor is to ensure that all employees, including sub-contractors and their employees, attend on-site Environmental Awareness Training prior to commencing work on site. • Follow-up Environmental Awareness Training may be required from time to time as new subcontractors or crews commence work or for specific activities that may potentially impact the environment, or if work is being undertaken in sensitive environments. • The contractor is to maintain accurate records of any training undertaken. • Training is to cover all aspects of the EMPr, procedures to be followed, the sensitivity of the site and importance of adhering to “no-go” areas. • The ECO shall monitor the contractor’s compliance with the requirement to provide sufficient environmental awareness training to all site staff. • Environmental signage is to be displayed on the site including – “no smoking”, “fire hazards”, etc. • Emergency numbers are to be clearly displayed. • All construction workers shall be issued with ID badges and clearly identifiable uniforms. • All construction workers shall be transported to and from site on a daily basis. • Workers shall remain on the site at all times during the work day and no one will be allowed to leave site by foot, not even during break times. • Night watchmen are to be provided with adequate cooking and heating facilities (no open fires), a suitable method of disposing of wastewater, and access to communication equipment. • Access to fuel and other equipment stores is to be strictly controlled.	
After Mitigation	
Extent of the Impact	2
Duration of the Impact	2
Intensity of the Impact	2
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**6**
Probability	1
Environmental Risk = Significance of Impact X Probability	**6**

Table 20: Environmental risk assessment: Site clearance

Activity: Clearance of site and other construction activities.	
Nature of Environmental Impact: • Loss of degraded vegetation during site clearance; • Potential destruction or loss of natural vegetation in No-Go Areas (wetlands); • Potential destruction of natural habitat for indigenous fauna; • Potential destruction of a natural carbon sink; and • Disturbance of the wetlands (watercourse).	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	1
Intensity of the Impact	2
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**5**
Probability	2
Environmental Risk = Significance of Impact X Probability	**10**
Objective of Mitigation Measures	
To minimise the loss of degraded vegetation, natural vegetation, habitats for indigenous vegetation and natural carbon sinks. To minimise the disturbance of wetlands	
Proposed Mitigation	
• Before any construction takes place the proposed area for the WWTW will be pegged out. All construction activities will be limited to these areas in order to reduce the footprint of the proposed activity and avoid impact on adjacent disturbed areas and nearby wetlands. • Construction areas should be fenced off or barricaded prior to and during construction. • Delineated wetland areas must be designated as “No-go areas”, avoided and conserved. • Effective planning of the construction operations. • Site clearing is to be limited to only the area necessary for carrying out the specified works. • Alien and invasive plant species, including exotic weeds, must be eradicated. • The contractor is to draw up a plan for submission to the ECO and the site manager indicating the locations of construction infrastructure including the site-camp, equipment cleaning pits, toilets, stores, site office, and “no-go” areas. • The “no-go” areas are to be demarcated with a wire and danger-tape temporary barrier fence attached to planted posts (wooden or metal) at a minimum. This can be in the form of two strands of wire 500mm apart on droppers of 3m spacing, with danger tape zigzagged between the wires. • The site boundary is to be clearly demarcated and screened from the commencement of works. The erection of the final boundary fence or wall is preferable. • All demarcation is to be regularly maintained. • No unauthorised entry, stockpiling, dumping or storage of equipment in “no-go” areas, or outside the site boundary is permitted. • All construction activities, plant, labour and materials are to be restricted within the site boundary. • Should the only means of completing specified work be to enter “no-go” areas, authorisation must be provided in writing by the ECO. • Search and rescue (if necessary) is to take place prior to commencement of work on site. • Removal of vegetation is to be avoided until such time as soil stripping is required. • Should construction in areas that have been stripped not commence within a short period of time the exposed areas shall be re-vegetated or stabilised. Soil stabilising measures could include rotovating in straw bales (at a rate of 1 bale/20m²), applying mulching or brush packing, or creating windbreaks using brush or bales. • Disturbed areas should be rehabilitated once the construction activities have ended. Only indigenous plant species should be planted.	
After Mitigation	
Extent of the Impact	1

Duration of the Impact	1
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**3**
Probability	1
Environmental Risk = Significance of Impact X Probability	**3**

Table 21: Environmental risk assessment: Stockpiling

Activity: Stockpiling of topsoil and cleared vegetation	
Nature of Environmental Impact: • Potential loss of valuable topsoil due to inadequate stockpiling practices; • Potential outbreak of fires; and • Potential erosion of cleared areas.	
Before Mitigation	
Extent of the Impact	1
Duration of the Impact	2
Intensity of the Impact	2
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**5**
Probability	2
Environmental Risk = Significance of Impact X Probability	**10**
Objective of Mitigation Measures	
To ensure the proper management of topsoil and to minimise erosion of cleared areas.	
Proposed Mitigation	
• Before any construction takes place the proposed area for the WWTW will be pegged out. All construction activities will be limited to these areas. • Topsoil (top 150mm) is to be stockpiled in demarcated areas and retained for future landscaping efforts. • Topsoil stockpiles shall not exceed 1m in height and 2m in width and shall be protected from wind, erosion and runoff by covering with a suitable fabric approved by the ECO. Once earthworks are complete, disturbed areas are to be re-vegetated or rehabilitated. • The contractor is to ensure that all reasonable measures are taken to limit erosion and sedimentation from construction activities. Erosion protection measures include cut-off drains and/or berms. • Any sub-soil or rocks removed should also be stockpiled separately and be used during the rehabilitation. • Basic fire-fighting equipment (e.g. fire extinguishers) must be available near stockpiles. • Once the construction activities have been completed, the remaining disturbed area must be top soiled, sloped and re-vegetated as soon as possible using suitable grass species. This re-vegetation will assist in reducing the potential of erosion. If sterilization of the topsoil during stockpiling has occurred, inorganic fertilizers will be used to supplement the soils before seeding of the area takes place. Compacted soil should be ripped to ensure effective re-vegetation.	
After Mitigation	
Extent of the Impact	1
Duration of the Impact	1
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**3**
Probability	1
Environmental Risk = Significance of Impact X Probability	**3**

Table 22: Environmental risk assessment: Fire establishment

Activity: Construction activities	
Nature of Environmental Impact: Potential disturbance of vegetation surrounding the proposed site as a result of runaway veldt fires caused by workers or contractors.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	2
Intensity of the Impact	2
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**6**
Probability	2
Environmental Risk = Significance of Impact X Probability	**12**
Objective of Mitigation Measures	
To prevent the occurrence of avoidable veldt fires.	
Proposed Mitigation	
• Basic fire-fighting equipment is to be placed at strategic locations on site (e.g. at the site office, flammable material store and watchman's container). • Equipment is to be maintained in good working order to the satisfaction of local fire authorities. • No open fires are permitted. A dedicated braai facility may be permitted in an area approved by the ECO, if the campsite is in close proximity to firefighting equipment. At no time is a braai fire to be left unattended. • Smoking is prohibited near places where any readily combustible or flammable materials are present. Notices are to be prominently displayed prohibiting smoking in such areas. • Welding, flame cutting and other hot work is only to be undertaken in places where the necessary safety precautions are in place (i.e. not near potential sources of combustion and with a fire extinguisher immediately accessible). • All flammable materials are to be stored in a suitable, lockable storage area. • Combustible materials may not accumulate on the construction site. • Cooking is to be restricted to bottled gas facilities in designated areas approved by the ECO. This facility is to be supervised and strictly controlled. • Fire extinguishers must be readily available.	
After Mitigation	
Extent of the Impact	2
Duration of the Impact	1
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**4**
Probability	1
Environmental Risk = Significance of Impact X Probability	**4**

Table 23: Environmental risk assessment: Cement and concrete

Activity: The storage, mixing and disposal of cement and concrete	
Nature of Environmental Impact: Potential water- and/or soil- pollution due to incorrect management of concrete and cement.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	2
Intensity of the Impact	2
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**6**
Probability	2
Environmental Risk = Significance of Impact X Probability	**12**

Objective of Mitigation Measures	
To prevent the contamination of soil and water as a result of concrete and cement used on site.	
Proposed Mitigation	
• No mixing of concrete or cement directly on the ground is permitted. The mixing of concrete will only be done on mortarboards (dugga-boards). • Ready-mix trucks are not permitted to clean chutes on site. Cleaning into foundations or a dedicated cleaning pit is permitted. • Both used and unused cement bags are to be stored in weatherproof containers so as not to be affected by rain or runoff. • Contaminated soil resulting from concrete or cement spills, including residue produced by the washing of cavities, is to be removed immediately after the spillage has occurred and placed on the appropriate rubble stockpile. • Runoff from the washing out of wall cavities is to be contained against the building by excavations of berms around the foundations.	
After Mitigation	
Extent of the Impact	1
Duration of the Impact	2
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**4**
Probability	1
Environmental Risk = Significance of Impact X Probability	**4**

Table 24: Environmental risk assessment: Generation of wash water

Activity: The cleaning of vehicles, equipment and construction areas.	
Nature of Environmental Impact: Potential soil-, surface water- and ground water- contamination due to contaminated wash water.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	2
Intensity of the Impact	2
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**6**
Probability	2
Environmental Risk = Significance of Impact X Probability	**12**
Objective of Mitigation Measures	
To prevent the contamination of the soil, surface water and ground water as a result of polluted wash water.	
Proposed Mitigation	
• No washing of vehicles or equipment is permitted on site. • Cleaning of equipment is to take place within designated areas. • A dedicated cleaning area is to be installed to facilitate washing of all cement and painting equipment. The cleaning area could be a plastic lined cleaning pit or dedicated plastic or metal drums, located as close as possible to a water point or within reach of a hose no longer than 10m. • No wastewater may be disposed of on site, onto the soil or into any water body. • Soil contaminated with hazardous substances, fuel or oil shall be treated as hazardous waste and removed from site.	
After Mitigation	
Extent of the Impact	1
Duration of the Impact	2
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**4**

Probability	1
Environmental Risk = Significance of Impact X Probability	**4**

Table 25: Environmental risk assessment: Hazardous waste

Activity: Generation, storage and disposal of hazardous waste.	
Nature of Environmental Impact: The potential pollution of soil-, surface water- and ground water- due to incorrect hazardous waste management.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	2
Intensity of the Impact	2
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**6**
Probability	2
Environmental Risk = Significance of Impact X Probability	**12**
Objective of Mitigation Measures	
To prevent soil-, surface water- and ground water- contamination due to hazardous substances	
Proposed Mitigation	
• Equipment and vehicles are to be repaired immediately upon developing leaks. Drip trays shall be supplied for all repair work undertaken on machinery on site. • Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to catch incidental spills and pollutants. • Drip trays are to be inspected daily for leaks and effectiveness and emptied when necessary. This is to be closely monitored during rain events to prevent overflow. Oil and diesel spills are considered hazardous. Disposal of such contaminants should be done by following the recommended steps. • Appropriate equipment to deal with fire or pollution incidents is to be readily available on site. This includes fire extinguishers, spill kits for hydrocarbon spills, drip trays for plant or machinery leaks, drums or containers for contaminated water and drip trays for minor hydrocarbon spills. • Soil contaminated with hazardous substances, fuel or oil shall be treated as hazardous waste and removed from site.	
After Mitigation	
Extent of the Impact	1
Duration of the Impact	2
Intensity of the Impact	2
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**5**
Probability	1
Environmental Risk = Significance of Impact X Probability	**5**

Table 26: Environmental risk assessment: General waste and building rubble

Activity: Production, storage and disposal of general waste and building rubble.	
Nature of Environmental Impact: Potential soil-, surface water- and ground water- contamination due to general waste generated.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	1
Intensity of the Impact	2
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**5**
Probability	2
Environmental Risk = Significance of Impact X Probability	**10**

Objective of Mitigation Measures	
To prevent soil-, surface water- and ground water- contamination due to general waste produced	
Proposed Mitigation	
• A construction refuse collection structure shall be erected on commencement of construction work within the boundaries of the site. The minimum requirement is as follows: ▪ 4 ready-fence panels (3m x 1.8m) covered with shade cloth or hessian, one panel being movable to provide access. The structure shall have a roof (ready fence panel, or similar) to contain waste materials in windy conditions. The floor shall be lined with HDPE plastic to prevent ground contamination from leachate such as cement powder residue or empty chemical or paint containers. ▪ Alternatively, refuse skips can be used but also need to be covered with shade cloth to ensure the containment of waste. • Refuse bins shall be provided for domestic waste (such as lunch litter) and placed in designated eating areas and any other areas where deemed necessary to control littering. • Refuse bins are not to overflow and are to be emptied regularly. No littering is permitted on site. • Building rubble is to be kept separate from other construction waste. Rubble is to be kept clean of brick ties, plastics, papers and cement bags at all times. • Rubble stockpiles and refuse structures shall be positioned to permit easy access by removal trucks. • Accumulation of large stockpiles of rubble and waste is not permitted. Waste is to be removed at regular intervals at a minimum frequency of once a week. • All waste is to be disposed of at approved landfill sites, no burning or burying is permitted. • The contractor shall delegate a specific waste management job description to an individual or team if directed by the ECO.	
After Mitigation	
Extent of the Impact	1
Duration of the Impact	1
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**3**
Probability	1
Environmental Risk = Significance of Impact X Probability	**3**

Table 27: Environmental risk assessment: Dust

Activity: Construction activities and vehicles travelling to and from the site.	
Nature of Environmental Impact: Generation of dust as a result of cleared vegetation and from the increase in vehicle frequency. Nature of Socio-economic Impact: Nuisance due to dust generated.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	1
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**4**
Probability	3
Environmental Risk = Significance of Impact X Probability	**12**
Objective of Mitigation Measures	
To prevent the generation of dust and nuisance	
Proposed Mitigation	
• All areas impacted by construction shall be regularly maintained including roads and pavements. • A dustcart needs to be onsite to water down dusty roads on dry windy days.	

• Speed bumps or traffic speed signs need to be erected to reduce speeding onsite that could result in the generation of dust. • Regular maintenance of vehicles to address wear of tires and breaks. Optimal engine combustion will allow for 'cleaner' exhaust emissions.	
After Mitigation	
Extent of the Impact	2
Duration of the Impact	1
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**4**
Probability	1
Environmental Risk = Significance of Impact X Probability	4

Table 28: Environmental risk assessment: Traffic

Activity: Increased traffic frequency on road infrastructure.	
Nature of Environmental and/or Socio-economic Impact: Potential wear of access roads, potential accidents on access roads, potential unpermitted transport of materials and potential loss of materials being transported on the access roads.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	1
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**4**
Probability	3
Environmental Risk = Significance of Impact X Probability	12
Objective of Mitigation Measures	
Minimise the impact of construction activities on the immediate and surrounding natural and social environment and prevent contamination resulting from construction activities.	
Proposed Mitigation	
• Ensure that all construction vehicles using adjoining roads are roadworthy. • All loads are to be securely fastened when being transported. • All vehicles are to adhere to the tonnage limitation and acquire a permit as required. • All speed limits and other traffic regulations on the public roadways must be adhered to.	
After Mitigation	
Extent of the Impact	2
Duration of the Impact	1
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**4**
Probability	1
Environmental Risk = Significance of Impact X Probability	4

Table 29: Environmental risk assessment: Utilisation of water

Activity: Utilisation of water.	
Nature of Environmental Impact: Potential wastage of water and depletion of water resource as a result of poor management.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	2

Intensity of the Impact	2
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**6**
Probability	2
Environmental Risk = Significance of Impact X Probability	**12**
Objective of Mitigation Measures	
Prevent the wastage of a natural resource	
Proposed Mitigation	
• Any buried pipes must be plastic or non-ferrous due to the potentially chemically aggressive nature of the foundation materials. • Leaking water taps and hosepipes are to be repaired immediately. • Running water taps and hosepipes are not to be left unattended. • Unused water standpipes are to be buried to prevent damage and resultant water leaks. • Taps are to be attached to secured supports and used in preference to standpipes with no valve mechanism to open and close water supply. All hose and tap connections are to be fitted with correct and appropriate plumbing fittings.	
After Mitigation	
Extent of the Impact	2
Duration of the Impact	2
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**5**
Probability	1
Environmental Risk = Significance of Impact X Probability	**5**

Table 30: Environmental risk assessment: Ablution facilities

Activity: Installation and use of ablution facilities.	
Nature of Environmental Impact: Potential unsanitary conditions on site, potential surface- and ground- water contamination and potential soil contamination.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	2
Intensity of the Impact	2
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**6**
Probability	2
Environmental Risk = Significance of Impact X Probability	**12**
Objective of Mitigation Measures	
Prevent the contamination of the soil, surface- and ground-water.	
Proposed Mitigation	
• Sufficient ablution facilities shall be provided – minimum of 1 toilet per 15 workers. • Plumbed facilities are preferred. Chemical facilities are to be serviced regularly. • Toilets should have properly closing doors and supplied with toilet paper. • The location of toilets is to be approved by the ECO prior to site establishment, but shall be located within 100m of any work point. • Toilets may not be located within delineated wetland zones. • Chemical toilets are to be serviced weekly. The contractor is to ensure that no spillage occurs and that the contents are removed from site according to approved methods. • Chemical toilets are to be emptied prior to temporary site closure for a period longer than 4 days. • Only the use of ablution facilities will be permitted onsite.	

After Mitigation	
Extent of the Impact	2
Duration of the Impact	2
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**5**
Probability	1
Environmental Risk = Significance of Impact X Probability	**5**

Table 31: Environmental risk assessment: Hazardous chemicals

Activity: Storage and handling of hazardous chemicals, including fuel.	
Nature of Environmental Impact: Potential hazardous chemical spills, resulting from incorrect management of resources, can cause soil-, surface water- and groundwater- pollution.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	2
Intensity of the Impact	2
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**6**
Probability	2
Environmental Risk = Significance of Impact X Probability	**12**
Objective of Mitigation Measures	
To prevent or minimise soil- and water- contamination as a result of accidental spillages of hazardous chemicals used onsite.	
Proposed Mitigation	
• Proper handling, storage and disposal of hazardous chemicals. All fuels and flammable materials are to be handled safely, stored safely and clearly labelled. • Flammable materials are to comply with standard fire safety regulations. • Drip trays must be used to collect spillage from equipment, vehicles and plant. These should be emptied regularly into secondary containers. • Fuels and flammable materials are to be handled in a safety conscious manner. • If refueling on site or from drums, the ground must be protected and proper dispensing equipment is to be used i.e. hand pumps and funnels. Drums may not be tipped to dispense fuel. • All fuels and flammable materials are to be stored safely and clearly labeled. • Safety signage including “No Smoking”, “No Naked Lights” and “Danger”, and product identification signs, are to be clearly displayed on fuel stores and tanks. • All liquid fuels (petrol and diesel) are to be stored in tanks or containers with lids and drip trays. • Fuel and flammable materials are to be kept under lock and key at all times and are to be stored at a central, easily accessible location. • Storage areas for fuels and flammable materials are to comply with standard fire safety regulations. • Adequate fire-fighting equipment shall be available close at hand and no smoking is permitted within the vicinity of storage areas. • All personnel handling fuels and hazardous materials are to be issued with the appropriate Personal Protective Equipment (PPE).	
After Mitigation	
Extent of the Impact	1
Duration of the Impact	2
Intensity of the Impact	2
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**5**
Probability	1

Environmental Risk = Significance of Impact X Probability	**5**

Table 32: Environmental risk assessment: Noise

Activity: Generation of noise from construction vehicles and machinery.	
Nature of Environmental Impact: Potential disturbance or nuisance to neighbors as a result of the increase in ambient noise from construction vehicles and machinery.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	1
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**4**
Probability	3
Environmental Risk = Significance of Impact X Probability	**12**
Objective of Mitigation Measures	
Minimise noise generation from construction activities	
Proposed Mitigation	
• The site workers and contractors will adhere to the requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993). • Regular maintenance of vehicles and equipment. • All plant and machinery are to be fitted with adequate silencers. • Working hours should be restricted to daylight hours. • Working procedures should be structured so as to avoid the unnecessary generation of noise. • No sound amplification equipment such as sirens, loud hailers or hooters are to be used on site except in emergencies and no amplified music is permitted on site. • If work is to be undertaken outside of normal work hours permission must be obtained from the ECO and the site manager. • No noisy work is to be conducted over the weekends or on religious public holidays.	
After Mitigation	
Extent of the Impact	2
Duration of the Impact	1
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**4**
Probability	1
Environmental Risk = Significance of Impact X Probability	**4**

Table 33: Environmental risk assessment: Resource usage during construction

Activity: The use of resources such as electricity, oil, grease, fuel and construction materials.	
Nature of Environmental Impact: Potential wastage of valuable resources due to inefficient or redundant usage.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	1
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**4**
Probability	2
Environmental Risk = Significance of Impact X Probability	**8**
Objective of Mitigation Measures	
To prevent the unnecessary wastage of resources	
Proposed Mitigation	

• Regular maintenance and inspection of equipment to prevent leaks. • Optimalisation of processes to reduce electricity consumption. • Regular site inspection by supervisors. • Proper environmental training and awareness.	
After Mitigation	
Extent of the Impact	1
Duration of the Impact	1
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**3**
Probability	1
Environmental Risk = Significance of Impact X Probability	**3**

8.3.2 Environmental Impact Assessments – Operational Phase

Tables 34 to 45 provide the environmental impact assessments for all operational phase activities.

Table 34: Environmental risk assessment: Groundwater quality

Activity: Treatment of abattoir wastewater.	
Nature of Environmental Impact: Potential groundwater contamination from the spillage of wastewater through leaking pipes or through seepage from treatment ponds.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	2
Intensity of the Impact	2
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**6**
Probability	2
Environmental Risk = Significance of Impact X Probability	**12**
Objective of Mitigation Measures	
To prevent the contamination of groundwater through the spillage and seepage of wastewater into the ground.	
Proposed Mitigation	
• The following mitigation measures must be implemented to avoid the seepage of wastewater from the treatment ponds and artificial wetlands: ▪ All wastewater containment ponds and artificial wetland cells must be lined with a 1.5mm HDPE liner. ▪ All reasonable measures must be taken to avoid liner damage and leakage. • Groundwater monitoring of DEBH01 and DEBH02 must be undertaken on a quarterly basis to ensure that no groundwater contamination is occurring. • Groundwater qualities should be analyzed for organic and inorganic content. • The parameters recommended for analysis are: Electrical Conductivity, pH, Total Dissolved Solids, fluoride, ammonia nitrogen, nitrate, total phosphorus, Chemical Oxygen Demand (COD), oil and grease, chloride, sodium, total alkalinity, calcium, magnesium, sodium, potassium, sulphate, iron, manganese, aluminium and turbidity. • In terms of flow, all water uses and discharges should be measured on an ongoing basis. • As far as possible, the same monitoring boreholes should be used to develop a long data record. This will enable trend analysis and recognition of progressive impacts (or improvement) with time. • The monitoring results should be interpreted on a regular basis to verify results from the geohydrological study and implement remedial action where the necessity is indicated.	

After Mitigation	
Extent of the Impact	2
Duration of the Impact	2
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**5**
Probability	1
Environmental Risk = Significance of Impact X Probability	**5**

Table 35: Environmental risk assessment: Dust

Activity: Generation of dust.	
Nature of Environmental Impact: Air quality degradation as a result of the accumulation of dust.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	1
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**4**
Probability	2
Environmental Risk = Significance of Impact X Probability	**8**
Objective of Mitigation Measures	
To minimise the potential impact of dust pollution caused by vehicles and other activities onsite.	
Proposed Mitigation	
• A water bowser needs to be onsite to water down dusty roads on dry windy days. • Speed bumps or traffic speed signs need to be erected on site to reduce speeding that could result in the generation of dust. • Roads must be tarred or paved where possible. • A complaints register must be kept on site. The complaints register must record the following: date when complaint was received, name of person who reported the complaint and when and how the concern was addressed.	
After Mitigation	
Extent of the Impact	1
Duration of the Impact	1
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**3**
Probability	1
Environmental Risk = Significance of Impact X Probability	**3**

Table 36: Environmental risk assessment: Generation of odours

Activity: Generation of odours at the treatment plant.	
Nature of Environmental Impact: Potential social impact (nuisance) caused by odours generated.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	3
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**6**
Probability	3
Environmental Risk = Significance of Impact X Probability	**18**
Objective of Mitigation Measures	
To minimise the impact of odours created at the treatment plant.	

Proposed Mitigation	
• The wastewater treatment plant must be designed, operated and maintained so as to minimise odours. • Odours produced during the commissioning phase of the treatment works can be minimised by for example using an artificial cover on the ponds that will break down over time or by laying straw or hay on the surface of the anaerobic pond. • Commercial microbial and enzyme products must be added during the commissioning phase to promote natural binding and prevent the generation of odours. • All chemicals and detergents used at the abattoir must be compatible with the bacteria used in the wastewater treatment plant. • Should system failure occur, a suitable starter culture or enzyme must be used to re-establish pond equilibriums. • A complaints register must be kept on site. The complaints register must record the following: date when complaint was received, name of person who reported the complaint and when and how the concern was addressed.	
After Mitigation	
Extent of the Impact	2
Duration of the Impact	3
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**6**
Probability	1
Environmental Risk = Significance of Impact X Probability	6

Table 37: Environmental risk assessment: Storm water management

Activity: Storm water management.	
Nature of Environmental Impact: • Potential sinkhole and doline (compaction subsidence) formation; • Potential soil- and surface water- contamination from the treatment ponds and artificial wetland; • Potential siltation of the watercourse; and • Additional volume and dilution due to run-off into the treatment ponds may also impact on the effectiveness of the treatment system.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	3
Intensity of the Impact	3
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**8**
Probability	3
Environmental Risk = Significance of Impact X Probability	24
Objective of Mitigation Measures	
• To prevent the formation of sinkholes and doline. • To minimise the potential for environmental impact caused by storm water, for instance, erosion of topsoil or siltation of surface water bodies, to control general storm water disposal, and to facilitate appropriate dissipation in heavy rain events.	
Proposed Mitigation	
• No significant accumulations of surface water may occur as a result of inadequate canalization of storm water. • Storm water measures must be inspected on a regular basis in order to ensure that the structures are functional and not causing soil erosion. • The storm water drainage system must be maintained (free-draining) and not contaminated by other waste sources. Storm water must be kept separate from the wastewater treatment system. • Runoff from areas without potential sources of contamination should be minimised by	

minimising the extent of impermeable surfaces. • Storm water must be diverted away from the treatment ponds and artificial wetland. • Placing of erosion prevention structures or vegetation to reduce water velocity at concentration points within the drainage system. • Placing of culverts underneath road foundation.	
After Mitigation	
Extent of the Impact	2
Duration of the Impact	2
Intensity of the Impact	2
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**6**
Probability	1
Environmental Risk = Significance of Impact X Probability	**6**

Table 38: Environmental risk assessment: Noise and light pollution

Activity: Increase in ambient noise level as a result of operating machinery (e.g. pumps and aerators) and the installation of artificial night-time lighting.	
Nature of Environmental Impact: Potential noise pollution and light pollution (at night), potential nuisance due to noise and lights, potential disturbance of feeding or breeding animals.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	3
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**6**
Probability	3
Environmental Risk = Significance of Impact X Probability	**18**
Objective of Mitigation Measures	
To prevent the facility becoming a nuisance to adjacent landowners as a result of the increase in environmental sound levels and light levels at night.	
Proposed Mitigation	
• Equipment should be selected and maintained to minimise noise levels. • Ensure that machinery (e.g. pumps and aerators) is in proper working condition, fitted with silencing equipment if necessary. • Enclose machines and equipment with elevated noise emissions (in excess of 85dB) in noise reduction housing, where possible. • Conduct regular maintenance on pumps. • Maintain a dB reading of less than 50dB at the site boundary. • Keep equipment in good repair and attend to loose or rattling covers, worn bearings and broken equipment. • Night-time lighting must be kept to a minimum and switched off when not required. • Night-time lighting must be directed away from the R50 road to prevent disturbance of passing vehicles. • A complaints register must be kept on site. The complaints register must record the following: date when complaint was received, name of person who reported the complaint and when and how the concern was addressed.	
After Mitigation	
Extent of the Impact	1
Duration of the Impact	3
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**5**
Probability	1
Environmental Risk = Significance of Impact X Probability	**5**

Table 39: Environmental risk assessment: Hazardous substances

Activity: Accidental spillage of hazardous substances, such as fuel or chemicals used to maintain pumps and aerators.	
Nature of Environmental Impact: Potential soil-, surface water- and/or ground water-contamination.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	2
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**5**
Probability	2
Environmental Risk = Significance of Impact X Probability	**10**
Objective of Mitigation Measures	
To prevent the spilling of hazardous chemicals or materials to soil, surface water and ground water bodies.	
Proposed Mitigation	
• Proper storage of chemicals in a lockable, well ventilated building. • Storage areas for hazardous chemicals are to comply with standard fire safety regulations. • Safety signage including “No Smoking”, “No Naked Lights” and “Danger”, and product identification signs, are to be clearly displayed in areas housing chemicals. • Adequate fire-fighting equipment shall be available close at hand and no smoking is permitted within the vicinity of storage areas. • Chemicals are to be properly labeled and handled in a safety conscious manner. • All personnel handling hazardous chemicals and hazardous materials are to be issued with the appropriate Personal Protective Equipment (PPE). • Limited access to the storage areas. • The removal of only the daily-required amount of chemicals to be used from the shed. • If refueling on site or from drums, the ground must be protected and proper dispensing equipment is to be used i.e. hand pumps and funnels. Drums may not be tipped to dispense fuel. • Use of drip trays during filling of machinery or equipment. Drip trays should be emptied into secondary containers on a regular basis. • Spill kits should be readily available.	
After Mitigation	
Extent of the Impact	1
Duration of the Impact	1
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**3**
Probability	1
Environmental Risk = Significance of Impact X Probability	**3**

Table 40: Environmental risk assessment: General and domestic waste

Activity: Generation of general and domestic waste.	
Nature of Environmental Impact: Potential pollution of soil, surface water and/or groundwater by waste generated onsite.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	1
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**4**

Probability	2
Environmental Risk = Significance of Impact X Probability	**8**
Objective of Mitigation Measures	
To prevent the contamination of the natural environment by pollutants from general and domestic waste generated onsite.	
Proposed Mitigation	
• The facility manager should ensure that waste containers are provided for the collection of general waste at various points on the premises. • Proper domestic waste management and overall waste management on site. • All containers shall be kept in a clean and hygienic manner. • Storage containers shall be stored in a manner that prevents the harbouring of pests. • Training of staff in proper hygiene. • Frequent collection of waste in bins. • Disposal of waste at the municipal landfill site.	
After Mitigation	
Extent of the Impact	2
Duration of the Impact	1
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**4**
Probability	1
Environmental Risk = Significance of Impact X Probability	**4**

Table 41: Environmental risk assessment: Hazardous waste

Activity: Generation of hazardous waste during the abattoir wastewater treatment process.	
Nature of Environmental Impact: • Potential build-up of sludge at the bottom of the treatment ponds that may compromise the treatment capacity of the system. This may lead to the discharge of only partially-treated wastewater into the environment; • Potential soil-, surface- and/or ground-water- contamination due to incorrect disposal of hazardous waste.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	2
Intensity of the Impact	2
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**6**
Probability	2
Environmental Risk = Significance of Impact X Probability	**12**
Objective of Mitigation Measures	
To prevent to pollution of the environment through the discharge of insufficiently treated wastewater or the incorrect disposal of hazardous waste.	
Proposed Mitigation	
• Sludge must be removed from the wastewater treatment plant as stipulated by the plant designer. • The sludge must be disposed of in an appropriate manner and may not be sent to a municipal landfill site that only deals with general waste. • Ponds must be regularly inspected for signs of sludge build up and ineffective treatment of the wastewater. • Regular monitoring of discharge water (treated wastewater) qualities.	
After Mitigation	
Extent of the Impact	1
Duration of the Impact	2

Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**4**
Probability	1
Environmental Risk = Significance of Impact X Probability	**4**

Table 42: Environmental risk assessment: Water use

Activity: Water use	
Nature of Environmental Impact: Potential wastage and/or pollution of water	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	1
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**4**
Probability	2
Environmental Risk = Significance of Impact X Probability	**8**
Objective of Mitigation Measures	
To prevent the wastage and/or pollution of water	
Proposed Mitigation	
• Abattoir wastewater should be efficiently treated and re-used as far as possible. Re-use will depend on the salinity levels of the treated water. • Clean storm water must be kept away from areas where it could be contaminated and must be directed to the storm water drainage system. • Leaking taps and hose pipes are to be repaired immediately. • Running water taps and hosepipes are not to be left unattended. • Unused standpipes are to be buried to prevent damage and resultant water leaks. • Taps are to be attached to secured supports and used in preference to standpipes with no valve mechanism to open and close the water supply. All hose and tap connections are to be fitted with correct and appropriate plumbing fittings.	
After Mitigation	
Extent of the Impact	1
Duration of the Impact	1
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**3**
Probability	1
Environmental Risk = Significance of Impact X Probability	**3**

Table 43: Environmental risk assessment: Sanitation

Activity: General sanitation onsite.	
Nature of Environmental Impact: Potential surface- and/or ground water- contamination.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	1
Intensity of the Impact	2
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**5**
Probability	2
Environmental Risk = Significance of Impact X Probability	**10**
Objective of Mitigation Measures	
To prevent the contamination of the natural environment by pollutants from poor sanitation onsite.	

Proposed Mitigation	
• Construction of toilet facilities connected to a septic tank. • The septic tank must be treated with anaerobic bacteria to break down solids and to neutralise "bad" bacteria, such as *E. coli*. • The septic tank must be emptied at regular intervals, before reaching its maximum capacity. • Ablution facilities should be maintained to prevent or minimize blockage and leakages. • Sewerage systems should be kept separate from storm water system. • Awareness of the importance of proper hygiene should be created among employees. • Toilets should have properly closing doors and supplied with toilet paper.	
After Mitigation	
Extent of the Impact	1
Duration of the Impact	1
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**3**
Probability	1
Environmental Risk = Significance of Impact X Probability	**3**

Table 44: Environmental risk assessment: Operation of the abattoir wastewater treatment works

Activity: Treatment of abattoir wastewater.	
Nature of Environmental Impact: • Potential soil-, surface- and groundwater- pollution should wastewater not be treated effectively; • Disturbance of the wetland (watercourse); and • Potential sinkhole and doline (compaction subsidence) formation.	
Before Mitigation	
Extent of the Impact	2
Duration of the Impact	2
Intensity of the Impact	2
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**6**
Probability	3
Environmental Risk = Significance of Impact X Probability	**18**
Objective of Mitigation Measures	
To prevent the contamination of the natural environment though abattoir wastewater and to prevent the formation of sinkholes and doline.	
Proposed Mitigation	
• The wastewater treatment plant must be capable of treating 2 500m^3 of abattoir wastewater per day. • Anaerobic ponds must be designed to have a long enough retention period so that a satisfactory level of breakdown can occur. • The treatment works must be designed carefully so that overloading does not occur. • The wastewater must be treated to a quality that complies with the Department of Water Affairs' General Limit standards for the discharge of wastewater into a water resource. • In terms of flow, all water uses and discharges should be measured on an ongoing basis. • As far as possible, the same surface monitoring points should be used to develop a long data record and enable trend analysis and recognition of progressive impacts (or improvement) with time. • The following parameters should be monitored for the treated wastewater: ▪ pH ▪ Electrical conductivity (mS/m) ▪ Faecal coliforms (per 100ml) ▪ Chemical Oxygen Demand (COD) (mg/l) ▪ Ammonia as Nitrogen (mg/l)	

▪ Nitrate/Nitrite as Nitrogen (mg/l) ▪ BOD ▪ Salinity ▪ Bacterial levels ▪ Nutrient load ▪ Suspended solids • The monitoring results should be interpreted on a regular basis to implement remedial action where the necessity is indicated. • Spilling and leaking from the treatment ponds and wetlands should be prevented. • Sludge must be removed from the ponds as prescribed by the treatment system designer. • Treated wastewater must be re-used where possible and where not possible, must be disposed of in an acceptable manner, such as through discharge into the existing natural drainage line. • The existing natural drainage line must be maintained and should be free-flowing at all times to prevent the accumulation of water on the surface. • Floating matter, such as grass, may not accumulate on the surface of the treatment ponds. • Pond and wetland embankments must be regularly maintained and inspected for structural integrity. • Wetland areas must be conserved. The WWTW must be operated efficiently to ensure that only clean, treated water is released into the environment (into the natural drainage line). • Opportunities should be identified to prevent or reduce wastewater production at the abattoir through for example recycling, reuse or process modifications.

After Mitigation	
Extent of the Impact	2
Duration of the Impact	2
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**5**
Probability	1
Environmental Risk = Significance of Impact X Probability	**5**

Table 45: Environmental risk assessment: Resource use during operation

Activity: Usage of resources such as electricity and water.	
Nature of Environmental Impact: Potential wastage of valuable resources due to inefficient or redundant use.	
Before Mitigation	
Extent of the Impact	1
Duration of the Impact	3
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**5**
Probability	2
Environmental Risk = Significance of Impact X Probability	**10**
Objective of Mitigation Measures	
To prevent the unnecessary wastage of resources	
Proposed Mitigation	
• Regular maintenance and inspection of equipment, such as water pipes, to prevent leaks. • Regular site inspection by supervisors. • Proper environmental training and awareness. • Monitoring of resource consumption. • Implementation of technologies that can reduce resource consumption. • Processes should be designed to save electricity and water where possible.	
After Mitigation	
Extent of the Impact	1

Duration of the Impact	1
Intensity of the Impact	1
Significance of Impact = Extent of Impact + Duration of Impact + Intensity of Impact	**3**
Probability	1
Environmental Risk = Significance of Impact X Probability	**3**

8.3.3 Cumulative Impacts

Cumulative impacts refer to the situation where an activity may in itself not have a significant impact, but may become significant when added to the existing and potential impacts from similar or different activities in the area.

The only activities within a one kilometre radius of the site are residential buildings. Other known sources of environmental impacts include poultry broiler houses (2.25km from the site), a feed mill (4.2km from the site), an egg laying farm (4.2km from the site), and a chicken waste rendering facility (7km from the site). A similar wastewater treatment works is planned for an abattoir that lies approximately 10km from the site. These sources could contribute to noise-, water-, and atmospheric- pollution in the area.

Due to the distance of the site to other significant activities (in terms of environmental and social impacts), it can be concluded that no significant cumulative impacts will result from the proposed activity.

8.3.4 Assumptions, gaps in knowledge and uncertainties

The following assumptions were made during the environmental impact assessment:

- The wastewater treatment plant will operate as designed and will effectively treat the abattoir wastewater to an acceptable quality (DWA General Limit values for discharge of wastewater into a water resource);
- The abattoir wastewater volumes will not exceed the treatment capacity of the wastewater treatment plant; and
    - All mitigation measures proposed in the draft EMPr (Appendix D) will be implemented by the applicant to ensure that the environmental impacts are kept to a minimum.

9. ENVIRONMENTAL IMPACT STATEMENT

9.1 Summary of key findings

At present, wastewater generated at the AFGRI Delmas abattoir is ineffectively treated as follows:

1. The wastewater is screened by a rotary screen to remove the solids. The solids are sent to a rendering plant.
2. The wastewater is pumped to a storage vessel where manual fat skimming occurs.
3. The wastewater is then pumped to an aeration pond and is discharged into a drainage line. the drainage line runs into a constructed dam that is located within a wetland area (south of the abattoir). The wetland has been negatively impacted upon through the above mentioned discharge of wastewater.

The current wastewater treatment process at the abattoir is inadequate and a wastewater treatment works is therefore being proposed to effectively treat the wastewater to General Limit for discharge standards. Treated water will be re-used at the abattoir as far as possible, decreasing the amount of groundwater that needs to be abstracted from neighbouring boreholes. The discharge of remaining water (that which cannot be re-used) into the above mentioned drainage line should have a positive, rehabilitating effect on the wetland area to the south of the proposed WWTW. Other environmental impacts that may result from the proposed WWTW, such as noise-, soil-, water-, and air- pollution can be mitigated and sensitive receptors like residential dwellings are situated far away from the site for the proposed WWTW.

A geotechnical investigation conducted by Johann van der Merwe found that undisturbed soil samples are “pervious”. For this reason, all the treatment ponds and wetland cells will be lined with a HDPE liner. This will prevent soil and groundwater contamination.

9.2 Comparative assessment of positive and negative implications of the proposed activity and alternatives

The table below compares the positive and negative implications of the proposed wastewater treatment works to those from the alternative activity, namely the no-go option or current situation.

Table 46: Comparison of the positive and negative implications of the proposed activity and alternative option

	Wastewater Treatment Works	No-go option
Positive impacts	• Significant improvement in quality and rehabilitation of the wetland to the south of the abattoir and proposed WWTW • Job creation • Stimulation of the local economy • Re-use of water at the Delmas abattoir, decreasing the amount of groundwater that needs to be abstracted • Reduced pressure on groundwater resources • Removal of a potential source of soil, surface, and groundwater pollution, i.e. the discharge of partially treated wastewater into the environment	• No new disturbance of the site
Negative impacts	• Disturbance of vegetation (old crops) due to construction activities like site clearance • Visual impact on motorists driving on the R50 • Minimal noise pollution • Generation of odours (severe at first, but decreasing with time) • Minimal dust generation	• Continued pollution of the environment and contamination of a wetland • No re-use of water at the Delmas abattoir

A comparison between the impacts of the proposed activity and no-go option shows that the no-go option has a greater negative impact on the environment than the proposed activity. Authorisation of the wastewater treatment works is recommended on condition that the environmental impacts are mitigated as stipulated in the Environmental Management Programme.

10. CONCLUSION AND RECOMMENDATION

During the construction phase, the project can be expected to have low negative impacts on the various environmental attributes with proper mitigation measures implemented. The project can be expected to have a positive impact on the regional and local socio-economy during the construction phase. This will be as a result of the creation of jobs as well as procurement opportunities from local suppliers in the area. These benefits can be maximised through preference in procurement processes for local firms and employment of local labourers.

Once constructed, the wastewater treatment works will directly contribute to the local economy though the creation of jobs. The most significant, positive impact created by the treatment plant will be the quality improvement of the wastewater being discharged into the environment by AFGRI Poultry. This positive impact outweighs the smaller, negative impacts that may be caused by the treatment works.

Based on the outcomes of the specialist assessments that have informed the environmental impact assessment process, together with the recommendations made by the specialists and EAP, the overall impact of the project is of **Low - Medium significance** that can be reduced to **Low significance** though the implementation of simple and effective mitigation measures.

The following recommendations are therefore made:

1. **The project should be approved and allowed to proceed.**
2. **The mitigation measures proposed above, that have been incorporated into the EMPr in more detail, must be implemented during the construction and operational phases of the project.**
3. **A communications pathway must be established that would allow the designated ECO to accept and deal with stakeholder complaints.**
4. **Mitigation measures proposed above should be incorporated as far as possible into the operational plan for the development.**
5. **Strict monitoring and enforcement of requirements of the EMPr must be undertaken to ensure that contractors and operators adhere to these requirements.**