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## 1. IMPACT ASSESSMENT METHODOLOGY

Assessment of potential impacts is guided by Guideline 5: Assessment of Alternatives and Impacts, developed in line with EIA Regulations. The objective of the assessment of impacts is to identify and assess all the significant impacts that may arise from the undertaking of an activity. The findings of impact assessments are used to inform the competent authority's decision as to whether the activity should be authorised, authorised subject to conditions that will mitigate the impacts to within acceptable levels or should be refused.

Different types of impacts may occur from the undertaking of an activity. The impacts may be positive or negative and may be categorised as being direct (primary), indirect (secondary) or cumulative impacts (additional to existing).

**Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.

**Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity (e.g. the reduction of water in a stream that supplies water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

**Cumulative impacts** are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

The first stage of risk/ impact assessment is the identification of environmental activities, aspects and impacts. This is supported by the identification of receptors and resources, which allows for an understanding of the impact pathway and an assessment of the sensitivity to change. The definitions used in the impact assessment are presented below:

- An **activity** is a distinct process or task undertaken by an organisation for which a responsibility can be assigned. Activities also include facilities or infrastructure that is possessed by an organisation.
- An **environmental aspect** is an element of an organisation’s activities, products and services which can interact with the environment. The interaction of an aspect with the environment may result in an impact.
- **Environmental risks/impacts** are the consequences of these aspects on environmental resources or receptors of particular value or sensitivity, for example, disturbance due to noise and health effects due to poorer air quality. In the case where the impact is on human health or wellbeing, this should be stated. Similarly, where the receptor is not anthropogenic, then it should, where possible, be stipulated what the receptor is.
- **Receptors** can comprise, but are not limited to, people or human-made systems, such as local residents, communities and social infrastructure, as well as components of the biophysical environment such as wetlands, flora and riverine systems.
- **Resources** include components of the biophysical environment.

### Impact rating

The significance of the impact is then assessed by rating each variable numerically according to the defined criteria. Refer to the tables below. The purpose of the rating is to develop a clear understanding of influences and processes associated with each impact. The severity, spatial scope and duration of the impact together comprise the consequence of the impact and when summed can obtain a maximum value of 15. The frequency of the activity and the frequency of the impact together comprise the likelihood of the impact occurring and can obtain a maximum value of 10. The values for likelihood and consequence of the impact are then read off a significance rating matrix and are used to determine whether mitigation is necessary. The assessment of significance is undertaken twice, without mitigations and with mitigations. The assessment criterion is illustrated in **Tables 1-3 below**.

**Table 1: Criteria for assessing significance of impacts**

### LIKELIHOOD DESCRIPTORS

PROBABILITY OF IMPACT	RATING
Highly unlikely	1
Possible	2

Likely	3
Highly likely	4
Definite	5
<b>SENSITIVITY OF RECEIVING ENVIRONMENT</b>	<b>RATING</b>
Not sensitive/important	1
With limited sensitivity/importance	2
Moderately sensitive/important	3
Highly sensitive/important	4
Critically sensitive/important	5

### CONSEQUENCE DESCRIPTORS

<b>SEVERITY OF IMPACT</b>	<b>RATING</b>
Insignificant / ecosystem structure and function unchanged	1
Small / ecosystem structure and function largely unchanged	2
Significant / ecosystem structure and function moderately altered	3
Great / harmful/ ecosystem structure and function Largely altered	4
Disastrous / ecosystem structure and function seriously to critically altered	5
<b>SPATIAL SCOPE OF IMPACT</b>	<b>RATING</b>
Activity specific/< 5 ha impacted	1
Development specific/ within the site boundary	2
Local area/ within 1km of the site boundary	3
Regional within 5km of the site boundary	4
Entire habitat unit / Entire system / > 5000ha impacted	5
<b>DURATION OF IMPACT</b>	<b>RATING</b>
One day to one month	1
One month to one year	2
One year to five years	3
Life of operation or less than 20 years	4

Permanent	5
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**Table 2: Significance rating matrix**

CONSEQUENCE (Severity + Spatial Scope + Duration)															
LIKEHOOD (Probability + Sensitivity)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150

**Table 3: Positive/ Negative Mitigation Ratings**

SIGNIFICANCE RATINGS	VALUE	NEGATIVE IMPACT MANAGEMENT RECOMMENDATION	POSITIVE IMPACT MANAGEMENT RECOMMENDATION
Very high	126-150	Improve current management	Maintain current management
High	101-125	Improve current management	Maintain current management
Medium-high	76-100	Improve current management	Maintain current management
Medium-low	51-75	Maintain current management	Improve current management
Low	26-50	Maintain current management	Improve current management
Very low	1-25	Maintain current management	Improve current management

The following points were considered when undertaking the assessment:

- Risks and impacts were analysed in the context of the project's area of influence encompassing:
- Primary project site and related facilities that the client and its contractors develops or controls;
- Areas potentially impacted by cumulative impacts for further planned development of the project, any existing project or condition and other project-related developments; and

- Areas potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location.

Risks/Impacts were assessed for all stages of the project cycle including:

- Pre-construction;
- Construction;
- Rehabilitation; and
- Operational.

### **Mitigation measure development**

The following points present the key concepts considered in the development of mitigation measures for the proposed development:

- Mitigation and performance improvement measures and actions that address the risks and impacts are identified and described in as much detail as possible.
- Measures and actions to address negative impacts will favour avoidance and prevention over minimization, mitigation or compensation.
- Desired outcomes are defined, and have been developed in such a way as to be measurable events with performance indicators, targets and acceptable criteria that can be tracked over defined periods, with estimates of the resources (including human resource and training requirements) and responsibilities for implementation.

### **Recommendations**

Recommendations were developed to address and mitigate impacts associated with the proposed development. These recommendations also include general management measures which apply to the proposed development as a whole. Mitigation measures have been developed to address issues in all phases throughout the lifecycle of the operation from planning, through construction, operation and closure through to after care and maintenance.

## 2. PRE-CONSTRUCTION AND PLANNING PHASE

### T1 (preferred technology): Underground Wells

Activity	Direct Impact		Significance	Proposed mitigations				
Engineering design	Design incompatible with the environment		<b>12 (very low)</b>	<ul style="list-style-type: none"> <li>Assimilate requirements of the BAR and EMPr in the design and construction management giving special attention to the proposed hazardous fuel underground wells.</li> <li>Prior to construction The Developer must ensure that the authorised activity is limited to the property boundary or building line.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	1	1	1	1	4	2	6	<b>12 (very low)</b>
With mitigation	1	1	1	1	4	2	6	<b>12 (Very low)</b>
Activity	Direct Impact		Significance	Proposed mitigations				
Establishment of the construction camp sites	Establishment of construction camp can lead to damage or loss of existing vegetation and changes to the area's water quality		<b>9 (very low)</b>	<ul style="list-style-type: none"> <li>The planning and design for the construction camp must ensure that there is a minimum impact on the environment.</li> <li>The construction camps must be located to the already disturbed area where possible.</li> <li>The Contractor camp must have the necessary ablation facilities.</li> <li>The Contractor must maintain service records of all chemical toilets on site.</li> <li>Where ablation facilities are available the Contractor shall make use of such facilities.</li> <li>The Contractor must inform all site staff to the use of supplied ablation facilities and under no circumstances shall indiscriminate urinating be allowed other than in supplied facilities.</li> <li>The Contractor must supply waste collection bins for waste collection on site and all solid waste collected shall be disposed of at an official or registered waste disposal facility.</li> </ul>				

								<ul style="list-style-type: none"> <li>No solid waste must be disposed of or burned on site.</li> <li>Additional construction camp facilities must be placed within the property and on already disturbed land as far as possible.</li> <li>Emergency and contact numbers of the contractors must be available and accessible to all workers on site or possibly displayed on a construction signage board.</li> </ul>
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	3	1	1	1	2	4	4	<b>16 (very low)</b>
With mitigation	2	1	1	1	1	3	3	<b>9 (very low)</b>
Activity	Direct Impact	Significance	Proposed mitigations					
Designated areas for vehicle parking and storage of equipment.	Pollution of soils by hydrocarbons	<b>8 (very low)</b>	<ul style="list-style-type: none"> <li>No storage of vehicles or equipment will be allowed outside of the designated area.</li> <li>Drip trays or oil spill absorbent material must be supplied to prevent pollution and clean-up polluted soil where prevention efforts failed.</li> </ul>					
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	2	1	2	1	2	3	5	<b>15 (very low)</b>
With mitigation	1	1	1	1	2	2	4	<b>8 (very low)</b>

Activity	Indirect Impact	Significance	Proposed mitigations					
Establishment of the construction camp sites	Crowding of job-seekers around the site, creating security risk.	<b>42 (low)</b>	<ul style="list-style-type: none"> <li>The Contractor shall recognise that the site is surrounded by commercial and administrative buildings and as such should take all reasonable measures to ensure the safety of people in the surrounding properties.</li> <li>Adequate measures must be implemented to prevent unauthorised access to construction work areas.</li> <li>Recruitment of local labour should be done off-site in consultation with community representatives.</li> <li>The site should be fenced-off, with 24-hour access control.</li> </ul>					
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	4	4	2	3	1	8	6	<b>48 (low)</b>



With mitigation	3	4	2	3	1	7	6	<b>42 (low)</b>
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Activity	Cumulative Impact		Significance	Proposed mitigations				
Engineering design	Bad design of underground wells could expose groundwater to pollution through leakages. Bad design could potentially compromise the aesthetic value of the site.		<b>12 (very low)</b>	<ul style="list-style-type: none"> <li>The wells should be done to the specification of Sasol Company and installed according to SANS specification.</li> <li>Only a registered engineer will be utilized for the design of underground well.</li> <li>The recommendations of the Geotech Report are paramount in the design of underground wells.</li> <li>Assimilate requirements of the BAR and EMPr in the design and construction management giving special attention to the proposed fuel storage wells.</li> <li>Prior to construction The Developer must ensure that the authorised activity is limited to the property boundary or building line.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	2	2	2	1	4	4	7	<b>28 (low)</b>
With mitigation	1	1	1	1	4	2	6	<b>12 (very low)</b>

## T2: Alternative technology: Overhead Fuel Tank

Activity	Direct Impact		Significance	Proposed mitigations				
Engineering design	Design incompatible with the environment		<b>12 (very low)</b>	<ul style="list-style-type: none"> <li>Assimilate requirements of the BAR and EMPr in the design and construction management giving special attention to the proposed hazardous fuel storage tanks and the oil separator facility or waste water treatment facility.</li> <li>Prior to construction The Developer must ensure that the authorised activity is limited to the property boundary or building line.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	2	2	2	1	4	4	7	<b>28 (low)</b>

With mitigation	1	1	1	1	4	2	6	<b>12 (very low)</b>
<b>Activity</b>	<b>Direct Impact</b>		<b>Significance</b>	<b>Proposed mitigations</b>				
Establishment of the construction camp sites	Establishment of construction camp can lead to damage or loss of existing vegetation and changes to the area's water quality		<b>9 (very low)</b>	<ul style="list-style-type: none"> <li>• The planning and design for the construction camp must ensure that there is a minimum impact on the environment.</li> <li>• The construction camps must be located to the already disturbed area where possible.</li> <li>• The Contractor camp must have the necessary ablution facilities.</li> <li>• The Contractor must maintain service records of all chemical toilets on site.</li> <li>• Where ablution facilities are available the Contractor shall make use of such facilities.</li> <li>• The Contractor must inform all site staff to the use of supplied ablution facilities and under no circumstances shall indiscriminate urinating be allowed other than in supplied facilities.</li> <li>• The Contractor must supply waste collection bins for waste collection on site and all solid waste collected shall be disposed of at an official or registered waste disposal facility.</li> <li>• No solid waste must be disposed of or burned on site.</li> <li>• Additional construction camp facilities must be placed within the property and on already disturbed land as far as possible.</li> <li>• Emergency and contact numbers of the contractors must be available and accessible to all workers on site or possible displayed on a construction signage board.</li> </ul>				
<b>Significance</b>	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	<b>Rating</b>
Without mitigation	3	1	1	1	2	4	4	<b>16 (very low)</b>
With mitigation	2	1	1	1	1	3	3	<b>9 (very low)</b>
<b>Activity</b>	<b>Direct Impact</b>		<b>Significance</b>	<b>Proposed mitigations</b>				
Designated areas for vehicle parking and storage of equipment.	Pollution of soils by hydrocarbons		<b>8 (very low)</b>	<ul style="list-style-type: none"> <li>• No storage of vehicles or equipment will be allowed outside of the designated area.</li> <li>• Drip trays or oil spill absorbent material must be supplied to prevent pollution and clean-up polluted soil where prevention efforts failed.</li> </ul>				
<b>Significance</b>	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	<b>Rating</b>
Without mitigation	2	1	2	1	2	3	5	<b>15 (very low)</b>

With mitigation	1	1	1	1	2	2	4	<b>8 (very low)</b>
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Activity	Indirect Impact		Significance	Proposed mitigations				
Establishment of the construction camp sites	Crowding of job-seekers around the site, creating security risk.		<b>42 (low)</b>	<ul style="list-style-type: none"> <li>The Contractor shall recognise that the site is surrounded by commercial and agricultural areas and must take all reasonable measures to ensure the safety of people in the surrounding properties.</li> <li>Adequate measures must be implemented to prevent unauthorised access to construction work areas.</li> <li>Recruitment of local labour should be done off-site in consultation with community representatives.</li> <li>The site should be fenced-off, with 24-hour access control.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	4	4	2	3	1	8	6	<b>48 (low)</b>
With mitigation	3	4	2	3	1	7	6	<b>42 (low)</b>

Activity	Cumulative Impacts		Significance	Proposed mitigations				
Engineering design	Bad design of fuel tanks could potentially compromise the aesthetic value of the site		<b>28 (low)</b>	<ul style="list-style-type: none"> <li>The fuel tanks should be of the design prescribed and/or acceptable in terms of SANS for fuel storage tanks.</li> <li>Assimilate requirements of the BAR and EMPr in the design and construction management giving special attention to the proposed fuel storage tank.</li> <li>Prior to construction The Developer must ensure that the authorised activity is limited to the property boundary or building line.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	4	2	2	1	4	6	7	<b>42 (low)</b>
With mitigation	4	2	2	1	4	6	7	<b>42 (low)</b>

**No-Go Alternative**

No impacts associated with “no-go” alternative have been identified for the planning phase.

### 3. CONSTRUCTION PHASE

#### T1 (preferred technology): Underground Fuel Storage Wells

Activity	Direct Impacts			Significance	Proposed Mitigations				
Construction and earth works	Depletion of aesthetic value			<b>20 (very low)</b>	<ul style="list-style-type: none"> <li>Limit all construction activities to the proposed footprint within consolidatedn Erf 1252 Nkandla Local Municipality, KwaZulu Natal</li> <li>Topsoil should be well preserved as prescribed below for use during the rehabilitation phase.</li> <li>Overburden soil should be reused in other activities in the area that need filling with such soil material.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating	
Without mitigation	4	1	2	2	2	5	6	<b>30 (low)</b>	
With mitigation	3	1	1	2	2	4	5	<b>20 (very low)</b>	
Activity	Direct Impacts		Significance	Proposed Mitigations					
Site clearing	Soil erosion		<b>6 (very low)</b>	<ul style="list-style-type: none"> <li>Stormwater management plan should be developed for the construction phase.</li> <li>Avoid leaving disturbed surfaces bare for long periods as this will make the site prone to erosion.</li> <li>Avoid undue stormwater concentration (e.g. construction runoff measures should be done according to soil conservation principles).</li> <li>The run-off from the exposed ground should be controlled with the careful placement of flow retarding barriers.</li> <li>The soil that is excavated during construction should be stock-piled in layers and protected by berms to prevent erosion.</li> <li>All stockpiles must be kept as small as possible, with gentle slopes (18 degrees) in order to avoid excessive erosive losses.</li> <li>Exposed soil should be covered with brush-packs of non-invasive species in order to minimise erosive losses.</li> </ul>					

Activity	Direct Impacts		Significance	Proposed Mitigations				
				<ul style="list-style-type: none"> <li>The removal of plant material should be kept to a minimum.</li> <li>Rehabilitation of erosion channels and gullies must be undertaken on an on-going basis.</li> <li>Re-establishment of indigenous plant cover on disturbed areas must take place as soon as possible once activities in that area have ceased.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	3	2	1	1	1	5	3	15 (very low)
With mitigation	1	1	1	1	1	2	3	6 (very low)
Site clearing and construction works	Increased ambient dust		20 (very low)	<ul style="list-style-type: none"> <li>Dust suppression is to be conducted during construction, or as complaints are received.</li> <li>The use of enclosures, screens and sheeting should be considered to contain dust.</li> <li>The Contractor is to take appropriate measures to minimise the generation of dust as a result of excavation works. Such measures include frequent spraying during low rainfall periods.</li> <li>Speed limits must be enforced in all areas to reduce the generation of dust.</li> <li>Re-vegetate disturbed areas as soon as possible after disturbance.</li> <li>No burning on site of any sort on site.</li> <li>Stockpiles should not be higher than two (2) m to avoid compaction, and single handling is recommended.</li> <li>Dust suppression must be undertaken for stockpiles older than a month – with either water or a biodegradable chemical binding agent.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	4	1	1	3	2	5	6	30(low)
With mitigation	3	1	1	2	2	4	5	20 (Very low)

Activity	Direct Impacts	Significance	Proposed Mitigations
	Soil pollution and degradation	12 (very low)	<ul style="list-style-type: none"> <li>• Workers must be trained to be able to prevent chemical and hydrocarbon spills.</li> <li>• Combat chemical pollution in order to avoid toxic substances entering storwater channels.</li> <li>• Spill kits must be available on-site at all times in order to ensure rapid deployment of corrective measures following spill incidents.</li> <li>• Workers must be suitably trained in the use of spill kits.</li> <li>• Stockpile topsoil in heaps not exceeding two (2) m in height.</li> <li>• Use only the A-horizon for topsoil purposes.</li> <li>• Handle topsoil only in the moist state to prevent wind erosion.</li> <li>• All possible efforts must be made by the Contractor to strip topsoil to a maximum depth of 150 mm.</li> <li>• Topsoil stockpiles must be kept as small as possible in order to minimise compaction, wind erosion and the formation of anaerobic conditions.</li> <li>• Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired.</li> <li>• Topsoil must not be handled when the moisture content exceeds 12%.</li> <li>• Topsoil stockpiles must be kept separate from subsoil.</li> <li>• Excavated and stockpiled soil material are to be stored and bermed on the higher lying areas of the footprint area and not in any storm water run-off channels or any other areas where it is likely to cause erosion, or where water would naturally accumulate.</li> <li>• The topsoil should be replaced as soon as possible on any backfilled areas, thereby allowing for the regrowth of the seed bank contained within the topsoil.</li> <li>• Cover exposed soils with brush cycling and minimise erosive losses.</li> <li>• Stockpiles susceptible to wind erosion are to be covered during windy periods.</li> <li>• Refueling must take place in well-demarcated areas and over suitable drip trays to prevent soil pollution.</li> </ul>

Activity	Direct Impacts		Significance	Proposed Mitigations				
				<ul style="list-style-type: none"> <li>• Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site.</li> <li>• Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</li> <li>• Surplus concrete must not be dumped indiscriminately on site.</li> <li>• Concrete trucks must not be washed on site unless adequate washing and concrete collection facilities are available and such washing is controllable.</li> <li>• Bins and containers must be made available by the contractor for the storage of construction and domestic or general waste.</li> <li>• Temporary storage of construction waste will take place within the site, and within designated areas.</li> <li>• The Contractor must be responsible to remove and transport all spoil and construction waste offsite to a registered waste disposal facility and proof of such disposal maintained on the environmental file on site.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	4	1	1	1	2	5	4	<b>20 (very low)</b>
With mitigation	2	1	1	1	2	3	4	<b>12 (very low)</b>
Activity	Direct Impacts		Significance	Proposed Mitigations				
Provision of water	Water pollution and wastage		<b>24 (very low)</b>	<ul style="list-style-type: none"> <li>• All designs must include means to protect or maintain the current hydrological regime.</li> <li>• Stormwater management systems must include attenuation structures to minimize the potential impact or erosion and sedimentation from construction site.</li> <li>• Clearing of vegetation must be kept to a minimum.</li> <li>• Only existing access roads to the site must be used.</li> <li>• All leaking pipes to be repaired immediately.</li> <li>• No equipment must be used which may cause excessive oil spills or pollution on site.</li> </ul>				



Activity	Direct Impacts	Significance	Proposed Mitigations
			<ul style="list-style-type: none"> <li>• Construction vehicles must be maintained in good working order, to reduce the probability of leakage of fuels and lubricants.</li> <li>• Construction water must be sourced from site.</li> <li>• Potable water must be sourced from site and must be adequate and appropriate quality for human use.</li> <li>• A walled concrete platform, dedicated store with adequate flooring or bermed area should be used to accommodate chemicals such as fuel, oil, paint, herbicide and insecticides, as appropriate, in well-ventilated areas.</li> <li>• Surface water draining off contaminated areas containing oil and petrol should be channeled towards a sump, which will separate these chemicals and oils.</li> <li>• All portable septic toilets (if any) must be serviced, no sewage spillage is allowed on-site.</li> <li>• Under no circumstances may ablutions occur outside of the provided facilities.</li> <li>• Oil residue shall be treated with oil absorbent such as Drizit or similar and this material removed to an approved waste site. Spill kits must be easily accessible and workers must undergo induction regarding the use thereof.</li> <li>• Hazardous materials – such as paint, cement, fuels, oil, herbicides, battery acid or detergents – must be stored in sealed, lockable containers when not in use</li> <li>• A register must be kept on all substances on site.</li> <li>• Hazardous storage areas must be monitored for spills and any spills shall be contained, cleaned and rehabilitated immediately</li> <li>• No storage of hazardous substances or decantation into unmarked containers or containers with irrelevant labeling.</li> <li>• To avoid fire risks, no decanted fuel to be left unattended in the sun to avoid fire.</li> <li>• When handling hazardous materials, manufacturer’s specifications must be complied with. The Material Safety Data Sheet (MSDS) must be available on site for all hazardous substances used on site.</li> <li>• All reasonable care must be taken to prevent spills of any hazardous material when in use.</li> </ul>

Activity	Direct Impacts		Significance	Proposed Mitigations				
				<ul style="list-style-type: none"> <li>• Emergency spill response and clean-up procedures as noted in the MSDS must be followed and a designated person must have the necessary training to adequately handle accidental spillages on site.</li> <li>• The contractor must ensure that there is a supply of chemical absorbent spill kit and used for cleanup of accidental chemical spills.</li> <li>• All products are to be stored with compatibility in mind.</li> <li>• Storage areas must display the required safety signs depicting “No smoking”, “No naked lights” and “Danger”.</li> <li>• All containers on site must be clearly marked to indicate contents as well as safety requirements.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	3	1	2	3	5	4	10	<b>40 (low)</b>
With mitigation	2	1	1	2	5	3	8	<b>24 (very low)</b>
Establishment of camp site	Disturbance on fauna		<b>8 (very low)</b>	<ul style="list-style-type: none"> <li>• Careful consideration is required when planning the placement for stockpiling construction material, topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall development footprint.</li> <li>• The extent of the proposed project must be demarcated on site layout plans.</li> <li>• No construction personnel or vehicles may leave the demarcated area except those authorised to do so. Those areas surrounding the project site that are not part of the demarcated development area should be considered as “no-go” areas for Employees, machinery or even visitors.</li> <li>• All those working on site must be inducted and educated about the conservation importance of the fauna and flora occurring on site.</li> <li>• The (Contractor’s Environmental Control Officer) CECO must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site.</li> <li>• The environmental induction must occur in the appropriate languages for the workers who may require translation.</li> <li>• Reptiles and amphibians that are exposed during construction activities must be captured for later release or translocation by a qualified expert.</li> <li>• No trapping or hunting of fauna is to take place.</li> </ul>				

Activity	Direct Impacts		Significance	Proposed Mitigations				
				<ul style="list-style-type: none"> <li>• Access control must be implemented at all times and “no-go” zones observed.</li> <li>• All faunal habitat areas, where disturbed, must be rehabilitated to ensure that faunal ecology is re-instated upon completion of construction works.</li> <li>• As part of the rehabilitation of disturbed areas, only indigenous plant species must be used to restore natural habitat for indigenous faunal species.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	1	1	1	1	2	2	4	8 (very low)
With mitigation	1	1	1	1	2	2	4	8 (very low)
	Disturbance on flora		6 (very low)	<ul style="list-style-type: none"> <li>• There is no indigenous vegetation worthy of protection on-site.</li> <li>• Invasion of alien plants should be eradicated.</li> <li>• Mechanical methods should be used for removal of weeds.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	1	1	1	1	1	2	3	6 (very low)
With mitigation	1	1	1	1	1	2	3	6 (very low)
	Increased ambient noise		20 (very low)	<ul style="list-style-type: none"> <li>• A register of all plant and equipment on site must be maintained at all times.</li> <li>• All plant and equipment on site must be in good working condition.</li> <li>• Maintenance of plant and equipment must be as per manufacturer specification, and records must be produced on demand.</li> <li>• Plant and equipment noise audits must be conducted periodically and all plant and equipment with excessive noise must be stopped from working until such repairs are made.</li> <li>• Vehicles should be fitted with silencers to reduce noise levels.</li> <li>• Workers should not behave in an unruly manner.</li> <li>• No construction works to be carried out after hours.</li> <li>• No construction works to be carried out during weekends.</li> <li>• Workers should be provided with appropriate PPE.</li> </ul>				

Activity	Direct Impacts		Significance	Proposed Mitigations				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	4	1	2	2	2	5	6	<b>30 (low)</b>
With mitigation	3	1	1	2	2	4	5	<b>20 (very low)</b>
	Fire hazard		<b>14 (very low)</b>	<ul style="list-style-type: none"> <li>• Fires on site must be made on designated areas and no open fires outside designated areas.</li> <li>• Hold fire prevention talks.</li> <li>• Ensure adequate firefighting equipment on-site and in all major working areas.</li> <li>• Firefighting equipment to be in good working conditions at all times.</li> <li>• Ensure that all workers on-site know the proper procedure in the incidence of fire on-site.</li> <li>• Smoking is not permitted in those areas considered as fire hazard.</li> <li>• Proper emergency escape routes should be established and clearly marked.</li> <li>• Follow manufacturers' guide for storage and transportation of flammable materials.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	1	1	4	2	2	2	8	<b>16 (very low)</b>
With mitigation	1	1	4	1	2	2	7	<b>14 (very low)</b>
	Possible Incidents and injury to workers due to negligence		<b>20 (very low)</b>	<ul style="list-style-type: none"> <li>• Workers must be provided with appropriate Personal Protection Equipment (PPE).</li> <li>• Respect workers right to refuse to work in unsafe and unhealthy environment.</li> <li>• Provide first aid component and have trained first aid personnel on site.</li> <li>• All work to be carried out under strict supervision and according to best practice.</li> <li>• Material stockpiles or stacks must be stable and well secured to prevent collapse of the stockpile and possible injury to workers or local residents.</li> <li>• The owner must comply with the standards set out in the Occupational Health Safety Act.</li> <li>• Workers are not allowed to drink alcohol on duty.</li> </ul>				

Activity	Direct Impacts		Significance	Proposed Mitigations				
				<ul style="list-style-type: none"> <li>Keep record of injuries on-site.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	3	4	4	1	2	7	7	<b>49 (medium-low)</b>
With mitigation	2	2	2	1	2	4	5	<b>20 (very low)</b>
	Job creation		<b>Positive impact</b>	<ul style="list-style-type: none"> <li>This can be enhanced further by employing local labour and introducing skills development program, to promote skills development within the local community.</li> </ul>				

Activity	Indirect Impact		Significance	Proposed Mitigations				
Construction works	Theft and security risk due to increased human activity on and around the site		<b>32 (low)</b>	<ul style="list-style-type: none"> <li>Workers are not allowed to loiter into adjacent properties.</li> <li>Workers should wear badges or overall that they can be easily identified by.</li> <li>Construction site should be fenced off and access controlled.</li> <li>People entering construction site should be registered first.</li> <li>The Developer should develop communication channels with the surrounding community to enable complaints reporting.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	3	2	2	4	2	5	8	<b>40 (low)</b>
With mitigation	2	2	2	4	2	4	8	<b>32 (low)</b>
Activity	Cumulative Impact		Significance	Proposed Mitigations				
Establishment of camp site	Traffic congestion		<b>15 (very low)</b>	<ul style="list-style-type: none"> <li>The contractor must note that existing access roads are sufficient to facilitate transportation of material to site and that these are public roads.</li> <li>No access to or activities on privately owned land along the access road to site.</li> <li>Vehicle speed on site must be restricted to 30km/h for construction vehicles and 40km/h for motor vehicles on access road from the main public road.</li> <li>Appropriate response plans must be prepared by Contractors to ensure the fastest possible reaction to spills or accidents</li> </ul>				

			<ul style="list-style-type: none"> <li>• Deliveries must be scheduled for during off-peak hour (09h00- 15h00) as much as possible.</li> <li>• All drivers and operators are to have licenses for driving and moving of plant on site.</li> <li>• All road vehicles to be road worthy.</li> </ul>					
<b>Significance</b>	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	<b>Rating</b>
Without mitigation	4	2	2	3	2	6	7	<b>42 (low)</b>
With mitigation	2	1	1	2	2	3	5	<b>15 (very low)</b>

## T2: Above-ground Fuel Storage Tanks

Activity	Direct Impacts	Significance	Proposed Mitigations					
Construction and earth works	Depletion of aesthetic value	<b>20 (very low)</b>	<ul style="list-style-type: none"> <li>Limit all construction activities to the proposed consolidated Erf 1252 Nkandla Local Municipality, KwaZulu Natal</li> <li>Topsoil should be well preserved as prescribed below for use during the rehabilitation phase.</li> </ul>					
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	4	1	2	2	2	5	6	<b>30 (low)</b>
With mitigation	3	1	1	2	2	4	5	<b>20 (very low)</b>
Activity	Direct Impacts	Significance	Proposed Mitigations					
Site clearing	Soil erosion	<b>6 (very low)</b>	<ul style="list-style-type: none"> <li>Stormwater management plan should be developed for the construction phase.</li> <li>Avoid leaving disturbed surfaces bare for long periods as this will make the site prone to erosion.</li> <li>Avoid undue stormwater concentration (e.g. construction runoff measures should be done according to soil conservation principles).</li> <li>The run-off from the exposed ground should be controlled with the careful placement of flow retarding barriers.</li> <li>The soil that is excavated during construction should be stock-piled in layers and protected by berms to prevent erosion.</li> <li>All stockpiles must be kept as small as possible, with gentle slopes (18 degrees) in order to avoid excessive erosive losses.</li> <li>Exposed soil should be covered with brush-packs of non-invasive species in order to minimise erosive losses.</li> <li>The removal of plant material should be kept to a minimum.</li> <li>Rehabilitation of erosion channels and gullies must be undertaken on an on-going basis.</li> <li>Re-establishment of indigenous plant cover on disturbed areas must take place as soon as possible once activities in that area have ceased.</li> </ul>					

Activity	Direct Impacts		Significance	Proposed Mitigations				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	3	2	1	1	1	5	3	<b>15 (very low)</b>
With mitigation	1	1	1	1	1	2	3	<b>6 (very low)</b>
Site clearing and construction works	Increased ambient dust		<b>20 (very low)</b>	<ul style="list-style-type: none"> <li>Dust suppression is to be conducted during construction, or as complaints are received.</li> <li>The use of enclosures, screens and sheeting should be considered to contain dust.</li> <li>The Contractor is to take appropriate measures to minimise the generation of dust as a result of excavation works. Such measures include frequent spraying during low rainfall periods.</li> <li>Speed limits must be enforced in all areas to reduce the generation of dust.</li> <li>Re-vegetate disturbed areas as soon as possible after disturbance.</li> <li>No burning on site of any sort on site.</li> <li>Stockpiles should not be higher than two (2) m to avoid compaction, and single handling is recommended.</li> <li>Dust suppression must be undertaken for stockpiles older than a month – with either water or a biodegradable chemical binding agent.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	4	1	1	3	2	5	6	<b>30(low)</b>
With mitigation	3	1	1	2	2	4	5	<b>20 (Very low)</b>
	Soil pollution and degradation		<b>12 (very low)</b>	<ul style="list-style-type: none"> <li>Workers must be trained to be able to prevent chemical and hydrocarbon spills.</li> <li>Combat chemical pollution in order to avoid toxic substances entering stormwater channels.</li> <li>Spill kits must be available on-site at all times in order to ensure rapid deployment of corrective measures following spill incidents.</li> </ul>				



Activity	Direct Impacts	Significance	Proposed Mitigations
			<ul style="list-style-type: none"> <li>• Workers must be suitably trained in the use of spill kits.</li> <li>• Stockpile topsoil in heaps not exceeding two (2) m in height.</li> <li>• Use only the A-horizon for topsoil purposes.</li> <li>• Handle topsoil only in the moist state to prevent wind erosion.</li> <li>• All possible efforts must be made by the Contractor to strip topsoil to a maximum depth of 150 mm.</li> <li>• Topsoil stockpiles must be kept as small as possible in order to minimise compaction, wind erosion and the formation of anaerobic conditions.</li> <li>• Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired.</li> <li>• Topsoil must not be handled when the moisture content exceeds 12%.</li> <li>• Topsoil stockpiles must be kept separate from subsoil.</li> <li>• Excavated and stockpiled soil material are to be stored and bermed on the higher lying areas of the footprint area and not in any storm water run-off channels or any other areas where it is likely to cause erosion, or where water would naturally accumulate.</li> <li>• The topsoil should be replaced as soon as possible on any backfilled areas, thereby allowing for the regrowth of the seed bank contained within the topsoil.</li> <li>• Cover exposed soils with brush cycling and minimise erosive losses.</li> <li>• Stockpiles susceptible to wind erosion are to be covered during windy periods.</li> <li>• Refueling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution.</li> <li>• Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site.</li> <li>• Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</li> <li>• Surplus concrete must not be dumped indiscriminately on site.</li> </ul>

Activity	Direct Impacts		Significance	Proposed Mitigations				
				<ul style="list-style-type: none"> <li>• Concrete trucks must not be washed on site unless adequate washing and concrete collection facilities are available and such washing is controllable.</li> <li>• Bins and containers must be made available by the contractor for the storage of construction and domestic or general waste.</li> <li>• Temporary storage of construction waste will take place within the site, and within areas designated by the CECO and the owner.</li> <li>• The Contractor must be responsible to remove and transport all spoil and construction waste off site to a registered waste disposal facility and proof of such disposal maintained on the environmental file on site.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	4	1	1	1	2	5	4	<b>20 (very low)</b>
With mitigation	2	1	1	1	2	3	4	<b>12 (very low)</b>
Activity	Direct Impacts		Significance	Proposed Mitigations				
Provision of water	Water pollution and wastage		<b>24 (very low)</b>	<ul style="list-style-type: none"> <li>• All designs must include means to protect or maintain the current hydrological regime.</li> <li>• Stormwater management systems must include attenuation structures to minimize the potential impact or erosion and sedimentation from construction site.</li> <li>• Clearing of vegetation must be kept to a minimum.</li> <li>• Only existing access roads to the site must be used.</li> <li>• All leaking pipes to be repaired immediately.</li> <li>• No equipment must be used which may cause excessive oil spills or pollution on site.</li> <li>• Construction vehicles must be maintained in good working order, to reduce the probability of leakage of fuels and lubricants.</li> <li>• Construction water must be sourced from site.</li> <li>• Potable water must be sourced from site and must be adequate and appropriate quality for human use.</li> </ul>				

Activity	Direct Impacts	Significance	Proposed Mitigations
			<ul style="list-style-type: none"> <li>• A walled concrete platform, dedicated store with adequate flooring or bermed area should be used to accommodate chemicals such as fuel, oil, paint, herbicide and insecticides, as appropriate, in well-ventilated areas.</li> <li>• Surface water draining off contaminated areas containing oil and petrol should be channeled towards a sump, which will separate these chemicals and oils.</li> <li>• All portable septic toilets (if any) must be serviced, no sewage spillage is allowed on-site.</li> <li>• Under no circumstances may ablutions occur outside of the provided facilities.</li> <li>• Oil residue shall be treated with oil absorbent such as Drizit or similar and this material removed to an approved waste site. Spill kits must be easily accessible and workers must undergo induction regarding the use thereof.</li> <li>• Hazardous materials – such as paint, cement, fuels, oil, herbicides, battery acid or detergents – must be stored in sealed, lockable containers when not in use</li> <li>• A register must be kept on all substances on site.</li> <li>• Hazardous storage areas must be monitored for spills and any spills shall be contained, cleaned and rehabilitated immediately</li> <li>• No storage of hazardous substances or decantation into unmarked containers or containers with irrelevant labeling.</li> <li>• To avoid fire risks, no decanted fuel to be left unattended in the sun to avoid fire.</li> <li>• When handling hazardous materials, manufacturer's specifications must be complied with. The Material Safety Data Sheet (MSDS) must be available on site for all hazardous substances used on site.</li> <li>• All reasonable care must be taken to prevent spills of any hazardous material when in use.</li> <li>• Emergency spill response and clean-up procedures as noted in the MSDS must be followed and a designated person must have the necessary training to adequately handle accidental spillages on site.</li> <li>• The contractor must ensure that there is a supply of chemical absorbent spill kit and used for cleanup of accidental chemical spills.</li> <li>• All products are to be stored with compatibility in mind.</li> </ul>

Activity	Direct Impacts		Significance	Proposed Mitigations				
				<ul style="list-style-type: none"> <li>Storage areas must display the required safety signs depicting “No smoking”, “No naked lights” and “Danger”.</li> <li>All containers on site must be clearly marked to indicate contents as well as safety requirements.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	3	1	2	3	5	4	10	<b>40 (low)</b>
With mitigation	2	1	1	2	5	3	8	<b>24 (very low)</b>
Establishment of camp site	Disturbance on fauna		<b>8 (very low)</b>	<ul style="list-style-type: none"> <li>Careful consideration is required when planning the placement for stockpiling construction material, topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall development footprint.</li> <li>The extent of the proposed project must be demarcated on site layout plans.</li> <li>No construction personnel or vehicles may leave the demarcated area except those authorised to do so. Those areas surrounding the project site that are not part of the demarcated development area should be considered as “no-go” areas for Employees, machinery or even visitors.</li> <li>All those working on site must be inducted and educated about the conservation importance of the fauna and flora occurring on site.</li> <li>The (Contractor’s Environmental Control Officer) CECO must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site.</li> <li>The environmental induction must occur in the appropriate languages for the workers who may require translation.</li> <li>Reptiles and amphibians that are exposed during construction activities must be captured for later release or translocation by a qualified expert.</li> <li>No trapping or hunting of fauna is to take place.</li> <li>Access control must be implemented at all times and “no-go” zones observed.</li> <li>All faunal habitat areas, where disturbed, must be rehabilitated to ensure that faunal ecology is re-instated upon completion of construction works.</li> <li>As part of the rehabilitation of disturbed areas, only indigenous plant species must be used to restore natural habitat for indigenous faunal species.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating

Activity	Direct Impacts		Significance	Proposed Mitigations				
Without mitigation	1	1	1	1	2	2	4	8 (very low)
With mitigation	1	1	1	1	2	2	4	8 (very low)
	Disturbance on flora		6 (very low)	<ul style="list-style-type: none"> <li>• There is no indigenous vegetation worthy of protection on-site.</li> <li>• Invasion of alien plants should be eradicated.</li> <li>• Mechanical methods should be used for removal of weeds.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	1	1	1	1	1	2	3	6 (very low)
With mitigation	1	1	1	1	1	2	3	6 (very low)
	Increased ambient noise		20 (very low)	<ul style="list-style-type: none"> <li>• A register of all plant and equipment on site must be maintained at all times.</li> <li>• All plant and equipment on site must be in good working condition.</li> <li>• Maintenance of plant and equipment must be as per manufacturer specification, and records must be produced on demand.</li> <li>• Plant and equipment noise audits must be conducted periodically and all plant and equipment with excessive noise must be stopped from working until such repairs are made.</li> <li>• Vehicles should be fitted with silencers to reduce noise levels.</li> <li>• Workers should not behave in an unruly manner.</li> <li>• No construction works to be carried out after hours.</li> <li>• No construction works to be carried out during weekends.</li> <li>• Workers should be provided with appropriate PPE.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	4	1	2	2	2	5	6	30 (low)
With mitigation	3	1	1	2	2	4	5	20 (very low)
	Fire hazard		14 (very low)	<ul style="list-style-type: none"> <li>• Fires on site must be made on designated areas and no open fires outside designated areas.</li> <li>• Hold fire prevention talks.</li> </ul>				

Activity	Direct Impacts		Significance	Proposed Mitigations				
				<ul style="list-style-type: none"> <li>• Ensure adequate firefighting equipment on-site and in all major working areas.</li> <li>• Firefighting equipment to be in good working conditions at all times.</li> <li>• Ensure that all workers on-site know the proper procedure in the incidence of fire on-site.</li> <li>• Smoking is not permitted in those areas considered as fire hazard.</li> <li>• Proper emergency escape routes should be established and clearly marked.</li> <li>• Follow manufacturers' guide for storage and transportation of flammable materials.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	1	1	4	2	2	2	8	<b>16 (very low)</b>
With mitigation	1	1	4	1	2	2	7	<b>14 (very low)</b>
	Possible Incidents and injury to workers due to negligence		<b>20 (very low)</b>	<ul style="list-style-type: none"> <li>• Workers must be provided with appropriate Personal Protection Equipment (PPE).</li> <li>• Respect workers right to refuse to work in unsafe and unhealthy environment.</li> <li>• Provide first aid component and have trained first aid personnel on site.</li> <li>• All work to be carried out under strict supervision and according to best practice.</li> <li>• Material stockpiles or stacks must be stable and well secured to prevent collapse of the stockpile and possible injury to workers or local residents.</li> <li>• The owner must comply with the standards set out in the Occupational Health Safety Act.</li> <li>• Workers are not allowed to drink alcohol on duty.</li> <li>• Keep record of injuries on-site.</li> </ul>				
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	3	4	4	1	2	7	7	<b>49 (medium-low)</b>
With mitigation	2	2	2	1	2	4	5	<b>20 (very low)</b>

Activity	Direct Impacts	Significance	Proposed Mitigations
	Job creation	Positive impact	<ul style="list-style-type: none"> <li>This can be enhanced further by employing local labour and introducing skills development program, to promote skills development within the local community.</li> </ul>

Activity	Indirect Impact	Significance	Proposed Mitigations
Construction works	Theft and security risk due to increased human activity on and around the site	32 (low)	<ul style="list-style-type: none"> <li>Workers are not allowed to loiter into adjacent properties.</li> <li>Workers should wear badges or overall that they can be easily identified by.</li> <li>Construction site should be fenced off and access controlled.</li> <li>People entering construction site should be registered first.</li> <li>The Developer should develop communication channels with the surrounding community to enable complaints reporting.</li> </ul>

Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	3	2	2	4	2	5	8	40 (low)
With mitigation	2	2	2	4	2	4	8	32 (low)

Activity	Cumulative Impact	Significance	Proposed Mitigations
Establishment of camp site	Traffic congestion	15 (very low)	<ul style="list-style-type: none"> <li>The contractor must note that existing access roads are sufficient to facilitate transportation of material to site and that these are public roads.</li> <li>No access to or activities on privately owned land along the access road to site.</li> <li>Vehicle speed on site must be restricted to 30km/h for construction vehicles and 40km/h for motor vehicles on access road from the main public road.</li> <li>Appropriate response plans must be prepared by Contractors to ensure the fastest possible reaction to spills or accidents</li> <li>Deliveries must be scheduled for during off-peak hour (09h00- 15h00) as much as possible.</li> <li>All drivers and operators are to have licenses for driving and moving of plant on site.</li> <li>All road vehicles to be road worthy.</li> </ul>

Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	4	2	2	3	2	6	7	42 (low)

With mitigation	2	1	1	2	2	3	5	15 (very low)
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**No-go alternative**

Activity		Cumulative Impact			Significance	Proposed Mitigations		
Site clearing and construction works		Employment opportunities will be foregone if the project is not implemented.			56 (Medium-low)	N/A		
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	5	3	2	4	1	8	7	56 (Medium-low)
With Mitigation	-	-	-	-	-	-	-	-



#### 4. REHABILITATION PHASE

##### T1 (preferred technology): Underground Fuel Storage Wells

Activity		Direct Impact			Significance		Proposed Mitigations		
Rehabilitation of construction activity		Construction waste and rubble can impact negatively on the <b>aesthetic</b> value of the site.					<ul style="list-style-type: none"> <li>• Backfilling of stockpiles must be done in such a way that it will restore the original topography of the area.</li> <li>• Soil erosion measures should be implemented and monitored until topography is restored and stabilised.</li> </ul>		
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating	
Without mitigation	2	2	1	2	1	4	4	<b>16 (very low)</b>	
	1	1	1	1	1	2	3	<b>12 (very low)</b>	
Activity		Direct Impact			Significance		Proposed Mitigations		
Rehabilitation of construction activity		Prevention of erosion and restoration of biodiversity					<ul style="list-style-type: none"> <li>• Natural restoration of vegetation is encouraged and as such all declared weeds or problem plants must be removed on an on-going basis.</li> <li>• Other methods of rehabilitation may also be used at the discretion of the CEO or the owner of the property</li> <li>• Construction site to be cleared of all building rubble.</li> <li>• All construction facilities and materials must be removed from the construction camp and rehabilitation carried out, including the removal of concrete and compacted earth platforms, fuel storage tanks and chemical toilets.</li> </ul>		

			<ul style="list-style-type: none"> <li>• Any contaminated material or soil must be removed for disposal at a registered hazardous waste disposal facility and proof of disposal must be provided and kept in the file. The prescribed re-vegetation process must then be followed thereafter.</li> <li>• Remove all temporary structures and re-instate the area on completion of the works.</li> <li>• All effluent washing water should be properly disposed of.</li> <li>• Effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, for resale or disposal at a recognised facility and proof of disposal must be provided.</li> <li>• Refuse bins should be emptied and removed from the site.</li> <li>• Dispose refuse and waste from facilities at a registered landfill site.</li> <li>• Rehabilitation must be carried out as soon as possible after the construction is completed.</li> <li>• All rehabilitation is to be done with approval of The Developer.</li> </ul>
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**T2: Above-ground Fuel Storage Tanks**

The impacts associated with the rehabilitation phase of the project are the same for both T1 (T65 Fuel Tank) and T2 (T2: Above-ground Fuel Storage Tanks)

### **No-Go Alternative**

There won't be any rehabilitation for "no-go" option, the site will remain in its current state.

## 5. OPERATIONAL PHASE

### T1 (Preferred Technology): Underground Fuel Storage Wells

Activity		Direct Impact		Significance	Proposed Mitigations			
Operation of refuelling facility and associated infrastructure		Nuisance, Odour, Diseases, human and animal health, and management.		<b>12 (very low)</b>	<ul style="list-style-type: none"> <li>Environmental operational readiness requirements established during the execution phase must be implemented.</li> <li>Integrate the new facility within the existing EMS and ensure continued environmental management.</li> </ul>			
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	1	2	2	1	4	3	7	<b>21 (very low)</b>
With Mitigation	1	1	1	1	4	2	6	<b>12 (very low)</b>
Activity		Direct Impact		Significance	Proposed Mitigations			
Operation of refuelling facility and associated infrastructure		Pollution of water by waste and spillages.		<b>12 (very low)</b>	<ul style="list-style-type: none"> <li>Sufficient waste spill control measures should be provided to prevent risk of groundwater and surface water pollution.</li> <li>Precautions should be taken to ensure that surface run-off, potential leaks or spills do not flow into stormwater channels.</li> <li>Precautionary measures have to be implemented to prevent fuel spillages from flowing into surface run-off without first passing through a simple gravity separator /settlement pond or similar protective installation.</li> <li>Submersible pumps are to be fitted with leak detectors that check the integrity of the pipe work where necessary.</li> <li>Where water is supplied for human consumption, guidelines in terms of a water service provider should be adhered to.</li> <li>Any spill should be cleaned up immediately and contaminated soil should be disposed off at a designated site.</li> <li>The pump and refueling areas must be located on a hardened surface which drains into a common drain.</li> <li>Automatic cut-off devices should be installed on pumps to avoid overflow and spillages during refueling.</li> </ul>			

								<ul style="list-style-type: none"> <li>• Tanker delivery driver must be present during delivery of fuel with the emergency cut off switch.</li> <li>• In the event of the pump dispenser or the hoses being knocked over or ripped off, the fuel supply must be cut off by shear off valves.</li> <li>• Strict procedures for the management of the site must be developed and adhered to.</li> <li>• Staff must be trained to prevent spillages during fuel dispensing.</li> <li>• Underground monitoring to be undertaken regularly to detect any leakages that could possibly occur underground.</li> </ul>
<b>Significance</b>	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	3	2	2	1	4	5	7	<b>35 (low)</b>
With Mitigation	1	1	1	1	4	2	6	<b>12 (very low)</b>
<b>Activity</b>	<b>Direct Impact</b>			<b>Significance</b>	<b>Proposed Mitigations</b>			
Operation of refuelling facility and associated infrastructure	Fire Risks			<b>28 (low)</b>	<ul style="list-style-type: none"> <li>• Fire extinguishers must be easily accessible and all site operation vehicles are to be fitted with fire extinguishers.</li> <li>• Employees are to be trained on fire safety.</li> <li>• Local emergency fire brigade numbers are to be known to all employees.</li> <li>• The prescribed fire safety precautions in terms of the Occupational Health and Safety Act must be adhered to.</li> <li>• The Developer management must develop an Emergency Response Plan. All staff must be adequately trained in the implementation of this plan.</li> <li>• All safety signs must be installed as required in the Health and Safety Plan.</li> </ul>			
<b>Significance</b>	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	2	3	4	2	4	5	10	<b>50 (low)</b>
With Mitigations	1	3	2	1	4	4	7	<b>28 (low)</b>
<b>Activity</b>	<b>Direct Impact</b>			<b>Significance</b>	<b>Proposed Mitigations</b>			

Operation of refuelling facility and associated infrastructure		Air pollution		<b>48 (low)</b>		<ul style="list-style-type: none"> <li>Ensure that drivers switch off the trucks once correctly parked, and avoid idling as much as possible.</li> <li>All operators should wear appropriate PPE to minimise exposure to fuel odours (e.g., gas masks).</li> </ul>		
<b>Significance</b>	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	5	2	2	4	4	7	10	<b>70 (medium-low)</b>
With Mitigations	5	1	1	3	4	6	8	<b>48 (low)</b>
<b>Activity</b>		<b>Direct Impact</b>		<b>Significance</b>		<b>Proposed Mitigations</b>		
Operation of refuelling facility and associated infrastructure		Polluted water and soil by waste and spillages		<b>12 (very low)</b>		<ul style="list-style-type: none"> <li>The design of underground storage tank wells mitigates against possible major spillages that could possibly pollute soil and water.</li> <li>To lower the potential for leachate formation, domestic waste is to be placed in a water tight container and disposed of on a regular basis.</li> <li>Used oil must be disposed of in accordance with the correct procedures.</li> <li>All equipment that has the potential for spillages or leakages shall be equipped with drip-trays.</li> <li>Care must be taken to ensure that oil spillages and effluent are limited during maintenance. In the event of a spillage/leakage, the source of the spill or leak must be identified and correctly addressed.</li> <li>The spillage/leakage must be cleaned immediately and any contaminated soil must be removed and disposed off through appropriate waste disposal method.</li> </ul>		
<b>Significance</b>	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	3	2	2	1	4	5	7	<b>35 (low)</b>
With mitigation	1	1	1	1	4	2	6	<b>12 (very low)</b>
<b>Activity</b>		<b>Direct Impact</b>		<b>Significance</b>		<b>Proposed Mitigations</b>		
Operation of refuelling facility and associated infrastructure		Creation of job opportunities		<b>Positive Impact: 32 (low)</b>		<ul style="list-style-type: none"> <li>This can be enhanced further by employing local labour and introducing skills development program, to promote skills development within the local community.</li> </ul>		

Activity		Indirect Impact		Significance	Proposed Mitigations			
Operation of refuelling facility and associated infrastructure		Improved competitiveness and better quality of service.		<b>Positive impact</b>	<ul style="list-style-type: none"> <li>In order to enhance this positive impact, the site manager should ensure that the requirements of the BAR and EMPr are adhered with throughout the operation phase of the project.</li> </ul>			
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation								
With Mitigations								
Activity		Cumulative Impact		Significance	Proposed Mitigations			
Operation of refuelling facility and associated infrastructure		Increased ambient noise due to increased number of vehicles being refueled on-site and containers delivering fuel.		<b>14 (very low)</b>	<ul style="list-style-type: none"> <li>All vehicle drivers must comply to Health and Safety Plan requirements for the speed limit and road accidents.</li> <li>Deliveries must be scheduled for during the working hours and if possible during off-peak hour traffic times (i.e., from 9am – 3pm).</li> <li>A register of all plant and equipment on-site must be maintained at all times.</li> <li>All plant and equipment on-site must be in good working condition.</li> <li>Maintenance of plant and equipment must be as per manufacturer specification, and records must be produced on demand.</li> </ul>			
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	2	2	2	2	4	4	8	<b>32 (low)</b>
With mitigation	1	1	1	2	4	2	7	<b>14 (very low)</b>

## T2: Above-ground Fuel Tanks

Activity		Direct Impact		Significance	Proposed Mitigations			
Operation of refuelling facility and associated infrastructure		Nuisance, Odour, Diseases, human and animal health, and management		<b>12 (very low)</b>	<ul style="list-style-type: none"> <li>Environmental operational readiness requirements established during the execution phase must be implemented.</li> </ul>			

					<ul style="list-style-type: none"> <li>Integrate the new facility within the existing EMS and ensure continued environmental management.</li> </ul>			
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	1	2	2	1	4	3	7	<b>21 (very low)</b>
With Mitigation	1	1	1	1	4	2	6	<b>12 (very low)</b>
Activity	Direct Impact			Significance	Proposed Mitigations			
Operation of refuelling facility and associated infrastructure	Pollution of water by waste and spillages			<b>27 (low)</b>	<ul style="list-style-type: none"> <li>Sufficient waste spill control measures should be provided to prevent risk of groundwater and surface water pollution.</li> <li>Precautions should be taken to ensure that surface run-off, potential leaks or spills do not flow into stormwater channels.</li> <li>Precautionary measures have to be implemented to prevent fuel spillages from flowing into surface run-off without first passing through a simple gravity separator /settlement pond or similar protective installation.</li> <li>Submersible pumps are to be fitted with leak detectors that check the integrity of the pipe work where necessary.</li> <li>Where water is supplied for human consumption, guidelines in terms of a water service provider should be adhered to.</li> <li>Any spill should be cleaned up immediately and contaminated soil should be disposed off at a designated site.</li> <li>The pump and refueling areas must be located on a hardened surface which drains into a common drain.</li> <li>Automatic cut-off devices should be installed on pumps to avoid overflow and spillages during refueling.</li> <li>Tanker delivery driver must be present during delivery of fuel with the emergency cut off switch.</li> <li>In the event of the pump dispenser or the hoses being knocked over or ripped off, the fuel supply must be cut off by shear off valves.</li> <li>Strict procedures for the management of the site must be developed and adhered to.</li> <li>Staff must be trained to prevent spillages during fuel dispensing.</li> </ul>			



Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	3	2	4	4	4	5	12	<b>60 (medium-low)</b>
With Mitigation	2	1	3	2	4	3	9	<b>27 (low)</b>
<b>Activity</b>		<b>Direct Impact</b>		<b>Significance</b>	<b>Proposed Mitigations</b>			
Operation of refuelling facility and associated infrastructure		Fire Risks		<b>28 (low)</b>	<ul style="list-style-type: none"> <li>• Fire extinguishers must be easily accessible and all site operation vehicles are to be fitted with fire extinguishers.</li> <li>• Employees are to be trained on fire safety.</li> <li>• Local emergency fire brigade numbers are to be known to all employees.</li> <li>• The prescribed fire safety precautions in terms of the Occupational Health and Safety Act must be adhered to.</li> <li>• The Developer management must develop an Emergency Response Plan. All staff must be adequately trained in the implementation of this plan.</li> <li>• All safety signs must be installed as required in the Health and Safety Plan.</li> </ul>			
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	2	3	4	2	4	5	10	<b>50 (low)</b>
With Mitigations	1	3	2	1	4	4	7	<b>28 (low)</b>
<b>Activity</b>		<b>Direct Impact</b>		<b>Significance</b>	<b>Proposed Mitigations</b>			
Operation of refuelling facility and associated infrastructure		Air pollution		<b>48 (low)</b>	<ul style="list-style-type: none"> <li>• Ensure that drivers switch off the trucks once correctly parked, and avoid idling as much as possible.</li> <li>• All operators should wear appropriate PPE to minimise exposure to fuel odours (e.g., gas masks).</li> </ul>			
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	5	2	2	4	4	7	10	<b>70 (medium-low)</b>
With Mitigations	5	1	1	3	4	6	8	<b>48 (low)</b>

Activity		Direct Impact		Significance	Proposed Mitigations			
Operation of refuelling facility and associated infrastructure		Polluted water and soil by waste		<b>27 (low)</b>	<ul style="list-style-type: none"> <li>To lower the potential for leachate formation, domestic waste is to be placed in a water tight container and disposed of on a regular basis.</li> <li>Used oil must be disposed of in accordance with the correct procedures.</li> <li>All equipment that has the potential for spillages or leakages shall be equipped with drip-trays.</li> <li>Care must be taken to ensure that oil spillages and effluent are limited during maintenance. In the event of a spillage/leakage, the source of the spill or leak must be identified and correctly addressed.</li> <li>The spillage/leakage must be cleaned immediately and any contaminated soil must be removed and disposed off through appropriate waste disposal method.</li> </ul>			
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	3	2	4	4	4	5	12	<b>60 (medium-low)</b>
With mitigation	2	1	3	2	4	3	9	<b>27 (low)</b>
Activity		Direct Impact		Significance	Proposed Mitigations			
Operation of refuelling facility and associated infrastructure		Creation of job opportunities		<b>Positive Impact: 32 (low)</b>	<ul style="list-style-type: none"> <li>This can be enhanced further by employing local labour and introducing skills development program, to promote skills development within the local community.</li> </ul>			
Activity		Indirect Impact		Significance	Proposed Mitigations			
Operation of refuelling facility and associated infrastructure		Improved competitiveness and better quality of service.		<b>Positive impact</b>	<ul style="list-style-type: none"> <li>In order to enhance this positive impact, the site manager should ensure that the requirements of the BAR and EMPr are adhered with throughout the operation phase of the project.</li> </ul>			
Activity		Cumulative Impact		Significance	Proposed Mitigations			
Operation of refuelling facility and associated infrastructure		Increased ambient noise due to increased number of trains being refueled on-site.		<b>14 (very low)</b>	<ul style="list-style-type: none"> <li>All vehicle drivers must comply to Health and Safety Plan requirements for the speed limit and road accidents.</li> <li>Deliveries must be scheduled for during the working hours and if possible during off-peak hour traffic times (i.e., from 9am – 3pm).</li> <li>A register of all plant and equipment on-site must be maintained at all times.</li> </ul>			

					<ul style="list-style-type: none"> <li>• All plant and equipment on-site must be in good working condition.</li> <li>• Maintenance of plant and equipment must be as per manufacturer specification, and records must be produced on demand.</li> </ul>			
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	2	2	2	2	4	4	8	<b>32 (low)</b>
With mitigation	1	1	1	2	4	2	7	<b>14 (very low)</b>

### No-Go Alternative

Activity	Cumulative Impact				Significance	Proposed Mitigations		
Operation of refuelling facility and associated infrastructure	Employment opportunities will be foregone if the project is not implemented.				56 (Medium-low)	N/A		
Significance	Probability	Sensitivity	Severity	Spatial scale	Duration	Likelihood	Consequence	Rating
Without mitigation	5	3	2	4	1	8	7	56 (Medium-low)
With Mitigation	-	-	-	-	-	-	-	-

## 6. CONCLUSIONS AND RECOMMENDATION

Nkandla Local Municipality has 14 wards which are serviced by 1 garage therefore the community is in need of another petrol filling station. According to Nkandla IDP 2015/2016 41,1% of the population of Nkandla have no income and 50% of the population depend on the government grants, the proposed development can help in alleviating poverty in the area by creating jobs opportunities

Following risk rating assessment and rating of identified impacts, the findings are summarised below:

	T1- Underground Fuel Storage Wells	T2- Above-ground Fuel Storage Tank	NO-GO
Design Phase	83	99	0
Construction Phase	182	182	56
Operational Phase	158	188	56

### Recommendations

Green Diamond Consulting has considered and assessed all potential impacts likely to occur for both alternatives as well as the “no-go” alternative. Based on the outcome of the assessment, Green Diamond Consulting recommends that the department grant environmental authorisation for construction of Underground Fuel Storage Wells. This alternative (T1) has lower negative impacts than above-ground fuel tanks. Alternative T1 further has more positive impacts than “no-go option” while it has the same positive impacts as Alternative T2. The project will have positive impacts that will last for the lifetime of the project. With the correct implementation of mitigation measures, positive impacts will outweigh negative impacts in a long run.

The following mitigation measures should be considered for inclusion in the recommended environmental authorisation in respect of the application:

- An approved EMPr should be binding for the life of the project.
- EMPr should be monitored by an independent ECO, bi-weekly during the construction phase and monthly during rehabilitation phase until vegetation has been completely re-established.
- An environmental audit should be conducted after six months from project completion.
- Only clear sites where construction activities will take place within the immediate future.
- Limit site clearance to areas which are already disturbed.

- Limit the speed of construction vehicles on dirt roads to limit dust emissions.
- Implement a dust suppression program (including periodic wetting).
- Cover haul vehicles, during transport of soil materials.
- Implement erosion control measures where applicable.
- Rehabilitate areas after construction to reduce erosion.
- Ensure that all construction material is properly stored in a demarcated area.
- Remove construction rubble at least once a week.
- Limit the use of public roads by construction vehicles.
- No construction vehicles should be allowed to use the public roads after sunset and during weekends.
- No construction activities to take place on weekends.
- All potential hazardous substances should be stored in one safe location.
- Make use of local labour as far as economically possible.
- Introduce a skills development program, to promote skills development within the local community.
- Paint corrugated iron rods in a neutral colour.
- Only vegetation indigenous to the area should be used during rehabilitation of the site.
- No activities which will contribute to excessive noise should take place after 17h00.
- Dispose of waste at a registered waste disposal site
- Non-hazardous material should be recycled and utilised in other construction processes as far as practically possible.
- Rehabilitation success should be monitored until vegetation has been re-established on-site.