

CHAPTER 5. ENVIRONMENTAL MONITORING AND SOCIOECONOMIC IMPACT (Operational Phase)

The following represents key monitoring activities but Filling Station management may add as the need arises

Note: Most of the monitoring is the responsibility of the manager BUT he/she may delegate as required but those responsible need to have the task included in job description

To be Monitored	What needs to be monitored	Frequency	Responsibility	Findings
Water consumption	Liters used per guest/staff/services	Monthly	Filling Station Manager	
Sewerage system	Septic tanks	Every three months	Filling Station Manager	
Sewerage pipes	Leaks	Monthly	Filling Station Manager	
Grey water pipes	Leaks	Monthly	Filling Station Manager	
Fat traps	Functioning equipment	Weekly	Filling Station Manager	
Water installations	Functioning of purification equipment	Weekly	Filling Station Manager	
Soak Always	Drainage	Weekly	Filling Station Manager	
Tracks	Erosion	Monthly but more intensively after rainfall Events	Filling Station Manager	

5.1 Operational Phase

Objective	Management Measure	Monitoring Action & Method	Responsibility	Findings
To ensure that EMP and the Scoping Report understood by management & staff	EMP & Scoping Report incorporated into contract of Filling Station Manager	Contract which aligns EMP & Scoping Report	Proponent	
	Staff receive training and understand the implications and reasons for the EMP	Training held & roles and responsibilities of various staff members clearly spelt out and included in job descriptions	Filling Station Manager	
To ensure that the agreed socioeconomic	Implement contract monitoring tool			

benefits of the (if a contract exist) are achieved				
Minimize impacts on vegetation	Existing vegetation in Filling Station area is not removed except where it is a hindrance to operations	Conduct regular inspections and keep staff informed	Filling Station Manager	
	Introduced ornamental plants must only be indigenous to the area	N/A	Filling Station Manager	
	Staff do not fell trees or damage vegetation	Inform staff of policy as well as the repercussions should there be none Compliance. Include in code of conduct for staff	Filling Station Manager	
Minimize land degradation & erosion	Rainfall run-off at Filling Station does not cause undue erosion	Regular inspections and if required remedial contouring or drainage	Filling Station Manager	
	Ensure that tracks used exclusively for Filling Station activities are not subjected to erosion or excessive waterlogging	Undertake inspections regularly and, if required, install additional drainage or undertake whatever repairs required to rehabilitate and reduce erosion	Filling Station Manager	
To preserve scenic quality & "sense of place"	Mitigation measures implemented during construction phase are maintained	Regular inspections of screens etc. hiding services & installations are functional and if required repair	Filling Station Manager	
Minimize impact on water resources	Staff are aware of the need to not use water wastefully	Undertake staff training	Filling Station Manager	
	Water usage & consumption is within the "best practice guidelines"	Monitor water usage on a monthly basis and calculate usage per guest and for staff members and compare against Targets	Filling Station Manager	

	There is no leakage from water systems	Undertake regular inspections of all water pipes	Filling Station Manager	
Minimize soil & water pollution	Spillages of potentially harmful substances must be cleared immediately and disposed of at an appropriate site	Inspection and follow-up cleanups if required	Filling Station Manager	
	Functional septic tanks	Undertake regular inspections and, if required, dislodge	Filling Station Manager	
	Functional fat traps	Inspect & clean on a regular basis and store matter in sealed containers	Filling Station Manager	
	Functional soak aways	Inspect on a regular Basis	Filling Station Manager	
	Functional and leak free waste water pipes	Inspect on a regular basis on repair if required	Filling Station Manager	
	Use of environment friendly soaps & detergents	Ensure that procurement specifies this need	Filling Station Manager	
	No contamination of soil or water by fuels or oil	Ensure that all fuels stored and managed to reduce risk of Spillages	Filling Station Manager	

5. 2 Environmental Monitoring (Operational Phase)

The following represents key monitoring activities but Filling Station management may add as the need arises Note: Most of the monitoring is the responsibility of the manager BUT he/she may delegate as required but those responsible need to have the task included in job description.

To be Monitored	What needs to be monitored	Frequency	Responsibility	Findings
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	equipment			
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Table 2: Criterion and classification of impacts

Assessment Evaluation Criteria	Rating (Severity)	
Impact Type	A	Negative
	=	No Impact or Negligible Impact
	+	Positive
Extent of impact	I	Immediate (the site and immediate surroundings)
	L	Local
	R	Regional
	N	National
	IT	International
Duration of impact	ST	Short term (0F5 years)
Duration of impact	ST	Short term (0F5 years)
	MT	Medium term (5F15 years)
	LT	Long term (lifetime of the development)
Intensity of impact	L	Low (where natural, cultural and social functions and processes are not affected)
	M	Medium (where the affected environment is altered but natural, cultural and social functions and processes can continue)
	H	High (where the affected environment is altered to the extent that natural, cultural and social functions and processes will temporarily or permanently cease).

Probability of impact	LP	Low probability (possibility of impact occurring is low)
	P	Probable (where there is a distinct possibility that it will occur)
	HP	Highly probable (where the impact is most likely to occur)
	D	Definite (where the impact will occur)
Significance of impact	L	Low (where natural, cultural and social and economic functions and processes are not affected). In the case of adverse impacts, mitigation is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means of achieving this benefit are likely to be easier, cheaper, more effective and less time-consuming
	M	Medium (where the affected environment is altered but natural, cultural, social and economic functions and processes can continue). An impact exists but is not substantial in relation to other impacts that might take effect within the bounds of those that could occur. In the case of Beneficial impacts, other means of achieving this benefit are about equal in time, cost and effort.
	H	High (where the affected environment is altered to the extent that natural, cultural, social and economic functions and processes will temporarily or permanently cease). In the case of adverse impacts, there is no possible mitigation that could offset the impact, or mitigation is difficult, expensive, time consuming or a combination of these. In the case of beneficial impacts, the impact is of a Substantial order within the bounds of impacts that could occur.

5.3 Potential Impacts

5.3.1 Socio-Economic Impacts

Impact: Increased Employment Opportunities

The development will create additional job opportunities for the village people and the surrounding villages and other localities nearby like Onyati residents and others. At preparatory, construction and operational stages, local Community members will be employed and consequently livelihood support for family members will be improved (short-term and long-term) – in particular as on average support from one job benefits five family members.

Impact: Increase in Local Population

The development will not have a significant impact on the population size of the area. The proposed development will source a very small number of highly skilled personnel from outside the Constituency during the construction phases. All semiskilled and unskilled staff will be employed from the Constituency and appropriate training will be provided. Human presence in the remote project site will though increase. It is not expected that this increase of human presence will significantly negatively impact in the area. It is however expected that this increased human presence financial injection into the local business and its surroundings villages.

Impact: Increase in Local Economic Activities

Trading opportunities among the local people are expected to increase. Food and other household necessities will be sold to the construction staff, providing both a short-term and long-term positive economic activity. Increased employment numbers within the Constituency

will also support local trade through increased income in the area, including sale of hand crafts.

Impact: Water Supply Availability

The development is unlikely to put pressure on water demand in the area and will not overwhelm the groundwater resources, as clients are just stopping over for fuel and relaxation and proceed to their destinations.

Impact: Loss on Cultural Site

No significant impact determined.

Impact: Increased Demand for Health Services

During construction and operations, all occupational health related injuries will be referred to the local health facilities for immediate attention, in Omuthiya. This will not have a significant impact on the capacity of the staff and facilities to meet the demand for health care, since most of the employed people will be from the area and already reside there. HIV and AID programs for the Contractors, and for the local communities will need to be developed and provide so to ensure that all participating people are not exposed to increased risk of HIV/AIDS spread.

Impact: Worker Safety

During the construction and operation phases, light to heavy machinery will be employed for the digging and putting up associated infrastructure. Absence of clear safety guidelines may lead to accidents affecting worker's safety and productivity, however, this will not be the case during the construction of this development and clear safety guidelines will be available and all workers will be briefed and trained accordingly, taking into consideration that the activity is place alongside a highway.

Impact: Increased Traffic

Increased traffic flow in and out of the area is expected during construction and operations. During operations, this increase is expected to be high as service will be available to the road user, and that it is no more a remote route from the outsider and slight increase in local traffic can be expected.

Impact: Blasting noise and vibration

There is a possibility of blasting that might take place during the construction depending on the type of underground layers that will be encountered. However limited vibrations from

machinery and tools could be perceived as intrusion. This will only occur during limited construction time

5.3.2 Environmental Impacts

Impact: Displacement of people

No impact, as it is owned by the town council.

Impact: Machinery noise and vibration

During the construction and operational phases, noise and vibrations from the vehicles and machineries will result into noise and vibration. This impact will be insignificant to Wild animals. The construction workers are the most vulnerable and therefore they should wear protective gear.

Impact: Water quality No impact.

Impact: Solid Waste Disposal

Waste will be produced at the site during the setting up of supporting infrastructure and digging trenches for the pipeline. Piles of sand cleared or dug out are not environmental pollutant hazard, but can reduce the area aesthetics value, therefore it will be done with little to no significant and site to restore in a shortest time less than a year.

Impact: Air Pollution

The major source of the impact will be dust from vehicles ferrying materials, possible blasting. However most of the material will be ferried via the tarred road which has less dust apart from burning of fuel, this impact is insignificant. Care should be taken not to expose workers to excessive dust and exhaust fumes.

Impact: Loss of Historical and Cultural Site:

There are no existing historical and cultural site within the site or in its immediate surrounding environment.

Impact: Loss of Productive Land

The plot is situated in a business zoned area, therefore no loss or impact on any wildlife or livestock, being that the site is between two busy main roads.

Impact: Loss of Wildlife Habitat, Indigenous Flora and Fauna

The project site will not interfere directly with any existing stock live that currently use the grazing land illegal, there are no wildlife since the plot is within town and completely cleared and serviced.

Impact: Erosion of the Topsoil

The nature of the project demands the use of machinery during construction. There will be soil removed for the development that might cause erosion. However, the nature of development requires such activity to be performed. Unless rehabilitation is not done properly after construction and no regular maintenance is carried out during the operational phase of the project.

The following Tables below present the proposed impact analysis. Table 3: Evaluation of impacts during preconstruction phase.

PRECONSTRUCTION PHASE							
Identified Impact	Impact Type	Extent	Duration	Intensity	Probability	Significance	
						Unmitigated	Mitigated
Surface water pollution	=						
Ground water pollution	=						
Soil erosion	=						
Soil pollution	=						
Air pollution	=						
Land use potential	=						
Habitat transformation	=						
Fauna displacement	=						
Damage to Flora	=						

Traffic impacts	=						
Visual & aesthetic Impacts	=						
Social	+	L	ST	M	D	L	M
Economic	+	L	ST	M	D	L	M

Impact: Siltation and Sedimentation the nature of business will require that excavation is required.

Impact: Soil degradation

No impact on a larger scale, only the development site

Table 4: Evaluation of impacts during construction phase

CONSTRUCTION PHASE							
Identified Impact	Impact Type	Extent	Duration	Intensity	Probability	Significance	
						Unmitigated	Mitigated
Surface water pollution	=						
Ground water pollution	=						
Soil erosion	A	I	ST	L	LP	L	=
Soil pollution	A	I	ST	L	LP	L	=
Air pollution	A	I	ST	L	P	L	=
Land use potential	A	I	ST	L	P	L	=
Habitat transformation	=						
Fauna displacement	A	I	ST	L	LP	L	=
Damage to Flora	=						
Traffic impacts	A	I	ST	L	P	L	=

Visual & aesthetic Impacts	A	I	ST	L	P	L	=
Social	+	L	ST	M	D	M	H
Economic	+	L	ST	M	D	M	H

Table 5: Evaluation of impacts during operational phase

OPERATIONS PHASE							
Identified Impact	Impact Type	Extent	Duration	Intensity	Probability	Significance	
						Unmitigated	Mitigated
Surface water pollution	=						
Ground water pollution	=						
Soil erosion	A	I	ST	L	P	L	=
Soil pollution	A	I	ST	L	P	L	=
Air pollution	=						
Land use potential	+	L	LT	M	D	M	L
Habitat transformation	=						
Fauna displacement	=						
Damage to Flora	=						

Traffic impacts	=						
Visual & aesthetic Impacts	+	L	LT	M	D	M	H
Social	+	L	LT	M	D	M	H
Economic	+	N	LT	M	D	M	H

CHAPTER 6: ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN (EMP)

From the above identification of adverse and positive impacts measures have been proposed for mitigation. In order to achieve this, an Environmental Management Plan (EMP) has been developed as part of this document.