Kapese Integrated Support Base

Environment and Social Impact Assessment Study

Report Prepared for

Tullow Kenya B.V.

Report No. KT/4080/ESIA/V1/R1

February 2015

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February 2015

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1 Non-technical Summary

1.1 Overview

Tullow Kenya B.V. (Tullow) proposes to develop an Integrated Support Base (ISB) for their exploration, appraisal and early development associated with Blocks 10BB and 13T respectively. Tullow has recorded success in the exploration phase of its program in Kenya and is entering the extended exploration and appraisal phase. Tullow's existing operation in Block 10BB/13T is experiencing constraints in provision of adequate camp facilities, material storage yards and work areas for their contractors.

Consequently, Tullow has identified the need for the development of an ISB due to the following reasons:

1. The evolving E&A program up to and beyond 2018 may require the use of multiple rigs; currently, personnel manning these rigs are located in multiple rig camps, civils camps and support camps which creates operational inefficiencies;

2. The life support currently provided at Ekales, Twiga and Ngamia well sites is overstretched and was originally designed for exploration activities. The life support at these sites are not designed for current and future extended E&A activities;

3. The Twiga site was previously used as a materials storage yard by contractors in addition to providing life support services. Extended E&A well activities are envisaged to occur at the Twiga well site which means that all activities there will need to cease and be relocated elsewhere;

4. The Ekales site is currently used to provide life support services. Extended E&A well activities are envisaged to occur at the Ekales well site which means that all activities there will need to cease and be relocated elsewhere;

5. As Blocks 10BB and 13T are remotely located, E&A activities require sufficiently sized camp facilities, material storage facilities and work areas. Presently, such activities are fragmented and inefficient for E&A activities; and

6. As the exploration sites are scattered over a large area, Tullow proposes to manage the camp facilities, materials yards and work areas sustainably in order to improve control and coordination of operational, social, security, emergency response, logistics and EHS activities respectively.

The ISB is located about 7km east of Lokichar (se Figure 1 on Page 25) and will be constructed on a parcel of land leased to Africa Camp Solutions (ACS) by the local Turkana community in *circa* 2012. The total area of land leased is approximately 172.5ha (~426.3 acres) and of this previously leased area, Tullow proposes to develop about 156.4ha (380 acres).

The 172.5ha is currently fenced with an electric wire fence; the land is used as an air strip for arriving and departing passengers going to work at various Tullow operating locations in South Lokichar. No additional land will be required for the development of the Tullow ISB.

Kurrent Technologies Ltd. (KTL) has been appointed by Tullow to complete the Environment and Social Impact Assessment (ESIA) Study report for the necessary environmental authorization required in terms of Legal Notice 101 titled Environment (Impact Assessment and Audit) Regulations, 2003 (EIA/EA Regulations) promulgated under the Environment Management and Coordination Act, 1999 (EMCA). KTL is a National Environment Management Authority (NEMA) registered Firm of Experts and is producing this report in accordance with Regulations 18 – 23 of the EIA/EA Regulations.

The objectives of the proposed Kapese ISB are the following:

a) Provide a consistently high level of security around Tullow and Contractor personnel and assets;

b) Ensure consistent levels of compliance with Tullow EHS operating procedures;

c) Reduce Tullow's footprint and so minimise impact on the environment and land take;

d) Reduce road transportation by having immediate access to the Kapese airstrip;

e) Enable more effective emergency response;

f) Provide capacity to house an increasing number of field based personnel, materials, and equipment;

g) Streamline the supply chain and shorten lead times by providing a central consolidation point;

h) Consolidate human resources and subject matter expertise in one central location;

i) Reduce the need for large well pads and thereby minimise land take;

j) Establish field based organisation and so improve land access strategy and enhance community liaison;

k) Reduce operating costs through consolidation of assets, equipment and personnel;

l) Mitigate risk of shut down by reducing reliance on critical supplies from Nairobi, Kitale and Eldoret;

m) Provide a focal point and required level of control for Tullow to manage community engagements.

This section is the Non-Technical Executive Summary of the ESIA for the project. It presents an overview of the project and highlights the key impacts identified through the Environmental and Social Impact Assessment (ESIA) process and the mitigation and management measures that have been proposed by Tullow to reduce negative impacts and enhance positive impacts.

The ESIA Study describes the detailed environmental assessment of the proposed project including an Environment Management Plan (EMP). The NEMA is the lead agency in Kenya responsible for environmental authorization of the project. The NEMA file reference number for the project is **NEMA/PR/5/2/12994**.

1.2 Project description

As presented above, the land which includes the ISB is leased to ACS. ACS commissioned the preparation of an Environmental Impact Assessment Project Report for the Proposed Development of an Air Strip and Accommodation Facility at Lokichar in Turkana South District, Turkana County, Reg. No. CPR/2011/41544, dated 23/02/2013.

The following activities were addressed in the ACS ESIA; because they were previously approved they are therefore not addressed in this ESIA:

- Site Clearance – including the clearing of all vegetation; and

- Installation of Security Fence.

The proposed Kapese ISB will be developed in two phases. The scope of the ESIA covers Phase 1 and includes the following aspects:

- A contractors' work area; the work area will be used to set up equipment, lay down areas and workshops associated with specific operations of a contractor. There will be a number of contractors accommodated at the ISB. Tullow will allocate a certain acreage to each contractor that needs to set up their operations at the ISB;
- A 400 man camp and training centre;
- Tullow offices;
- A fuel storage facility;
- A truck parking facility;
- A security camp;
- Upgrading the runway to accommodate large aircraft such as the Hercules L100-30 and Dash 8 Bombardier
- Water supply from boreholes for work areas; and
- Site drainage for the ISB.

Phase 2 will provide facilities to support future E&A activities, early development works and production drilling activities. A detailed project plan will be developed once there is a clear plan on the long-term development plans. A separate ESIA study will be prepared for Phase 2 or additional impact assessment(s) will be performed as required by NEMA and this ESIA revised as appropriate.

Conceptually, Phase 2 activities may include:

- 800 man camp (including a medical facility);
- Field office facility for 60 staff;
- 100 man long-term security camp;
- Field training centre;
- Work areas for services and development of early works;
- Integrated waste management facility;

- Wastewater treatment facility;
- Central power generation;
- Central fuel facility;
- Site roads and street lighting;
- Phase 2 site security.

A sketch layout of the Kapese ISB showing the facilities that will be provided in Phase 1 and 2 is shown in Figure 2 (page 28).

1.3 Public/stakeholder consultation

As part of the ESIA Study, a comprehensive public/stakeholder consultation process was carried out. The consultation process was carried out with the political leadership in Turkana County, County Commissioner's office, Government ministries, departments, regulators, lead agencies and members of the Turkana community within the project area of influence.

In June 2014, Tullow undertook a social risk assessment to identify Interested and Affected Parties (I&APs) to the Kapese ISB. Tullow conducted meetings with several stakeholders and identified five villages around the proposed project site that could potentially be affected by the project.

In July 2014, KTL accompanied by Tullow, undertook comprehensive stakeholder consultations of the project in Nairobi, Lodwar and Lokichar. The consultation included Focus Group Meetings (FGDs), one-on-one meetings and public meetings (*barazas*). A total of nineteen meetings were held with various stakeholders; an issues and response report was raised and the issues raised are addressed in this report. In general, the communities commented as follows:

- The communities would like employment opportunities during the construction and operational phase of the Kapese ISB;
- Provision of water supply for the communities;
- Provision of health facilities such as ambulances and medical centers; and
- Request for business opportunities to supply goods for the project.

1.4 Specialist studies

The following specialist studies were undertaken over the course of the EIA process:

- Social Impact assessment;
- Ecological impact assessment;
- Cultural heritage assessment;
- Flood risk assessment.

The findings of these specialist studies have been integrated in this ESIA study and a summary of each is provided below.

1.4.1 Key findings of the specialist studies

1.4.1.1 Social impact assessment

A social impact assessment was undertaken as part of the ESIA Study. The assessment was conducted based on public/stakeholder consultations with the political leadership in Turkana County (Senators, MPs, MCAs), Council of Elders and communities living around the vicinity of the project site. The format of the consultation included meetings, separate focus group discussions with the elders, women and youth respectively, and public meetings (*barazas*).

Based on the comments received from various stakeholders, it is perceived that the proposed Kapese ISB will have both positive and adverse social impacts. Most people are looking for job opportunities which is a positive social impact in the area. The development of the ISB may also trigger other socio-economic activities such as provision of goods and services to those that will be working within the ISB. It is further envisaged that with additional disposable income, there could potentially be negative effects as well, such as an increase in the prevalence of sexually transmitted diseases, changes in moral behaviour, etc.

In general, the potential social impacts associated with the proposed Kapese ISB are listed below.

- It is anticipated that there will be a net economic benefit to the community, County and Kenya. Employment opportunities will be available during the construction and operational phase; additionally, there will be business opportunities available for persons to supply goods to the Kapese ISB camp as long as they meet appropriate quality standards;

- Based on the combined positive and adverse impacts identified, the project will not cause social unrest;

- The negative impacts identified through the social impact assessment can be mitigated through regular communications from Tullow on the status of the project coupled with implementation of the ESMP;

1.4.1.2 Ecological impact assessment

In Kapese, the habitat is predominantly woodland occasionally interrupted by shrublands, grasslands and near bare areas. Riverine vegetation occurs along river valleys (luggas). Because of the dry climate, the area was not rich in terms of species diversity of woody plants. Kapese is a relatively harsh environment for mammals and they may be particularly vulnerable to hunting by local communities.

From the various site surveys undertaken within the proposed Kapese ISB, there are no species (flora and fauna) of ecological concern listed in the IUCN Red Data List of species that were observed or are known to exist.

The key findings of the ecological impact assessment include:

- There is an existing lugga that runs along the length of the Kapese ISB plot in the south where Tullow intends developing its infrastructure. This lugga will get affected as a significant portion of the infrastructure footprint will be developed over it. Subsequently, most of the existing habitat within the plot will experience irreversible changes;

- Soil erosion during the construction phase could potentially increase the amount of sediment carried downstream during the rainy season;

- Clearing of vegetation and trees for development of the Kapese ISB infrastructure footprint will have an impact on seed dispersal in the area. As a result, ecological processes, including seed dispersal, nutrient cycling and pollination will be altered within the study area;

- Introduction of Alien Invasive Species (AIS) (flora and fauna) is an ecological concern judging by the large area covered by *Prosopis Juliflora* (known as the Mathenge weed) in Blocks 10BB and 13T. With various service contractors coming to develop and operate their infrastructure and activities within the Kapese ISB, it is essential that all contractors follow best practices for cleaning all equipment brought to the Kapese ISB and do not introduce AIS;

- Dust and exhaust impacts can affect both flora and fauna. It is envisaged that during the construction phase, construction plant, equipment and vehicles will generate dust and noxious emissions which may have an adverse impact on the ecosystems within the Kapese ISB and surrounding areas.

1.4.1.3 Cultural heritage assessment

The cultural heritage impact assessment shows that the general area in Blocks 10BB and 13T is rich in both Paleontological and Archaeological sites; the fenced area does not hold any substantial materials of any Prehistoric nature except for one potential Holocene archaeological site found towards the north-west of the fenced area. This is an area that falls under the jurisdiction of ACS and not Tullow as Tullow has sub-leased the southern portion of the fenced off area for establishment of the ISB.

From a heritage perspective, the assessment showed that the culture of the Turkana community will be affected by the development of the Kapese ISB. The culture is expected to change both positively and adversely due to changes in lifestyles, clothing, and other socio-economic changes which will be brought about by the development of the Kapese ISB and interactions with the people employed within it.

1.4.1.4 Flood risk assessment

A flood risk assessment was undertaken for the Kapese ISB. Tullow has engaged a consulting engineering company to design the drainage within the site.

The results of the flood risk assessment indicate that the Kapese ISB is founded on a floodplain that drains eastwards from the site. As such it is recommended that barriers/berms be created along the western and southern boundaries to prevent flooding of the ISB during the operational phase.

1.5 Impact assessment

For the biophysical and social environment, KTL developed potential environmental and social impacts associated with the activities envisaged at the proposed Kapese ISB.

Each potential impact was then assessed using the matrix below before applying any mitigation measures and after applying mitigation measures.

EXTENT

Localized (At localized scale and a few hectares in extent)	**1**
Study area (The proposed site and its immediate environs)	**2**
Regional (County level)	**3**
National (Country)	**4**
International (Beyond Kenya)	**5**

MAGNITUDE

Small and will have no effect on the environment	**0**
Minor and will not result in an impact on the processes	**2**
Low and will cause a slight impact on the processes	**4**
Moderate and will result in process continuing but in a modified way	**6**
High (processes are altered to the extent that they temporarily cease)	**8**
Very high and results in complete destruction of patterns and permanent cessation of the processes	**10**

DURATION

Very short (0 – 1 Years)	**1**
Short (1 – 5 Years)	**2**
Medium term (5 – 15 years)	**3**
Long term (>15 years)	**4**
Permanent	**5**

PROBABILITY

Highly improbable (<20% chance of occurring)	**1**
Improbable (>20 – 40% chance of occurring)	**2**
Probable (>40% - 70% chance of occurring)	**3**
Highly probable (>70% - 90% chance of occurring)	**4**
Definite (>90% - 100% chance of occurring)	**5**

Method used to determine the environmental risk

Risk = (Extent + Duration + Magnitude) x Probability

		CONSEQUENCE (Extent+Duration+Magnitude)																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
PROBABILITY	1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	2	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
	3	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
	4	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
	5	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100

Significance rating criteria

Low	<30	Where this impact would not have a direct influence on the decision to develop in the area
Medium	30-60	Where the impact could influence the decision to develop in the area unless it is effectively mitigated
High	>60	Where the impact must have an influence on the decision process to develop in the area

Based on the above methodology, each potential impact was assessed for its significance during the construction and operational phases respectively. For adverse impacts, practical mitigation measures were proposed in order to reduce the impact to as low as reasonably practical (ALARP). For positive impacts, enhancements were proposed to promote the impact.

1.6 Environment and social management plan

The purpose of the Environmental and Social Management Plan (ESMP) is to ensure that social and environmental impacts, risks and liabilities identified during the EIA process are effectively managed during the construction, operation and closure of the proposed Kapese ISB project. The ESMP specifies the mitigation and management measures to which Tullow is committed, and shows how the Project will mobilize organizational capacity and resources to implement these measures. It also shows how management measures aimed at mitigation and enhancement will be scheduled.

Best practice principles require that every reasonable effort be made to reduce and preferably to prevent negative impacts, while enhancing positive benefits, especially within the communities most directly affected by the proposed project. These principles have guided the ESIA process. For the proposed ISB, potential negative impacts will be avoided through careful design.

The ESMP is a key product of the ESIA process and is generated based on management and/or mitigation measures that will be taken into consideration to address impacts during the planning and design, pre-construction and construction activities, and operations, as necessary.

The ESMP is a living document that will be periodically reviewed and updated. It may be necessary to update the version presented in this SEIA Study (See Section 11) during the detailed design phase, prior to the commencement of construction.

Responsibility for the ESMP will reside in the Environment, Health and Safety (EHS) functional management cluster of Tullow, but there will be links with other functional clusters in areas such as operation and maintenance services.

Tullow has an existing suite of initiatives under its social investment programme which support local livelihoods, health care, environmental projects, education initiatives, and enterprise (local business) development. This includes social infrastructure projects, including community water provision, as well as longer term capacity building initiatives. In addition, TKBV is committed to maximising local content through employment and the supply of goods and services by local businesses and will continue to support this throughout the construction and operation of the Kapese IOB. Therefore social related mitigation measures specified in this ESIA will be addressed programmatically through the existing Tullow social investment programme.

1.7 Conclusions and recommendations

The proposed Kapese ISB is essential for Tullow in order to allow them to carry out exploration and appraisal activities in the South Lokichar region. The location of the base is such that it can provide support to Tullow's operations centrally in Blocks 10BB, 13T, 12A and 10BA.

Based on the public/stakeholder consultations, baseline studies and site visits undertaken, it can be concluded that:

- Tullow should implement the mitigation measures and ESMP given in this ESIA Study;
- Tullow should get assurance from their contractors who have been/will be allocated work areas, that they will comply with the requirements of this ESIA Study during the lifetime of the Kapese ISB;

- The Kapese ISB will provide gainful employment opportunities for the people of Kapese and Lokichar in general during phase 1 and 2 of the project;

- Each contractor that has a signed contract with Tullow and is allocated a work area within the ISB, must comply with the requirements of Kenyan related EHS legislation and Tullow corporate EHS standards as a minimum;

- Each Tullow contractor must demonstrate compliance with the requirements set out in the ESMP in this report as it applies to their work area and type of service provided to Tullow;

- Each contractor must have a “chance finds procedure” incorporated in their standards as part of their environmental and social management system (ESMS) for any paleontological finds within their designated work area; and

- Each contractor must demonstrate to Tullow that they have endeavoured to use the hierarchy of hazard control to design, construct and operate a world class operation.

Acronyms

Acronym	Definition
ACS	Africa Camp Solutions
AFEX	Africa Expeditions
ALARP	As Low As Reasonably Practical
API	American Petroleum Institute
BAT	Best Available Technologies
BHI	Baker Hughes International
BMP	Best Management Practices
BSI	British Standards Institute
CLO	Community Liaison Officer
DB	Distribution Board
DOSHS	Directorate of Occupational Safety and Health Services
E&A	Exploration and Appraisal
EDL	Effluent Discharge License
EMCA	Environment Management and Coordination Act, 1999
EPR	Environment Project Report
FGD	Focus Group Discussion
H&S	Health and Safety
Ha	Hectare
HGV	Heavy Goods Vehicle
I&APs	Interested and Affected Parties
IFC	International Finance Corporation
ISB	Integrated Support Base

Acronym	Definition
IWMF	Integrated Waste Management Facility
IWMS	Integrated Waste Management System
JSA	Job Safety Analysis
Kapese ISB	Kapese Integrated Support Base (area that Tullow has sub-leased from ACS)
Km^2	Square kilometers
KTL	Kurrent Technologies Ltd.
L.N.	Legal Notice
LMP	Liquid Mud Plant
LOPC	Loss Of Primary Containment
LPG	Liquefied Petroleum Gas
m^2	Square meters
MBBR	Moving Bed Bio-Reactor
MCA	Member of the County Assembly
MCE	Member of the County Executive
MoEP	Ministry of Energy and Petroleum
MP	Member of Parliament
MPA	Mega Pascal
NEMA	National Environment Management Authority
NFPA	National Fire Protection Association
NMK	National Museums of Kenya
OGP	Oil and Gas Producers Association
OMC	Oil Marketing Company

Acronym	Definition
OSHA	Occupational Safety and Health Act, 2007
OWS	Oil Water Separator
PPE	Personal Protective Equipment
SLB	Schlumberger
STI	Sexually Transmitted Disease
TKBV	Tullow Kenya B.V.
WWTP	Waste Water Treatment Plant

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2 Introduction and background

Tullow Kenya B.V. (Tullow) proposes to develop an Integrated Support Base (ISB) for their exploration, appraisal and early development activities associated with Blocks 10BB and 13T respectively. As a result of its exploration success in the South Lokichar area of Blocks 10BB and 13T, exploration and appraisal activities are planned to continue in the current areas and may expand to Blocks 10BA and 12A during 2015 and 2016.

Subsequently, Tullow identified the need for the development of an ISB for the following reasons:

1. The evolving exploration and appraisal (E&A) programme up to and beyond 2018 may require the use of multiple rigs; currently, personnel manning these rigs are located in multiple rig camps, civils camps and support camps which creates operational inefficiencies;

2. The life support currently provided at Ekales, Twiga and Ngamia well sites is overstretched and was originally designed for exploration activities. The life support at these sites are not designed for current and future extended E&A activities;

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The ISB is located about 7km east of Lokichar (see Figure 1) and will be constructed on a parcel of land leased to Africa Camp Solutions (ACS) by the t the Turkana County Council in *circa* 2012. The total area of land leased is approximately 172.5ha (~426.3 acres) and Tullow proposes to develop about 153.8ha (380 acres).

The 172.5ha is currently fenced with an electric wire fence; the land is used as an air strip for arriving and departing passengers going to work at various Tullow operating locations in South Lokichar.

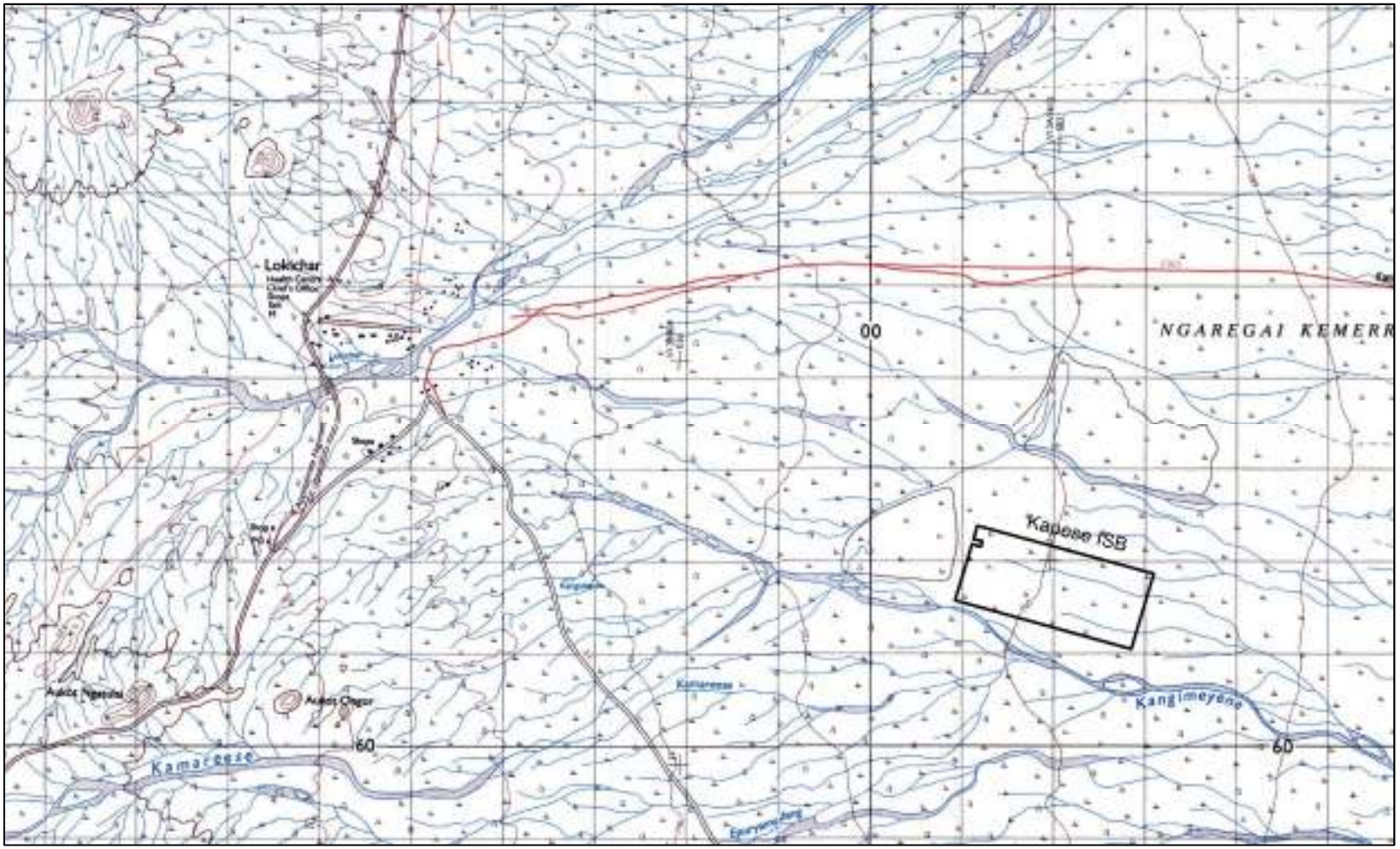
The land which includes the ISB is leased to ACS. ACS commissioned the preparation of an Environmental Impact Assessment Project Report for the Proposed Development of an Air Strip and Accommodation Facility at Lokichar in Turkana South District, Turkana County, Reg. No. CPR/2011/41544, dated 23/02/2013.

The following activities were addressed in the ACS ESIA:

- Site Clearance – including the clearing of all vegetation north of the murram road; and
- Installation of the external Security Fence.

A description of the proposed ISB project and its activities is given in Section 3 of this report.

Figure 1: Image showing location of Kapese ISB



2.1 Overview of the proposed development

Resulting from the successes of its exploration program in Blocks 10BB and 13T, Tullow and its partners are focusing on a long-term and sustainable operating model for the extended exploration and appraisal (E&A) activities. The South Lokichar basin is viewed as the likely long-term development area for oil production, hence the need to focus within this area and make it the focal hub for field operations.

The proposed Integrated Support Base (ISB) will consist of a secure operating site incorporating facilities for camp accommodation, a transport hub (both land and air), storage/yard space, segregated work sites for Tullow and its contractors, office space, an integrated waste management facility, and fuel supply.

Initially, Tullow proposes to develop an area where three of their contractors namely Schlumberger (SLB), Baker Hughes International (BHI) and AFEX will be based. SLB and BHI have similar operations of providing well testing services; AFEX will provide camp solutions for Tullow and its contractors.

The construction of the ISB is proposed to be implemented in two phases. In phase 1, the following infrastructure and facilities will be constructed to support the existing exploration and appraisal (E&A) activities:

- Site preparation including excavation, backfilling, compaction for a 400 man camp, installation of site drainage, upgrading a limited number of internal access roads, and plumbing for site water distribution network;
- Construction of a security camp, perimeter fencing, perimeter security lighting, guard huts, security training center and CCTV cameras;
- Construction of a bulk aboveground fuel storage and dispensing area and maintenance facility for vehicles;
- A 400 man capacity camp complete with the required service facilities, medical area, camp utilities and offices;
- A communications system for the entire ISB including camp Wi-Fi, communications and data for the offices, warehouses, Community Liaison Office, Contractor Work Area, fuel and maintenance facilities, etc.;
- Construction of a Tullow logistics base for storing E&A materials such as drill stems, pipes, etc.

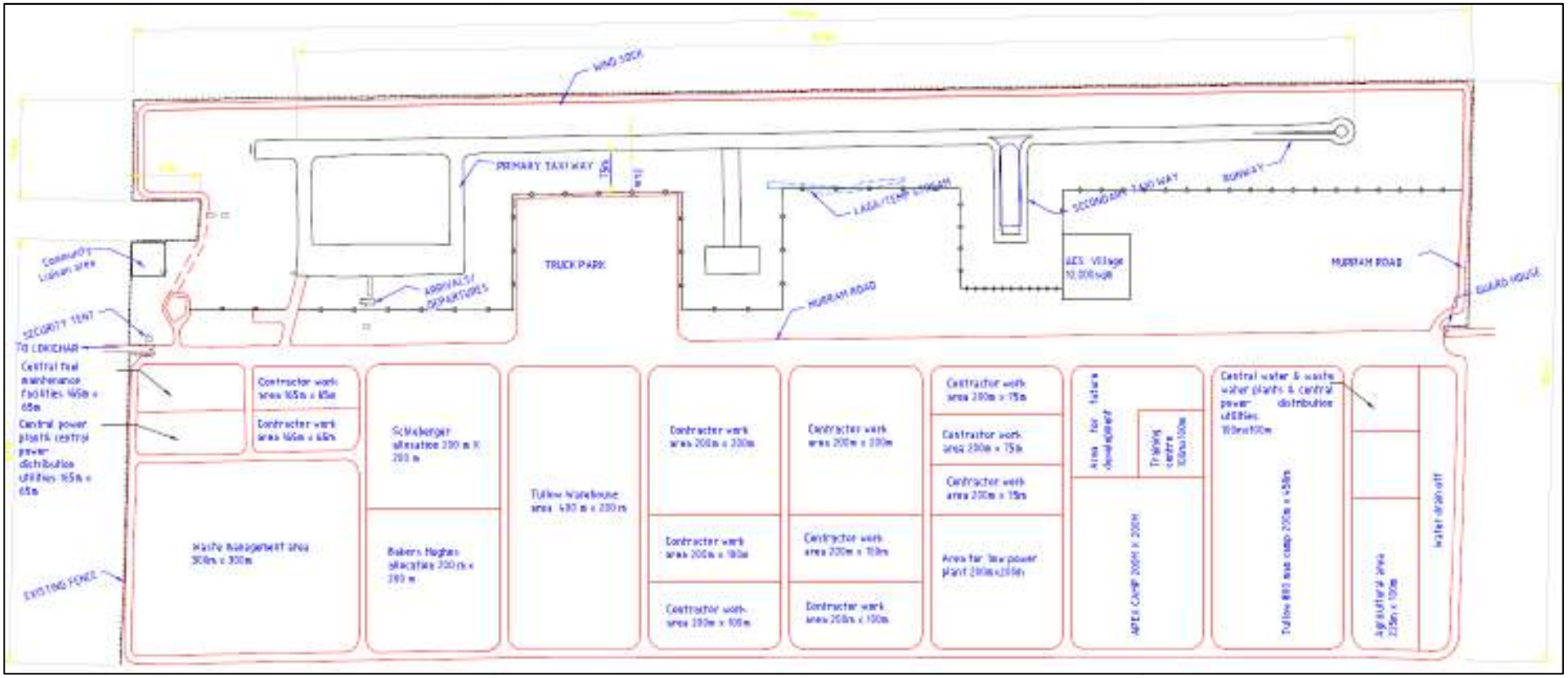
- A contractor's work area for SLB and BHI to set up their workshops, liquid mud plant and other operations;
- Construction of a Community Liaison Office (CLO) complete with ablutions, utilities and lighting.

Phase 2 of the project may be undertaken if and when Tullow establishes a need to expand their operations. The infrastructure in phase 2 may comprise the following:

- A central power plant and electrical wiring distribution network within the ISB;
- A central water treatment facility and distribution network;
- A wastewater treatment facility;
- An integrated waste management facility;
- An airstrip terminal building for arriving and departing passengers;
- An 800 man camp;
- A permanent security camp and associated facilities;
- Construction of internal access roads and street lighting within the ISB;
- Preparation of additional contractor's work areas and utility connections;
- Construction of site drainage for the entire ISB;
- Construction of a fully-fledged on-site medical facility;
- A fully-fledged training facility;
- Construction of additional offices, information communications systems, etc.

A sketch showing the layout of the proposed ISB is shown in Figure 2. This image shows the facilities required for both phases of the project.

Figure 2: Sketch showing the layout of the proposed ISB for Phase 1



2.2 Need and justification for the proposed project

As a result of Tullow's exploration success in the South Lokichar area of Blocks 10BB and 13T, E&A activities are planned to continue in the current areas and expand to Blocks 10BA and 12A during 2015 & 2016. Due to the success of the E&A campaign Tullow and its Joint Venture Partners must now transition to a longer term, sustainable operating model to efficiently support the E&A program over multiple exploration Blocks.

The proposed operating model is to have a field operations and logistics hub located centrally to the E&A blocks near to the border of Blocks 13T and 10BB with smaller satellite bases in 12A & 10BA.

Presently, Tullow provides support and coordination to four operating rigs. The operating rigs come complete with drilling camps which provide accommodation for the drilling crews and essential support staff.

The remainder of the support is provided by drilling services companies, logistics providers, civil engineering companies, water project personnel and Tullow field operations management staff which include Operations Management, Social Performance, EHS and security personnel all of whom are currently housed in Ngamia, Ekales or Twiga camps.

The operating model in the field has grown organically resulting in the emergence of multiple hub locations and well sites holding large amounts of materials, equipment and personnel.

As activities have increased, the following challenges have arisen;

- Inability of service companies to establish Forward Operating Bases and so effectively support the drilling operations;
- Large numbers of personnel and materials having to be positioned at the well sites;
- Inconsistent levels of EHS standards and living conditions impacting on morale, hygiene and increasing risk to the operations;
- Inefficient and inadequate accommodation facilities which are not fit for a multi-year exploration and appraisal campaign;
- High levels of in-field road traffic to transport personnel and materials between multiple sites increasing risk of stoppages and road traffic accidents;
- De-centralisation of tools, equipment and infrastructure required to service the operation; and

- Additional Capital Expenditure (CAPEX)/Operational Expenditure (OPEX) costs of relocating support camps and lay down areas from well pads which are to be used for appraisal.

In order to ameliorate the above situation, the establishment of an ISB will address the challenges currently faced in the field by improving the standard of accommodation and life support facilities, centralising the field operations organisation and driving efficiency through economies of scale.

2.3 Legal requirements pertaining to the proposed project

The environmental legislation which is applicable to the authorization of the proposed Kapese ISB is summarized below.

2.3.1 Environment Management and Coordination Act, 1999

The Environment Management and Coordination Act, 1999 (EMCA) is framework legislation for management and coordination of environmental issues in Kenya. Part II of the Act establishes a set of General Principles that apply to all activities within Kenya that may significantly affect the environment. The general principles include the following:

a) Every person in Kenya is entitled to a clean and healthy environment and had the duty to safeguard and enhance the environment;

b) The entitlement to a clean and healthy environment includes access by any person in Kenya to various public elements or segments of the environment for recreational, educational, health, spiritual and cultural purposes;

c) If a person alleges that the entitlement of a clean and healthy environment has been, is being or is likely to be contravened in relation to him, then that person may apply to the High Court for redress and the High Court may take such orders, issue such writs or give such directions as it may deem appropriate to remedy the situation.

Section 58(1) of the Act states:

"Notwithstanding any approval, permit or license granted under this Act or any other law in force in Kenya, any person, being a proponent of a project, shall, before financing, commencing, proceeding with, carried out, executing or conducting or causing to be financed, commenced, proceeded with, carried out, executed or conducted by another person any undertaking specified in the Second Schedule to this Act, submit a project report to the Authority, in the prescribed form, giving the prescribed information and which shall be accompanied by the prescribed fee."

The Second Schedule of the Act states that an ESIA Study is required for among others, the following types of activities:

- An activity out of character with its surrounding;
- Any structure of a scale not in keeping with its surrounding;
- Major changes in land use.

Legal requirements for this project

The proposed ISB may be characterized as an activity out of character with its surrounding and therefore an ESIA Study is mandatory. Subsequently, Tullow is obliged to comply with the principles set out in the EMCA and its subsidiary legislation and specifically Section 58(1) of the Act.

2.3.2 EMCA EIA Regulations, 2003

Section 147 of the EMCA empowers the Minister in charge of environmental affairs in Kenya to promulgate regulations to give effect to the provisions of the Act based on recommendations from NEMA and consultation with relevant lead agencies.

In 2003, the Minister in charge of Environment promulgated EIA regulations to operationalize Part IV – Environment Impact Assessment and Part V – Environmental Audit and Monitoring of the EMCA. These regulations were titled Legal Notice 101: Environment (Impact Assessment and Audit) Regulations, 2003.

These regulations lay out the process to be followed for undertaking an ESIA Study of a project. The regulations contain the requirements for an EPR Study, public consultation, detailed environmental assessment, etc.

The regulations stipulate that:

- Public participation must be undertaken at various stages of the assessment process;
- The assessment must be conducted by a NEMA registered Firm of Experts or Lead Expert;
- The relevant authorities respond to applications and submissions within stipulated time frames;
- Decisions taken by NEMA can be appealed by the Proponent or any other interested and affected party.

Legal requirements for this project

The proposed Kapese ISB invokes activities in terms of the EIA Regulations 2003 and as such is subject to an EPR Study and ESIA process in accordance with stipulated procedures stipulated in the regulations, prior to commencing the activity.

2.3.3 Other legislation affecting the Kapese ISB

Other pieces of legislation that affect the proposed ISB are discussed in Section 4 of this report. Some of them include:

- The Constitution of Kenya, 2010;
- The Occupational Safety and Health Act, 2007 and its subsidiary legislation;
- The Public Health Act; and
- National Museums & Heritage Act 6 of 2006-Cap 216.

2.4 Objectives of the ESIA process

The EPR Study phase is used to identify those elements of the bio-physical and social environment that are most likely going to be affected by a proposed activity. This enables a Firm of Experts to focus on those elements of relevance that need to be studied during the detailed environmental assessment phase including defining the extent of studies required.

For the Kapese ISB, this was achieved through an evaluation of the proposed project in order to identify and describe potential environmental impacts. The scoping phase included inputs from Tullow and its three contractors namely SLB, BHI and AFEX, specialists from the National Museums of Kenya (NMK), and public/stakeholder consultation with key stakeholders that included National and County Governments, Politicians from Turkana County constituencies and interested and affected parties (I&APs).

The detailed environmental assessment addresses those identified potential environmental and social impacts and benefits associated with all phases of the project including design, construction, operation and decommissioning, and recommends appropriate mitigation measures for potentially significant environmental and social impacts. The ESIA Study report aims to provide the environmental authorities with sufficient information to make an informed decision regarding the proposed project.

The release of the ESIA Study report provides stakeholders with an opportunity to verify issues that they have raised through the ESIA process to ensure that they have been correctly captured and adequately considered. The ESIA Study will go through an iterative process to address the comments and concerns of all stakeholders and once satisfied, NEMA will be requested to issue an EIA License for the project.

2.5 Details of the Firm of Experts

Kurrent Technologies Ltd. (KTL) has been appointed by Tullow as the independent consultant to undertake the ESIA process required in terms of the EMCA and its subsidiary legislation.

Kurrent Technologies Ltd. (KTL) is a leading integrated Engineering, Health, Safety, Social, Environment and Training consulting company in East and Central Africa. The company was established in December 2001 and consistently provides professional consulting services to the energy and manufacturing sectors respectively.

KTL prides itself in delivering end-to-end solutions to its clients in a cost effective manner through a combination of advanced technologies, proven processes and outstanding personnel. The firm has completed more than 200 assignments including the engineering design and project management of several petroleum terminals and depots, service stations and LPG plants.

KTL has successfully completed several large EIA Studies in the energy sector for projects associated with refineries, pipelines, bulk petroleum storage and distribution facilities as well as retail facilities.

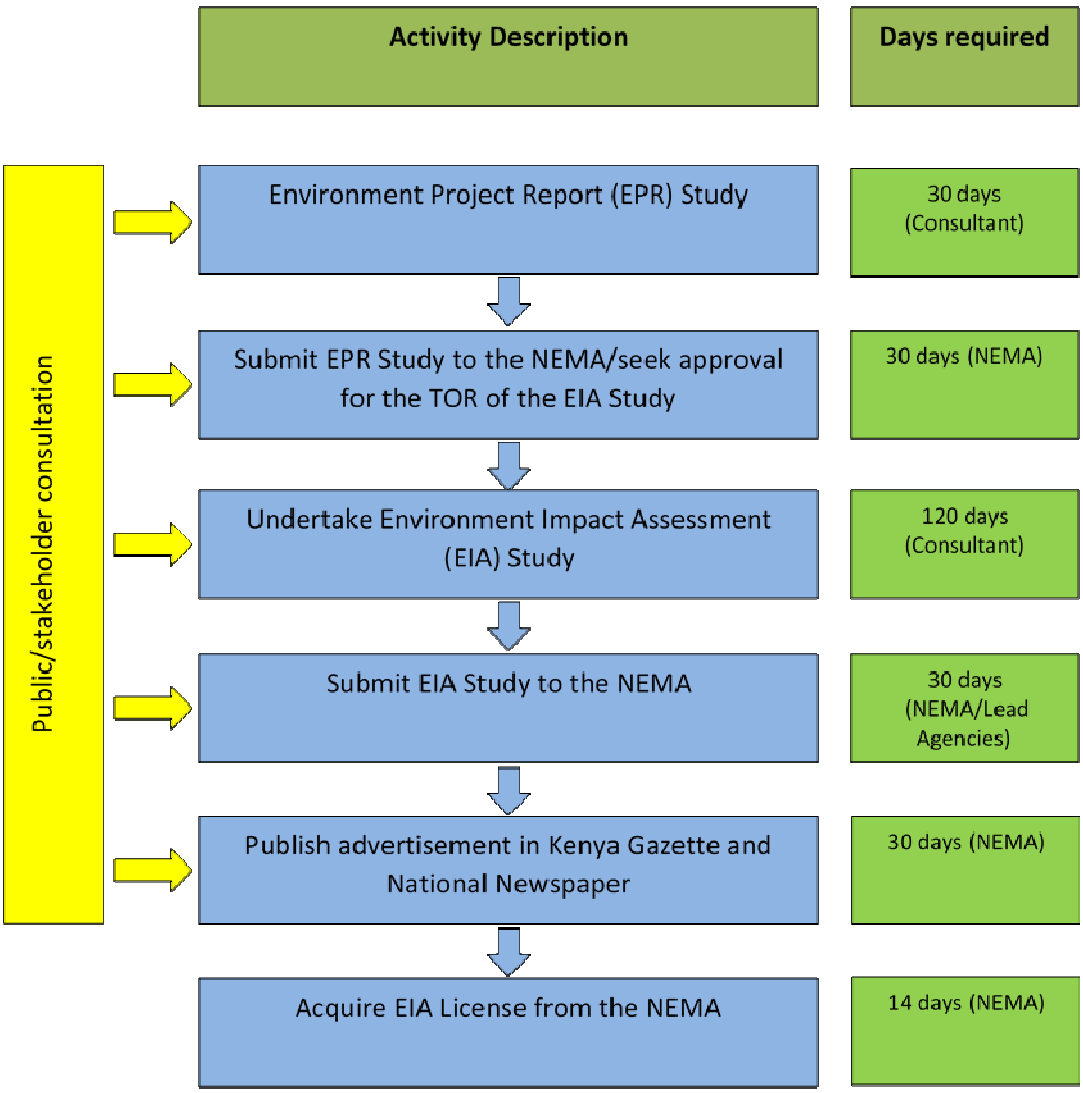
The company's independence is ensured by the fact that it does not hold equity in any project, nor does its staff or associates serve as directors in any company to whom consultancy services are provided. This enables our staff and associates to provide clients with conflict-free advice and objective support on critical issues.

2.6 Approach to the ESIA

The ESIA Study has been guided by the requirements of the EIA Regulations in Kenya and the International Finance Corporation's (IFC's) environmental and social performance standards

The ESIA phase consists of two phases namely **scoping** and **detailed assessment** as shown in Figure 3. The overall aim of the scoping phase was to determine whether there are environmental issues and impacts that require further investigation in an ESIA. More specifically, the objectives of the scoping phase for this ESIA were to:

- Develop a common understanding of the proposed project with the authorities and I&APs;
- Identify stakeholders and notify them of the proposed activity, alternatives and processes;
- Provide stakeholders with the opportunity to participate in the process and identify issues and concerns associated with the proposed activity;
- Identify potential environmental impacts that will require further study in the impact assessment phase of the EIA process; and
- Develop terms of reference for the studies that will be conducted in the impact assessment phase.



The activities that have been conducted so far as part of the ESIA are as follows:

- Presentation of the project to the Turkana County Leadership (MPs and Senators) in Nairobi in order to solicit their comments about the project;
- Presentation of the project to the County Executive and Members of the County Assembly in Lodwar in order to seek their comments about the project;
- Preparation of a draft EPR Study report and submission to Tullow for review and comments;
- Preparation of a final EPR Study report for submission to NEMA and other lead agencies for review, comments and approval;

- Conducting public meetings at the project site and five villages surrounding the ISB. The public meetings also included focus group discussions to enable informed consultation and participation;
- Providing clarification to NEMA on the Kapese ISB project on November 28th, 2014 to enable them issue the TOR letter;
- Submitting a draft ESIA Study to Tullow for review and comments
- Submission of the final ESIA Study to NEMA for consideration.

2.7 Structure of the ESIA Study report

This ESIA Study has been undertaken in accordance with the requirements of Rule 18(1) of the Kenyan EIA Regulations 2003 which describes the content of an ESIA Study. This report incorporates the information as required in Rule 18(1) namely:

1) The proposed location of the project;
2) A concise description of the national environmental legislative and regulatory framework, baseline information, and any other relevant information related to the project;
3) The objectives of the project;
4) The technology, procedures and processes to be used, in the implementation of the project;
5) The materials to be used in the construction and implementation of the project;
6) The products, by-products and waste generated project;
7) A description of the potentially affected environment;
8) The environmental effects of the project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short term and long-term effects anticipated;
9) Alternative technologies and processes available and reasons for preferring the chosen technology and processes;
10) Analysis of alternatives including project site, design and technologies and reasons for preferring the proposed site, design and technologies.

11) An environmental management plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment including the cost, time frame and responsibility to implement the measures;

12) Provision of an action plan for the prevention and management of foreseeable accidents and hazardous activities in the cause of carrying out activities or major industrial and other development projects;

13) The measures to prevent health hazards and to ensure security in the working environment for the employees and for the management of emergencies;

14) An identification of gaps in knowledge and uncertainties which were encountered in compiling the information; and

15) An economic and social analysis of the project.

The report is divided into thirteen sections namely:

Section 1 Executive Summary

A non-technical summary of the ESIA Study

Section 2 Introduction and background

Introduces the EPR Study and the legal context of the ISB

Section 3 Description of the project

Describes the various elements of and the motivation for development of the Kapese ISB

Section 4 Relevant legislation and ESIA process

A concise description of the national environmental and legislative framework for the ISB project

Section 5 Public/stakeholder consultation process

Describes the public participation process followed and the issues and concerns that have been raised by the I&APs

Section 6 Nature of the affected environment

Provides an overview of the affected biophysical and

socio-economic environment in the Kapese area

Section 7 Potential environmental impacts

Describes the potential environmental and social impacts identified through various processes

Section 8 Specialist studies

Describes the specialist studies undertaken for the project and their findings and conclusions

Section 9 Methodology for impact identification and assessment

Provides an overview of the methodology used for assessing the potential environmental and social impacts associated with the project

Section 10 Assessment of environmental impacts

Describes the assessment of environmental and social impacts associated with the project

Section 11 Environmental and social management plan

Stipulates environmental management guidelines that should be implemented in the planning, design, pre-construction, construction and operational stages of the ISB

Section 12 Conclusions and Recommendations

Concludes and summarizes the findings and recommendations of the ESIA Study

Section 13 References

Provides references used to compile the report

3 Description of the project

3.1 Introduction

Resulting from the successes of their exploration program in Blocks 10BB and 13T, Tullow and its partners must now focus on a long-term and sustainable operating model for the extended exploration and appraisal (E&A) activities. The Lokichar Basin is viewed as the likely long-term development area for oil production and hence the need to focus within this area and make it the focal hub for field operations. The proposed Integrated Support Base (ISB) will consist of a secure operating site incorporating facilities for camp accommodation, a transport hub (both land and air), storage/yard space, segregated work sites for Tullow and contractors, office space, waste management facility and fuel supply.

Initially, Tullow proposes to develop an area where three of their contractors namely Schlumberger, Baker Hughes International and AFEX will be based. Schlumberger and Baker Hughes have similar operations of providing well testing services; AFEX will be providing camp solutions for Tullow and its contractors.

3.2 Proposed facilities and land requirements

A preliminary layout of the ISB is shown in Figure 2. The facilities shown will be developed over two phases. The Phase 1 activities will include the following:

- A contractors' work area; the work area will be used to set up equipment, lay down areas and workshops associated with specific operations of a contractor. There will be a number of contractors accommodated at the ISB. Tullow will allocate a certain acreage to each contractor that needs to set up their operations at the ISB;
- A 400 man camp and training centre;
- Tullow offices;
- A fuel storage facility;
- A truck parking facility;
- A security camp;

- Upgrading the runway to accommodate large aircraft such as the Hercules L100-30 and Dash 8 Bombardier
- Water supply from boreholes for work areas; and
- Site drainage for the ISB; and

The Phase 2 master plan has several components which are listed below and may be developed if the operation at the ISB expands. At this stage, no designs exist for any of the activities listed below and hence an environmental and social assessment cannot be done. Subsequently, a separate ESIA Study will be done for the components that may need to be developed in Phase 2 of the development.

- Central power plant and distribution network;
- Central water treatment facility and distribution network;
- Wastewater treatment facility and distribution network;
- Integrated waste management facility;
- 800 man camp;
- Permanent security camp and facilities;
- Access roads and street lighting;
- Other contractor work areas and utility connections;
- Site drainage system;
- Site medical facility;
- Training facility;
- Additional office facility;
- Phase 2 ICT systems;
- Lightning protection system;
- Earthing system;
- Terminal building at the airstrip; and
- Additional security camp for 100 persons.

3.3 Project timing

The project program shown in Table 1 is currently envisaged for the Kapese ISB.

Table 1: Table showing timing of the ESIA Study for Phase 1 activities

Activity	Potential date	Duration
Undertaking EIA	Commenced July 2014	6 months
Making draft scoping reports available for comment	October 2014	30 days
Making final scoping reports available for comment and submission to NEMA	November 2014	30 days
Submission of draft EIA report	December 2014	
Review and revision of draft EIA report	Commences mid-December 2014	1 week
Submission of final EIA report	January 2015	
Authority decision	February 2015	30 days after submission
Planning and design	Underway, to be completed in fourth quarter of 2014	
Construction phase	First quarter of 2015	Approx. 6 months
Operation phase	Second half of 2015	

3.4 Project alternatives

The following alternative aspects are ordinarily considered for all proposed developments:

- Location – what is the best site for a proposed development and any infrastructure associated with it?
- Activity – are there other means to achieve the same objective?
- Scheduling – relates to project development and potential time constraints.
- Demand – relates to improved efficiencies in an operation, e.g. managing Tullow and contractor staff from an Integrated Support Base rather than individual scattered well pad locations in South Lokichar.
- No-go option – implications of not proceeding with the project.

3.4.1 Location alternatives

Currently, Tullow manages its exploration activities from the Ekales camp which is relatively small given that Tullow is entering the appraisal and development phase and it is expected that over the long term activities will grow.

Tullow requires about 153.8ha of land for an operating base which can accommodate its staff members and contractors. As the land tenure in Turkana County is communal, the community leased 172.5ha of land to ACS. This company in turn negotiated with Tullow to sub-lease 153.8ha for the development of an Integrated Support Base. Subsequently, there are no other location alternatives considered in the environmental assessment of the Kapese Integrated Support Base.

3.4.2 Activity alternatives

If Tullow is to achieve operational efficiencies and a reduction in their environmental footprint, an Integrated Support Base is a requirement. Alternatively, Tullow and its contractors can continue to use a number of exploration well sites as their storage and operations yards. The decision to establish an Integrated Support Base is influenced by the fact that Tullow needs to have better efficiencies in the management and monitoring of their operations.

3.4.3 Scheduling alternatives

The Integrated Support Base project is being driven by Tullow's operations and their need to achieve operational efficiencies by consolidating their operations and those of their contractors in a centralized location. Without proper scheduling, Tullow's environmental footprint may increase at the individual well pad locations. Therefore, Tullow wishes to commence construction of Phase I of the Integrated Support Base in November 2014 and commence operations by the first quarter of 2015.

3.4.4 Technology alternatives

Tullow and its appointed contractors conduct operations in several countries around the world. They employ various types of technologies for the exploration and appraisal programs to achieve their objectives. An example of a technology that Tullow has considered and will be using in South Lokichar is the use of synthetic based mud in lieu of water based mud at depths below 1000m.

Tullow's appointed contractors are also evaluating technologies for their specific work areas in order to ensure that they use the best available technologies and processes for their respective activities.

3.4.5 Demand alternatives

The demand for larger well pads sizes (over 250m x 250m) will continue if Tullow's contractors have to replicate their activities at each well pad. This could potentially have adverse environmental consequences which Tullow wants to avoid. Subsequently, with contractors operations consolidated at the Kapese Integrated Support Base, the demand for larger well pads will reduce as critical activities can be carried out at the ISB thus potentially reducing environmental footprints at individual well pad sites.

3.4.6 "No-go" alternative

The do-nothing alternative is the option of not constructing the Kapese Integrated Support Base. This alternative would result in no additional environmental impacts in the project area.

The potential positive impacts associated with the proposed Kapese Integrated Support Base are mostly associated with biophysical aspects. Should the proposed project not be constructed, the anticipated environmental and social impacts associated with the project will not come to pass. Subsequently, potential adverse impacts associated with the construction and operation of the proposed Integrated Support Base would be avoided; the impacts on the study area would therefore be neutral.

As Tullow's activities are moving towards appraisal and production, there will be an increased demand for contractor services. Tullow is currently using the Ekales well site as a base for their operational activities and due to its small size, is insufficient. This implies that Tullow has to manage its contractors from several locations as the Ekales camp cannot accommodate Tullow and its contractors. This also leads to communication related issues to the detriment of the operations.

Subsequently, the do-nothing alternative is not a preferred alternative and will not be assessed in further detail during the EIA phase.

3.5 Main project activities

The establishment of the ISB will be undertaken in two phases namely "Phase 1" and "Phase 2" respectively. Phase 1 will include provision of facilities to support current E&A activities and concept design works for Phase 2 which will support development drilling. The activities for each of the two phases are described below.

Given below are the principal project activities that will take place at the Kapese ISB.

3.5.1 Construction phase

During the construction phase of the project, each contractor that is allocated space by Tullow at the ISB will be required to appoint their own set of construction teams or contractors for developing their respective areas.

Each of the contractors has their own set of EHS standards and will apply such standards to their nominated sub-contractors. Additionally, throughout the construction phase, each contractor will at all times comply with Tullow's EHS Standards Framework and Tullow's Safety Rules.

All contractors working at the Kapese ISB will mandatorily comply with the requirements of applicable Kenyan EHS related legislation and any conditions in the ESIA License issued by NEMA.

General construction activities will include site preparation (excavation, backfilling and compaction of common areas), construction of stormwater drainage systems, establishment of internal access roads, truck parking yard, arrivals/departures area, laying of cables in trenches for electrical and telecommunications works, fencing of contractor's work areas as required, excavations for reinforced concrete foundations, and construction of reinforced concrete slabs.

Construction of various facilities within the ISB will be such that they can be removed and relocated easily. Contractors will erect containerized units for accommodation, catering, ablution facilities, offices, etc. Other contractors will erect workshops that will be supported on steel structures. The refueling services contractor will have an aboveground storage tank farm built on an impermeable surface and within bunded secondary containment to prevent loss of containment.

During construction, water will be required for mixing of concrete. This water will be sourced from the existing Tullow boreholes which have been permitted separately to this ESIA study.

During construction, storm water will be controlled to minimize the risk of erosion and sedimentation and prevent water contamination. Contaminated storm water will be treated before being released.

During construction there will be 24-hour security onsite. Workers camps will be established on site adjacent to the work areas.

Job opportunities will be generated through the construction of the various facilities. Skilled, semi-skilled and unskilled labor will be required in technical fields as well as in ISB operation and management.

3.5.2 Operational phase

During the operational phase, each contractor will manage their respective facility in an environmentally sustainable manner. Water at the ISB will be required for drinking, toilets and showers. Each contractor will have an on-site water tank for holding water.

Each contractor will supply their own electrical power through power generation sets. The generators will supply power to on-site facilities, including the workshop and perimeter lighting.

During operation, sewerage and waste will be dealt with in accordance with Legal Notice 121: Environment Management and Coordination (Waste Management) Regulations, 2006. All petroleum storage tanks will be bunded and provided with a closed system drain where the water will be treated prior to release. Storm water runoff from loading areas will be dealt with in a similar manner and in accordance with Legal Notice 120: Environment Management and Coordination (Water Quality) Regulations, 2006.

Due to its remote location and sensitivities associated with types of activities, security measures will be stringent during the operation of the ISB. On-site security of the premises will be engaged to restrict entry to authorized personnel.

3.5.3 Decommissioning phase

Tullow has signed a five year lease with ACS for the Kapese ISB. It is envisaged that Tullow will be at the Kapese ISB for at least five years and it is likely that this period may be extended.

The facilities and infrastructure expected to be constructed will be such that they can easily be removed during decommissioning. Tullow will provide a decommissioning plan to NEMA at least 3 months prior to the decommissioning date of the Tullow ISB facilities. The decommissioning plan will include a site restoration/rehabilitation plan.

3.6 Phase 1 activities

Phase 1 activities will include the development and establishment of the facilities outlined below.

3.6.1 Site preparation

Site preparation will be done for the truck parking area, 400 man camp, fuel facility, security camp and Community Liaison office. Site preparation will include ground preparation works, site water distribution system, and access roads.

The topography of the site is that the plot slopes in an easterly direction. The ISB will require to be properly drained as there are two sizable luggas that go through it, one beneath the existing runway and the other running across the plot in a west-south-west to east-south-east direction.

3.6.2 Site security

Site security is a crucial aspect for protection of Tullow and its contractors' people and assets from external or internal threats. The scope of work for site security will include the construction of a security camp. The security scope of work will include erection of guard huts at strategic locations within the ISB. The ISB site will be secured by private security staff who will operate from the Kapese site. Police will be housed in Lokichar

The entire ISB is currently fenced; this will be enhanced by having additional fencing around each contractor work location thus providing another layer of protection; the Kapese site has a perimeter fence, where required internal fences within the ISB will be erected around camp and work areas

3.6.3 Fuel and maintenance facility

A fuel facility comprising of about 600m^3 storage capacity is proposed at the ISB. The construction and management of the fuel facility will be farmed out to an existing established marketing oil company in Kenya. This Central Fuel Store will be for use by Tullow and contractor staff vehicles. The fuel will be stored above ground in steel storage tanks within secondary containment designed to accommodate 110% of the volume of the largest storage tank in the unlikely event of loss of primary containment (LOPC).

A fuel dispensing area will be created for refuelling vehicles, the exact location will be determined during the detailed engineering design phase.

A hazardous area classification drawing will be produced for the fuel facility indicating the types of electrical fittings including pumps, motors, switches and associated equipment required for the fuel storage and dispensing facility. The entire fuel facility will have appropriate earthed for dissipation of excess current.

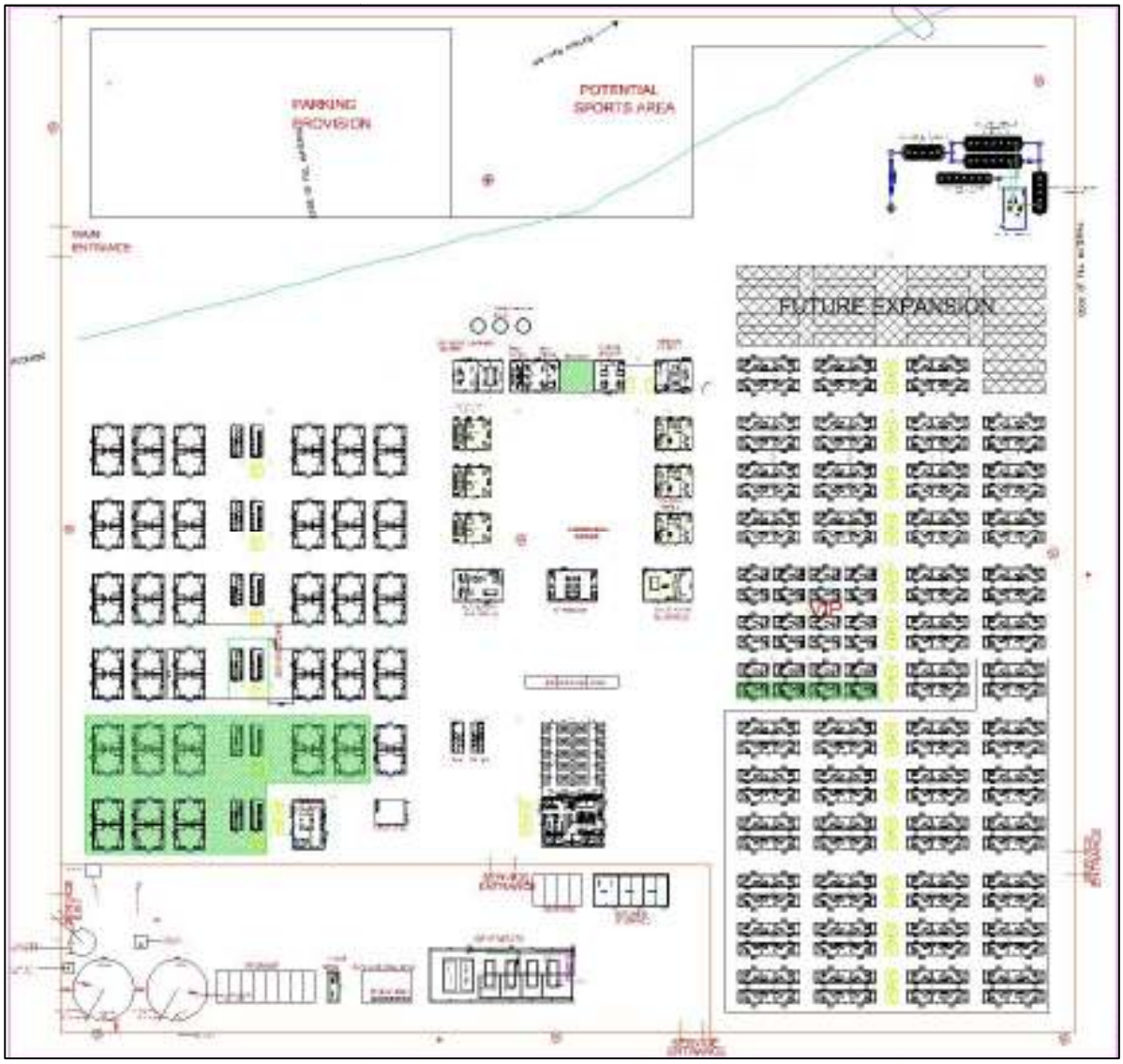
A maintenance workshop is also included in the scope of work. The details of this will be discussed in the ESIA Study phase.

3.6.4 400 man camp

A separate EIA Study was conducted by ACS for a camp site to accommodate Tullow staff and contractors. This has gone through a couple of Variation of EIA Licenses and Tullow is awaiting communication from NEMA on the variations.

In the meantime, Africa Expeditions (AFEX) has been contracted by Tullow to build and operate a 400 man capacity camp. A preliminary layout drawing of the camp is shown in Figure 3. The camp will be used by Tullow and its visitors, and contractors that will be working on the extended E&A activities. A preliminary layout of the 400 man camp is shown below.

Figure 3: Preliminary layout drawing of the 400 man camp facility



The features of the 400 man camp are described below.

3.6.4.1 Accommodation facilities

Accommodation units will be in the form of containers. There are three types of units that will be used for accommodation:

- Single en-suite units;
- Twin units with a common bathroom; and
- A 4-bed unit with communal bathroom facilities.

Images of a typical single en-suite unit are shown in Figures 4 – 6.

Figure 4: Single unit container laid on concrete block

Figure 5: image of the inside of a single unit

Figure 6: Single unit containers laid out at a camp site

3.6.4.2 Ablution facilities

There will be a number of different types of ablution facilities at the camp. The ablution facilities will be associated with the grey water, foul water, kitchen wastes, etc. All effluent emanating from the camp will be treated in an on-site wastewater treatment plant before being either recycled for use in toilet flushing systems, landscaping, or dust suppression.

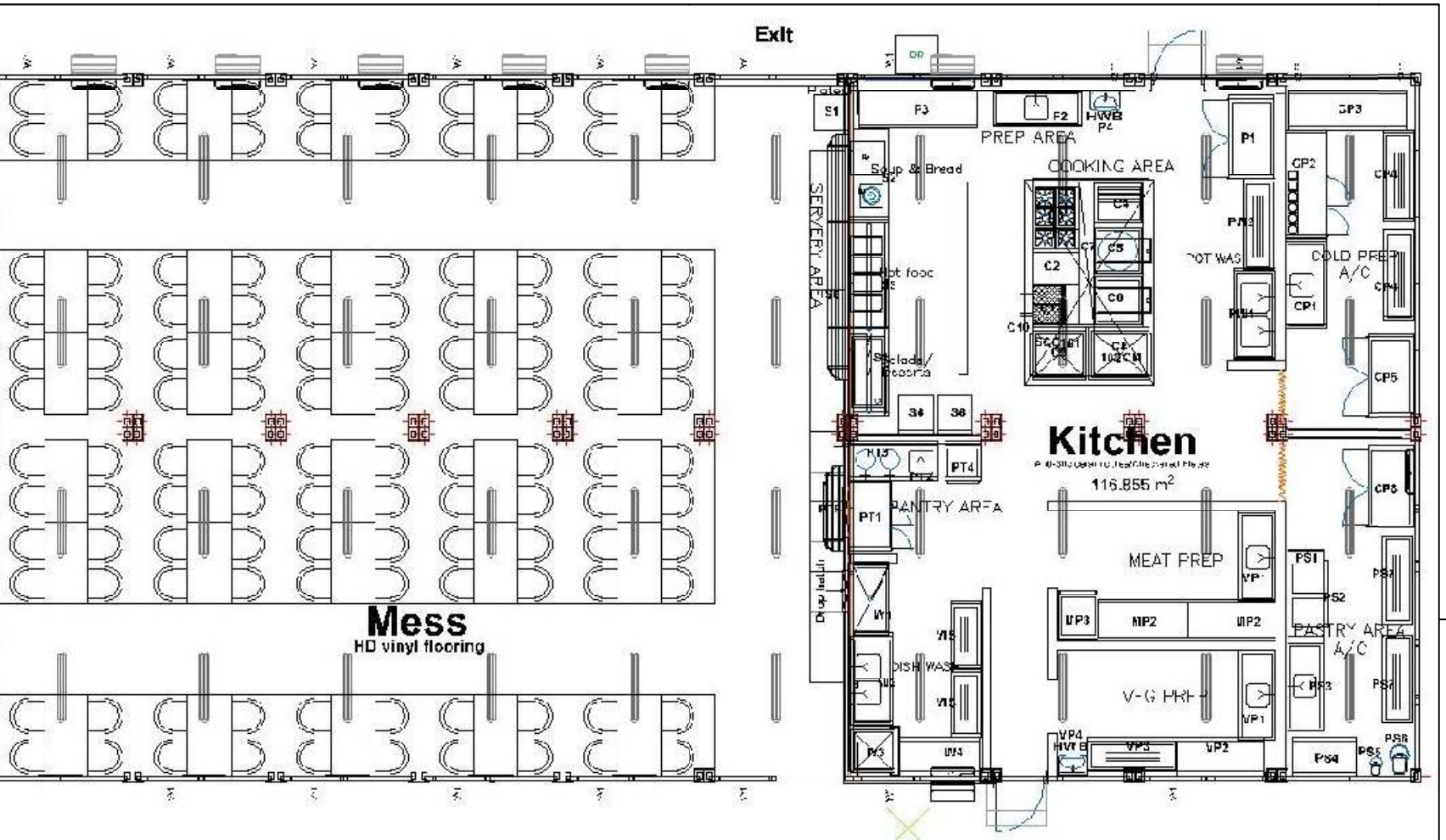
3.6.4.3 Mess facilities

The mess at the Kapese camp is designed to accommodate 120 people at any given time. It will have a fully fledged kitchen with the following features:

- Cold preparation area;
- Pastry preparation area;
- Meat and vegetable preparation area;
- Cooking area;
- Pantry and dish wash area with a drop hatch; and
- A servery.

Figure 7 shows a propsoed layout of the mess and kitchen facility in the AFEX camp.

Figure 7: Image showing the layout of the kitchen and mess facility


Exit
Mess
HD vinyl flooring
Kitchen
116.855 m²
PREP AREA
COOKING AREA
SERVERY AREA
PANTRY AREA
MEAT PREP
PASTRY AREA
COLD PREP
A/C
Soup & Bread

3.6.4.4 On-site wastewater treatment plant

A 100m^3/day wastewater treatment plant (WWTP) will be installed having a capacity to treat effluent arising from the camp facilities. AFEX has identified a supplier of a Moving Bed Bio-Reactor (MBBR) wastewater treatment system from Portugal who has installed similar units at various hospitality, educational and apartment type institutions in Kenya with success. Typical images of the WWTP are shown in Figures 8 and 9. For the AFEX camp at Kapese, the length of the MBBR is 11.14m, diameter is 2.19m and capacity is 35m^3.

Figure 8: Image of Moving Bed Bio-Reactor

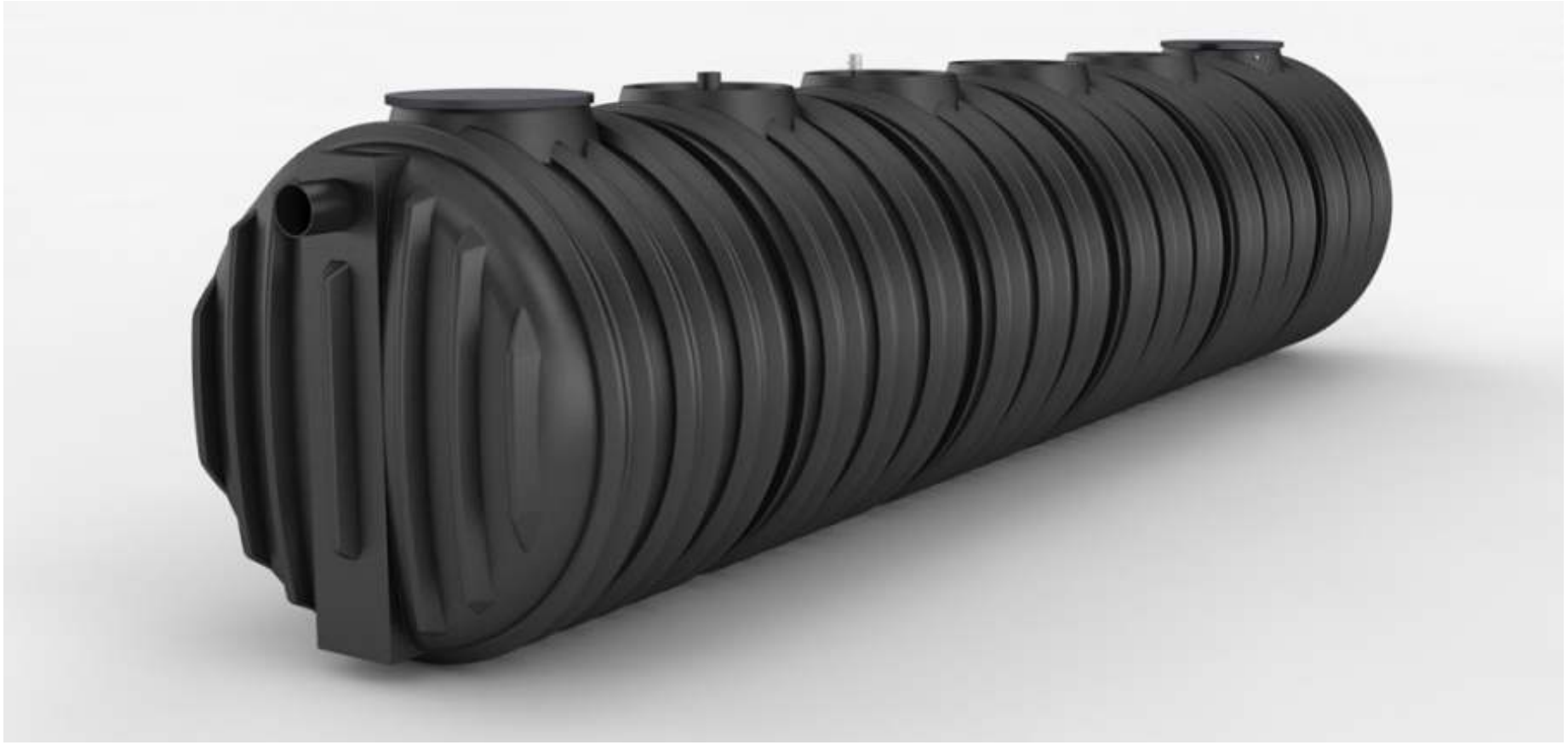
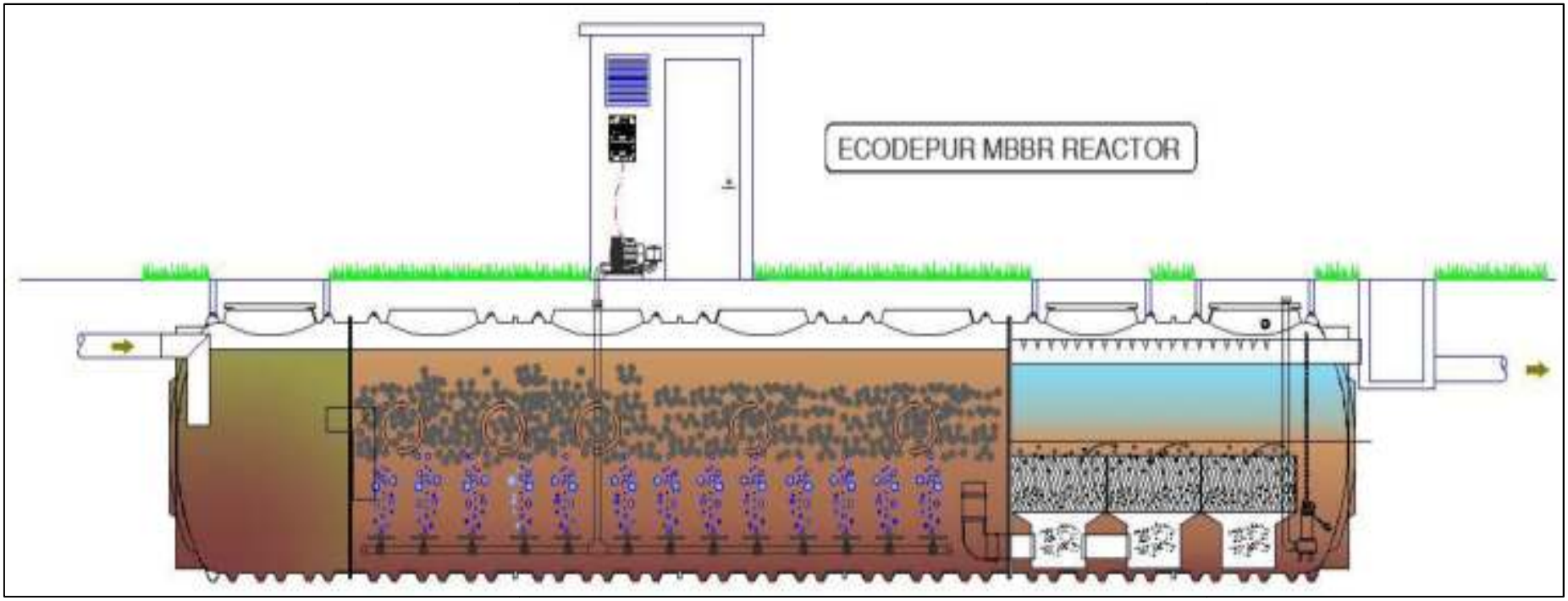


Figure 9: ECODEPUR® Moving Bed Bio-Reactor (MBBR)



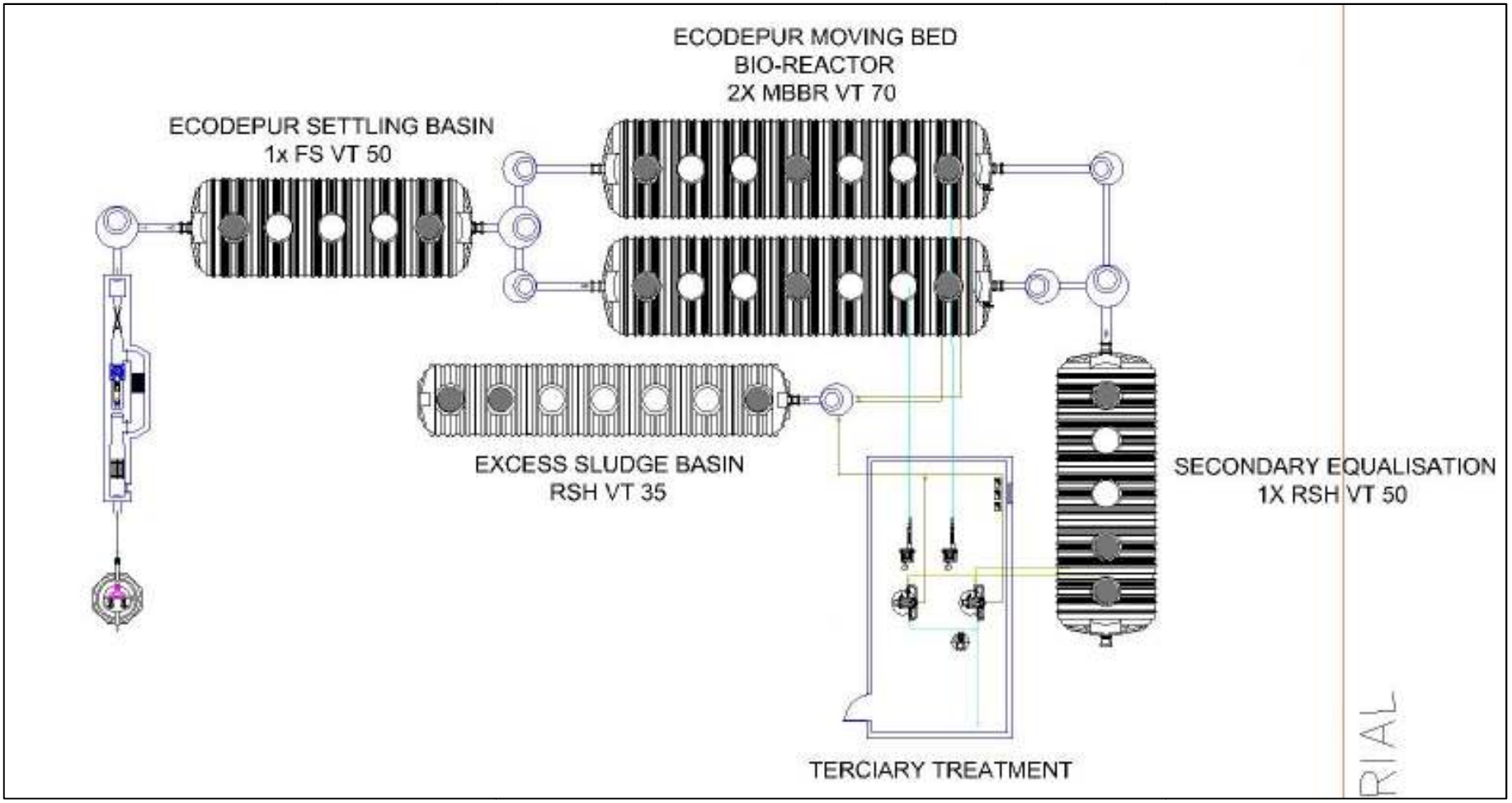
For the AFEX camp, the proposed layout to the WWTP is shown in Figure 10. All effluent will first enter a settling basin in which coarse solids will settle at the bottom. The effluent will then be transferred into two Moving Bed Bio-Reactor laid in parallel. In this step, the wastewater is aerated artificially through a forced air diffusion system powered by an electric blower commanded by a programmer clock.

The aeration ensures aerobic biological degradation of effluent, thus ensuring high levels of treatment and the absence of unpleasant odors. Noise levels generated by the blower are negligible.

After aeration and biological treatment, the effluent passes to the secondary sedimentation tank, or clarifier, where the suspended sludge settles to the bottom of the tank and the clarified water exits the treatment unit trough an overflow weir. The excess sludge accumulation is removed with a submerged pump to a sludge management facility within the camp; the sludge or scum can be used as a fertilizer.

The effluent which has undergone secondary treatment is then taken through a tertiary treatment process that includes filtration and disinfection. Filtration is a process for removal of suspended particulate matter. Disinfection is the destruction of pathogenic microorganisms that exist in water; the most common disinfectant used is chlorine (it oxidizes the enzymes of microbial cells that are essential for the metabolic activities) which is a powerful oxidant and will be used at the AFEX camp in Kapese.

Figure 10: Layout of the MBBR wastewater system at the AFEX camp



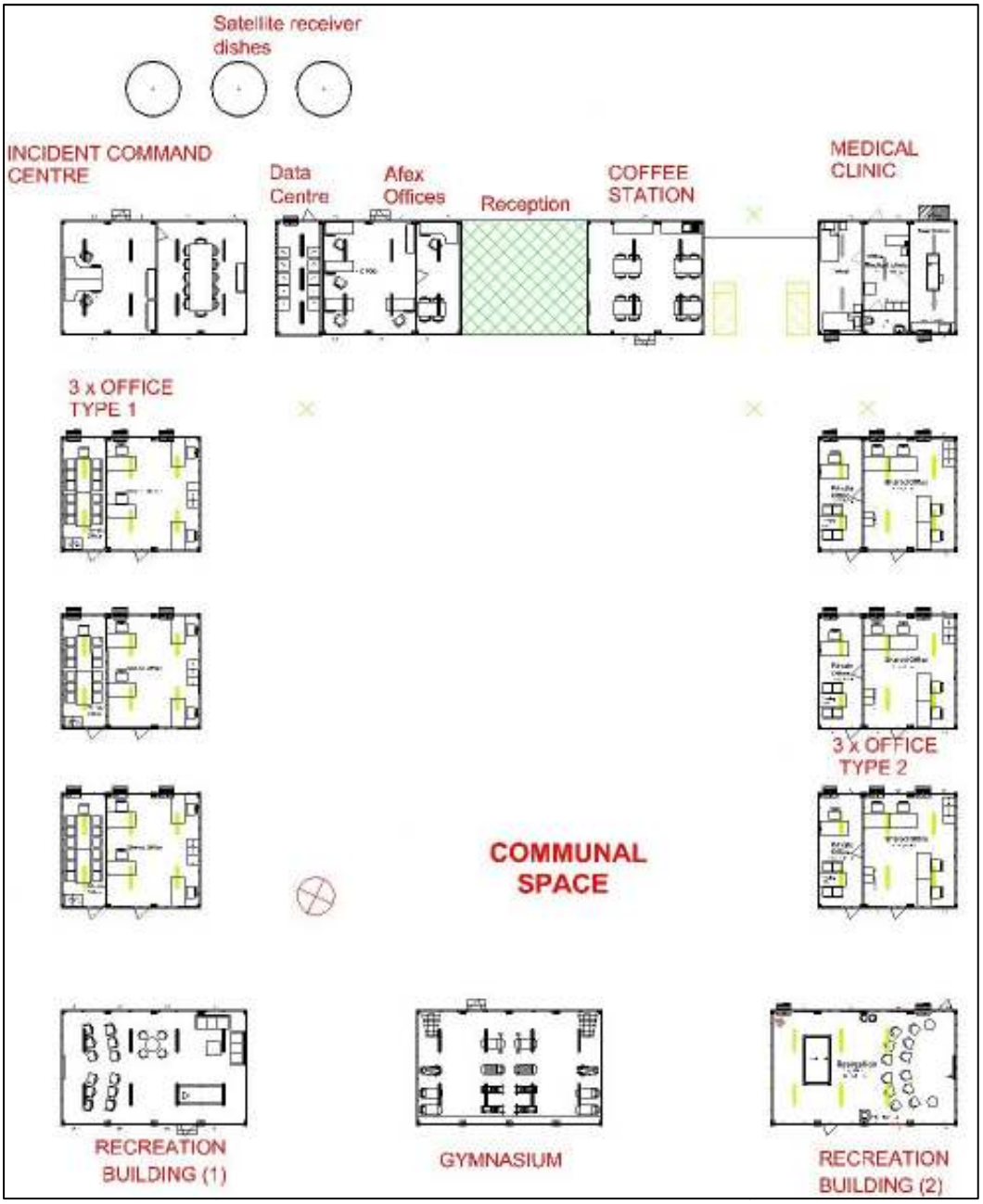
3.6.4.5 Offices and amenities

As part of the Phase I development, AFEX will build offices for Tullow and its visitors within the camp. The proposed layout of the offices is shown in Figure 11.

The offices will contain a reception area, Tullow offices in modular units, AFEX offices, an Incident Command Centre for crisis management, a fully-fledged and kitted medical clinic staffed on a 24/7 basis.

For recreational purposes, there will be two recreational buildings and a gymnasium for workers.

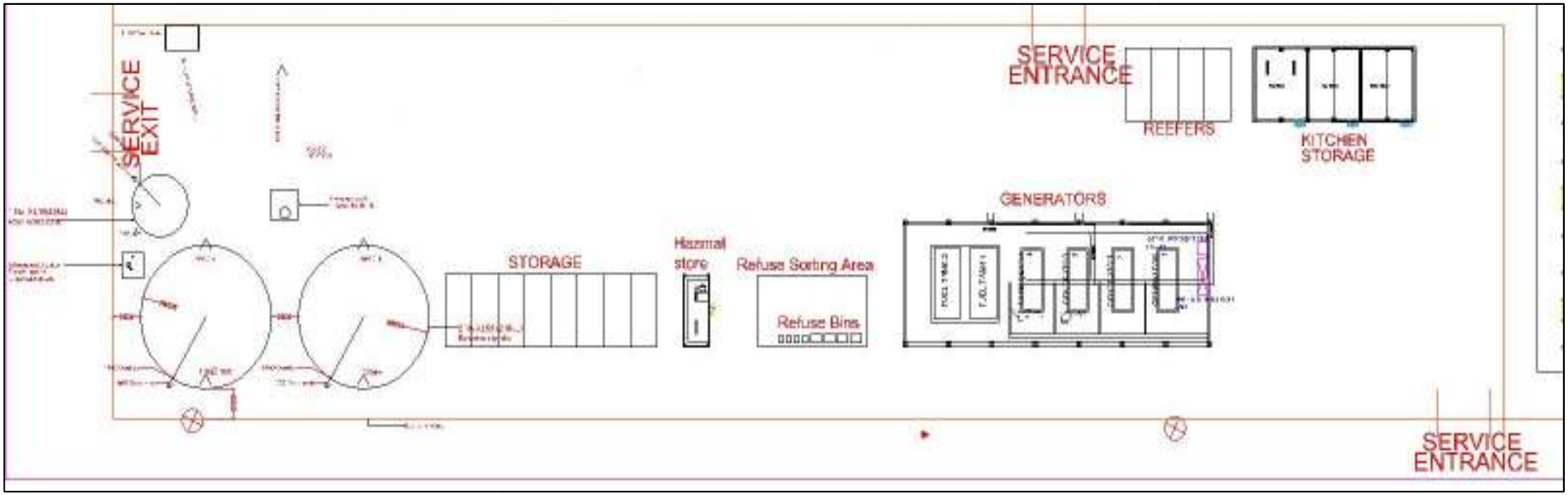
Figure 11: Image of the offices and amenities within the camp



3.6.4.6 Service area

The service area of the camp is situated in the southern part of the AFEX work area and has a physical separation from the main camp by a fence. Figure 12 shows the section of the camp that is known as the service area.

Figure 12: Layout of the service area within the AFEX camp



From an access control perspective, this layout will provide enhanced levels of safety and security to all workers. The south-eastern part of the service area will include a 50m^3 capacity raw water tank which will receive water from a Tullow water supply location. The water will be treated using a reverse osmosis process followed by disinfection to potable water standards and stored in two large aboveground water storage tanks each having a capacity of about 250m^3. The water from these tanks will be provided at several end points such as the kitchen, wash rooms, bathrooms, laundry, etc.

The entire camp will be powered using generators. AFEX is proposing to install four generators for powering up the camp facilities; one will be the duty generator while three will be on stand-by. The generators will be placed on concrete foundations and skids to avoid vibration. The generators will come with their own skid mounted fuel tanks. AFEX is proposing to install two aboveground bulk storage tanks for diesel; these tanks will be bunded and connected to an oil water separator on the outside. The capacity of the reinforced concrete bund wall will be 110% of the largest storage tank. Firefighting equipment will be mounted around the bund wall. The generators and diesel tanks will be covered under a steel structure shed with an iron sheet roof. This will minimize any drainage getting into the secondary containment area thus reducing the amount of oily wastewater to be treated in the OWS.

For waste management, AFEX will have a refuse sorting area to segregate food, plastic and other wastes. AFEX is also providing a hazardous materials storage area for any substances that could be hazardous such as used oil, chemicals, etc.

For storage of perishable goods, AFEX will have a dedicated kitchen storage area. Within this area will be a vegetable store, dry goods store and water store respectively.

3.6.4.7 Other features of the AFEX camp

The camp will have smoke alarms in each unit; there will also be a manual fire alarm system that will be installed within the entire camp. Fire protection will be provided through fire extinguishers.

The entire camp will be fenced to enhance safety and security of those working and residing within the camp.

3.6.5 Information and Communication Technology

For ease of communication internally and externally, the ISB will be connected to communication infrastructure. This will include cabling for internet connectivity which will be laid to (i) the main camp are for Wi-Fi connectivity, (ii) Tullow and AFEX offices, (iii) the CLO office, (iv) contractor work area, (v) Security camp, (vi) fuel and maintenance facility, .

3.6.6 Tullow logistics base

Currently, Tullow has its own warehouses for storage of various types of goods at the other drill sites and require relocation to the proposed ISB. The Tullow logistics base will comprise warehouse type tents. The warehouses will require appropriately designed foundations and reinforced concrete bases and will include pipe racks. There will be offices within the logistics warehouses including lighting, ablution facilities and associated utilities.

3.6.7 Service Contractors

Extended exploration and appraisal (E&A) activities will require the use of various types of contractors. In Phase I, two key service contractors that will be working at the Kapese ISB are Schlumberger and Baker Hughes International. These two contractors will be allocated approximately 40,000m^2 and 30,000m^2 of work area respectively. The design of their respective facilities will require approval by Tullow prior to construction. The conceptual design of their respective work areas has been done and will include the following features:

- Cement storage area with containment berm;
- Cement warehouse;
- Truck maintenance area;
- Wireline;
- Mechanical workshop;
- Ablution facilities.

Tullow will provide the water connection points to each contractor facility. Once approved by Tullow, each contractor will among other things carry out the following:

- Carry out all ground preparations and construct foundations to receive infrastructure;
- Install external fences, if required, to an agreed minimum standard;
- Erect all required buildings and infrastructure;
- Provide adequate drainage and connections to the site stormwater drainage system;
- Provide fire and safety equipment in compliance with Kenya's Fire Risk Reduction Rules, 2007 and Tullow EHS requirements;
- Provide any additional power, water and wastewater treatment units over and above those provided by Tullow;
- Provide work area lighting and work area perimeter lighting;
- Provide work site internal pedestrian walkway path access as well as vehicle access;
- Provide work site access gates and any additional security and access control measures, equipment and personnel;
- All communications systems and associated infrastructure.

Given below is a description of each contractor's work area and the activities that will take place there.

3.6.8 Schlumberger

Schlumberger (SLB) is the world's leading supplier of technology, integrated project management and information solutions to customers working in the oil and gas industry worldwide. Employing approximately 126,000 people representing over 140 nationalities and working in more than 85 countries, Schlumberger provides the industry's widest range of products and services from exploration through production.

SLB supplies a wide range of products and services from formation evaluation through directional drilling, well cementing and stimulation, well completions and productivity to consulting, software, information management and IT infrastructure services that support core industry operational processes.

SLB has been in Kenya since Tullow discovered oil and has been a key service contractor providing well cementing and stimulation and well completion services.

Tullow has allocated a work area of about 30,000m^2 to SLB at the Kapese ISB. Based on this area, SLB proposes to develop their Kapese operating base in two phases. The features of Phase I will comprise the following:

- Site works:
  - ✓ Fencing and anti-vehicle bund at perimeter around 30,000sqm site (200m by 150m);
  - ✓ Site to be leveled /compacted to minimum 95% or as required by the civil standards in this document and axel loading requirement. Workshop areas to be paved;
  - ✓ Site wide underground electrical distribution, sanitary sewer, portable water network, (provide connection point to building location as per master plan);
  - ✓ Fence Lighting will be provided along all fences. Lighting fences will consist of Projectors which will illuminate the access to road and periphery from outside, as well as the open-air areas inside the facility; and
  - ✓ Waste water collection and treatment area.
- Portable Workshop areas:
  - ✓ Scope of Work: Portable workshop with roof over containers 340m^2 and 635m^2 modular workshop with two 3-ton crane;
  - ✓ Modular workshop floor to be paving block and modular workshop to be placed on slab made out of reinforced concrete (min.200mm thick, 25N/mm^2);
  - ✓ The area to be covered with 25-Mega Pascal (MPA) minimum strength of block pavement, over compacted subgrade;
  - ✓ Wash bay area with drainage connection ready for portable wash-bay unit installation;
  - ✓ Machine shop roof shed (7m x 10m reinforced concrete to have concrete slab of 25N/mm^2 of min.200mm thick, walls on 3 sides with roll-up door) 7m x 10m remaining area will have paving block of 25MPA. The height at lower eave to be 4m (roof to be slightly sloped, higher eave along container side).

- ✓ Installation of power, compressed airlines with hose reels; and
- ✓ Supply and install water line with hose reel.

- Portable Office slab:
  - ✓ 18mx10m reinforced concrete slab with power connection point; and
  - ✓ Installation lunch area roof shed with lighting (6.5mx12m).

- Radiation Source Storage and Nuclear calibration facility 300m^2 (roof shed with 2.7m high wall, and 3 ton overhead crane with support structures, 8 underground storage concrete pits. This facility will be designed in accordant with the requirements of the Radiation Protection Act and other international atomic energy standards;
- Open air Storage Area and trafficable areas compacted crushed stone over 95% compacted sub grade;
- Supply and install roof shed (6mx7.2m) with light fixtures and power connection to modified containers storage areas (Modified Containers by Tullow);
- 82m x 2.1m highly compacted area for liquid mud-plant tanks as per LMP specification including civil work with utility connection;
- Installation of a 2000bbl (318m^3) capacity aboveground water tank with pump which will be connected to the main water supply point and site fire water and utility lines;
- Secured entry with 24m^2 Guard House, control and bathroom (interlocked with two 5m sliding gates), controlled personal entry/exit doors (one door to be turnstile);
- Toilet Blocks with septic and soak away pit as required;
- Security fence (721 meters long 3m high) with perimeter lighting, berm and ditch (anti-vehicle) to cover 30,000m^2 site (Electrified coiled razor installation);
- Utility facility 270m^2 roof shed with concrete slab and pad for two Generators ~500KVA each, supply and install Main electrical panel to connect to individual building distribution boards (DBs);
- Toilet block 44.2m^2;

- Installation of fire alarm and detection system to workshop and support buildings to meet NFPA Requirements.

Sketches of the conceptual SLB layout are given in Figures 13 – 19.

Figure 13: Conceptual layout of the SLB work area

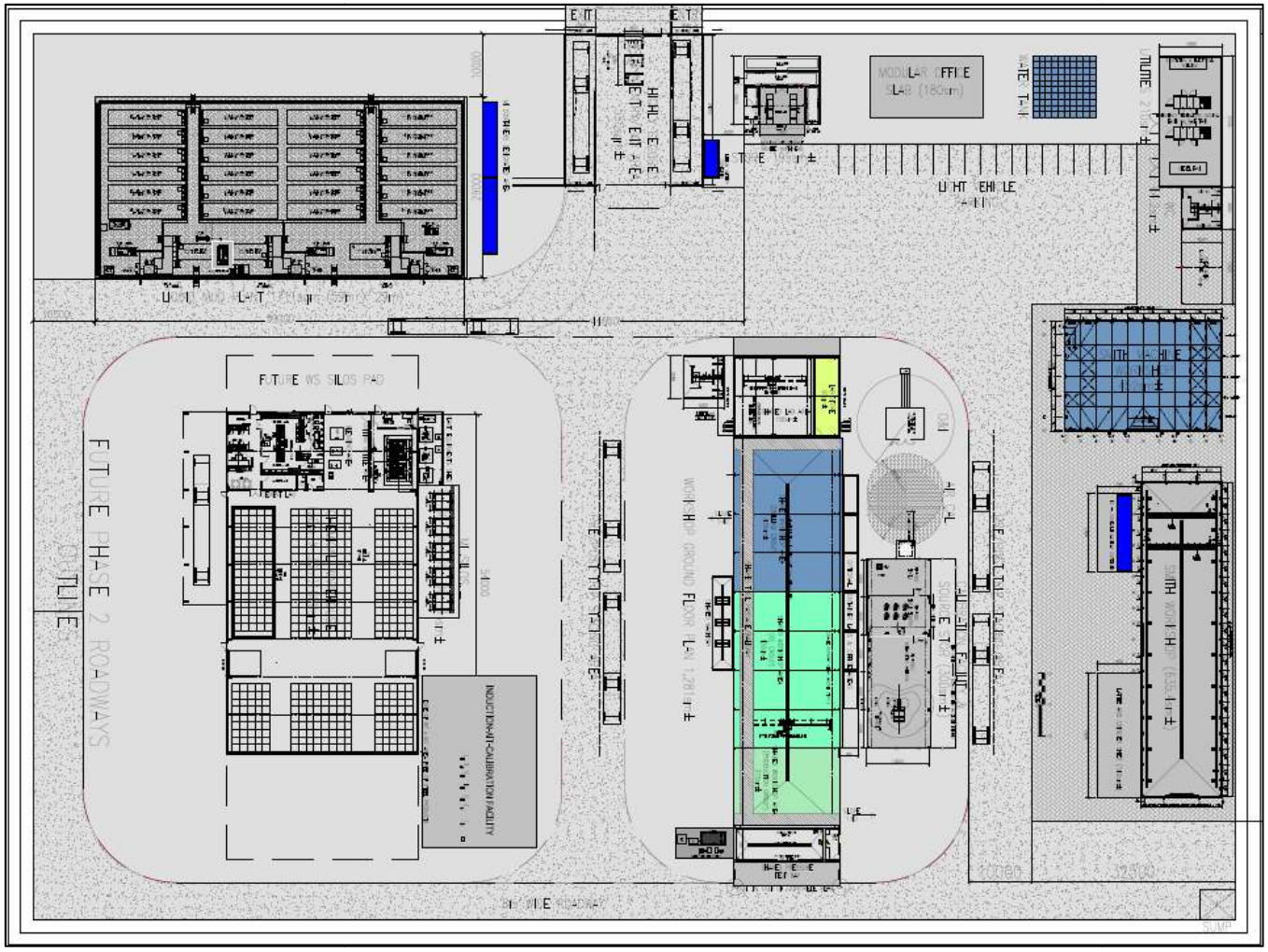


Figure 14: Conceptual layout of workshop area

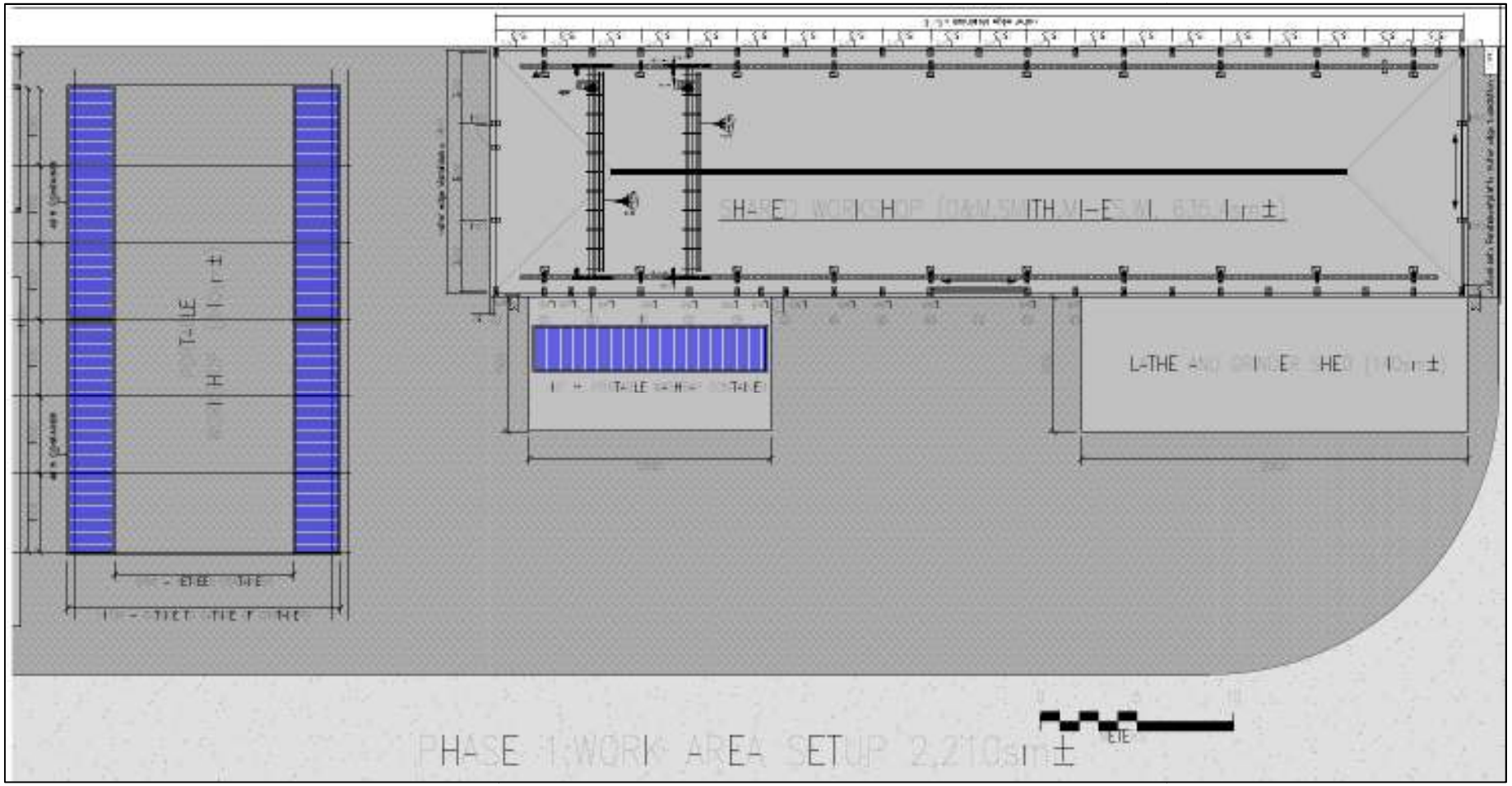


Figure 15: Image of a typical workshop setup

Figure 16: Conceptual layout of Liquid Mud Plant

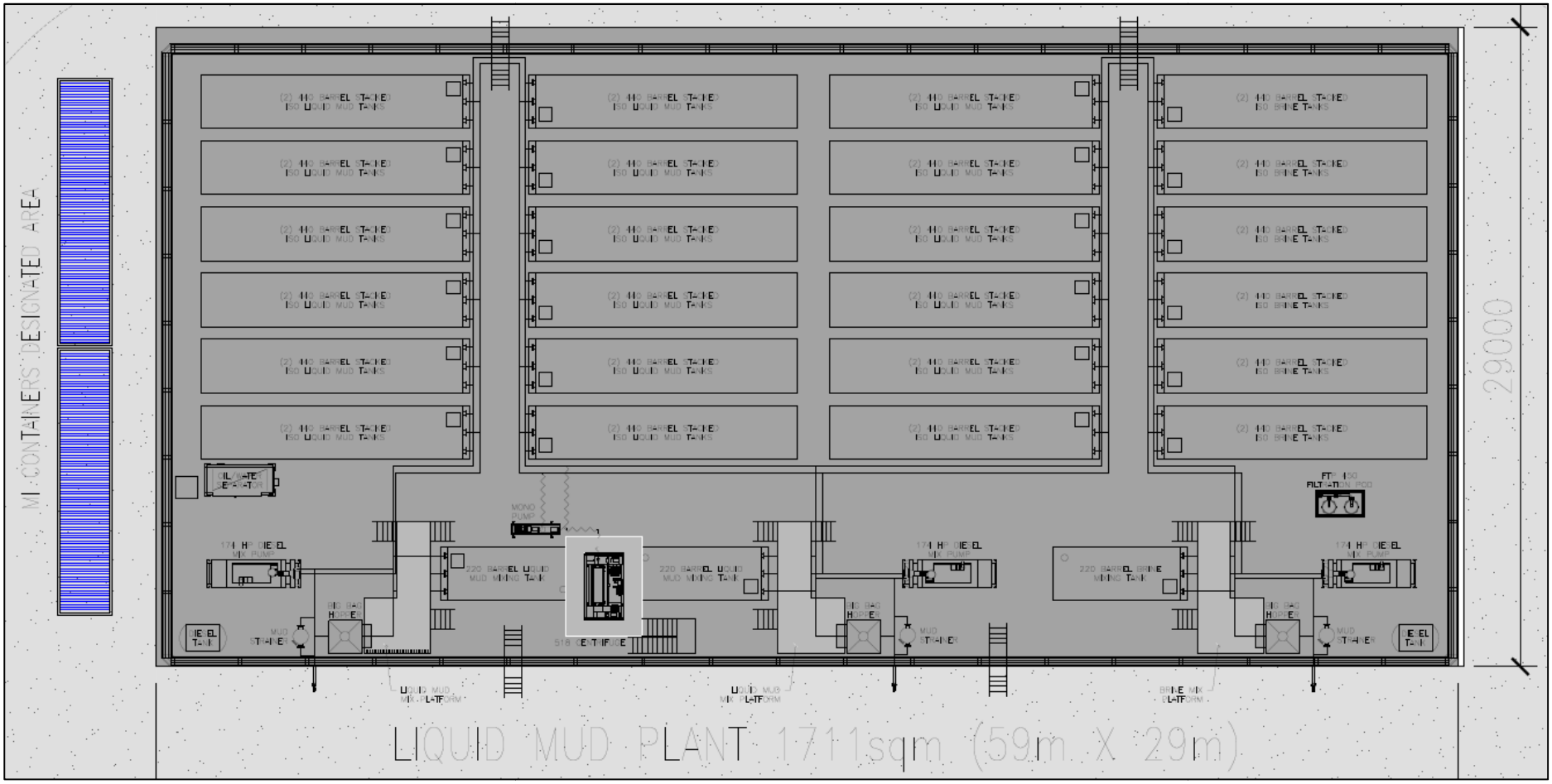


Figure 17: Conceptual layout of support facility

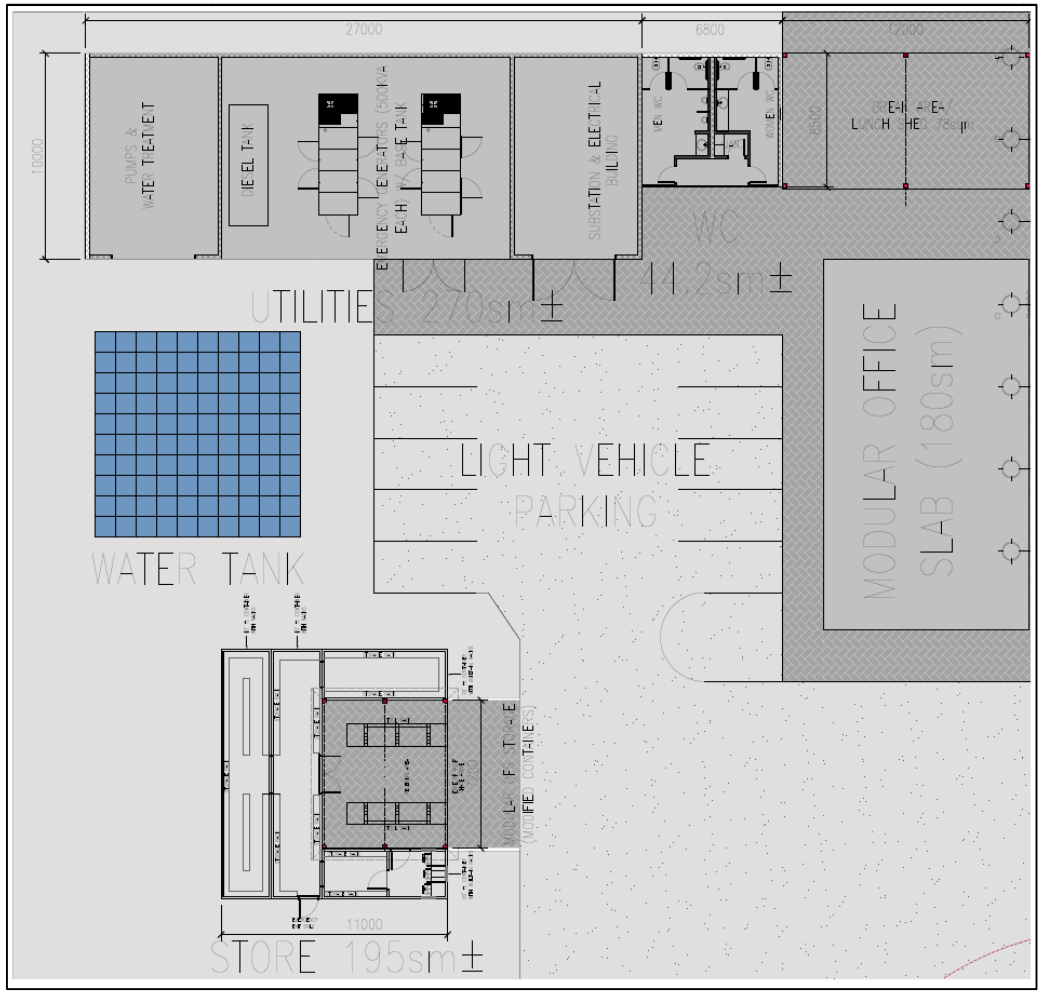


Figure 18: Conceptual layout of the nuclear calibration facility

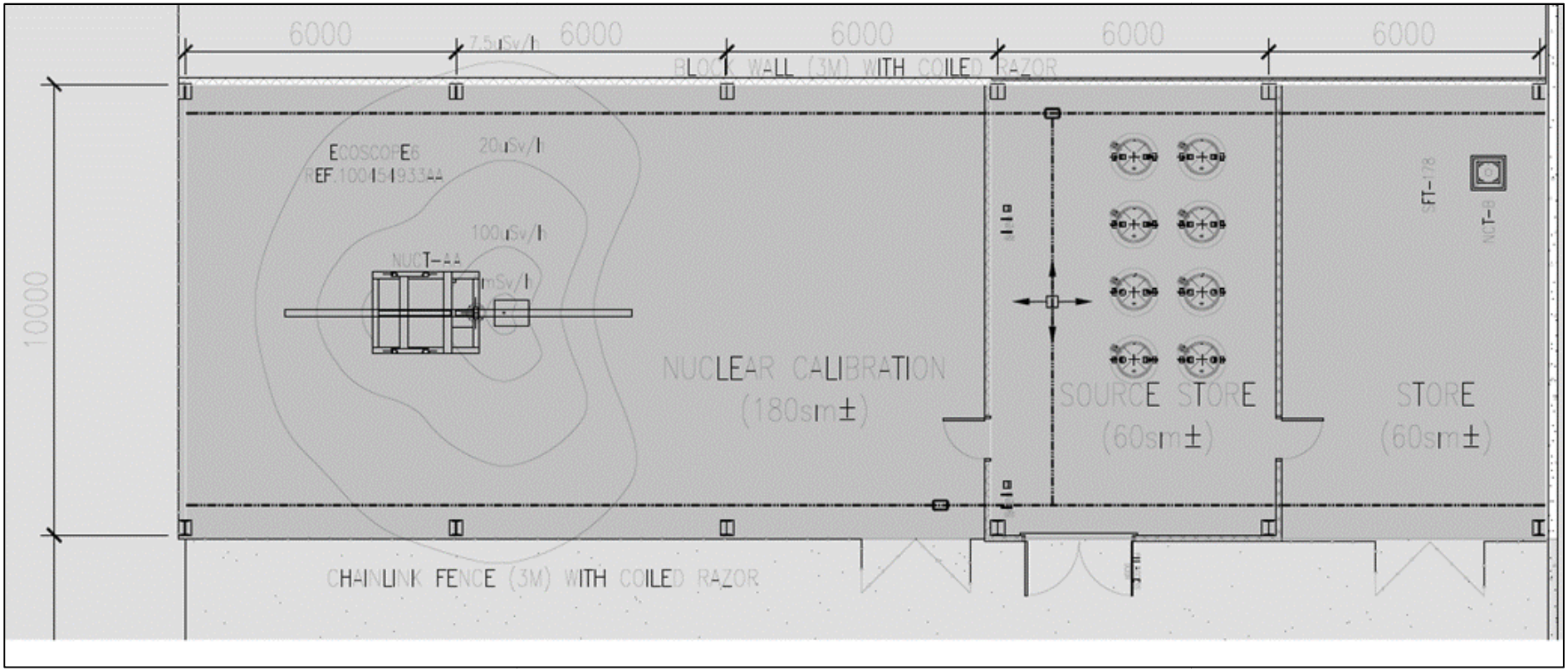
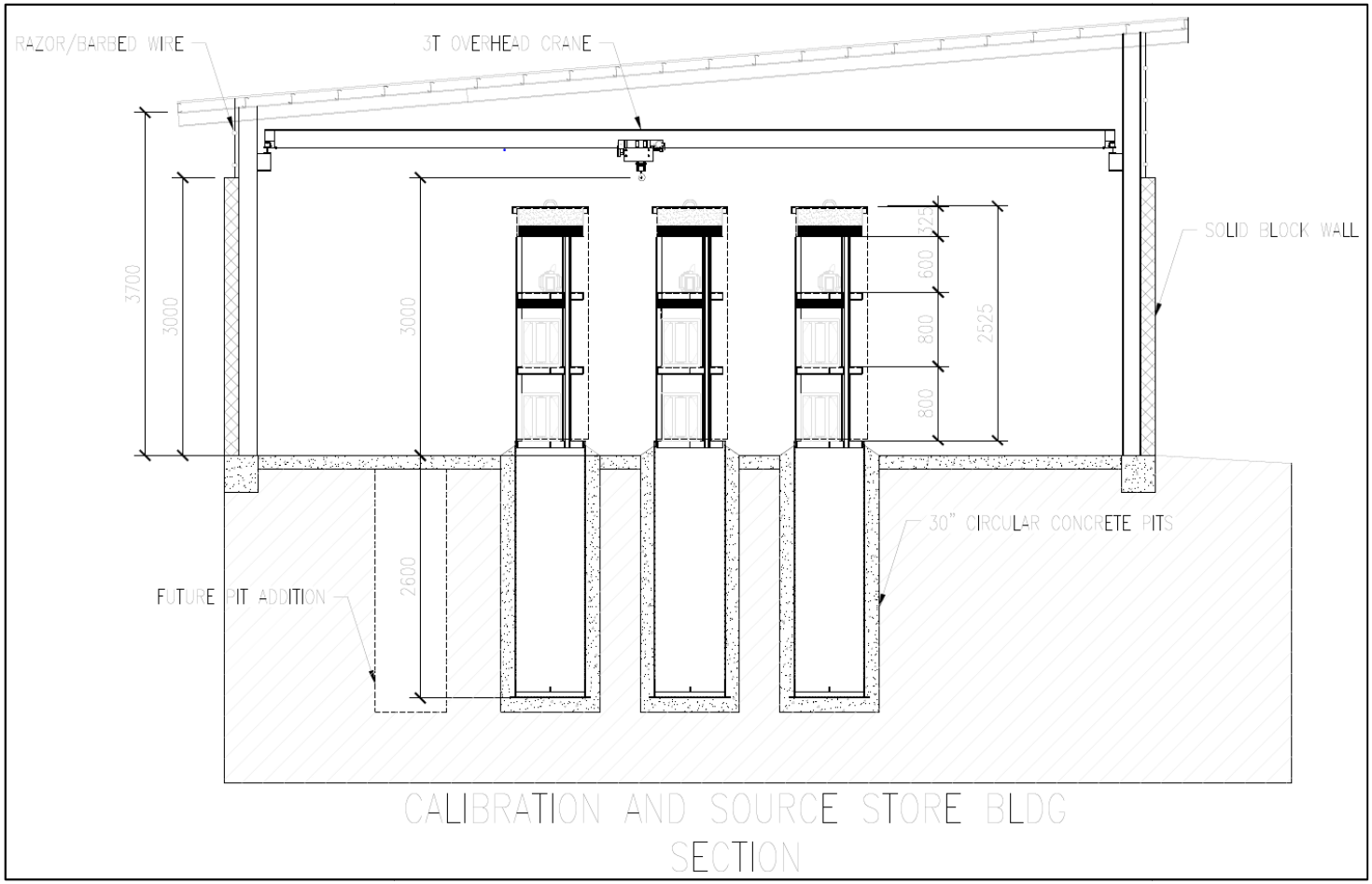


Figure 19: Figure showing sectional view of the nuclear calibration facility



3.6.9 Baker Hughes International

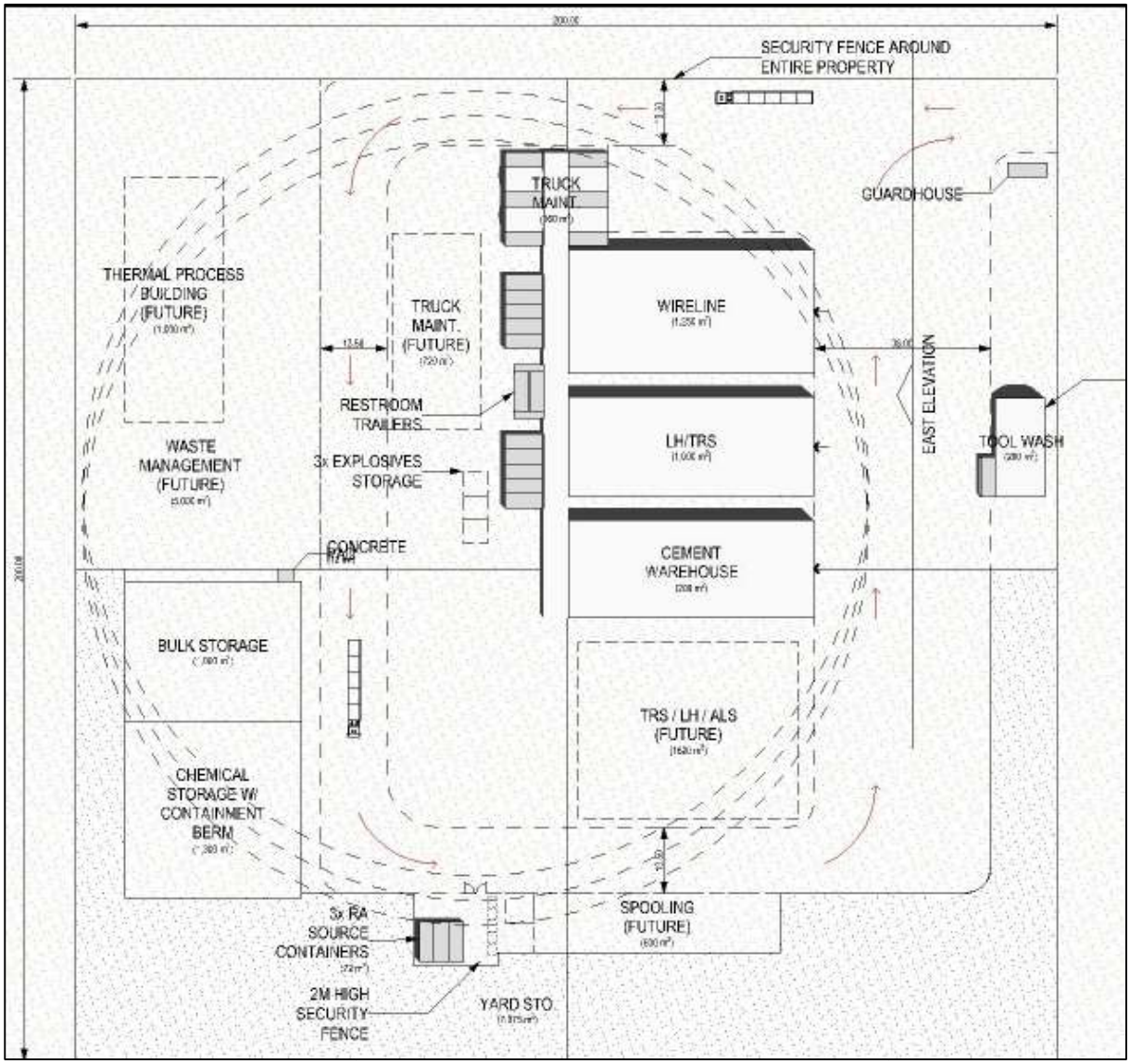
Baker Hughes was formed in 1987 with the merger of Baker International and Hughes Tool Company—both founded over 100 years ago when R.C. Baker and Howard Hughes, Sr. conceived ground-breaking inventions that revolutionized the fledgling petroleum era. Since those earliest advancements, we've never stopped searching for solutions to conquer the next frontier.

Baker Hughes Incorporated creates value from oil and gas reservoirs with high-performance drilling, evaluation, completions and production technology and services, integrated operations and reservoir consulting. Our solutions are designed to lower costs, reduce risk or improve productivity for the global oil and gas industry.

Baker Hughes International (BHI) has been in Kenya since Tullow discovered oil in March 2012. They provide Tullow with similar services to SLB i.e. evaluation, completions and production technology and services.

BHI has been allocated an area of approximately 40,000m^2 at the Kapese ISB. A site plan showing the proposed layout of the BHI work area at the Kapese ISB is shown in Figure 20.

Figure 20: Conceptual layout of the BHI work area at Kapese ISB



3.6.9.1 Structures and Facilities

BHI will construct a facility that includes a warehouse block measuring 1250m^2, a truck maintenance area measuring 120m^2, a radiation source container and explosives storage bunkers.

Layouts of the proposed development are shown in Figures 21 - 26.

Figure 21: Proposed wireline layout plan

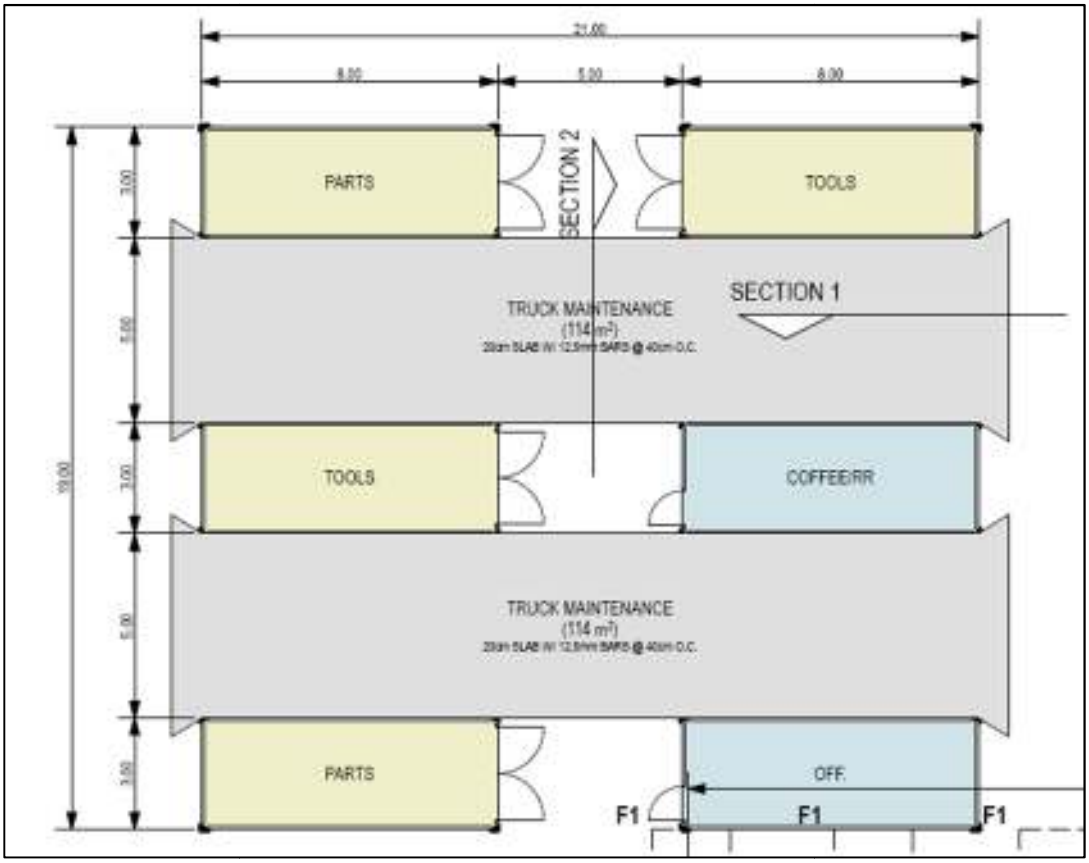


Figure 22: Proposed wireline plan

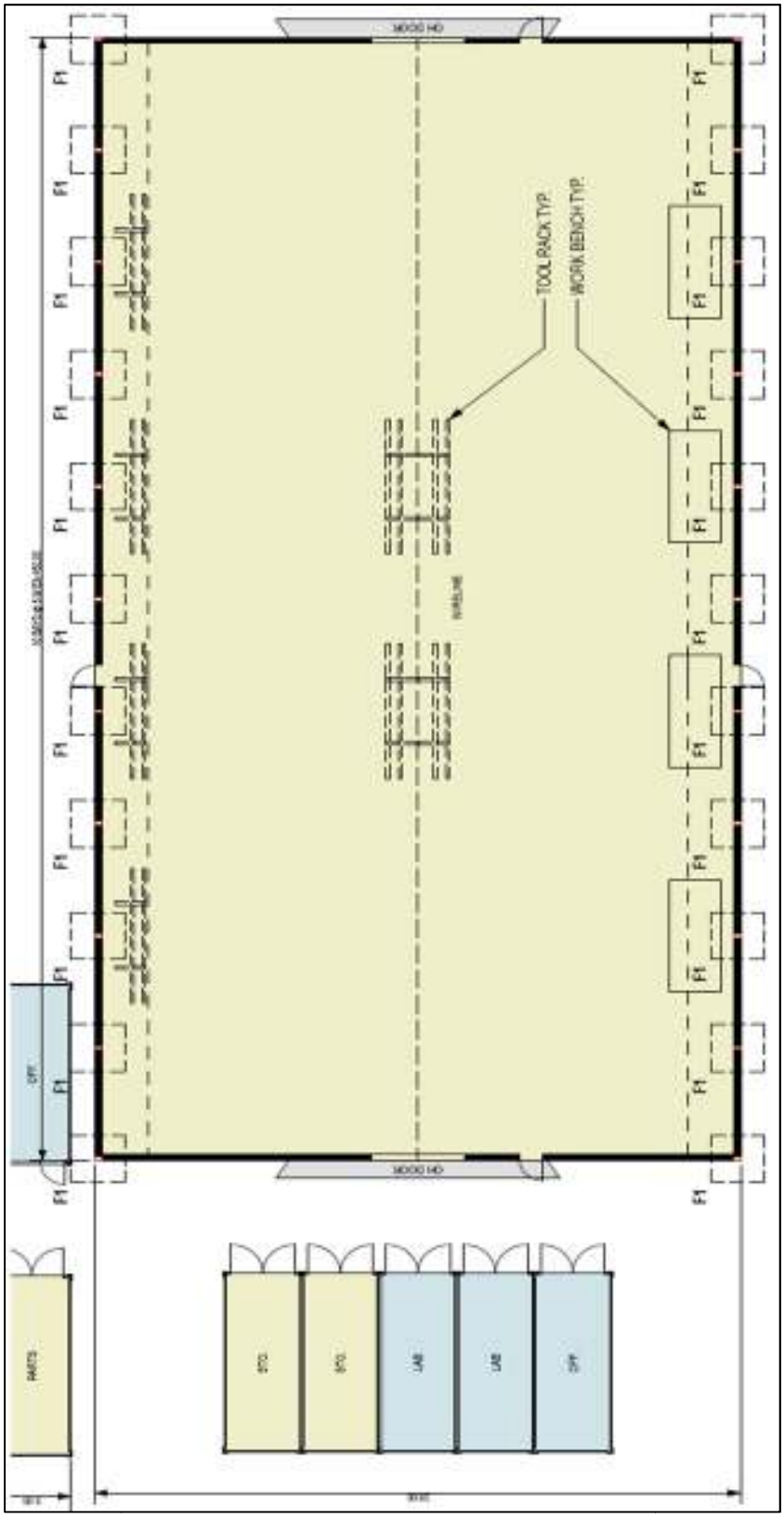


Figure 23: Proposed tool wash layout plan

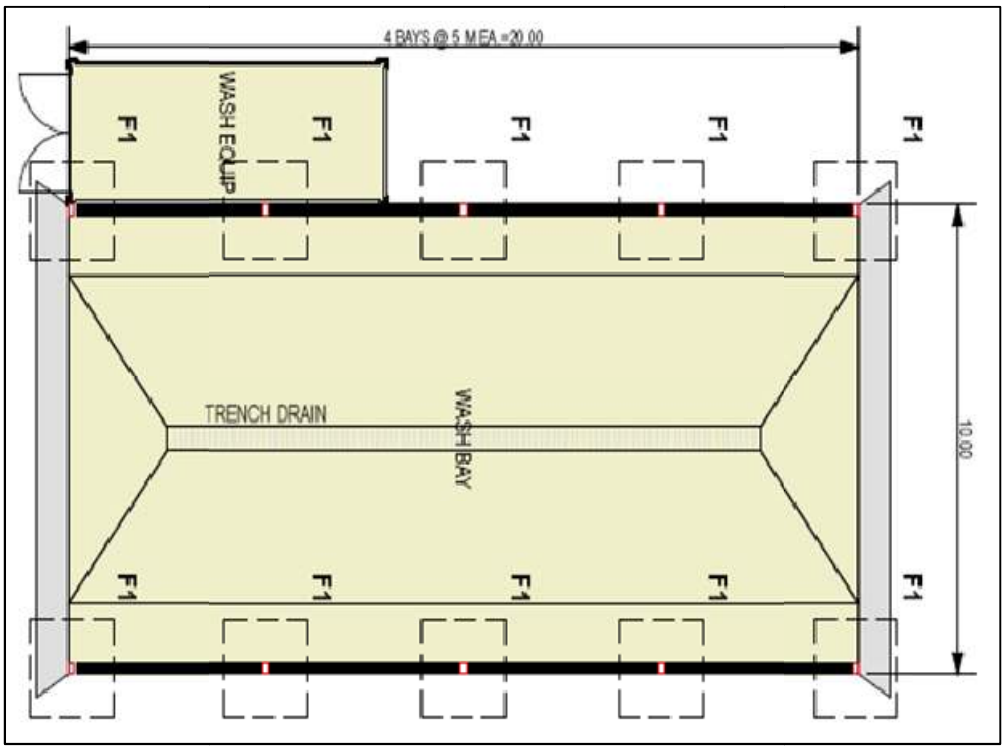


Figure 24: Front view of existing wireline maintenance workshop

Figure 25: Inside view of existing wireline maintenance workshop

Figure 26: Truck maintenance area outside the wireline tools workshop

3.6.9.2 Construction phase activities

Activities anticipated during this phase include construction of concrete plinths for:-

- Source handling area;
- Mobile wash area, mobile maintenance unit;
- Tool wash area; and
- Explosive storage bunkers.

3.6.9.3 Operation phase activities

The proposed Wireline Services facilities shall consist of an Electronics & Electrical Lab, a Hydraulic Lab and the RA Calibration (this is a restricted area created for calibration of tools which use radioactive sources for lithology measurements) and Bunker Area . These facilities contain all the necessary tools and test equipment to carry out full high level preventative maintenance and repair on all WS equipment. Figure 27 – 30 shows typical operational phase activities.

Figure 27: Tools under maintenance

Figure 28: Tools string check in the open

Figure 29: RA Bunker

Figure 30: Calibration area

The facility will also house an oven which is used to qualify applicable Wireline equipment to full temperature specification.

The hydraulics will contain all equipment required to fully maintain and operationally check the Reservoir Characterization Instrument modules and Power Cord tools.

Figure 31 shows a WS Electronics & Electrical Lab while Figure 32 shows a typical RCI lab.

Figure 31: Typical WS Electronics & Electrical Lab

Figure 32: Typical WS RCI lab

3.6.9.4 Wireline Maintenance, Calibration and Support

Calibration of tools will mostly take place externally and comprise the use of small quantities of radioactive source (RA) materials. During tool calibration activities, barriers will put in place to prevent personnel access to the area. A RA monitor/alarm will also be in operation. During the maintenance of the tools, by products would include waste such as paper towels, old O-rings, old parts and old hydraulic oil. The use of soldering irons and contact cleaners are required as well. Figure 33 – 36 shows typical equipment used for calibrating tools.

Figure 33: Typical wireline calibration equipment

3.6.9.5 Wireline Support Vehicle Maintenance

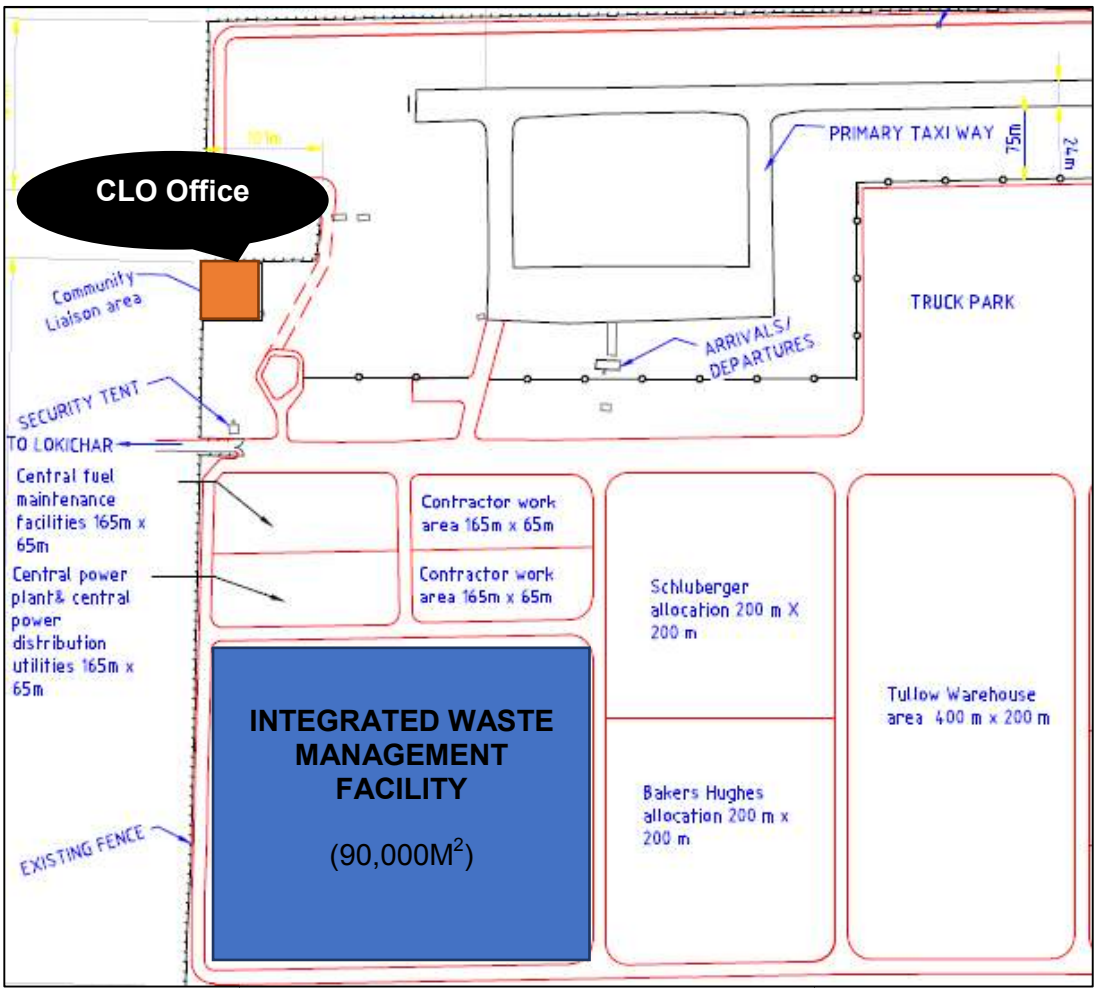
Vehicle maintenance will include oil changes for the large trucks. Light vehicle maintenance will be undertaken at the dealer. BHI will undertake all washing in the self-contained wash bay, with no discharge to site or external drains. Upon reaching capacity, washings will be removed from the bay by a suitably qualified waste contractor for offsite disposal. BHI will not undertake any refuelling on site. Waste water and sludge generated from washing activities will be captured within a self-contained wash bay. Figure 34 shows a typical truck maintenance area.

Figure 34: Truck maintenance area outside the wireline tools workshop

3.6.10 Community liaison office

A community liaison office will be established at the ISB and will be manned by a full-time CLO. The CLO will implement Tullow's Grievance Mechanism related to the Kapese ISB from this location. Subsequently, the office will be used to receive comments and grievances from the community for further handling, and for the provision of information to I&APs. The office will be furnished complete with ablution facilities, utilities, internet connectivity and lighting. The location of the Community Liaison Office is shown in Figure 35.

Figure 35: Image showing location of the CLO office at the Kapese ISB



3.6.11 Integrated waste management facility

As part of its Kapese ISB, Tullow has allocated an area of 90,000m^2 for an Integrated Waste Management Facility (IWMF). This facility will be designed, built and operated by an independent third party contractor for a minimum period of three years. The location of the waste management facility within the ISB is shown in Figure 35. The IWMF will be used to treat a variety of non-hazardous and hazardous wastes generated by Tullow operations in the Lokichar basin.

Tullow is in the process of appointing a third party contractor to design, build and operate the IWMF at their Kapese ISB. Consequently, an ESIA Study will be required to be undertaken once the preliminary design is completed by the successful Tullow appointed service contractor. The IWMF will be managed in accordance with Kenya's Legal Notice 121 titled: Environment Management and Coordination (Waste Management) Regulations, 2006, relevant international conventions on waste management which Kenya has ratified and/or domesticated, Tullow EHS standards and international best practices, such as those of the IFC, where appropriate.

This sub-section provides an outline of the requirements for management of an IWMF at the Kapese ISB.

Tullow's current life support is provided through existing camps located at Ngamia, Twiga and Ekales exploration well sites. These camps have a mix of tents and containers which may accommodate anywhere between 1000 to 2500 personnel. Hazardous and non-hazardous waste is generated from the drilling operations and from the general living arrangements and accommodation activities. The approximate quantities of non-hazardous wastes generated through Tullow's existing activities is given in Table 2 while Table 3 indicates the approximate quantities of hazardous wastes generated.

Table 2: Approximate quantity of non-hazardous waste generated through Tullow operations

Item	Waste stream	Waste types	Estimated quantity of waste per month per site
1.	Solid Domestic Waste[1]	Glass, Aluminium cans, general plastics, food waste.	3000kg
2.	Metals (non-contaminated)	Ferrous and non-ferrous, including drinks cans (steel and aluminium), electrical wiring.	500 kg
3.	Paper	Papers, magazines, office paper, cardboard boxes (not contaminated with oil, grease, chemicals).	500 kg
4.	General Plastic (non-contaminated)	Plastic bottles and plastic bags	1300 kg
5.	General Plastic (non-contaminated)	Mixed plastics including polystyrene and glossy paper	1000 kg
6.	Wood (non-contaminated)	Pallets, crates, furniture.	5000 kg
7.	General Industrial Waste	Printer Cartridges, Tin cans, empty drums	Data Not Available

[1] Note that this waste is not separated at site and is accounted for as solid waste. Ideally it should be separated at site as compostable food waste, meat food waste, plastics, glass (clear, green and brown) and aluminium.

Table 3: Approximate quantity of hazardous waste generated through Tullow operations

Item	Waste stream	Waste types	Estimated quantity of waste per month per site
1.	Oil	Used engine oil, hydraulic oil, cleaning agent, cooking oil, rig slops oil, crude oil from testing equipment washing, oil contaminated water / salt water and the like.	3000 litres
2.	Oil contaminated materials	Oily rags, used spill absorbent, hydraulic hoses, minor quantities of grease, contaminated P.P.E	500 kg
3.	Contaminated sands	Sand contaminated with Crude Oil or Fuel	Data Not Available
4.	Dry Tank Residue	Cement and barite from tank clean outs.	Data Not Available
5.	Dry Tank Residue	Tank clean outs from drilling and completions-contaminated water from chemical residues.	Data Not Available
6.	Metal Containers	Used chemical containers that contained paints, aerosols, pesticides, solvents, propellants, etc.	500 kg
7.	Waste Containers	Used chemical containers that contained paints, aerosol, pesticides, solvents, propellants, etc.	1000kg
8.	Batteries	Dry cell batteries, 12V car batteries, 24V truck batteries, Lithium Ion batteries, Ni-Cad batteries.	200 kg
9.	Electrical goods and instrumentation	Old computers, screens, televisions, fridges, air conditioners, instrumentation and other electrical goods.	Data Not Available
10.	Chemicals, various	Small amounts of various solvents, thinners, paints, flammable liquids, cleaners, laboratory waste, and chemical residues left over in containers or no longer required.	250 litres

Item	Waste stream	Waste types	Estimated quantity of waste per month per site
11.	Bulbs and fluorescent tubes	Fluorescent tubes & bulbs.	100 kg
12.	Medical/clinical	Sharps-including razor blades, dressings, expired medicines, mercury thermometers	
13.	Filters	Glycol filters, brine filters, water filters, oil filters.	200 kg
14.	Contaminated Wood	Pallets, crates, furniture	500 kg
15.	Spilled chemical residue	Chemical powders (drilling mud components, etc.).	Data Not Available
16.			
17.			

In order to manage the above types of wastes, the IWMF is envisaged to have the features described below.

3.6.11.1 Central field processing and transfer station

The central field processing and transfer station will be located at the Kapese ISB. Different types of wastes collected from various Tullow field locations in Blocks 10BB, 13T, 10BA and 12A will be brought by road transport for processing. The central field processing and transfer station is expected to have the following types of equipment for managing various types of wastes:

- Low impact shredders for paper and or plastic water bottles;
- Drum Crusher/compactors;
- Plastic compactor for products to be put into bails for removal to recycle facilities;
- Pelletizers;
- In vessel composters; and
- Incinerator with secondary burner (must meet Ringleman emissions) for hazardous wastes such as used oil.

The features of the central field processing and transfer station will include:

- Safe drop-off zones for waste skips with clear access paths;
- Pedestrian zones/PPE free zones;
- Clean and dirty defined areas, particularly for the hazardous waste areas;
- Suitable drainage including properly designed oil water separators;
- Waste container wash down area including wheel wash at exit point to ensure waste is not carried out of the IWMF;
- Trucks with self-loading skip hook;
- Waste container storage area (skips and waste bins) with containment covers such as elastic hold-down cargo nets which cover the top of skip loads;
- Pest control facilities; and
- Environmental controls for noise, nuisance odours, and dust generation.

3.6.11.2 IWMF design considerations

The IWMF must be designed for the long term needs of Tullow's exploration and appraisal program and beyond. Subsequently, a sustainable design will require the following criteria to be incorporated:

- The IWMF should contain an area where loaded skips can easily be dropped off and empty skips loaded onto trucks;
- The above drop off points and storage areas will be sheltered in order to prevent industrial waste from being scattered during high winds. The mechanism might include but not be limited to the installation of lockable covers and/or cargo nets;
- The roadways leading to/from the storage areas shall be safe and free of clutter;
- The storage area will be protected from rain and wind. Adequate lighting and utilities (power, water, compressed air), will be provided at the storage site. The storage area will be constructed as to not create a confined space;
- Storage locations will be actively managed and isolated from scavengers;
- Sufficient space will be available at the storage point to place empty skips when not in use;
- Collection vehicles and storage containers will be enclosed or will use appropriate cargo netting to prevent loss of contents;

- When not in use, the storage area shall remain locked. Only authorised personnel are granted an entry to/ from the hazardous storage area; and

- All staff working at the IWMF will be provided with appropriate personal protective equipment (PPE) including coveralls, safety boots, gloves, goggles and hardhat as a minimum. Note that PPE requirements will be determined by a risk assessment.

3.6.11.3 Waste collection and transportation

The waste will be collected from various Tullow exploration well sites and camp locations and transported to the IWMF at the Kapese ISB. Tullow's design of these facilities will take into consideration the location where waste is to be collected from by ensuring the following:

- The waste area is accessible to the trucks that will be collecting filled skips and dropping off empty ones;

- The waste collection point will be located in sheltered areas of a site to prevent wind blowing away wastes such as paper, plastics and polythene; and

- Prior to transporting them, all filled up skips or storage containers shall be covered or enclosed or will use cargo netting to prevent loss of contents.

3.6.11.4 Waste collection equipment and operational management

The successful Tullow waste service contractor will be required to invest in equipment such as waste collection trucks, waste containers (skips), and, recruit and train staff members to safely operate the IWMF.

The waste collection vehicles will be modern and fitted with (i) a fire extinguisher, (ii) shovel and broom for collecting any spilled waste, (iii) an audible back-up alarm, (iv) two-way communication facilities, and (v) a means of securing the load.

The industrial waste storage skips and the area of waste collection vehicles used to hold industrial waste will be watertight and prohibit spillage of any solids or liquid waste materials onto any exterior surface or the surrounding ground.

All lifting equipment fitted on the trucks will require examinations in accordance with the Plant Safety Rules promulgated under the Kenyan Occupational Safety and Health Act, 2007 (OSHA).

All employees and subcontractors employed by the service contractor will be competent and possess skills in their respective trades. The opportunities for employment will firstly be provided to the indigenous Turkana community. The service contractor will be required to have in place a skills transfer program to

transfer knowledge and skills to the local Turkana community on the care and management of the waste collection trucks.

3.6.12 Phase 2 master plan

The phase 2 master plan will include concept designs of the infrastructure associated with the ISB. Concept designs will be done for the following:

- Central power plant and distribution network;
- Central water treatment facility and distribution network;
- Wastewater treatment facility and distribution network;
- Integrated waste management facility;
- 800 man camp;
- Permanent security camp and facilities;
- Access roads and street lighting;
- Other contractor work areas and utility connections;
- Site drainage system;
- Site medical facility;
- Training facility;
- Additional office facility;
- Phase 2 ICT systems;
- Lightning protection system; and
- Earthing system.
- Terminal building at the airstrip
- Additional security.

3.7 Phase 2 activities

Phase 2 will provide facilities to support future E&A activities, early development works and production drilling activities. A detailed project

plan will be developed once there is a clear plan on the long-term development plans.

Conceptually, Phase 2 activities may include:

- 800 man camp (including a medical facility);
- Field office facility for 60 staff;
- 100 man long-term security camp;
- Field training centre;
- Work areas for services and development of early works;
- Integrated waste management facility;
- Wastewater treatment facility;
- Central power generation;
- Central fuel facility;
- Site roads and street lighting;
- Phase 2 site security.

3.8 Personnel requirements

According to the Tullow project implementation plan dated May 16th, 2014, given below is a brief description of the estimated manpower required for the Kapese project. Total manpower is assumed to be approximately **490 persons**. A breakdown of the personnel requirements is given below.

E&A Campaign 2014 to 2019 – 2 Drilling rigs and 1 work over rig based in the Lokichar Cluster. Drilling Crews and associated security to be located in the drill camps associated with the drilling rigs. Drilling services support (SLB, BHI, etc.) based at the Kapese Operations Base. Average number of service support for 3 rigs estimated at **200 persons**.

Security 2014 to 2019

The Kapese base camp will serve as the central security control point until the Operators camp is constructed at the CPF location. Security estimated

peak at the central base camp **100 persons** with 50 persons remaining at the base camp for the duration of its operation.

Tullow Field Operations Support 2014 to 2019

The Kapese base camp will serve as the central field control point until the Operators camp is constructed at the CPF location. Estimated peak at the central base camp **50 persons**

E&A Logistics Support 2014 to 2019

The Kapese base camp will serve as the central field logistics hub to support E&A and development drilling programmes. The central base camp will require material logistics personnel and a fleet of buses to transport personnel to worksites. Estimated peak at the central base camp **40 persons**.

Camp Staff 2014 to 2019

The Kapese base camp staff **30 persons**

Rig Move Personnel 2014 to 2019

The Kapese base camp will serve as the central rig move hub to support rig move drivers and personnel. Numbers will fluctuate but are estimated at **40 persons**.

Development Study & Survey Personnel 2014 to 2019

The Kapese base camp will serve as the central base for Development survey and study personnel & official visitors. Numbers will fluctuate but are estimated at between **20 & 30 persons**.

4 Relevant legislation and ESIA process

This section provides an outline of the applicable legislation and best practices that will be applicable to the Kapese ISB.

4.1 Constitution of Kenya, 2010

Environment and social sustainability is covered explicitly in the Constitution of Kenya, 2012. Clause 42 under the Bill of Rights of the Constitution of Kenya, 2010 provides *inter alia* that every person has a right to a clean and healthy environment. Clause 43 of the Constitution provides that every person in Kenya has economic and social rights.

Chapter 5 of the Constitution provides for the sustainable management of land and the environment in Kenya. Specifically, Clauses 69 – 72 deals with environmental management in Kenya and the proposed project will be conducted in accordance with these Clauses.

Clause 69(1)(f) of the Constitution requires the State to develop systems for environmental impact assessment. The State already has a system for environmental impact assessment in the form of the Environment Management and Coordination Act, 1999 (EMCA) and its subsidiary legislation titled Legal Notice 101: Environment (Impact Assessment and Audit) Regulations, 2003 (L.N. 101).

The Constitution of Kenya is applicable to the Kapese ISB as every person living in the country is entitled to a clean and health environment and the principle of public participation is a bill of right.

4.2 Environment Management and Coordination Act

The proposed project will be undertaken in accordance with relevant sections of the Environment Management and Coordination Act, 1999 (EMCA), specifically Clauses 58 – 63. These sections of the Act are operationalized by subsidiary legislation promulgated under the Act and specifically L.N. 101: Environment (Impact Assessment and Audit) Regulations, 2003.

The EMCA is a framework environmental law in Kenya. This Act (assented to on January 14, 2000) provides a structured approach to environmental management in Kenya. With the coming into force of the EMCA, the environmental provisions within the sectoral laws were not superseded; instead the environmental provisions within those laws were reinforced to better manage Kenya's ailing environment.

4.2.1 L.N. 101: EIA/EA Regulations 2003

On June 13th 2003, the Minister for Environment and Mineral Resources promulgated Legal Notice 101: Environment (Impact Assessment and Audit) Regulations, 2003 as provided for under section 147 of the EMCA. These regulations provide the framework for undertaking EIAs and EAs in Kenya by NEMA licensed Lead Experts and Firm of Experts.

An EIA or EA Study in Kenya is to be undertaken by a Kenyan duly licensed by the NEMA. The EIA/EA Regulations also provide information to project proponents on the requirements of either an EIA or EA as required by the EMCA.

The proposed project is subject to relevant provisions of these regulations and subsequently, this ESIA Study has been undertaken in accordance with the appropriate requirements.

4.2.2 L.N. 120: Water Quality Regulations, 2006

This regulation was promulgated on September 4th 2006 and became effective on July 1st 2007. The regulation provides for the sustainable management of water used for various purposes in Kenya. For industries in Kenya, the regulation requires that Proponents apply for an "Effluent Discharge License" annually for discharging process wastewater either into the environment, aquatic environment or public sewers.

For effluent discharges into the environment and aquatic environment, a Proponent needs to apply directly to the NEMA. For discharges into public sewers, a Proponent needs to apply for the license to the relevant county. The regulation contains discharge limits for various environmental parameters into public sewers and the environment.

These regulations will apply to the proposed project during the construction and operational phases respectively. Each contractor will be required to ensure that all effluent from construction activities is treated in accordance with the above regulations prior to discharge into the environment.

During the operational phase, Tullow will be required to apply for an Effluent Discharge License (EDL) from NEMA to discharge wastewater into the environment. It will be the responsibility of Tullow to ensure that each contractor working at the Kapese ISB complies with NEMA wastewater discharge standards.

4.2.3 L.N. 121: Waste Management Regulations, 2006

The Waste Management Regulations were promulgated on September 4th 2006 and became effective on July 1st 2007. This regulation is comprehensive and covers the management of various kinds of waste in Kenya. Generally it is a requirement under the regulations that a waste generator segregates their waste (hazardous and non-hazardous) by type and then disposes the wastes in an environmentally acceptable manner.

Under the regulation, it is a requirement that waste is transported using a vehicle that has an approved "Waste Transportation License" issued by NEMA. Wastes generated in Kenya must be disposed off in a licensed disposal facility. Such a facility will require annual environment audits to be undertaken by NEMA registered Lead Experts.

It is further a requirement under the regulation for a Proponent to install at their premises anti-pollution equipment for treatment of various types of wastes. The treatment options shall be approved by the NEMA in consultation with the relevant lead agency.

The regulation contains definitions of hazardous wastes in the Fourth Schedule. The regulation requires that prior to generating any hazardous waste, a Proponent shall undertake an EIA Study and seek approval from the NEMA.

Labeling of hazardous wastes is mandatory under the regulation and the specific labeling requirements are provided in Rule 18. The treatment options for hazardous waste disposal provided in Rule 19 include incineration or any other option approved by the NEMA.

During the construction and operational phases respectively, the proposed project may generate various types of wastes. For the most part, it is expected that the wastes will be non-hazardous in nature and can be disposed off in accordance with the above regulations. If however any hydrocarbons such as petroleum products (fuels, waste oil, hazardous chemicals, etc.) come into contact with soils, then the contaminated soils will be disposed off in an ESM in accordance with the regulations.

4.2.4 L.N. 61: Noise and Excessive Vibration Control Regulations, 2009

In May 2009, the Minister for Environment and Mineral Resources promulgated the above regulations for management of **environmental noise** and excessive vibration as shown in Table 4. The general prohibition states that no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment.

The regulations further provide factors that will be considered in determining whether or not noise and vibration is loud, unreasonable, unnecessary or unusual. For fixed installations, excessive vibration under these regulations is defined as any vibration emanating from the source and exceeds 0.5cm/s at 30m from the source.

Rules 13 and 14 of the regulations define the permissible noise levels for construction sites and are reproduced below. These noise limits will be applicable to the proposed project.

Table 4 : Maximum permissible noise levels-construction phase

Facility		***Maximum noise level permitted (L_{eq}) in dB(A)***	
		Day	***Night***
i).	Health facilities, educational institutions, homes for the disabled, etc.	60	35
ii).	Residential	60	35
iii).	Areas other than those in (i) and (ii) above	75	65

Time frame:

Day: 6.01 am – 8:00 pm (L_{eq}, 14 hours)

Night: 8:01 pm – 6:00 am (L_{eq}, 10 hours)

Rules 5 and 6 of the regulations define noise levels for various types of activities that generate noise. The First Schedule to the regulations defines permissible noise levels to be complied with during the operational phase of a project and is reproduced in Table 5 below.

Table 5: Maximum permissible noise levels-operational phase

Zone		Sound Level Limits (dBA) (Leq, 14h)		Noise Rating Level (NR) (Leq, 14h)	
		Day	Night	Day	Night
	Silent Zone	40	35	30	25
	Places of Worship	40	35	30	25
	Residential: Indoor Outdoor	 45 50	 35 35	 35 40	 25 25
	Mixed residential (with some commercial and places of entertainment)	55	35	50	25
	Commercial	60	35	55	25

Time frame:

Day: 6.01 am – 8:00 pm (L_{eq}, 14 hours)

Night: 8:01 pm – 6:00 am (L_{eq}, 10 hours)

The regulation further stipulates that a permit will be required during the construction and operational phase of a project if there will be equipment that will produce noise during this phase of the project.

Based on the nature of activities at the Kapese ISB, it is not envisaged that noise levels will exceed the limits given in this regulation. However, if any Tullow appointed contractor expects to generate noise levels in excess of the limits given in the table above, that contractor shall apply for a noise permit from NEMA for the duration of exceedance. The fourth schedule of the regulations contains details of the application for a noise license while the fifth schedule provides a description of the noise permit that the NEMA will grant the main contractor.

4.2.5 Licenses and Permits required under the EMCA

The subsidiary legislation under the EMCA is partially monitored through the use of permits and licenses. Subsequently all licenses and permits required during the construction phase shall be the responsibility of the individual contractors and their agents working on behalf of Tullow. During the operational phase, all permits and licenses required to operate the project will be the responsibility of the Proponent.

The subsidiary legislation under the EMCA requires some or all of the following types of permits to be available for inspection during the construction and operational phases of the project:

- Effluent Discharge License under Legal Notice 120: The Environment Management and Coordination (Water Quality) Regulations 2006;
- Waste Transport License under Legal Notice 121: The Environment Management and Coordination (Waste Management) Regulations 2006 for disposal of all types of wastes; and
- Noise Permit under Legal Notice 61: The Environment Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009.

4.3 Occupational Safety and Health Act, 2007

The OSHA was enacted to provide for the health, safety and welfare of persons employed in workplaces, and for matters incidental thereto and connected therewith.

Part II of the Act provides the General Duties that the Occupier must comply with respect to health and safety in the workplace. Such duties include undertaking S&H risk assessments, S&H audits, notification of accidents, injuries and dangerous occurrences, etc. A number of sections under this part shall be applicable to the proposed project.

Part IV deals with the enforcement provisions that DOSHS has under the Act. It discusses the instances when Improvement and Prohibition Notices can be issued as well as the powers of OSH officers. This part of the Act will be mandatory for the Occupier to comply with for the proposed project.

Part V of the Act requires all workplaces to be registered with the DOSHS. This part will be applicable for the proposed project as the Occupier will have to apply for registration of their project with the DOSHS on

completion of the construction phase and before the operational phase of the project.

Part VI of the Act lists the requirements for occupational health provisions which include cleanliness, ventilation, overcrowding, etc. This section of the Act will apply to the Occupier during the operational phase of the project.

Part VII of the Act contains provisions for the safe operation of machinery and includes all prime movers and transmission equipment. Additionally this part includes the safe operation of cranes, chains, ropes, lifting tackles, pressure vessels and their statutory examination by DOSHS Approved Persons. This part of the Act will apply to the proposed project during the construction and operational phases respectively.

Part VIII of the Act contains provisions for general safety of a workplace especially fire safety. This part of the Act will apply to the proposed project during the design, construction and operational phases respectively of the project.

Part IX of the Act deals with Chemical Safety. This will be applicable to the proposed project as it will receive, store, handle and distribute materials such as petroleum fuels, lubricants, chemicals, etc. The Occupier will be required to have MSDS sheets for all hazardous materials handled in the workplace including labeling of all receptacles containing such hazardous materials.

Part X of the Act deals with the General Welfare conditions that must be present during the construction and operational phase of the project. Such conditions include first aid facilities, supply of drinking water, accommodation for clothing, ergonomics, etc.

Part XI of the Act contains Special Provisions on the management of health, safety and welfare. These include work permit systems, PPE requirements and medical surveillance. Some sections of this part of the Act will be applicable to the proposed project during the construction and operational phase.

Part XIII of the Act stipulates various fines and penalties associated with non-compliance with the Act. It includes those fines and penalties that are not included in other sections of the Act and will be important for the Occupier to read and understand the penalties for non-compliance with S&H provisions.

Part XIV of the Act is the last section of the Act and contains miscellaneous provisions which are not covered elsewhere in the Act. Some sections under this part of the Act will be apply to the proposed

project and it is in the interest of the Occupier to read, understand and ensure compliance with it.

The proposed project will be undertaken in compliance with the Occupational Safety and Health Act, 2007 (OSHA) during the construction and operational phases respectively.

During the construction phase, each contractor will be required to fully comply with the requirements of Legal Notice 40 titled: Building Operations and Works of Engineering Construction Rules, 1984 (BOWEC). Each contractor will develop and implement a formal construction health and safety plan for the entire construction phase duration in alignment with the BOWEC, OSHA and international health and safety best practices.

In accordance with the OSHA requirements, Tullow is in the process of registering the Kapese ISB as a workplace. Some of the important subsidiary legislation which operationalizes the Act and is applicable to the proposed project is described below.

4.3.1 L.N. 31: The Safety and Health Committee Rules 2004

These rules came into effect on April 28th, 2004 and require that an Occupier formalize a Safety and Health (S&H) Committee if there are a minimum of 20 persons employed in the work place. The size of the S&H Committee will depend on the number of workers employed at the place of work.

For the Proponent and Contractor, the OSHA and the S&H Committee Rules 2004 are important as they require compliance with the following measures:

- Posting of an Abstract of the Factories and Other Places of Work Act in key sections of each area of the factory or other workplace;
- Provision of first aid boxes in accordance with Legal Notice No. 160 of 1977;
- Ensuring that there are an appropriate number of certified first aiders trained by an approved institutions and that the certification of these first aiders is current;
- Provision of a General Register for recording amongst other things all incidents, accidents and occupational injuries;
- Appointment of a S&H Committee made up of an equal number of members from management and workers based on the total number of employees in the workplace;

- Training of the S&H Committee in accordance with these rules;
- Appointment of a S&H management representative for the Proponent;

The S&H Committee must meet at least quarterly, take minutes, circulate key action items on bulletin boards and may be required to send a copy of the minutes to the DOSHS provincial office.

Appropriate recordkeeping including maintenance of all current certificates related to inspection of critical equipment such as cranes, air compressors, lifts, pulleys, etc. Such inspections need to be undertaken by an approved person registered by the Director of the DOSHS.

4.3.2 L.N. 24: Medical Examination Rules 2005

These rules provide for Occupiers to mandatorily undertake pre-employment, periodic and termination medical evaluations of workers whose occupations are stipulated in the Second Schedule of the OSHA and the First Schedule of the above Regulation. Workers that fall under the above two schedules are required to undergo medical evaluations by a registered medical health practitioner duly registered by the DOSHS.

It will be incumbent on the EPC Contractor to ensure that Material Safety Data Sheets (MSDSs) for chemicals used in the construction phase are studied for toxicological and epidemiological information and workers trained on their safe handling, use and disposal. If any of these products present negative impacts to human health, the workers exposed to the chemicals will be required to undergo medical examinations in accordance with the above Rules.

4.3.3 L.N. 25: Noise Prevention and Control Rules 2005

These rules were promulgated on March 10th 2005 for **occupational noise** exposures and apply to workplaces in Kenya. The regulation is applicable to the project as there will be noise potentially generated by construction equipment that may exceed the permissible occupational noise levels given below.

The rules set the permissible level for occupational noise in any workplace (which includes construction sites) as follows:

- 90 dB(A) over an 8-hour TWA period over 24-hours; and
- 140 dB(A) peak sound level at any given time.

Additionally the rules set permissible limits for community noise levels emanating from a workplace as follows:

- 50 dB(A) during the day; and
- 45 dB(A) at night.

If noise levels exceed the above permissible levels, the Occupier is required to develop, rollout and implement a written hearing conservation program which should include the following sections as a minimum:

- Undertaking a Noise Level Survey;
- Education and training of persons affected by excessive noise;
- Engineering noise control methods;
- Hearing protection requirements;
- Posting of notices in noisy areas;
- Audiometric testing methods and frequencies for those exposed to high noises; and
- Annual program review.

The Proponent is to ensure that any equipment brought to a site in Kenya for use shall be designed or have built-in noise reduction devices that do not exceed 90 dB(A). The Proponent shall request the supplier of the machine or equipment for its noise characteristics.

There is also a requirement for a Proponent to medically examine those employees that may be exposed to continuous noise levels of 85 dB(A) as indicated in Regulation 16. If found unfit, the occupational hearing loss to the worker will be compensated as an occupational disease.

It is expected that during the construction phase of the project, there may be plant and equipment that exceeds the threshold levels of noise stipulated under the Rules. It will therefore be incumbent on each contractor and their sub-contractors to ensure that their equipment is serviced properly and/or use equipment that complies with the threshold noise values given above. Alternatively each contractor will be required to develop, rollout and implement a written hearing conservation program during the construction phase.

4.3.4 L.N. 59: Fire Risk Reduction Rules, 2007

These rules were promulgated by the Minister for Labor on April 16th 2007 and apply to all workplaces. A number of sections of the rules apply to the proposed project as enumerated below.

Regulation 5 requires Proponents to ensure that fire resistant materials are used for construction of new buildings. A number of minimum specifications of materials are provided in this rule.

Regulation 6 requires that all flammable materials be stored in appropriately designed receptacles.

Regulation 7 requires that all flammable storage tanks or flammable liquid containers be labeled with the words “Highly Flammable” in English or Kiswahili. It is therefore practical for the Proponent to use a system similar to the Hazardous Material Identification System (HMIS) of labeling their product containers. The regulation requires a Proponent to consult the product’s MSDS for appropriate labeling requirements.

Regulation 8(3) requires a Proponent to have a Spill Prevention, Control and Countermeasures plan (SPCC). This may be important if there will be chemicals stored at the refueling area.

Regulation 16 requires Proponents to ensure that electrical equipment is installed in accordance with the respective hazardous area classification system. It is also a requirement that all electrical equipment is inspected 6-monthly by a competent person and the Proponent is required to keep records of such inspections.

Regulation 22 provides a description of the functions of a fire-fighting team. Regulation 23 requires Proponents to mandatorily undertake fire drills at least once a year.

Regulation 33 requires Proponents to have adequate fire water storage capacity. As a minimum this regulation requires Proponents to have at least $10m^3$ of dedicated fire water storage capacity.

Regulation 34 requires Proponents to develop, rollout and implement a comprehensive written Fire Safety Policy. This policy should contain a Fire Safety Policy Statement signed by the CEO, a Fire Safety Policy Manual and a brief summary of the Fire Safety Policy of the company.

Regulation 35 requires a Proponent to notify the nearest OSH area office of a fire incident within 24 hours of its occurrence and a written report sent to the Director of DOSHS within 7 days.

4.3.5 L.N. 60: Hazardous Substances Rules, 2007

These rules were promulgated by the Minister of Labor on April 16th 2007 and will apply to the proposed project as workers may potentially be exposed to chemicals that can potentially be hazardous to occupational health.

The Rules state that the Proponent shall ensure that where chemicals come into contact with employees, the exposure limits set out in the First Schedule of the Regulations are not exceeded. Where employees may be exposed to two or more chemicals in the workplace the Proponent shall work out the combined exposure using the narrative given in the Second Schedule of the Regulations. The Minister of Labor is empowered to change the exposure limits given in the First Schedule of the Regulations.

It is the responsibility of the Proponent to ensure that all employees exposed to chemicals in the workplace are protected adequately from exposure to hazardous substances that may be present using the hierarchy of hazard control methods. Such methods include elimination of the chemicals, substitution of the chemicals with less hazardous ones, engineering controls, administrative controls, use of PPE and emergency response planning. If engineering controls are applied, the Proponent will undertake the maintenance and testing of the engineering controls once every 24 months using a DOSHS approved Engineering Controls Examiner who will submit his report to the Director DOSHS within 30 days.

Regulation 12 – 15 requires Proponents to have a chemical safety program developed and implemented at their workplace if chemicals will be stored and handled. The Proponent is required to maintain an inventory of all MSDSs for the chemicals stored and handled in their workplace. As a minimum, the MSDS shall comply with the format indicated in the Third Schedule of the Regulations and will be disclosed fully to the employees handling the chemical. All unused, obsolete or expired chemicals must be disposed off in an environmentally sound manner. All containers containing chemicals must be labeled appropriately as indicated in the MSDS for that chemical. Training of employees on the hazards associated with handling chemicals safely in the workplace will be provided at the Proponent's cost.

Regulation 16 requires the Proponent to monitor chemical exposure levels in the workplace annually by engaging a DOSHS registered Air Quality Monitor. The cost of the exposure monitoring survey will be borne by the Proponent. The Air Quality Monitor shall submit a report to the DOSHS Director within 30 days.

Regulation 19 requires Proponents that use hazardous chemicals in the workplace to subject those employees to medical examinations in accordance with the requirements of Legal Notice 24: The Factories and Other Places of Work (Medical Examination) Rules 2005.

4.4 Public Health Act, Cap 242

The Public Health Act was promulgated for securing the health of workers and communities working around projects. It came into force on September 6th, 1921 and has been revised several times with the latest revision being done in 1986.

Part IV-A: General Provisions of the Act deals with the prevention and suppression of infectious diseases and certain sections of this part will be applicable to the project.

Part IX of the Act deals with the governance of sanitation and housing associated with a project. Certain sections of this part will be applicable to the project during the construction phase of the project.

4.5 Water Act, 2002

Under the Water Act, the principle requirement for the Proponent will be to apply for a water abstraction permit from the relevant water services board and pay the requisite licensing fees. This will be applicable as the project will require water for construction and operational purposes.

4.6 Other important legislation

The above sections highlight some of the principal Acts in Kenya that the proposed project will require to be in compliance with. The outline of legislation provided in the above sections is not exhaustive and it is possible that there may be other laws and regulations that the proposed project may need to comply with. Subsequently, the Proponent and Contractor must err on the safe side by ensuring that a legal risk assessment is carried out before commencement of the project to ensure that any Acts not listed above and which are important, are complied with and the necessary permits applied for prior to the construction phase of the project.

4.7 Legislation and guidelines that have informed the preparation of the EIA report

From the foregoing, the following legislation has informed the scope and content of this ESIA Study:

- Environment Management and Coordination Act, 1999
- Environment (Impact Assessment and Audit) Regulations, 2003
- Environment Management and Coordination (Water Quality) Regulations, 2006
- Environment Management and Coordination (Waste Management) Regulations, 2006
- Environment Management and Coordination (Noise and Excessive Vibration Pollution) Regulations, 2006
- Occupational Safety and Health Act, 2007 and its subsidiary legislation.
- Public Health Act;
- Water Act, 2002 and the Water Resource Management Authority (WRMA) Rules, 2006;

4.8 Project environmental standards

4.8.1 Tullow EHS Standards Framework

Tullow has developed an EHS Standards framework which applies across Tullow activities and operations worldwide. The standards describe the framework of EHS documentation, including vision, policy, standards and procedures including minimum EHS standards to support the development and implementation of EHS related processes across Tullow.

Within these standards, Tullow specifically has a standard called Environmental and Social Management. This standard requires each Tullow operating entity to internalize the following environmental and social aspects in all activities and operations:

- Biodiversity;
- Greenhouse gases
- Resource management; and
- Socio-economic

Subsequent to the above, the proposed Kapese ISB will be operated in accordance with the above standards and each contractor will be required to demonstrate their conformance.

4.9 Approach to undertaking the ESIA Study

4.9.1 Objectives of the EIA

Under the Second Schedule of the EMCA, an EIA is mandatory for a project that is outside the character of its surroundings. The purpose of an EIA is to provide information to regulators, the public and other stakeholders to aid the decision-making process. The objectives of an EIA are to:

- Define the scope of the project and the potential interactions of project activities with the environment (natural and social);
- Identify relevant national and international legislation, standards and guidelines and to ensure that they are considered at all stages of project development;
- Provide a description of the proposed project activities and the existing environmental and social conditions that the project activities may interact with;
- Predict, describe and assess impacts that may result from project activities and identify mitigation measures and management actions to avoid, reduce, remedy or compensate for significant adverse effects and, where practicable, to maximize potential positive impacts and opportunities; and
- Provide a plan for implementation of mitigation measures and management of residual impacts as well as methods for monitoring the effectiveness of the plan.

4.9.2 Approach to the EIA Study

The approach taken in this study is guided by the principles of integrated environmental management. The approach is therefore guided by the principles of transparency which is aimed at encouraging decision making. The underpinning principles of integrated environmental management are:

- Informed decision making;
- Accountability for information on which decisions are made;
- A broad interpretation of the word “environment”;
- Consultation with stakeholders;
- Due consideration of feasible alternatives;
- An attempt to mitigate negative impacts and enhance positive impacts associated with the proposed project;
- An attempt to ensure that social costs of the development proposals are outweighed by the social benefits;
- Regard to individual rights and obligations;
- Compliance with these principles during all stages of planning, implementation and decommissioning of the proposed development; and
- Opportunities for public and specialist input in the decision making process.

The study has also been guided by the requirements of the EIA Regulations set out in terms of the Environment Management and Coordination Act, 1999 (EMCA).

The EIA process consists of two phases namely the Environment Project Report (EPR) phase and the detailed Environment and Social Impact Assessment phase. The overall aim of the Environment Project Report (EPR) phase (scoping study) was to determine whether there are environmental issues and impacts that require further investigation in the EIA.

4.9.3 Scoping

The proposed project was registered by submitting the EPR Study to NEMA on October 2nd, 2014 and having registration number NEMA/PR/5/2/12994. The EPR Study was approved and permission for submission of the ESIA Study was given on October 23rd, 2014.

The objectives of the EPR phase are to:

- Develop a common understanding of the proposed project with the authorities and stakeholders;
- Identify stakeholders and engage them on the proposed project and processes;
- Provide stakeholders with the opportunity to participate in the process and identify issues and concerns associated with the proposed project;
- Identify potential environmental impacts that will require further study in the impact assessment phase of the EIA process; and
- Develop a terms of reference (TOR) for conducting the EIA Study.

The range of specialist studies undertaken during the EIA phase were informed by the issues identified in the final Environment Project Report (EPR) Study. The specialist studies and experts used are listed in Table 6. Results from these studies have been incorporated into the EIA Study, particularly into the description of the affected environment and impact assessment.

Table 6: List of Specialist Studies undertaken as part of the EIA Study

Specialist Study	Specialist	Appendix in Volume II of this ESIA Study
Ecology	Mr. Geoffrey Mwangi	Appendix A
Social impact assessment	Ms. Hottensia Kabuki	Appendix B
Cultural Heritage impact assessment	Dr. Freda Nkirote	Appendix C

The activities that have been conducted thus far as part of the EIA process include:

- Hosting public consultation meetings, focus group discussions and key informant interviews with communities surrounding the Kapese ISB and to engage those affected by the project on potential environmental and social issues;
- Preparation of the Environment Project Report for submission to the NEMA for consideration;
- Appointment of environmental and social specialists and completion of specialist study report;
- Undertaking baseline data collection of various environmental and social parameters between August and October 2014;

- Compilation of an Environment and Social Impact Assessment (EIA) Study Report including incorporation of comments raised by stakeholders, specialist studies and an Environment Management Plan (EMP); and
- Submission of the Final EIA Study Report to the NEMA for onward distribution to other lead agencies associated with the proposed project for consideration.

4.9.4 Baseline Data Collection

For the EIA, baseline data was obtained from the following sources.

- Tullow project related information including EPR Study for the project; Phase I Project Implementation Plan; input from stakeholders; and published sources on the internet; and
- Appropriate baseline surveys conducted between August and October 2014 to characterize the baseline environment.

4.9.5 Public/stakeholder engagement

A total of nineteen stakeholder consultation meetings were held over a period of about 7 days between July 14th and 21st, 2014. The meetings were held in Nairobi, Lodwar and within villages affected by the project.

Issues and response reports were generated for each of the meetings and have been incorporated in the environmental and social impact assessment section of this report.

The public/stakeholder meetings were conducted to ensure that stakeholder engagement was undertaken in an inclusive manner and provided important input to the EIA process. The objective of engagement is to ensure that sources of existing information and expertise are identified, legislative requirements are met and that stakeholder concerns and expectations are addressed.

4.9.6 Key issues raised during stakeholder consultations

Public/stakeholder meetings form an integral part of the ESIA process; subsequently various types of meetings were held with respect to the proposed project. These included stakeholder meetings with politicians and other community members, focus group meetings with the youth and women and one-on-one meetings.

Some of the issues raised by the public include:

- Economic issues (employment, economic benefits, etc.);
- Ecological issues (impacts on terrestrial ecology);
- Health, safety and security arising from the operation of the new project; and
- Social issues (conflicts over job opportunities, disruption of infrastructure and services, etc.).

These issues informed the specialist studies and the detailed environmental assessment.

4.9.7 Impact Assessment

The impact assessment process followed four steps namely:

(1) Identification and prediction of potential environmental and social impacts as a consequence of project activities.

(2) Evaluation of the importance and significance of the impact using a matrix.

(3) Development of mitigation measures to manage significant impacts where practicable.

(4) Evaluation of the significance of the residual impact.

The impact assessment considered both predictable and unpredictable impacts (such as accidents). Impacts were assessed as either significant or not significant; those that were assessed as significant were further rated as being of minor, moderate or major significance. For significant impacts, mitigation measures were developed to reduce the residual impacts to as low as reasonably practicable (ALARP) levels. This approach took into account the technical and financial feasibility of mitigation measures.

4.9.8 Environment management plan (EMP)

The purpose of the EMP is to ensure that social and environmental impacts, risks and liabilities identified during the EIA process are effectively managed during the construction, operations and closure of the proposed project. The EMP specifies the mitigation and management measures to which the Proponent is committed, and shows how the Project will mobilize organizational capacity and resources to implement these measures. It also shows how management measures aimed at mitigation and enhancement will be scheduled.

Best practice principles require that every reasonable effort be made to reduce and preferably to prevent negative impacts, while enhancing positive benefits, especially within the communities most directly affected by the proposed project. These principles have guided the EIA process. For the proposed project, potential negative impacts will be avoided through careful design.

The EMP is a key product of the EIA process and is generated based on management and/or mitigation measures that will be taken into consideration to address impacts during the planning and design, pre-construction and construction activities, and operations, as necessary.

The EMP is a living document that will be periodically reviewed and updated. It may be necessary to update the version presented in this EIA Study during the detailed design phase, prior to the commencement of construction.

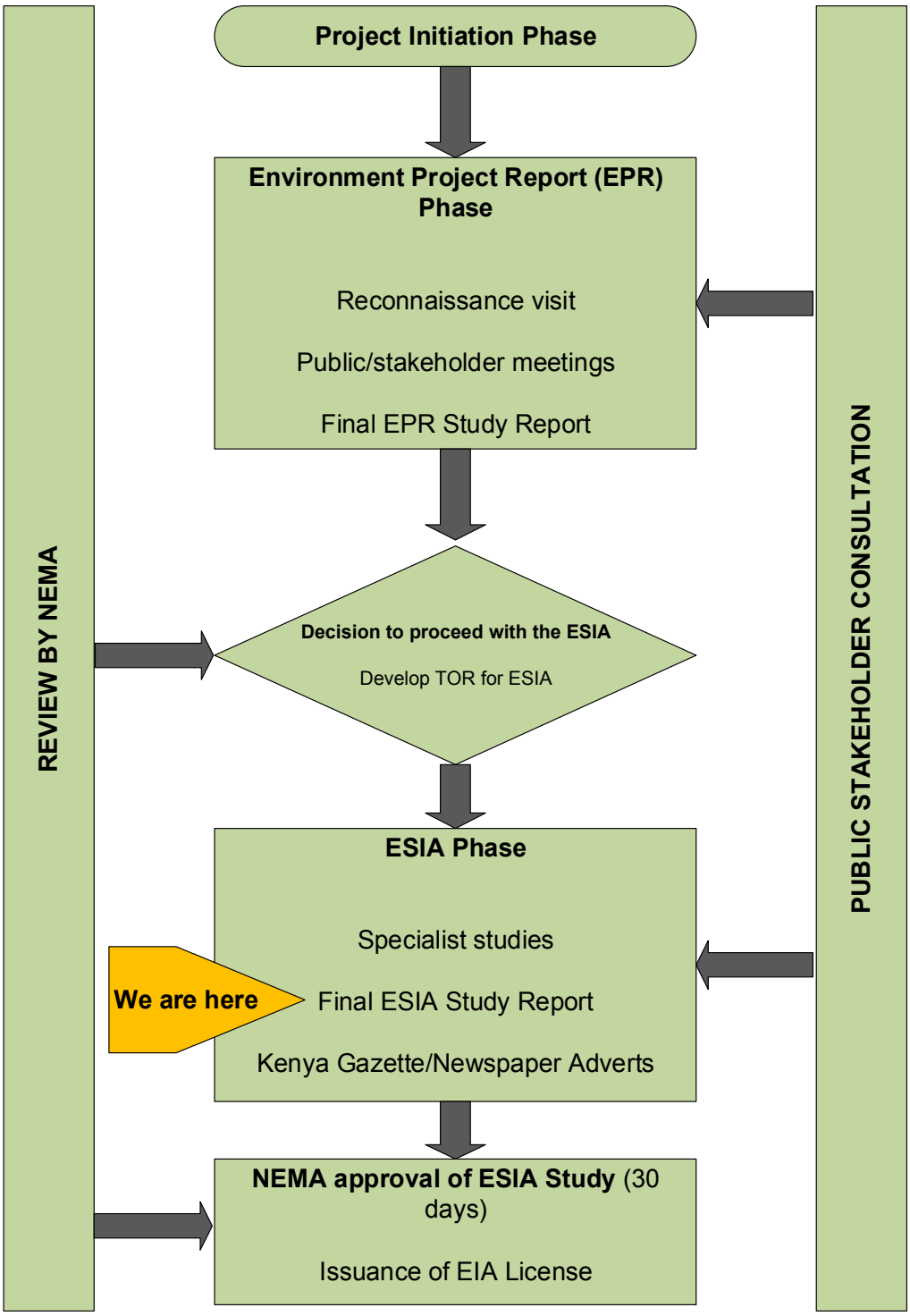
Responsibility for the EMP will reside in the Proponent's Resident Engineer for the project, but there will be links with other functional clusters in areas such as operation and maintenance services.

4.9.9 Reporting and Disclosure

The EIA process and outcomes are drawn together into an ESIA Study which will be submitted to NEMA for review. In accordance with Kenya EIA requirements, NEMA is expected to disclose the ESIA Study to the public for review and comment for a period of 30 days. NEMA will base the decision to grant or deny the EIA License for the project on the outcome of the review process.

Figure 36 shows schematically the various elements which comprise the EIA process for the proposed project and the sequence in which they occur.

Figure 36: The Environment Impact Assessment Process



5 Public/stakeholder consultation process

Public/stakeholder consultation forms a key component of the EIA process and the public participation undertaken so far has already resulted in the identification of a number of issues.

The objectives of the public/stakeholder consultation are outlined below, followed by a summary of the approach and the issues raised by the public to date.

- Identify and notify Interested and Affected Parties (I&APs) of the proposed development;
- Provide I&APs the opportunity to comment on the proposed activity and to raise issues and concerns; and
- Document I&AP issues and concerns.

This section provides an overview of the public/stakeholder consultation undertaken as part of the EIA process for the proposed development. Due to the nature and location of the project, the public/participation was limited, but still aimed to achieve the objectives of a comprehensive process.

To achieve these objectives, the tasks outlined below were undertaken by Tullow and KTL.

5.1 Identification of interested and affected persons

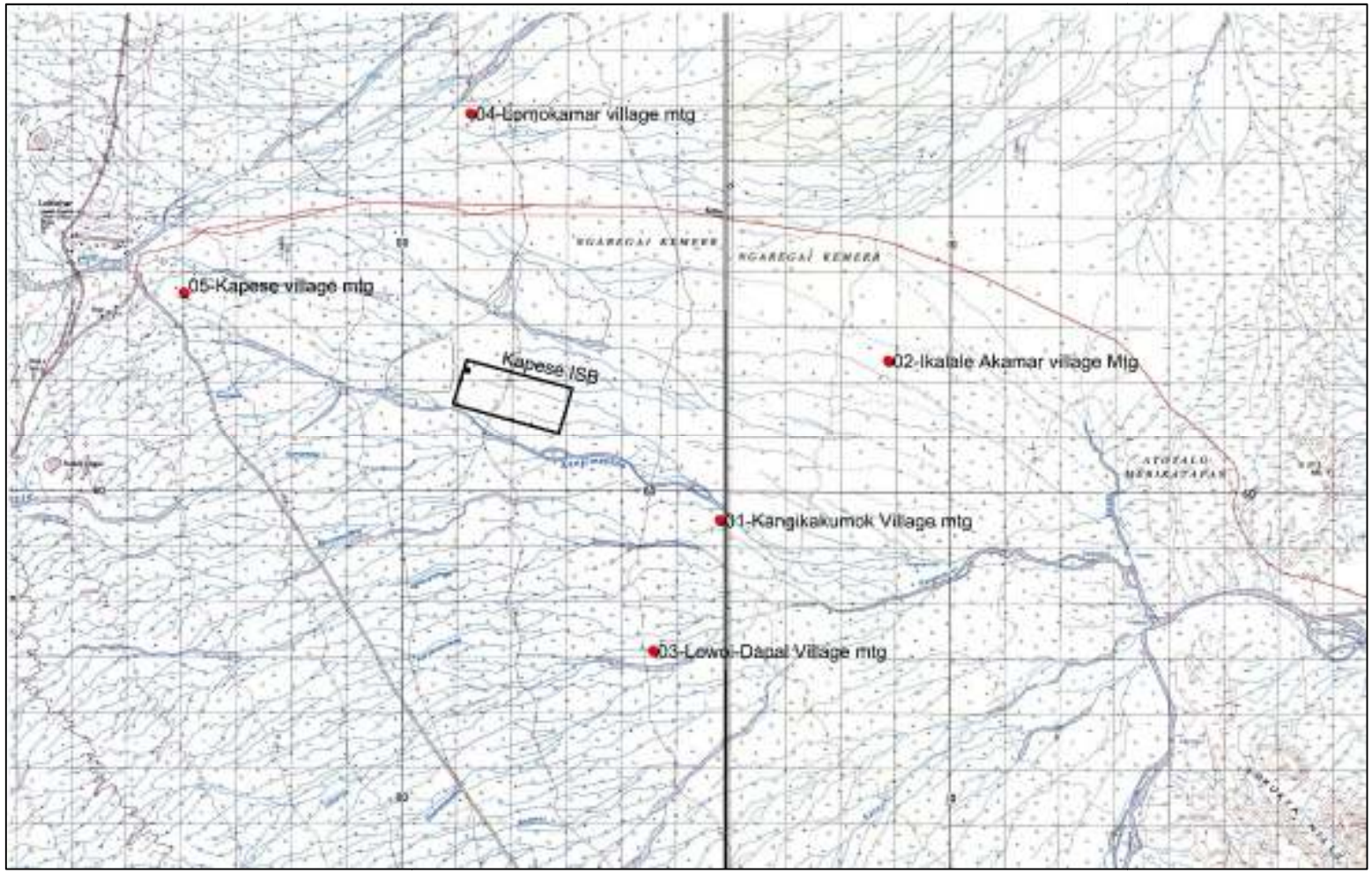
As part of its processes, Tullow undertook a social risk assessment study of the area surrounding the Kapese ISB in June 2014. The process involved meeting with council of elders, area chief, assistant chief, ACS Community Committee, civil society, the church, heads of different departments in Lokichar, member of parliament, the deputy county commissioner's office, member of county assembly and community members.

The above process yielded that there are about five villages in proximity of the Kapese ISB that are defined as interested and affected parties (I&APs). A map showing the locations of the villages around the project site is given in Figure 37.

Additionally, Tullow had already identified the political leadership in Turkana as I&APs; these included the County Government including the

Governor, County Executives and Members of the County Assembly, County Commissioner, Senator(s) and Members of Parliament (MPs).

Figure 37: Image showing location of villages around the Kapese ISB



5.2 Notification of the project

Tullow has a strong presence of its social performance team in the South Lokichar area. There are several Community Liaison Officers (CLOs) that Tullow has employed on a full-time basis to implement the social performance program on the ground.

Tullow's social performance team at the head office in Nairobi worked closely with their CLOs and Operations Managers on the ground to notify stakeholders of the proposed Kapese ISB project.

Based on the identification of I&APs, the Tullow social performance team in Nairobi was able to notify the Turkana political leadership, County Government, County Assembly, County Commissioner, and the community about the Kapese ISB. Both formal and informal means were used to notify the stakeholders about the project.

5.3 Background Information Document

KTL produced a hard copy Background Information Document (BID) in English and distributed it to all I&APs that were interested in receiving it. The BID briefly describes the proposed project and explains the EIA process.

5.4 Public meetings

A number of public/stakeholder consultation meetings were held on July 14th – 21st, 2014. The meetings held are given in Table 7.

Table 7: Table showing meeting dates venues and stakeholders

Meeting date	Description of stakeholder and venue
July 14th, 2014	Focus Group Discussion with MPs, Senators, Women's Representative in Nairobi
July 15th, 2014	Focus Group Discussion with Turkana County Government in Lodwar
July 16th, 2014	One-on-one meeting with NEMA in Lodwar
	One-on-one meeting with Ministry of Water in Lodwar

Meeting date	Description of stakeholder and venue
	Focus Group Discussion with the County Assembly in Lodwar
July 17th, 2014	Focus Group Discussion with the Sub-county leadership at the Kapese ISB
July 18th, 2014	Focus Group Discussion with the Council of Elders at the Kapese ISB
	Focus Group Discussion with the Youth at the Kapese ISB
	Focus Group Discussion with the Women at the Kapese ISB
July 19th, 2014	Public meeting with ACS employees at the Kapese ISB
	Public meeting at Kangikakumok village
	Focus Group Discussion with Women at Ikalale Kamar village
	Focus Group Discussion with Men at Ikalale Kamar village
July 20th, 2014	Public meeting with Elders and Youth at Lowoi Dapal Village
	Focus Group Discussion with Women at Lowoi Dapal Village
	Public meeting with Elders and Youth at Lomokamar village
	Focus Group Discussion with Women at Lomokamar village
July 21st, 2014	Public meeting with Elders and Youth at Kapese Village
	Focus Group Discussion with Women at Kapese Village

At each meeting, the presentation introduced the project to those in attendance, enabled I&APs the opportunity to discuss their perceptions

about the potential environmental and social impacts, as well as afford them the opportunity to discuss/highlight/raise any concerns or issues that they have with regards to the project with the ESIA team.

5.5 Distribution of EPR Study for comments

The draft EPR Study was submitted to Tullow for review and comments on October 4th, 2014; Tullow reverted on the study with their comments on October 6th, 2014.

The Final EPR Study was submitted to NEMA for a decision on whether the project may proceed to the Assessment Phase on October 23rd, 2014. No comments were received after submission of the Final EPR Study and NEMA gave the go ahead for the ESIA phase to begin on November 28th, 2014.

5.6 Distribution of ESIA Study for comments

The draft ESIA Study was submitted to Tullow on December 19th, 2014 for review and comments; Tullow reverted with their comments on January 5th, 2015.

The Final ESIA Study was submitted to NEMA on January 7, 2015 for consideration. NEMA will provide the documentation for the advertisements to be placed by Tullow in the Kenya Gazette and Newspaper of national circulation on one weekday a week for two consecutive weeks seeking the views and comments from the public about the Kapese ISB.

The public review period is expected to be 30 days from the date Tullow places the first advertisement in the newspaper. Any comments arising from a public review of the ESIA Study will be addressed by KTL and relevant responses provided to satisfy NEMA.

6 Nature of the affected environment

Situated in the north-western corner of Kenya, Turkana County has three international borders with Ethiopia, Sudan, and Uganda; nationally, it borders Samburu, Baringo and West Pokot counties respectively. It is the largest county in Kenya covering an area of 77,000km^2, which is about 42% of the area in the Rift Valley province.

Politically, the Kapese ISB falls within Lokichar sub-county (area~2913km^2) of Turkana South constituency.

6.1 Site location and surrounding land use

The proposed Kapese ISB is approximately rectangular in shape (2km long x 1km wide) and measures about 500acres in size; it is situated approximately 7km east of Lokichar town as shown in Figure 1. The land tenure in and around the site is communal and is held in trust by the County Government of Turkana. The community leased the 500 acres to ACS who then sub-leased about 380acres to Tullow for the Kapese ISB.

Prior to ACS leasing the land from the community, it was used for grazing purposes. After leasing the land, ACS constructed a perimeter fence around the entire 500 acres. Subsequently, they undertook an EIA Study to develop an airstrip and a hotel for which NEMA granted an EIA License. The air strip was constructed by ACS and is currently used for flights to and from Kapese; ACS also constructed a camp site for accommodation.

6.2 Biophysical environment

6.2.1 Physiography

Turkana County has several topographical features to note, including mountain ranges to the west, open plains in the centre, and rivers and Lake Turkana to the east. Lake Turkana is the largest and most saline of the Rift Valley lakes, though its water is arguably potable. There is no outlet, and with reduced inflows and high evaporation, the water is subject to three to four meter seasonal fluctuations in level. In total, the level has dropped 10m between 1975 and 1992 (Turkana District Environment Action Plan 2009 – 2013).

Lokichar sub-county occupies an area of about 2913km^2 (Turkana District Environment Action Plan 2009 – 2013). Turkana County with a geographical coverage of about 77,000 km^2, stands out as the largest County in Kenya. It is made up of seventeen administrative sub-counties. Approximately 80% of the total land area can be classified as arid or very arid. Arable land constitutes an estimated 32% of the total area but only 3% covered by Zones III of the county is suitable for limited rain fed production (Food Security District Profile, Turkana District, 2006).

The county has several topographical features to note including mountain ranges to the west, open plains in the center and, rivers and Lake Turkana to the east. Lake Turkana is the largest and most saline of the Rift Valley lakes, though its water is arguably potable. There is no outlet, and with reduced inflows and high evaporation, the water is subject to three to four meter seasonal fluctuations in level. In total, the level has dropped 10m between 1975 and 1992.

6.2.2 Climate

Turkana County is classified as an Arid and Semi-Arid Land (ASAL) area. The climate is characterized by warm to hot, with temperatures ranging between 24^{0}C to 40^{0}C.

Rainfall is erratic and unpredictable both in timing and distribution. Moreover, most of the precipitation is run off through the myriad of seasonal streams and rivers that drain the highlands that surround Turkana District. However, in general, the rainy season (*agiporo*) comprises long rains between April and August, and short rains between October and November. January, February and September tend to be the driest periods (*akumo*). Rainfall tends to be the highest in the western parts of the district and other areas of high elevation.

For the last two decades, the ASAL areas of Kenya have frequently suffered from failures in the annual rains but 2006 and 2007 witnessed a higher than expected rainfall. Conversely, flooding is also possible when there is too much rain like it was witnessed in October 2006 where many parts of the County experienced losses of livestock and small garden crops due to the flush waters.

6.2.3 Geology and soils

The geology and soils presented here represents that of the South Lokichar basin within Block 10BB which includes the area covered by the Kapese ISB (EPR Study Block 10BB, Earthview Geoconsultants, October 2010).

The Kenya Rift, which is topographically well-defined throughout most of Kenya, splays out into a broader, less distinct zone of rifting within the vicinity of Lake Turkana. The Turkana Depression has generally been regarded as a diffuse zone of faulting, linking the rift segments to the north and to the south (Dunkelman et al., 1988).

The geology of the area is dominated by rocks ranging from Precambrian (Neo-Proterozoic) to Recent age. These include:

i). The Precambrian (Neo-Proterozoic) basement rocks consisting of a variety of gneisses and undifferentiated brecciated rocks;

ii). Tertiary metamorphics such as quartzites and Tertiary lavas mainly basalts, phonolites, nephelinites, trachytes, andesites and overlying tuffs and gritty tuffs;

iii). Pleistocene to recent deposits.

The general stratigraphic succession of the Lokichar basin is described by Morley et al. (1992) as consisting, in ascending order; of the Precambrian basement rocks, Turkana (Loperot) grits, volcanic rocks and Pliocene to Recent sediments.

The Precambrian metamorphic basement system rocks of Turkana south consists of a stratiform sequence of successive layers of differing lithology that represents a sedimentary succession which has been subjected to granitization and metamorphism of a high degree.

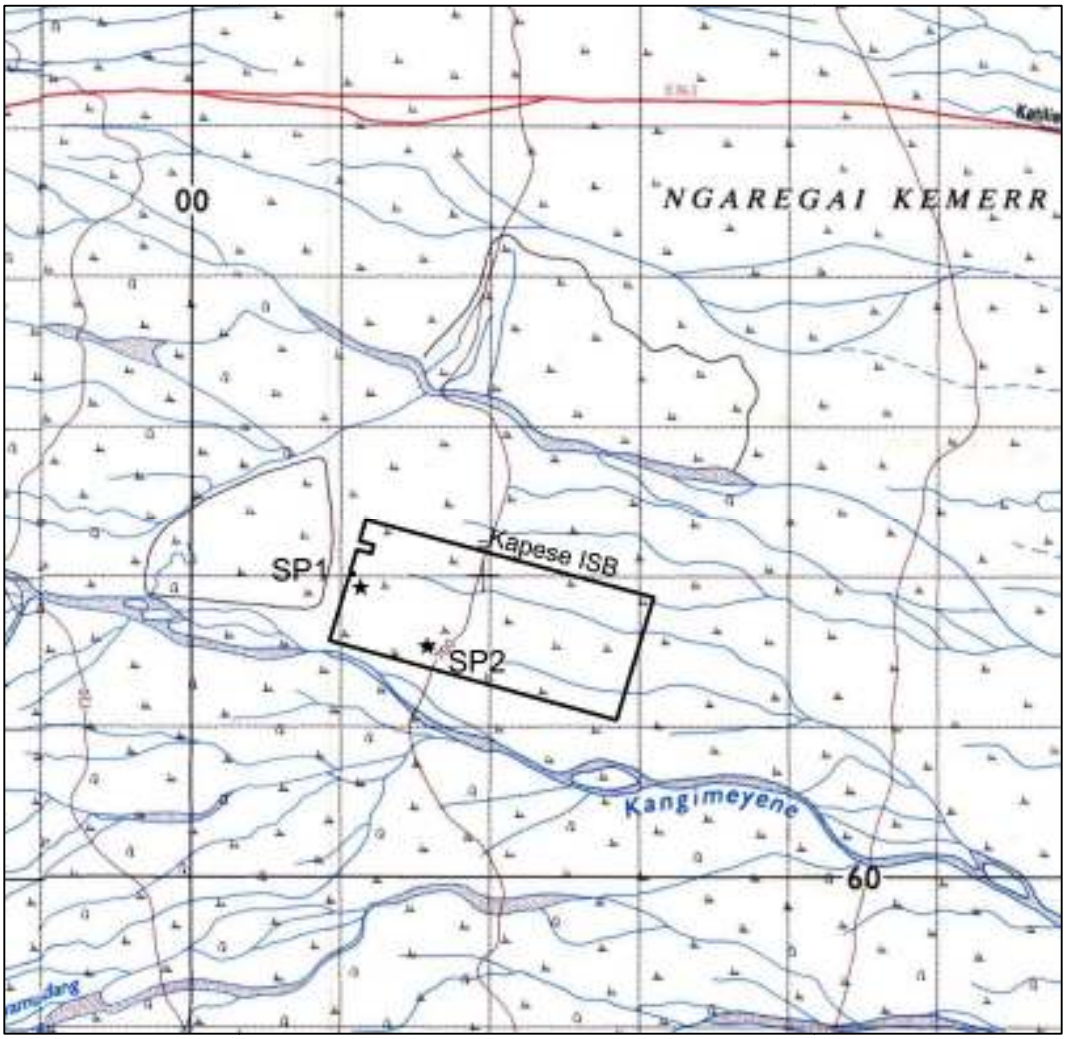
These are comprised of an upper fine-grained pelitic series with crystalline limestones and quartzites overlying a series of course gneisses, migmatites and a variety of undifferentiated brecciated rocks. The gneisses are marked by an increase in granularity and are lighter in overall color. Localized bands of crystalline limestone and highly weathered quartzites are common. Due to the overlying thick sediment and volcanic cover of approximately 4-8 km (Wescott et al., 1999) the basement rocks are of no hydrogeological significance in Turkana south. Localized exposures of the basement rocks occur in river channels and on hills where they have been exposed due to erosion of the overlying volcanic cover.

Because of high saltation and surface capping, only 30% of the soils are regarded as moderately fertile and suitable for agriculture and are found in central plains of Lorengippi, upper Loima and the lowlands of Turkwel. The ecosystem is very fragile and soils are not well developed.

In order to characterize the baseline soil conditions, soil sampling and analysis was conducted independently by SGS Kenya Limited. The potential impacts to soils were identified as surface and sub-surface soil contamination arising from loss of primary containment around the proposed fuel storage installation and near the proposed power plant (refer to Figure 2). The chemicals of concern identified were Total Petroleum Hydrocarbons (TPH) and Benzene, Toluene, Ethyl-benzene and Xylene (BTEX).

Two samples of soil were collected using the hand auger method with the sampling depth being between 600mm and 1000mm below grade level. The locations of the sampling points are shown in Figure 38 below.

Figure 38: Soil sampling location points



Currently, Kenya lacks legislation on soil contamination trigger levels. Subsequently, for the analysis of the soil samples, the Dutch Intervention Values (DIV) were used; these values are used by the oil marketing companies in Kenya including the refinery in Mombasa. The results of the soil sampling and analysis at the two sites within the Kapese ISB are given in Table 8 below.

Table 8: Soil analysis results for Kapese ISB

Parameter	DIV trigger value (mg/kg)	Sample 1 (mg/kg)	Sample 2 (mg/kg)
TPH	5000	180.67	126.60
Benzene	0.01	<0.01	<0.01
Toluene	0.03	0.04	0.002
Ethyl-benzene	0.01	<0.01	0.06
Xylene	0.02	0.02	<0.01

The results above show slightly elevated levels of Ethyl-benzene at sampling point 1 (SP1) and Toluene at sampling point 2 (SP2). The reasons for the slightly elevated baseline levels could be varied however, these two parameters are of less concern than benzene which is a known carcinogen. The principal chemical of concern in BTEX is usually Benzene which will be monitored during the operational phase as part of the annual environmental audits that Tullow will be submitting to NEMA.

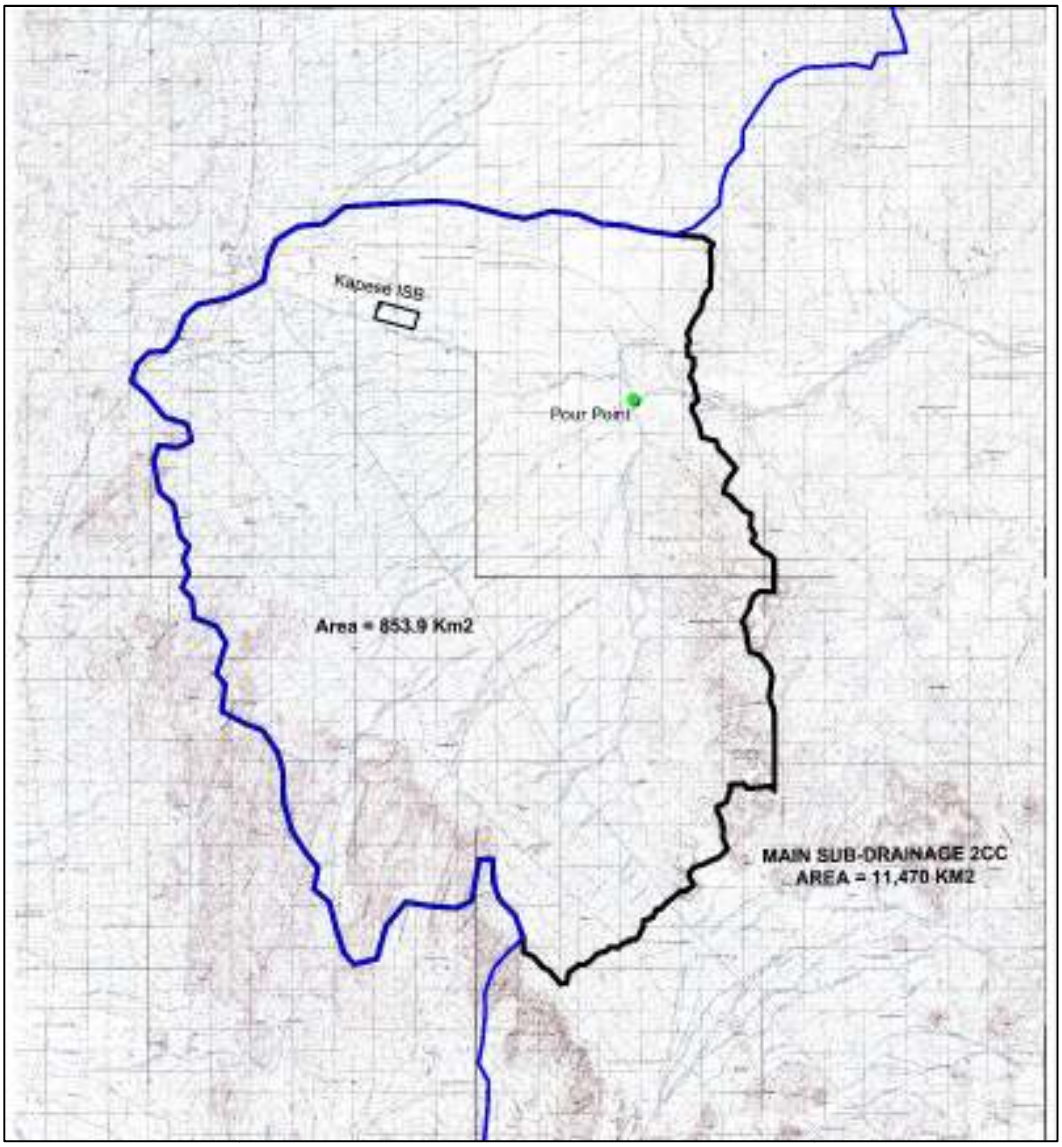
6.2.4 Vegetation

Vegetation in the entire Lokichar basin consists of mainly scattered Acacia bushes and a cover of annual herbaceous plants. The density of the woody plants increases on hilly ground. This vegetation pattern is repeated again until it becomes monotonous. The control of vegetation pattern is geological (Joubert 1966). However, it is punctuated by Maerua species and Acacia tortilis along the river-banks (Olang 1979). On the western side of these uplands and peneplains are the piedmont plains, which have been developed under dry climatic conditions (Olang 1979). Most of the vegetation is classified as short shrubs.

6.2.5 Surface water

The drainage basin as shown in the catchment area around the Kapese ISB in Figure 39 is made up of *luggas* (ephemeral rivers). As seen in the image below, there is a very small part of the catchment that will affect the ISB which is located to the upper northern part of the catchment. There is a lugga that passes through the Kapese ISB which will be diverted away from the plot.

Figure 39: Drainage catchment around project area and pour point



6.2.6 Ecology

An ecological study was undertaken within the Kapese ISB to characterize the baseline ecological conditions, identify and assess potential ecological and ecosystem services impacts, and develop mitigation measures.

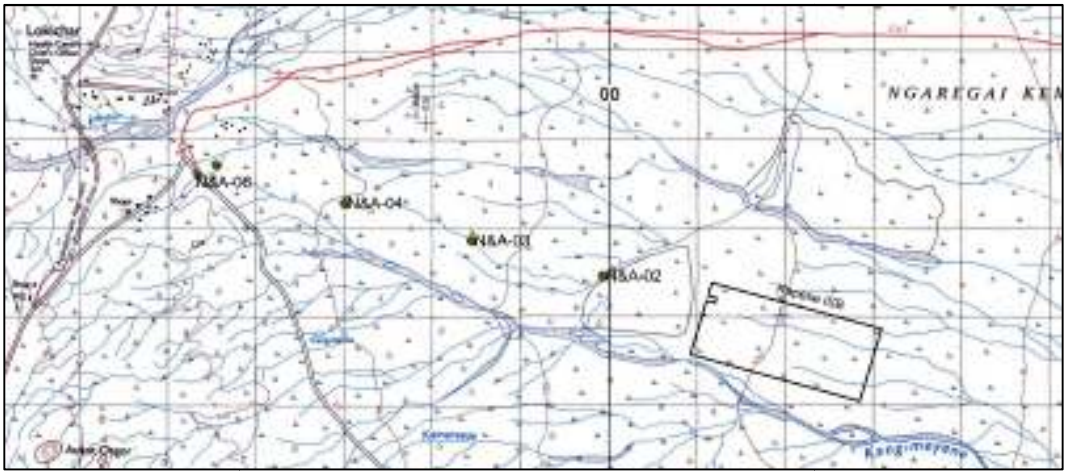
The output of the ecological assessment indicated that the Kapese ISB does not have significant ecological impacts associated with the construction and operational phases. Additionally, there were no Red Data List species found within the project site. The potential ecological impacts identified were: Impacts to ecosystem services and processes; Impact to Soil and Groundwater Ecological Attributes; Impacts to Habitats (Terrestrial, Seasonal Aquatic and Luggas); Impact on Faunal Movement and Animal Behavior; Invasive Species Impacts; and Dust and Exhaust Impacts. A number of ecological impacts related to the site were identified using IFC's guidelines. Using KTL's Risk and Impact Assessment Matrix, the extent, magnitude and duration of specific impacts were reviewed. The impact level for all project-related activities ranged between low and medium. Suggested mitigation strategies for these impacts were provided, which included specific on site and off site measures. When implemented, the proposed measures will ensure that ecological impacts for the proposed Kapese Integrated Operating Base do not cause adverse negative ecological impacts in the immediate and surrounding environment.

6.2.7 Air and noise quality

The existing ambient air and noise quality within the Kapese ISB may be categorized as relatively good. The sources of air emissions and noise around the project area include vehicle generated dust, exhaust emissions and noise.

An ambient air quality survey was undertaken as part of the ESIA Study on September 16th – 22nd, 2014; the parameters measured included SO_x, NO_x VOCs, PM_{10} and $PM_{2.5}$. For VOCs, SO_x and NO_x passive diffusion tubes were used while for particulates, minivol air samplers were used. The sampling points were identified based on the locations of potential sensitive receptors. A total of 11 sampling locations were chosen for the air quality survey; the passive diffusion tubes were mounted strategically for six days after which they were collected, a chain of custody completed and samples transported to the SGS Kenya laboratory in Mombasa for analysis. Some of the air quality survey locations are shown in Figure 40.

Figure 40: Air and Noise quality sampling locations



An ambient noise level survey was conducted at various locations in and around the Kapese ISB in order to characterize baseline noise environment. Both nocturnal and diurnal measurements were undertaken between September 16th and 22nd, 2014 at six monitoring locations identified as potential noise receptors. The measured baseline noise values were compared to the permissible noise limits stipulated in Kenya's environmental noise regulations of 2009 as presented in Table 9 and 10.

Table 9: Baseline ambient noise measurement results – Diurnal

Measurement location	Date/time	Results-dB(A)			NEMA limit-dB(A)
		L_{max}	L_{min}	L_{Aeq}	
Airstrip-no flights	16.9.2014 (11:57 – 12:12)	27.5	37.9	37.5	60
Airstrip-flights landing	16.9.2014 (12:28 – 12:43)	26.9	72.9	50.4	60
Kapese ISB-undisturbed (morning session)	18.9.2014 (08:48 – 09:03)	30.7	31.0	30.9	50
Kapese ISB-undisturbed (afternoon session)	17.9.2014 (15:06 – 15:21)	28.6	56.3	39.5	50
N&A-02-along the road (morning session)	18.9.2014 (09:33 – 09:48)	26.2	47.1	34.5	50
N&A-02 (afternoon session)	17.9.2014 (15:47 – 16:02)	26.9	52.8	34.8	50
N&A-03-along the road (morning session)	18.9.2014 (10:08 – 10:23)	26.8	69.5	48.2	50

Measurement location	Date/time	Results-dB(A)			NEMA limit-dB(A)
		L_{max}	L_{min}	L_{Aeq}	
N&A-02-along the road (afternoon session)	17.9.2014 (16:21 – 16:36)	26.6	49.7	33.2	50
N&A-04-along the road-homestead (afternoon session)	18.9.2014 (15:00 – 15:15)	27.1	57.9	39.4	50
N&A-05-church compound (morning session)	19.9.2014 (09:27 – 09:42)	29.6	51.0	40.3	40
N&A-05-church compound (afternoon session)	18.9.2014 (15:33 – 15:48)	28.1	67.3	47.1	40
N&A-05-shopping center (morning session)	19.9.2014 (09:55 – 10:10)	31.3	80.3	55.5	60
N&A-05-shopping center (morning session)	19.9.2014 (16:22 -16:37)	36.7	55.2	49.0	60

Table 10: Baseline ambient noise measurement results – Nocturnal

Measurement location	Date/time	Results-dB(A)			NEMA limit-dB(A)
		L_{max}	L_{min}	L_{Aeq}	
Kapese ISB (undisturbed)	19.9.2014 (20:30 – 20:45)	19.2	36.4	28.4	35
N&A-02 along the road	19.9.2014 (21:05 – 21:20)	26.4	47.1	29.0	35
N & A 03- along the road	19.09.2014 (21:29- 21:44)	26.1	28.4	27.8	35
N & A 04- along the road (homestead)	19.09.2014 (21:54- 22:00)	26.3	42.7	29.9	35
N & A 05- within the church compound	19.09.2014 (22:19- 22:34)	26.4	30.3	28.4	35
N & A 06- within the Lokichar shopping centre	19.09.2014 (22:41- 23:56)	27.4	47.0	44.8	35

The equivalent noise level (denoted in the tables as L_{Aeq}) measured at all points except the church compound during the day and at the shopping center at night show that the ambient noise are within the NEMA permissible limits. The reason for the slightly elevated noise level in the church compound area was due to children singing in the church and motor cycle traffic along the Lokichar – Kapese Road. The elevated noise level at night at the shopping center was due to a prayer meeting about 50m from the measurement point and motor cycle traffic.

6.2.8 Archaeology and cultural heritage

An archaeological and cultural heritage baseline survey for the proposed Kapese ISB was undertaken between September 9th and 16th, 2014. This baseline survey was conducted on behalf of KTL by a cultural heritage specialist from the National Museums of Kenya.

Through the baseline survey, it was established that the proposed Kapese ISB does not hold any substantial materials of any Prehistoric nature within the plot except for 1 potential Holocene archaeological site.

It was further established that the cultural heritage associated with the development of the project will affect the local community and subsequently, the potential impacts associated with such changes is assessed in Section 10 of this report.

6.3 Social and economic environment

6.3.1 Economic profile of Turkana County

The percentage of people in Turkana County defined as being in absolute poverty is 94.3%, which is higher than the national rate of 45.9% and ranked 47/47 out of the counties in Kenya (CRA 2011). Such poverty is deep and structural and not a simple consequence of drought (Levine & Crosskey, 2006; cited in Cardno, 2012). Indicative total income per pastoralist household (main economic activity) within Northern Turkana is as follows (Levine & Crosskey, 2006; cited in Cardno, 2012):

- **Wealthy**: trade about 20-25 goats per year, giving a 'cash equivalent' income of around KSh 15,000 – 22,000;
- **Middle income**: a cash equivalent of KSh. 14 - 20,000; and
- **Poor**: a cash equivalent of KShs. 14 - 18,000 - which is insufficient to be able to depend on pastoralism for their livelihood.

Aid dependency is very high; an indicative annual estimate of the value of external aid (cash plus food) per household is > KShs. 20,000 - 25,000. Without aid, it is predicted that herds owned by poor households would have been sold off within 2 years. Migration would have been the only option in the longer run. Coping mechanisms, such as increasing charcoal sales, are not sufficient to compensate, since the market is so limited (Levine & Crosskey, 2006; cited in Cardno, 2012).

The majority of the Turkana people are pastoralists who rear livestock and have to find pasture through the practice of migration; nomadic herding respectively of goats, sheep, cattle, donkeys, camels. Livestock is considered stock in trade of the Turkana, wealth that may be expended in the future if the drought does not wipe the animals out.

Over recent years, the pastoralist community has had to employ other supportive activities to supplement pastoralism, which has proved to be ineffective in meeting all their economic and social needs. Key areas of activity include sedentary agriculture, particularly along the River Turkwel, where settled farmers and agro pastoralists grow maize, sorghum, kales oranges, mangoes, bananas and vegetables.

The county suffers high unemployment levels of approximately 70% compared to a national rate of 42%. An explanation for the high rates of unemployment stems from structural unemployment where there is a mismatch between the skills of workforce and the requirements of the new job opportunities. Regional unemployment as a result of marginalization has contributed greatly to unemployment levels in the county.

Wage earners make up approximately six percent of the entire population. These are employed in sectors ranging from education, government, domestic to humanitarian organizations. A major section of these are non-residents. (Turkana County Development profile, 2013).

The proportion of self-employed in the county is very low since the majority of the population youth prefer wage employment. However, with the provision of alternative sources of livelihood like farming, trade and the expansion of the Disease Free Zone, this will increase the proportion of the self-employed. (Turkana County Development profile, 2013).

At the sub-county level, livestock production is the main economic activity practiced where the nomadic pastoralists utilize a wide variety of habitats under difficult and diverse environmental conditions. The main classes of livestock kept in the sub-county include cattle, goats, sheep, camels, donkeys and poultry. Pastoralism remains the leading economic activity hence approximately 64% of the district population derives their livelihoods from it. There are two main farming systems prevailing namely pastoralism and agro-pastoralism. (Turkana South District Development Plan 2008-2012).

The population in the labour force group (15-64 years) is at 52,742 people. The biggest challenge for the increasing population in this age group is to avail a corresponding number of employment opportunities. (Turkana South District Development Plan 2008-2012).

The majority of the population in this age group are engaged in the livestock sub-sector mainly pastoralism. In order to absorb the increasing labour force, investment in diverse sectors such as modern agriculture, livestock marketing, mining, fishing, agri-business and eco-tourism is required. The increase in devolved funds in the County has created employment opportunities. Local contractors employ casual laborers from among the community members and also offices are set up at devolved levels to absorb community members amongst their staff.

The main source of livelihood in the Kapese project area is livestock keeping and trading, sale of firewood, sale of charcoal and casual employment. There has been a change in the relative importance of livelihood sources from livestock keeping into (casual) employment by ACS. (Tullow Kenya BV- Risk Identification Process -Socio-Economic Baseline of project area).

6.3.1.1 Poverty

Poverty is complex and multidimensional in nature and manifests itself in various ways.

In Turkana County, the poverty incidence has been quite high with about 94.3% of population living below the poverty line. Food poverty is the most prevalent type of poverty in the county. Other manifestations of poverty are lack of access to amenities such as health, education, safe drinking water and sanitation, conflicts over natural resource use and insecurity. The main causes of poverty include; drought, high illiteracy levels, retrogressive traditional culture of cattle rustling, poor infrastructure and proliferation of illegal arms. This deprives the community of their livelihood and brings about livestock theft, destruction of property, reduced economic activities, collapse of educational facilities and low investment in the area. Other causes of poverty are lack of employment opportunities, poor marketing outlets, ignorance and slow uptake of new farming technology and methods. (Turkana County Development Profile)

Due to lack of affordable economic activities for the largest population, there is low saving hence low investment by local community.

Turkana South sub-county has a poverty index of 96.1% with a contribution of 0.5% to the national poverty. The sub-county is ranked the poorest in the country. The main cause of poverty in the district has been as a result of many factors including poor land tenure systems, prolonged droughts, insecurity, cattle rustling, high illiteracy levels, poor or

inadequate infrastructural facilities, insufficient water for livestock and human use, livestock diseases, inadequate health facilities, poor livestock marketing infrastructure and systems, high dependency tendencies and environmental degradation. (Turkana South District Development Plan)

Poverty situation at the project area is similar to that at the sub-county level.

6.3.1.2 Livestock

The low productivity of the rangelands means only indigenous livestock is raised; livestock needs to be moved frequently to exploit available resources. Livestock is considered to be a source of wealth and a symbol of status (e.g. it is used in dowries) however, there is a general lack of veterinary services in Turkana to deal with routine diseases and epidemics / epizootics.

Discussions with GoK livestock officers during a field visit indicated that households have an average of 15 sheep and/ or goats, 2 camels and between 2 and 3 cattle. The numbers of livestock estimated by the livestock officers to be in Turkana South are shown in Table 11.

Table 11: Estimated population of livestock in Turkana South

Division	Cattle	Sheep	Goat	Camels	Donkeys	Poultry
Katilu	169,740	416,396	594,970	59,410	39,400	27,213
Kainuk	150,880	370,131	563,655	31,361	32,840	11,655
Lokichar	56,588	138,801	407,086	74,260	59,130	20,447
Total	377,208	925,328	1,565,711	165,031	131,370	59,975

Livestock is either sold directly to traders at the Lokwamosing, Kalemung'orok, Kakong'u, and Lokichar markets or through the Livestock Marketing Authority (LMA). The LMA raises funds for its operations by charges recovered from every animal sold; they also facilitate transportation of livestock to external markets at as far away as Nairobi.

6.3.1.3 Charcoal making

In recent years, there has been extensive burning of trees by charcoal burners. Target species include Acacia tortilis, Acacia albida and other valued species.

6.3.2 Housing

There are all three types of housing in the County. These include: Permanent units, Semi-Permanent and Temporary Units. Permanent houses are mainly found in the urban centers while temporary house units known as manyattas constitute the majority of housing in all areas; both in rural and urban. The temporary units are mainly constructed by the nomads who are the majority in the county because of their constant movement with animals for pasture and water all over the County. The Semi-permanent houses are mainly mud walled and roofed with makuti or mabati in towns or urban areas.

Housing remains a big challenge in Turkana Sub-County with 80% of the population living in manyattas. Housing for a majority of the population has been met mainly by proliferation of informal settlements that seldom have access to essential basic services and infrastructure. 20% of the main dwellings are one roomed, making housing largely inadequate. (Turkana South District Development Plan 2008-2012)

While carrying out the stakeholder engagement activities, the Firm of Experts observed that most houses in the area were temporary houses. It was however noted that more semi-permanent and permanent buildings were coming up. This development is related to the sub-division of land upcoming within the Kapese village. This development is by workers employed by ACS and business people looking to tap into increasing demand for housing and business opportunities.

6.3.3 Water and Sanitation

Access to safe water and good sanitation are crucial to the health of a population. Use of unsafe water sources coupled with poor sanitation poses one of the greatest threats to health. Hence, universal access to safe water and sanitation is a key priority and responsibility of the Government.

The quantity and quality of water affects human welfare though several channels. Water availability influences the pattern of human settlement and the distribution of various development activities including agriculture and industry. Water shortages on the other hand can lead to low resource utilization, poor yields and food insecurity. Further, water scarcity accentuates poverty by limiting people's access to food and employment.

Safe disposal of human waste reduces disease transmission. In cases where sanitation facilities are lacking or are poorly constructed and/or maintained, chances of disease transmission are high.

About 88 percent of county's residents depend on surface and sub-surface dams for water, which often do not hold sufficient water due to the high evaporation rate during the dry seasons. The already existing water supplies are overstretched and unable to supply enough water for increasing population. (*Turkana County Development Profile 2013)*

The sub-county water needs are mostly met from ground sources such as boreholes, shallow wells and water pans. Therefore the sub-county is classified as water scarce, with water service coverage of about 40% which is much below the national coverage of 52% there is need to continue investing in water sources development to enhance reliable water sources at strategic areas for both human and livestock.

In Kapese village there are two boreholes serving the primary school and the Village. For Lokichar water supplied from Nalemsokon borehole near the primary school, Lokwadwat borehole, Lokichar mixed school borehole, Kasoroi borehole and Lokoburu borehole. (*Tullow Kenya BV- Risk Identification Process -Socio-Economic Baseline of project area*).

Tullow has established watering points at Lokitoe Limo, Ikalale Akamar, Lomokamar and Kapese villages. The water is supplied on average twice a week; the community considers the supply unreliable. At Lowoi Dapal village there is a Tullow borehole that is not functional. ACS provides water in all villages on a daily basis using water bowsers at specific points. There is one watering pan for the livestock in Kapese. Within all the Tullow watering points, there is a provision for livestock watering trough for the young livestock. (*Tullow Kenya BV- Risk Identification Process -Socio-Economic Baseline of project area*).

6.3.4 Schools

There are 275 primary schools in Turkana County, with 71 of them providing boarding facilities to learners. The nomadic nature of many communities has not encouraged the establishment of early childhood education (ECD) facilities. In addition, Turkana has a total of 189 Adult Literacy Centres with the Government supporting 163 of them and the rest supported by Faith-based organizations.

Within Turkana South, there are 10 primary schools but no secondary school (Turkana South Education Officer, pers. comm.). Turkana East has 36 primary schools and 6 secondary schools; of which only half have attained the minimum standards to offer the Kenya Certificates of Primary or Secondary Education.

The schools in the project area include Kapese Boys and Girls boarding school, Lokwadwat primary, Lokoboru Primary, Uhuru Primary, Kasoroi Primary and Lokichar Mixed secondary schools. In Lokichar the number of schools include Lokichar girls primary, Lokichar disabled school, Kolodichar Primary, Kamerese Primary, Morugore and AGs Secondary. *(Tullow Kenya BV- Risk Identification Process -Socio-Economic Baseline of project area)*

6.3.5 Waste management

There are no waste management facilities in the Study Area so bulk waste is either burnt in soil pits or transferred to town centres of further afield like Lokichar for processing by NEMA approved waste management contractors. Liquid waste is normally managed through the use of pit latrines (local communities) or the use of septic tanks/ cess pits.

7 Potential social and environmental impacts

This section presents the potential social and environmental impacts associated with the construction and operational phases of the Kapese ISB respectively.

7.1 Social impacts

7.1.1 Background

Turkana County is the largest county in Kenya covering over 77,000km^2 in area. Until the discovery of oil in March 2012, the County was generally undeveloped with the exception of some towns such as Lodwar, Lokichoggio, Lokichar and Lokori. With the discovery of oil, several direct and indirect services were required for the exploration program. For example, workers engaged by various contractors require food, transportation, accommodation, water services which are being provided by the local community.

As Tullow transitions into the appraisal phase of their oil exploration and development program in South Lokichar, it is envisaged that the establishment of the Kapese ISB will have both positive and adverse effects on the socio-economic environment in that area.

7.1.2 Impact identification

A social impact assessment was undertaken as part of this ESIA Study to characterize the potential social impacts associated with the establishment and operation of the Kapese ISB. Also assessed in the study was the opportunity for social uplifting of the local community arising from various direct and indirect economic activities. Tullow is expected to invest about US$9.5 Million to develop the infrastructure. This capital expenditure will be used to procure goods and services to develop the ISB with some of the goods and services being procured locally or regionally. An additional positive impact will be felt if the various contractors engaged by Tullow ensure that the first priority for all job opportunities are provided to the Turkana community living around the Kapese ISB where feasible.

The development of the ISB may also provide the local Turkana community with opportunities for training and skills development during the construction, commissioning and operational phases respectively.

The construction phase of the project will involve several truck movements from various parts of Kenya delivering goods to the Kapese ISB.

7.1.2.1 Construction phase impacts

During the construction phase, the potential positive social impacts include:

- Employment opportunities for construction of the infrastructure;
- Economic growth of the area; and
- Opportunities for training and skills development.

The potential negative impacts associated with the construction phase include:

- Increase in traffic and traffic related accidents;
- Risk of sexually transmitted infections (STIs);
- Project induced in-migration;
- Increase in crime.

7.1.2.2 Operational phase impacts

During the operational phase, each service contractor will engage workers that are necessary for their respective operations. There may be training and skills development opportunities provided by various service contractors. There could potentially be a demand for goods and services from the project area if such goods and services meet the required standards. The demand for goods and services should in turn lead to enhanced economic development of the area. However, in any society, increased disposable incomes may also attract negative social impacts; the proposed Kapese ISB is no exception and subsequently there could be potential adverse impacts similar to those of the construction phase.

7.2 Cultural heritage impacts

7.2.1 Background

The general area within Tullow's operations in Block 10BB, 13T and 10BA is rich in both paleontological and archaeological sites. However, the Kapese ISB does not hold any substantial materials of any Prehistoric nature except for one potential Holocene archaeological site towards the north-west of the fenced area; the sediments in the area of study are mostly of Holocene period (10000 years to present). Many places within the Turkana basin, have produced Later Stone Age, Neolithic and Iron Age artefacts. The area of study is flat and erosion rate is quite high. As such the retention of archaeological materials is low. However, in one area towards the North Western end of the development site, a low mound was found with about 20 pieces of pottery eroding out.

As with all other pastoralist tribes in Kenya, livestock, especially cattle, are at the core of Turkana culture. The Turkana people live a nomadic life, always moving from one place to another depending on the availability of pasture and water for their animals.

Unlike other nomadic tribes, the Turkana do not have complex customs or strong social structures. Each Turkana family tends to be self-sufficient though at times a number of families may graze their animals collectively.

7.2.2 Impact identification

Based on the cultural heritage specialist's observations, it is possible that archaeological and paleontological finds may be discovered especially around the western side of the development. A "chance finds procedure" will need to be developed and implemented by Tullow and its service contractors for this.

When ACS fenced the site, the Turkana community were locked out and this is not a direct Tullow impact. Some of the trees within the plot were previously used for holding meetings associated with good occasions such as weddings, birth of a child, naming of a child, etc. With the fencing of the plot, the community has lost a small part of its social and cultural space and subsequently these types of meetings cannot be held anymore. Being within a floodplain, the ISB plot previously provided the community living around it with materials such as branches/twigs for housing, charcoal for selling, and fodder for their livestock. Tullow recognizes these aspects and they will mitigate it using their social investment programmatic initiatives.

The potential cultural heritage impacts associated with the proposed Kapese ISB will occur during the construction phase as listed below.

7.2.2.1 Pre-construction phase impacts

- Loss of social and cultural space;
- Loss of grazing and browsing land;
- Loss of income from provisioning services (selling charcoal);
- Loss of building materials for homes;
- Lack of accessibility for community interaction; a
- Lack of accessibility to essential services

7.2.2.2 Construction phase impacts

- Paleontological and archaeological impacts; and
- Visual impacts.

7.3 Ecological impacts

7.3.1 Background

The northern part of the Kapese ISB is currently used as an airstrip for arriving and departing passengers; most of the passengers work at various Tullow sites in Block 10BB and 13T. The area of land where Tullow proposes to develop the Kapese ISB has a lugga going through the southern section of the plot. The lugga is the most prominent feature of the area that Tullow proposes to develop. Due to the harsh climate, the soils are not productive and the habitat is predominantly woodland occasionally interrupted by shrub lands, grasslands and near bare areas.

7.3.2 Impact identification

A number of ecological impacts are predicted to occur as a result of the Kapese ISB development. These are related to loss of ecosystem services during the construction and operational phase of the project. The potential ecological impacts are expected to occur during the construction phase as described below.

7.3.2.1 Construction phase impacts

- The lugga that runs across the length of the ISB in the south will be affected by the project. As a result of the development, surface water run-off is expected to increase due to the compacted surfaces needed to establish various types of infrastructure. Additionally, in order to reduce the risks of flooding within the ISB, berms will be erected along the western and southern boundaries of the plot thus diverting water away from the Kapese ISB.

- Habitat alteration is expected to occur resulting from the removal of vegetation, trees and luggas over the development footprint area and increased human activity. Most affected by this change will be ecological processes including seed dispersal, nutrient cycling and pollination

- With the escalation of exploration and appraisal activities, there will be changes to the movement of animals (livestock, camels, etc.) and this will impact on their behavior. Tullow has developed and implemented a land transport policy and integrated vehicle management system (IVMS) which they need to implement for the Kapese ISB project.

- There is a potential for new alien invasive species of flora and fauna not indigenous to the Kapese area and its environs to be introduced through construction plant and equipment that is not decontaminated and human activities.

- Dust and exhaust impacts can occur on plants which get coated with dust generated by vehicles. Further, animals such as birds could be adversely affected by noxious emissions of carbon monoxide, nitrous oxides, sulfur oxides generated by human related activities.

7.3.2.2 Operational phase impacts

During the operational phase, the following potential ecological impacts are envisaged:

- Introduction of alien invasive flora or fauna species;

- Dust and exhaust emission impacts on birds and plants.

7.4 Health and safety impacts

7.4.1 Background

Health and safety (H&S) impacts can occur if appropriate risk assessments are not undertaken and risk control measures implemented. There is a sufficient amount of H&S related legislation in Kenya which requires Occupiers and their agents and workers to demonstrate compliance.

Additionally, Tullow has a set of H&S related standards and "Safety Rules" which are applied across their operations worldwide. These standards and rules are generic in nature and not specific to a country or region where they are working.

7.4.2 Impact identification

The Kapese ISB will have several Tullow approved service contractors setting up their operations from there. Each of these approved contractors has their own set of H&S rules; incidents or accidents can occur if each contractor does not enforce their company specific rules and regulations as well as Kenyan legal requirements on H&S. The potential H&S impacts associated with the development of the Kapese ISB are described below.

7.4.2.1 Construction phase impacts

- During the construction phase, minor, serious or fatal injuries can potentially occur if good H&S practices are not implemented.

- Due to the nature of the terrain in Turkana County, it is not uncommon to come in contact with snakes and scorpions; the Kapese ISB is no exception. Subsequently, there is a potential for snake bites and scorpion stings during the construction phase.

7.4.2.2 Operational phase impacts

- The proposed use of radioactive sources during wireline or nuclear calibration of the bottom hole assembly presents concerns over occupational exposure to the potentially harmful effects of ionizing radiation. The Radiation Protection Act, 1982 (Cap 243) provides the legal framework for the safe handling and use of ionizing radiation sources, and further stipulates that all authorized persons shall make provision for the protection and safety of radiation sources commensurate with the magnitude and likelihood of potential exposure.

- The proposed use of explosives presents concerns over hazardous exposure to inadvertent surface detonation. Proper storage of explosives and accessories is important, not only to make sure that these materials are kept out of the hands of unauthorized persons and reduce the hazards of accidental explosion, but also maintain them in good condition. Explosives and accessories are perishable goods which are liable to deteriorate after prolonged storage, especially if subjected to high temperature and high humidity. The methods of packing used by the manufacturers are designed to give maximum protection against moisture, and provided the cases remain unopened the explosives should keep in good condition for long periods.

- The use of lifting equipment and other mechanized plant associated with the proposed operations presents a number of safety hazards that should be addressed under standard operating procedures. However, these have also been considered under the framework of the ESIA. Lifting equipment presents a significant hazard with potentially fatal consequences in the event of a safety incident.

- The improper storage and handling of chemicals is associated with the risk of fires. The consequences would be severe in terms of property loss and potential fatalities.

7.5 Traffic impacts

7.5.1 Background

It is envisaged that traffic levels will also increase during the operational phase of the ISB. Several issues may result from an increase in traffic in an area. Public safety may be jeopardized, noise and air pollution may increase and congestion within the selected area may rise.

7.5.2 Impact identification

7.5.2.1 Construction phase impacts

- There could potentially be adverse H&S impacts if loads carried by the heavy goods vehicles (HGVs) are not secured properly resulting in such vehicles rolling over and causing injury or property damage on public road networks.

- With the development of the Kapese ISB, it is envisaged that there will be several vehicle movements between Mombasa and the ISB. Within the area of operation in South Lokichar, Tullow has successfully maintained a speed limit of 40km/hour. Despite this, there have been incidents in the past where vehicles have rolled over or struck pedestrians and livestock.

- During the construction and operational phase of the Kapese ISB, workers may be exposed to H&S impacts if they don't comply with company established procedures for safe systems of work.

7.5.2.2 Operational phase impacts

Depending on Tullow field operations, the number and frequency of vehicle movements in and around the area of operation is likely to increase. This will generate potential adverse impacts such as:

- Increased dust and air emissions during the dry seasons; and

- Increased community and worker health & safety risk from the use of vehicles on the public road network.

7.6 Impact of chemical leaks and spills

7.6.1 Background

Various service contractors working at the proposed Kapese ISB will use chemicals for their operations some of which are hazardous. There will be a refueling facility which will have aboveground storage tanks (ASTs) and associated pipework, chemicals for manufacturing of "mud", oils, greases, coolants, etc.

When these chemicals enter the environment through media such as soil, they can contaminate the sub-surface and if not cleaned or remediated, can slowly find a pathway to a receptor such as groundwater.

Given the hot weather conditions generally found in Kapese throughout the year, chemicals having a low flash point will generally evaporate. However, more persistent chemicals such as diesel, used oil, etc. which have high (>60^{0}C) flash points may percolate into the sub-surface.

The Kapese ISB is located on top of a flood plain which implies that any loss of primary containment (LOPC) without cleanup measures may result in contaminants being washed downstream during the wet season.

The impacts associated with chemical leaks and spills could potentially occur during the operational phase only.

7.6.2 Impact identification

7.6.2.1 Operational phase impacts

Loss of primary containment (LOPC) is a significant event in an oil installation which can lead to surface and sub-surface contamination. The porosity of soils in Turkana and around the Kapese ISB is relatively high and products such as diesel can infiltrate and contaminate the sub-surface if the leak or spill without adequate retainer walls or bunds.

- The refueling area will store approximately 600m^3 – 1000m^3 of petroleum fuels in bulk aboveground storage tank farm. Such installations can be potentially hazardous from an EHS perspective if they are not designed to appropriate local and international oil industry standards of EHS. Spillage of fuel may occur during the refilling of aboveground storage tanks (ASTs) or vehicles on-site which may result from human error. The LOPC can be exacerbated if the fuel supplier does not have a proper inventory reconciliation system to account for any losses or gains in fuel quantities. LOPC can also occur from the AST connected pipework if it is not installed properly.

- The storage of chemicals without retainer walls or bunds at the proposed facility presents a risk of spills. When in contact with storm water, the effects of the spills this could spread beyond the proposed site, eventually contaminating public waters.

- The liquid mud plant (LMP) will be manufacturing “mud” that will be used in exploration drilling wells for a variety of purposes. Synthetic based mud and water based mud will both be used. The preparation of muds used in exploration are manufactured on site by mixing a variety of chemicals. The improper storage, handling, use and disposal of used muds can expose workers to occupational health impacts.

7.7 Solid and liquid waste generation and management impacts

7.7.1 Background

Solid and liquid waste has the potential of contaminating the surrounding soil and water resources on site. Solid waste may ruin the aesthetics of the area and portray an environmentally unfriendly area therefore negatively impacting on the neighborhood ambiance. Liquid waste may be associated with the generation of foul odors and may even pose a health hazard. Pests, such as flies and rodents, may also be attracted to the area via the odor and collection of waste, in order to scavenge on the solid or liquid waste if it is not disposed of in the correct manner.

7.7.2 Impact identification

7.7.2.1 Construction phase impacts

- Various types of non-hazardous and hazardous wastes may be generated by individual contractors during the construction phase of the Kapese ISB. For example solid waste and sewage will be generated through ablution facilities on site. The improper storage, handling and disposal of the waste will be a potential adverse impact.

7.7.2.2 Operational phase impacts

- During the operational phase, domestic waste will be produced from the 400-man camp and offices located within the Kapese ISB. The wastewater treatment plant installed could potentially fail due to an overload and cause foul smell, overflowing sewage, etc.

- There may be hazardous wastes such as used oil that could be generated as part of the vehicle maintenance facility within the fueling services contractor's scope. There is a potential for this used oil to be improperly managed leading to surface spills.

- Equipment washing at the proposed facility could generate a waste stream consisting of oily wastewater, wash solvent and solids. If not treated prior to its discharge into the environment, potentially contaminated wastewater could be released.

7.8 Stormwater management impacts

7.8.1 Background

The topography of the proposed Kapese ISB gently slopes from the west to the east of the plot. A lugga passes through this part of the plot and will be filled to pave way for development of the ISB. The proposed Kapese ISB currently does not contain any stormwater attenuation measures. While the average rainfall received in Turkana County is about 250mm/year, flash flooding is known to occur which can have detrimental run-off impacts.

7.8.2 Impact identification

7.8.2.1 Construction phase impacts

- If construction is undertaken during the rainy season (March – May), chances of the lugga overflowing through the southern part of the plot are high with soil erosion as a resultant effect.

7.8.2.2 Operational phase impacts

- With the complete development of the Kapese ISB (Phase 1 and 2), the amount of stormwater runoff rates will increase as most of the area will be covered by the development footprint which will be compacted thus reducing percolation.

- This will result in an increase in the quantity and velocity of stormwater leaving the site which, in turn, has the potential to transport contaminants away from the site into natural environments and create soil erosion in vulnerable areas.

7.9 Noise impacts

7.9.1 Background

Noise may be generated by vehicles entering and exiting the ISB, personnel and visitors at the ISB, aircraft taking off and landing, trucks entering or leaving the site, etc.. The existing noise climate around the ISB is of a rural nature with intermittent noise produced by aircraft landing and taking off and vehicles collecting and dropping passengers.

Noise pollution can have a negative impact on neighbors, especially in residential areas. It must also be noted that noise travels further during the night, resulting in the potential impact being more severe. Noise will be attributed to the employees and vehicles expected at the Kapese ISB.

7.9.2 Impact identification

7.9.2.1 Construction phase impacts

- During the construction phase, Tullow and its service contractors will be using contracted transport to deliver goods to the Kapese ISB. A higher frequency of trucks coming into the Kapese ISB has the potential to increase the ambient noise levels especially if the vehicles are not adequately maintained.

7.9.2.2 Operational phase impacts

- As the operations ramp up, there is a potential of increased road vehicle noise generated between Mombasa and the ISB.
- Noise will also be generated from the camp facilities including the kitchen, dining and common areas, from air conditioners and other social amenities which will be provided within the ISB.

7.10 Air quality impacts

7.10.1 Background

The soils within South Lokichar are generally loosely bound; thus dust levels can increase due to natural processes such as strong winds or human activities.

Since the discovery of oil in South Lokichar, the number of vehicle trips has increased as well as the vehicle population. This has led to an increase in vehicle emissions and dust generated which soils plants and homes in the vicinity of the roads used.

Exploration well sites require electricity to operate and currently use thermal power which generate SO_x, NO_x and VOC emissions.

7.10.2 Impact identification

7.10.2.1 Construction phase impacts

During the construction phase, sources of air quality impacts will be construction plant and equipment that emits Volatile Organic Carbons (VOCs), and dust generated by vehicles coming into and going from the Kapese ISB.

7.10.2.2 Operational phase impacts

Dusts and VOC emissions are expected to occur from vehicles delivering goods to the Kapese ISB;

Potential gas emissions may be released from tank vents during refilling, vehicle refueling, fuel spillage and motor vehicle exhausts.

Odors may arise from the waste generated on-site if not disposed of in accordance with L.N.121: Environment Management and Coordination (Waste Management) Regulations, 2006.

7.11 Cumulative impacts

7.11.1 Background

Cumulative impacts takes cognizance of surrounding factors and impacts in order to determine the potential impact of a multitude of factors acting together, and the potential result thereof.

7.11.2 Impact identification

As Tullow moves into the appraisal phase, the activities will increase in which case there will be more vehicle trips transporting materials to the Kapese ISB. The frequency of flights and size of aircraft coming to Kapese may also increase. With a centralized hub and spoke system, each contractor may make more vehicle trips due to the increased activities.

In the near future, Tullow will be considering development of the Central Processing Facility and crude oil export pipeline both of which will require large amounts of financial and human resources which will cumulate the existing impacts.

8 Specialist studies

As part of the ESIA Study of the proposed Kapese ISB, the following specialist studies were undertaken by KTL:

a) Social impact assessment;

b) Ecological impact assessment;

c) Flood risk assessment; and

d) Cultural heritage impact assessment.

Given below is a synopsis of these studies.

8.1 Social impact assessment

8.1.1 Objectives

The objectives of undertaking a social impact assessment were to:

- Determine the need and desirability of the proposed Kapese ISB;
- Evaluate the stakeholders' needs, perceptions and attitudes to the project;
- Determine the overall socio-economic benefits and sustainability of the proposed project; and
- Determine which mitigation/enhancement measures are desirable.

8.1.2 Results

The social impact assessment identified potential positive economic spin-offs and negative impacts of the proposed establishment of the Kapese ISB, the results of which are presented in Table 12 below.

Table 12: Potential positive and negative social impacts of the proposed ISB

Potential positive impacts	Potential negative impacts
• Creation of employment	• Insecurity
• Water supply for the locals	• Exposure to health hazards
• Access to better health facilities	• Air and noise pollution
• Improved access and provision of educational facilities	• Increased immorality
• Local business opportunities	• Road degradation

The above impacts were identified based on public meetings held at five villages around the Kapese ISB.

8.1.3 Recommendation/conclusion

The conclusions of the social impact assessment are as follows:

- It is anticipated that there will be a net economic benefit to the community, County and Kenya should the Kapese ISB continue. Employment opportunities will be available during the construction and operational phase; additionally, there will be business opportunities available for persons to supply goods to the Kapese ISB camp as long as they meet appropriate quality standards;

- Based on the combined positive and adverse impacts identified, the project will not cause social unrest should the Kapese ISB continue;

- The negative impacts identified through the social impact assessment can be mitigated through regular communications from Tullow on the status of the project coupled with implementation of the ESMP;

- ACS made several commitments to the local community when they were granted a lease for the land on which the Kapese ISB is to be constructed by Tullow. Consequently, ACS should implement the commitments it made to the community when it was granted a lease for the Kapese plot. These CSR commitments include:

  ✓ Prioritise the local community for employment and make exclusive reservation of employment opportunities for locals in the trades of security officers, drivers, artisans, etc.;

- ✓ Establish a micro—finance scheme to allow local community members and community groups to take small loans to establish their own businesses;
- ✓ Establish and implement an Academic and Vocational Training Bursary Fund for the benefit of the local community;
- ✓ Establish and run a capacity development and advisory 'drop-in' community centre in Lokichar; and
- ✓ Care for the property of the local community including livestock and respect communities in the proximity of the project area.

- ACS should establish the Kapese Conservancy as immediate compensation to locals for impact on access to grazing area,
- ACS should declare and agree upon a benefit sharing formula with the community.

8.2 Ecological impact assessment

8.2.1 Objectives

The objectives and scope of work for the ecological impact assessment were as follows:

- Describe the characteristics of the flora and fauna found within the project footprint area;
- Identification of Red Data plant or faunal species and plants of medicinal value;
- Identification ecologically sensitive zones ;
- Comment on the conservation status and value of the proposed development site in the context of the area;
- Identify and assess the impacts on the ecology within the ISB and provide management recommendations including future monitoring requirements if required; and
- Provide recommendations for the rehabilitation of the area following construction

8.2.2 Results

An ecological specialist was mobilized to carry out the baseline studies on various aspects of flora and fauna within the project area. He undertook the following surveys within the project site:

- Microhabitat identification;
- Plant survey;
- Mammal survey;
- Bird survey; and
- Herpetofauna survey;

8.2.3 Recommendation/conclusion

Based on his investigations, the ecologist is confident that development of the Kapese ISB does not pose any significant risk to the receiving environment, provided that the recommendations outlined are implemented diligently.

8.3 Flood risk assessment

8.3.1 Objectives

A flood risk assessment was undertaken as an independent study for the Kapese ISB. The objectives of the flood risk assessment were:

- Provide an assessment of the external flood risk;
- Provide general recommendations on flood management;
- Provide a synopsis of the applicable water related legislation that would affect the drainage of the site.

8.3.2 Results

An experienced hydrogeologist was engaged by Tullow directly to undertake the flood risk assessment. He conducted a walkover of the Kapese ISB to appreciate the potential flood risk. Water currently enters the ISB from the western side and exits from the eastern and northern side of the plot.

The hydrogeologist observed that there was minimal flow data on hydrology for the project area and subsequently used the rational formula Q=0.278 C I A where Q=peak runoff (m^3/s), I=storm rainfall intensity (mm/hour), A=drainage area (km^2) and C=Runoff coefficient (non-dimensional).

8.3.3 Recommendation/conclusion

Based on the results of the peak runoff calculations, it is recommended that:

- Low earth bunds be constructed along the western and southern fence lines to prevent water flowing into the ISB;
- Runoff generated from within the ISB can still be drained through the eastern and northern parts of the site;
- Suitable drainage will need to be provided at the entrance of the Kapese ISB as the flood water emanates from the western side of the plot;
- Tullow design engineers should complete the design of the drainage around the Kapese ISB;
- Tullow should consider establishing a weather station within Kapese which should include measurement of short duration rainfall as well as daily totals; and
- Tullow should consider establishing meteorological stations at other locations within the South Lokichar development zone.

8.4 Cultural heritage impact assessment

8.4.1 Objectives

A cultural heritage impact assessment was undertaken as part of the ESIA Study for the Kapese ISB. The objectives and scope of work for the assessment were as follows:

- Develop an understanding of the likely cultural heritage resources that may be found on the basis of a literature review of historical activities in the area;
- Detail the likelihood of cultural heritage resources being present in the Kapese ISB based on the natural setting and suitability for past habitation and/or use;
- Following a visit to site, and discussions with affected communities, identify and map all heritage resources in the area, including graves
- Assess the impact of the ISB development on such heritage resources; and
- Provide management measures for mitigation of any adverse effects on cultural heritage resources during and after the completion of the proposed development.

8.4.2 Results

The results of the cultural heritage impact assessment were as follows:

- The general area of Turkana is rich in archaeological and cultural heritage resources, however the Kapese ISB does not contain visible cultural heritage resources except for one potential Holocene archaeological site;
- The cultural landscape and some of livelihoods of the people living around the project area will be impacted as a result of the development of the ISB; and
- The chances of finding any archaeological artefacts around the Kapese ISB are minimal as the plot has a lugga going through it which drains from the western side towards the eastern and northern side.

8.4.3 Recommendation/conclusion

Based on the above, the recommendations for mitigation are:

- Develop and implement a “Chance finds procedure” for any bones (fossils or otherwise) which might surface during the construction phase and reporting to the National Museums of Kenya (NMK);
- Rescue excavations of the archaeological site should be undertaken by the NMK; and
- In order to maintain a “sense of place”, consider construction of low height buildings.

9 Methodology for impact identification and assessment

The purpose of impact assessment is to assign relative significance to predicted impacts associated with the project, and to determine the manner in which impacts are to be avoided, mitigated or managed. The potentially significant environmental impacts were identified based on the nature of the receiving environment, a review of the proposed activities, and the issues raised in the public participation process.

9.1 Methodology

In the impact assessment stage of an EIA, identified issues are analyzed and expected impacts are defined. This analysis identifies:

- The types of impact;
- Predicts the magnitude;
- Probability of occurrence;
- Extent of the impact; and
- Determines the overall significance of the impact.

9.2 Identification of environmental and social aspects and impacts

The outstanding environmental issues identified as having significance will be assessed using the methodology described below.

First, the issues raised will be described giving consideration to the associated activity and the aspect of that activity that is likely to result in an impact. The nature of the impact will also be described. Once this has been undertaken the significance of the impact can be determined. The following definitions will apply:

- An **activity** is a distinct process or task undertaken by an organization for which a responsibility can be assigned. Activities also include facilities or pieces of infrastructure that are possessed by an organization.

- An **environmental aspect** is an element of an organizations activities, products and services which can interact with the environment. The interaction of an aspect with the environment may result in an impact.

- **Environmental 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. 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 aquifers, flora and paleontology. Impacts on the environment can lead to changes in existing conditions; the impacts can be direct, indirect or cumulative. Direct impacts refer to changes in environmental components that result from direct cause-effect consequences of interactions between the environment and project activities. Indirect impacts result from cause-effect consequences of interactions between the environment and direct impacts. Cumulative impacts refer to the accumulation of changes to the environment caused by human activities.

Aspects and impacts associated with the proposed development have been differentiated into construction and operation phases of the project.

9.3 Description of aspects and impacts

The accumulated knowledge and the findings of the environmental investigations form the basis for the prediction of impacts. Once a potential impact has been determined during the scoping process, it is necessary to identify which project activity will cause the impact, the probability of occurrence of the impact, and its magnitude and extent (spatial and temporal). This information is important for evaluating the significance of the impact, and for defining mitigation and monitoring strategies. The aspects and impacts identified will therefore be described according to the definitions below.

9.3.1 Extent

The extent for each aspect, receptor and impact will be defined. The geographical coverage (spatial scope) description will take account of the following factors:

- The physical extent/distribution of the aspect, receptor and proposed impact; and
- The nature of the baseline environment within the area of impact.

For example, the impacts of noise are likely to be confined to a smaller geographical area than the impacts of atmospheric emissions, which may be experienced at some distance. The significance of impacts also varies spatially. Many will be significant only within the immediate vicinity of the site or within the surrounding community, whilst others may be significant at a local (project) or regional (county) level.

The extent of the impact will be rated on the following scale:

Localized (At localized scale and a few hectares in extent)	1
Study area (The proposed site and its immediate environs)	2
Regional (County level)	3
National (Country)	4
International (Beyond Kenya)	5

9.3.2 Duration

Duration refers to the length of time that the aspect may cause a change either positively or negatively on the environment.

The environmental assessment will distinguish between different time periods by assigning a rating to duration based on the following scale:

Very short (0 – 1 Years)	1
Short term (1 – 5 Years)	2
Medium term (5 – 15 years)	3
Long term (>15 years)	4

Permanent	5

9.3.3 Magnitude

The magnitude of an environmental aspect is determined by the degree of change to the baseline environment, and includes consideration of the following factors:

- The reversibility of the impact;
- The sensitivity of the receptor to the stressor;
- The impact duration, its permanency and whether it increases or decreases with time; Whether the aspect is controversial or would set a precedent; and
- The threat to environmental and health standards and objectives.

The magnitude of each of the impacts will be rated on the following scale:

Small and will have no effect on the environment	0
Minor and will not result in an impact on the processes	2
Low and will cause a slight impact on the processes	4
Moderate and will result in process continuing but in a modified way	6
High (processes are altered to the extent that they temporarily cease)	8
Very high and results in complete destruction of patterns and permanent cessation of the processes	10

9.3.4 Probability of impact

The probability or frequency of the impact occurring refers to how often the issue may impact either positively or negatively on the environment. After describing the frequency the findings will be indicated on the following scale:

Highly improbable (<20% chance of occurring)	1
Improbable (20 – 40% chance of occurring)	2
Probable (>40% - 70% chance of occurring)	3
Highly probable (>70% - 90% chance of occurring)	4
Definite (>90% - 100% chance of occurring)	5

9.4 Method of assessing the significance of impacts

The purpose of impact evaluation is to assign relative significance to predicted impacts associated with the project, and to determine the manner in which impacts are to be avoided, mitigated or managed. The information presented above in terms of identifying and describing the aspects and impacts will be summarized in a tabular form and a significance will be assigned with supporting rational. Significance will be determined before and after mitigation, taking into consideration all the factors described above.

A definition of a “significant impact” for the purposes of the study is: “An impact which, either in isolation or in combination with others, could in the opinion of the specialist, have a material influence on the decision-making process, including the specification of mitigating measures.”

9.5 Significance determination

The environmental significance rating is an attempt to evaluate the importance of a particular impact, the consequence and likelihood of which has already been assessed by the relevant specialist. The description and assessment of the aspects and impacts undertaken is presented in a consolidated table (Table 7) with the significance of the impact assigned using the process and matrix detailed below.

The sum of the first three criteria (extent, duration and magnitude) provides a collective score for the CONSEQUENCE of each impact. The last criteria determines the PROBABILITY of the impact occurring. The product of CONSEQUENCE and PROBABILITY leads to the assessment of the SIGNIFICANCE of the impact, shown in the significance matrix below.

Table 13: Significance Assessment Matrix

		CONSEQUENCE (Extent + Duration + Magnitude)																			
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
PROBABILITY	**1**	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	2	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
	3	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
	4	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
	5	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100

In order to evaluate the mitigation threshold, the ratings table below is used.

Table 14: Mitigation Ratings Table

Low	<30	Where this impact would not have a direct influence on the decision to develop in the area
Medium	30-60	Where the impact could influence the decision to develop in the area unless it is effectively mitigated
High	>60	Where the impact must have an influence on the decision process to develop in the area

9.6 Mitigation

Measures to avoid, reduce or manage impacts consistent with best practice will be proposed and the effectiveness of such measures assessed in terms of their ability to avoid, remove an impact entirely, render it insignificant or reduce its magnitude.

In assessing the significance of the impact, natural and existing mitigation will be taken into account. Natural and existing mitigation measures are defined as natural conditions, conditions inherent in the project design and existing management measures that alleviate (control, moderate or curb) impacts. In addition, the significance of impacts will be assessed taking into account any mitigation measures that are proposed.

An Environmental and Social Management Plan (ESMP) has been prepared and is provided in Section 11 of this report. This plan specifies the methods and procedures for managing the environmental aspects of the proposed development. Monitoring requirements are also be detailed within the plan, particularly for those environmental aspects that give rise to potentially significant impacts.

10 Assessment of social and environmental impacts

This section provides an assessment of the social and environmental impacts associated with the proposed Kapese ISB. For each impact, the assessment has been conducted pre-mitigation and post mitigation using the methodology described in Section 9 of this report.

10.1 List of potential social and environmental impacts

Social impacts

- Increase in employment during the construction and operational phases
- Economic growth of the area
- Opportunities for 'training and skills development'
- Increase in traffic and related incidents
- Risk of Sexually Transmitted Infections (STIs)
- Project induced in-migration
- Increase in crime

Cultural heritage impacts

- Impacts on graves;
- Cultural Landscape and Sense of Place impacts;
- Social and Cultural Space impacts;
- Loss of grazing and browsing land;
- Loss of income from selling charcoal;
- Loss of building materials for homes;
- Lack of accessibility for community interaction;

- Lack of accessibility to essential services

Ecological impacts

- Soil erosion
- Habitat Alteration
- Disturbance of faunal movement and behavior
- Alien Invasive Species
- Dust and Exhaust Impacts

Health and safety impacts

- Minor, serious or fatal injury to staff members employed to construct the Kapese ISB
- Snake, scorpion and insect bites
- Radiation sources
- Use of explosives
- Use of lifting equipment
- Fires associated with improper chemical storage

Fire and explosion impacts

- On-site fires and explosions

Traffic impacts

- Heavy vehicles entering and exiting the site during loading and off-loading of construction equipment;
- Increase in traffic volumes to the Kapese ISB

Impacts due to chemical/fuel leaks and spills

- Sub-surface soil contamination from leaking AST(s) or refilling

Solid and liquid waste generation and management

- Illegal dumping of construction waste

- Air, soil, surface water and contamination from system leakage. Vector infestation.
- Improper disposal of hazardous wastes (e.g. used oil, solvents, etc.)

Storm water management impacts

- Contamination of soils and surface water and transportation of contaminants downstream; creation of soil erosion in vulnerable areas; flooding of ISB during storm events

Noise impacts

- Disturbance of surrounding communities through noisy machinery and general construction noises

Air quality impacts

- Dust generation during construction and operations

10.2 Social impacts

10.2.1 Aspects and impacts

Table 15 summarizes the social aspects which could potentially impact upon the environment from the proposed development of the Kapese ISB during both the construction and operational phases.

Tullow has an existing suite of initiatives under its social investment programme which support local livelihoods, health care, environmental projects, education initiatives, and enterprise (local business) development. This includes social infrastructure projects, including community water provision, as well as longer term capacity building initiatives. In addition, TKBV is committed to maximising local content through employment and the supply of goods and services by local businesses and will continue to support this throughout the construction and operation of the Kapese IOB. Therefore social related mitigation measures are not specified in this ESIA as they are being addressed programmatically through the Tullow social investment program.

Table 15: Social related aspects and potential impacts

Aspect	Potential Impacts
Construction and	• Increase in employment during the

Aspect	Potential Impacts
operation of the Kapese ISB	construction and operational phases
	• Economic growth of the area
	• Opportunities for 'training and skills development'
	• Increase in traffic and related incidents
	• Risk of Sexually Transmitted Infections (STIs)
	• Project induced in-migration
	• Increase in crime

10.2.2 Significance

Predicted impacts are rated in Tables 16 – 25.

Table 16: Impact significance for employment creation-construction phase

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Localized	Very short	Low	Probable
	2	1	4	3
	Result: Low (+21)			
Mitigation measures	**Comments/Mitigation:** • Tullow and its contractors (SLB, AFEX and BHI) must endeavor to provide the first opportunities for any jobs to the local Turkana community living in and around the Kapese ISB where feasible (i.e. accounting for required skills and qualifications to perform the advertised role). • Tullow and its contractors should advertise for jobs through Tullow's Lokichar Community Resource Office and leverage the CLOs to notify the community of the project and job opportunities available • Tullow should endeavor to build capacity among the			

	local Turkana community for the skills set required during the operational phase of the project			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Regional	Long-term	High	Definite
	3	4	8	5
	Result: High (+75)			

Table 17: Impact significance for employment creation-operational phase

Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
Without mitigation	National	Medium-term	Moderate	Probable
	4	3	6	3
	Result: Medium (+39)			
Mitigation measures	**Comments/Mitigation:** • Communication and information programs should be used to manage expectations and target local service providers including those registered through the Public Participation process. • Management and enhancement measures for local employment to be included in labor and human resources plan.			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	National	Long-term	High	Highly probable
	4	4	8	4
	Result: High (+64)			

Table 18: Impact significance for economic growth-construction phase

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Regional	Short-term	Minor	Improbable
	3	2	2	2
	Result: Low (+14)			
Mitigation measures	**Comments/Mitigation:** • Tullow and its contractors should procure as many goods and services from the local Turkana community where feasible (i.e. where the goods and services provided meet required quality and safety standards); • Tullow should promote local businesses in the Lokichar area by providing opportunities to local Turkana businesses through a fair and transparent bidding process.			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Regional	Short-term	Low	Probable
	3	2	4	3
	Result: Low (+27)			

Table 19: Impact significance for economic growth-operational phase

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Regional	Short-term	Minor	Probable
	3	2	2	3
	Result: Low (+21)			
Mitigation measures	**Comments/Mitigation:** • Following on from the construction phase, Tullow and its contractors should make a conscious effort to support			

	local Turkana businessmen for procurement of goods such as vegetables, meats, construction materials, etc. • Additionally, Tullow should use their social performance team to inform the local communities about available business opportunities through the Lokichar Community Resource office and the ISB CLO office			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Regional	Medium-term	Low	Probable
	3	3	4	3
	Result: Medium (+30)			

Table 20: Impact significance on opportunities for 'training and skills development'-construction and operational phase

Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
Without mitigation	Study area	Short-term	Minor	Improbable
	2	2	2	2
	Result: Low (+12)			
Mitigation measures	**Comments/Mitigation:** • Tullow and its contractors should endeavor to provide as many job opportunities to the local Turkana community living in and around the Kapese ISB as feasible; • Tullow will endeavour to provide opportunities for 'training and skills development;			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Regional	Long-term	Moderate	Probable
	3	4	6	3

	Result: Medium (+39)

Table 21: Impact significance for increased traffic and related incidents-construction phase

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	National	Very short	Moderate	Probable
	4	1	6	3
	Result: Medium (-33)			
Mitigation measures	**Comments/Mitigation:** • Tullow and its contractors should undertake a risk management appraisal of their road transport carriers. This appraisal should be used by Tullow and its contractors to select those road transport carriers that can demonstrate compliance with OGP standards for their vehicles. • Tullow and its contractors should insist that their nominated road transport carriers have a formal driver safety program in place for all drivers. Such a program should include "belting up", fatigue management policy, "no mobile while mobile", etc. • Tullow and its contractors should insist that all drivers engaged for transporting goods to the Kapese ISB have undergone Tullow approved defensive driver training and that their certificates are valid.			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	National	Very short	Low	Improbable
	4	1	4	2
	Result: Low (-18)			

Table 22: Impact significance for increased traffic and related incidents-operational phase

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	National	Long-term	Moderate	Highly probable
	4	4	6	4
	Result: Medium (-56)			
Mitigation measures	**Comments/Mitigation:** • The mitigation measures recommended for the construction phase should continue to be implemented by Tullow and its contractors in the operational phase.			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	National	Long-term	Minor	Improbable
	4	4	2	2
	Result: Low (-20)			

Table 23: Impact significance for risk of sexually transmitted diseases-construction and operational phases

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Regional	Permanent	Moderate	Highly probable
	3	5	4	4
	Result: Medium (-48)			
Mitigation	**Comments/Mitigation:**			

measures	• Tullow and its contractors should implement their HIV/AIDS Policy to avoid discrimination at the ISB • Tullow and its contractors should develop and implement a peer educator program for HIV/AIDS and other wellness programs such as stress and stress management.			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Regional	Medium-term	Minor	Probable
	3	3	2	3
	Result: Low (-24)			

Table 24: Impact significance for Project induced in-migration-construction and operational phases

Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
Without mitigation	Regional	Medium-term	Moderate	Probable
	4	3	6	3
	Result: Medium (-39)			
Mitigation measures	**Comments/Mitigation:** • During the construction phase, Tullow and its contractors should give first priority for skilled, semi-skilled and unskilled jobs to suitably qualified experienced members of local Turkana communities. In the absence of suitably competent persons, Tullow and its contractors should continue to support their existing local content programs. • During the operational phase, Tullow and its contractors should support where possible, skills based organizational capacity development plans that include development of local Turkana communities to provide semi-skilled and skilled labor for maintenance of the			

	ISB. • The organizational capacity development plan should include a Human Resource Management plan that has a Training system for implementation to achieve the objectives of the Plan.

Mitigation Status	Extent	Duration	Magnitude	Probability
With mitigation	Regional	Medium-term	Minor	Probable
	3	3	2	3
	Result: Low (-24)			

Table 25: Impact significance for increase in crime-construction and operational phases

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Regional	Long-term	Low	Probable
	3	4	4	3
	Result: Medium (-33)			
Mitigation measures	**Comments/Mitigation:** • Tullow should undertake a security risk assessment for the construction and operational phases of the Kapese ISB. • Based on the outcome of the security risk assessment, Tullow should develop a security action plan for minimizing the potential for increase in crime levels resulting from the ISB construction and operations. • The security risk assessment and security action plan should be reviewed continuously and adapted to suit the prevailing security threat levels around the exploration and appraisal activities and areas.			
Mitigation	**Extent**	**Duration**	**Magnitude**	**Probability**

Status				
With mitigation	Study area	Short-term	Minor	Improbable
	2	2	2	2
	Result: Low (-12)			

10.3 Cultural heritage impacts

10.3.1 Aspects and impacts

Table 26 summarizes the cultural heritage aspects which could potentially impact upon the environment from the proposed development of the Kapese ISB during both the construction and operational phases.

Table 26: Cultural heritage related aspects and potential impacts

Aspect	Potential Impacts
Construction and operation of the Kapese ISB	• Paleontological finds impacts;
	• Archaeological finds impacts;
	• Cultural Landscape and Sense of Place impacts;
	• Social and Cultural Space impacts;
	• Loss of grazing and browsing land;
	• Loss of income from selling charcoal;
	• Loss of building materials for homes;

10.3.2 Significance

Predicted impacts are rated in Tables 27 – 33.

Table 27: Impact significance for paleontological finds-construction phase

Mitigation	Extent	Duration	Magnitude	Probability

Status				
Without mitigation	Study area	Permanent	Very high	Improbable
	2	5	10	2
	Result: Medium (-34)			
Mitigation measures	**Comments/Mitigation:** • Tullow should develop and implement a chance finds procedure which must be complied with by all their service contractors at the Kapese ISB; • Tullow's service contractors must incorporate Tullow's chance finds procedure into their documents with their nominated contractors who will undertake construction works in Kapese for them; • In the unlikely event of fossils appearing during any construction related activities, work should stop immediately and a qualified NMK scientist engaged to advise on the way forward;			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Study area	Short	Minor	Highly improbable
	2	2	2	1
	Result: Low (-6)			

Table 28: Impact significance for archaeological finds-construction phase

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Study area	Permanent	Very high	Definite
	2	5	10	5
	Result: High (-85)			

Mitigation measures	**Comments/Mitigation:** • Tullow should develop and implement a chance finds procedure which must be complied with by all their service contractors at the Kapese ISB; • Tullow's service contractors must incorporate Tullow's chance finds procedure into their documents with their nominated contractors who will undertake construction works in Kapese for them; • In the unlikely event of fossils appearing during any construction related activities, work should stop immediately and a qualified NMK scientist engaged to advise on the way forward;			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Study area	Very short	Minor	Highly improbable
	2	1	2	1
	Result: Low (-5)			

Table 29: Impact significance for loss of cultural landscape and sense of place-construction and operational phase

Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
Without mitigation	Study area	Permanent	High	Highly probable
	2	5	8	4
	Result: High (-60)			
Mitigation measures	**Comments/Mitigation:** • Tullow and its service contractors should limit height and density of the planed buildings to harmonize the visual impact on cultural landscape • Tullow and its service contractors should build			

	vegetation buffer zones, including planting of trees within and in the between various service contractors work areas • Tullow and its service contractors should only cut down vegetation and trees where their respective footprints are planned • Tullow and ACS should accelerate the creation of the conservancy which was one of the commitments made when leasing the land			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Study area	Short	Low	Improbable
	1	2	4	2
	Result: Low (-14)			

Table 30: Impact significance for loss of social and cultural space-construction and operational phase

Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
Without mitigation	Study area	Permanent	Moderate	Highly probable
	2	5	6	4
	Result: Medium (-52)			
Mitigation measures	**Comments/Mitigation:** • Tullow and its service contractors should consider selecting a location in consultation with the elders where an open social and cultural place can be constructed by growing trees that can provide shade and providing wooden benches			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**

With mitigation	Study area	Short	Minor	Improbable
	1	2	2	2
	Result: Low (-10)			

Table 31: Impact significance for loss of grazing land-construction and operational phase

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Study area	Permanent	Moderate	Definite
	2	5	6	5
	Result: Medium (-65)			
Mitigation measures	**Comments/Mitigation:** • Tullow and ACS should accelerate the provision of a conservancy which was a commitment made to the local Turkana community when the Kapese ISB land was leased • Tullow should consider assisting the community in accessing water as appropriate through its existing community water program			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Study area	Short	Low	Improbable
	2	2	4	2
	Result: Low (-16)			

Table 32: Impact significance for loss of revenue from charcoal sales-construction and operational phase

Mitigation Status	Extent	Duration	Magnitude	Probability

Without mitigation	Study area	Permanent	Moderate	Probable
	2	5	6	3
	Result: Medium (-33)			
Mitigation measures	**Comments/Mitigation:** • Wherever trees are to be cut down within the ISB footprint areas, Tullow and its service contractors should plant indigenous trees outside the ISB as an offset to prevent the effects of revenue loss through selling charcoal • Tullow and ACS should accelerate the development of the vocational training center for provision of skills to the Turkana community to enable them generate alternative incomes from employment instead of selling charcoal			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Study area	Short	Low	Improbable
	2	2	4	2
	Result: Low (-16)			

Table 33: Impact significance for loss of building materials-construction and operational phase

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Study area	Permanent	Moderate	Highly probable
	2	5	6	4
	Result: Medium (-52)			
Mitigation measures	**Comments/Mitigation:** • Tullow and its service contractors should develop and implement a biodiversity offset program by planting indigenous trees;			

	• ACS should accelerate the creation of a conservancy which should include planting of indigenous trees outside of the ISB area and within the floodplain			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Study area	Short	Minor	Improbable
	2	2	2	2
	Result: Low (-12)			

10.4 Ecological impacts

10.4.1 Aspects and impacts

Table 34 summarizes the ecological aspects which could potentially impact upon the environment from the proposed development of the Kapese ISB during both the construction and operational phases.

Table 34: Ecological related aspects and potential impacts

Aspect	Potential Impacts
Construction and operational phase activities	• Loss of water sources
	• Soil erosion
	• Habitat Alteration
	• Disturbance of faunal movement and behavior
	• Alien Invasive Species
	• Dust and Exhaust Impacts

10.4.2 Significance

Predicted impacts are rated in Tables 35 – 40.

Table 35: Impact significance for loss of water sources-pre-construction phase

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Study area	Medium term	Low	Highly probable
	2	3	4	4
	Result: Medium (-36)			
Mitigation measures	**Comments/Mitigation:** • Tullow should consider assisting the community in accessing water as appropriate through its existing community water program			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Study area	Very short	Minor	Improbable
	2	1	2	2
	Result: Low (-10)			

Table 36: Impact significance for soil erosion-construction phase

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Study area	Medium term	Moderate	Probable
	2	2	6	3
	Result: Medium (-30)			
Mitigation measures	**Comments/Mitigation:** • Avoid/minimize activities that can extensively impact on soil structure and stability • Avoid/ minimize disposal of contaminants including oil spills.			

	• Where roads in the ISB traverse the landscape, passage of water should be allowed through culverts constructed in areas where runoff passes. This will sustain normal drainage of water and enhance dispersal of seeds. • Where possible, minimize excavation and stripping of vegetation • Cleared areas should be replanted with vegetation to stabilize the soil when the area is restored at the end of the project.

Mitigation Status	Extent	Duration	Magnitude	Probability
With mitigation	Study area	Short	Minor	Improbable
	2	2	2	2
	Result: Low (-12)			

Table 37: Impact significance for loss of habitat-construction phase

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Study area	Permanent	Moderate	Highly probable
	2	5	6	4
	Result: Medium (-52)			
Mitigation measures	**Comments/Mitigation:** • Where possible, avoid destruction of trees and bushes. Trimming, rather than removal, should be carried out where possible. • Areas devoid of human activities should be left intact or rehabilitated/allowed to regenerate. • Construction activities should be accompanied with dust suppression techniques to reduce dusts released into			

	the surroundings. • Low speed limit should be adopted for operation in the area to avoid vehicles generating dust.			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Study area	Short	Minor	Improbable
	2	2	2	2
	Result: Low (-12)			

Table 38: Impact significance for disturbance of fauna movement and behavior-construction phase

Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
Without mitigation	Regional	Medium	Moderate	Probable
	3	3	6	3
	Result: Medium (-36)			
Mitigation measures	**Comments/Mitigation:** • All construction plant and equipment should comply with the requirements of environmental noise regulations in Kenya; noisy equipment should be fitted with appropriate engineering controls for noise suppression. • • Tullow should continue restricting the speed limit to 40km/h in all areas of operation • Floodlights should be limited to camps and their uses be minimized in areas perceived to be used by the animals frequently.			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With	Regional	Short	Minor	Improbable

mitigation	3	2	2	2
	Result: Low (-14)			

Table 39: Impact significance for Alien Invasive Species-construction and operational phase

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Study Area	Long-term	Magnitude	Probable
	2	4	6	3
	Result: Medium (-36)			
Mitigation measures	**Comments/Mitigation:** • Vehicles and other equipment should be cleaned thoroughly to remove sticking soils on wheels and other parts of the vehicle to avoid carrying seeds of invasive species to the site. • Soils used for compaction of murram roads should be obtained locally to avoid incidental carrying of propagules of invasive plant species from other places. •			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Study area	Short	Minor	Improbable
	2	2	2	2
	Result: Low (-12)			

Table 40: Impact significance for dust and exhaust-construction and operational phase

Mitigation Status	Extent	Duration	Magnitude	Probability

Without mitigation	Regional	Medium Term	Low	Probable
	3	3	4	3
	Result: Medium (-30)			
Mitigation measures	**Comments/Mitigation:** • Low speed limit should be adopted for operation in the area to avoid vehicles generating excessive dust.			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Study Area	Short	Minor	Improbable
	2	2	2	2
	Result: Low (-12)			

10.5 Health and safety impacts

10.5.1 Aspects and impacts

Table 41 summarizes the health and safety (H&S) aspects which could potentially impact upon the environment from the proposed development of the Kapese ISB during both the construction and operational phases.

Table 41: Health and safety related aspects and potential impacts

Aspect	Potential Impacts
Construction and operation activities (e.g. use of heavy machinery, installation of ASTs, vehicular movement, etc.)	• Accidents and injuries resulting from construction
	• Snake, scorpion and insect bites
	• Radiation sources
	• Use of explosives

Aspect	Potential Impacts
	• Use of lifting equipment
	• Fires associated with improper chemical storage

10.5.2 Significance

Predicted impacts are rated in Tables 42 – 48.

Table 42: Impact significance for accidents and injuries-construction phase

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Study area	Short-term	Moderate	Probable
	2	2	6	3
	Result: Medium (-30)			
Mitigation measures	**Comments/Mitigation:** • Tullow and its contractors must incorporate and enforce the requirements of Kenya's safety and health legislation (OSHA 2007) into all construction works contracts. The contracts for construction companies must also include compliance with corporate EHS related policies of Tullow or their contractors; • EHS risk assessments will be conducted by Tullow and its contractors for all construction at the Kapese ISB to ensure that appropriate risk control measures are implemented throughout the construction phase; • Appropriate signage and a demarcated construction area must be established around the construction site creating awareness of employees on-site of the potential Health and Safety risks. The Kapese site has a perimeter fence, where required internal fences will be erected around camp and work areas; • Tullow and its contractors will arrange for EHS induction training of all staff working on the proposed project. Refresher EHS training will be provided continually			

	based on task risk assessments to be performed throughout the construction phase. • The storage of oils, materials, chemicals, fuels, etc. to be used during the construction phase must not pose a risk to the surrounding environment; • Tullow and its contractors will be required to comply with international oil and gas EHS standards and codes of practice for the design and construction management of the proposed project;

Mitigation Status	Extent	Duration	Magnitude	Probability
With mitigation	Study area	Very short	Minor	Improbable
	2	1	2	2
	Result: Low (-10)			

Table 43: Impact significance for accidents and injuries -operational phase

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Study area	Short	High	Improbable
	2	2	8	2
	Result: Low (-24)			
Mitigation measures	**Comments/Mitigation:** • Tullow and its contractors should undertake a formal operational phase EHS risk assessment of the new project and based on the magnitude of risks, develop and implement EHS operational procedures that are applicable to each contractor. The EHS risk assessments and operational procedures should be updated annually or immediately following an injury/incident; • Tullow and its contractors must comply with the relevant requirements of the OSHA and EMCA such as undertaking statutory audits required by these			

	regulators. • Tullow should develop a detailed Emergency Response Plan (ERP) complete with individual Contingency Plans (CPs) for each credible scenario envisaged by the company. The ERP should contain elements such as receiving, identifying, and classifying emergency events, fires, explosions, and natural disasters; establishing and maintaining communications with local fire, police, and public officials and coordinating emergency response; emergency shutdown of the site and safe resumption of service; making personnel, equipment, tools, and materials available at the scene of an emergency; and protecting people first and then property, and making them safe from actual or potential hazards. • Each Tullow contractor working at the Kapese ISB must develop and implement their individual ERP and bridge it with the Tullow Kapese ISB ERP document. • Tullow and its contractors should provide all workers with relevant H&S training in order to prevent accidents and incidents during the operational phase. All contractors and their sub-contractors and other workers performing assignments on behalf of Tullow must comply with Tullow's Safety Rules

Mitigation Status	Extent	Duration	Magnitude	Probability
With mitigation	Study area	Very short	Low	Improbable
	2	1	4	2
	Result: Low (-14)			

Table 44: Impact significance for snake, scorpion and insect bites-construction and operational phases

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Localized	Very short	Low	Highly Probable

	1	1	4	4
	Result: Low (-24)			
Mitigation measures	**Comments/Mitigation:** • Tullow and its contractors should implement the Tullow Global Snake Bite Management Standard for the types of snakes and scorpions likely to be found within and around the Kapese ISB • Tullow and its contractors should engage the services of professional snake catchers should snakes be found within the ISB			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Localized	Very short	Minor	Improbable
	1	1	2	2
	Result: Low (-8)			

Table 45: Impact significance for radiation sources-operational phase

Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
Without mitigation	Regional	Permanent	High	Probable
	3	5	8	3
	Result: Medium (-48)			
Mitigation measures	**Comments/Mitigation:** • Transportation of radioactive materials will be strictly controlled, and recorded on a dangerous goods manifest • The source materials will be contained within specialized transportation containers, secured within a concrete floored and fenced compound. Access to the storage compound and source material will be strictly controlled, with keys retained by an allocated Radiation Protection Supervisor (RPS);			

	• Tullow's service contractors should construct storage and containment areas to international design standards. The bunker should be designed such that it provides enough shielding to minimize the dose rate to which any person outside will be exposed; • Radiation source calibration and storage areas will be separated from building structures, equipment racking, work-stations and walkways by a clear distance of at least 3 meters; • Barriers will be installed to keep personnel out and a radioactive source monitor/alarm will be put in place; • Implement radiation control procedures and monitoring for operations; • The service contractors should use radiation monitors for all radiation areas including source storage and calibration areas to determine exposure levels; • The service contractors should use continuous area monitors within the bunkers and fitted with audible and visible alarms; •

Mitigation Status	Extent	Duration	Magnitude	Probability
With mitigation	Study area	Short	Minor	Improbable
	2	2	4	2
	Result: Low (-16)			

Table 46: Impact significance for use of explosives-operational phase

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Study area	Short	High	Probable
	2	2	8	3

	Result: Medium (-36)
Mitigation measures	**Comments/Mitigation:** • The service contractors should construct storage and containment areas to international design standards. The bunker is designed to contain the blast in the event an accidental explosion occurs. The store will be an all welded construction, using nominal 12mm thick steel plate for the protection of the loadable area and an interior design of wood lining; • Each door of the bunker will be fitted with 2 locking points as required. Each will have an anti-tamper device fitted over the padlocks to prevent the locks from being cut/ground. The doors will be closed using the "cam lock type" container door locks. These do not form part of the 2 lock system per door; • The stores should be ventilated; • Explosives stores should be sited at a safe distance from stores containing flammable/combustible materials (minimum 15m); • The service contractors should develop and implement explosives storage control procedures and monitoring for operations. • Detonators will not be stored with other explosives

Mitigation Status	Extent	Duration	Magnitude	Probability
With mitigation	Study area	Very short	Low	Improbable
	2	1	4	2
	Result: Low (-14)			

Table 47: Impact significance for use of lifting equipment-construction and operational phase

Mitigation Status	Extent	Duration	Magnitude	Probability

Without mitigation	Localized	Permanent	High	Probable
	1	5	8	3
	Result: Medium (-42)			
Mitigation measures	**Comments/Mitigation:** • The service contractors should develop and implement a documented site safety plan to address operational hazards, and communicate safety requirements to all persons on site through visible and legible signage. • The service contractors should establish clearance zones for lifting operations and other wireline equipment maintenance work.			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Localized	Short	Low	Improbable
	1	2	4	2
	Result: Low (-14)			

Table 48: Impact significance for fires associated with chemical storage-operational phase

Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
Without mitigation	Study area	Short	High	Probable
	2	2	8	3
	Result: Medium (-36)			
Mitigation measures	**Comments/Mitigation:** • Display in a strategic area, a list of all chemicals stored on site to enable appropriate action by emergency services.			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**

With mitigation	Localized	Very short	Low	Improbable
	1	1	4	2
	Result: Low (-12)			

10.6 Fire and explosion impacts

10.6.1 Aspects and impacts

Table 49 summarizes the fire and explosion aspects which could potentially impact upon the environment from the proposed development of the Kapese ISB during both the construction and operational phases.

Table 49: Fire and explosion related aspects and potential impacts

Aspect	Potential Impacts
Storage and transfer of fuel	• On-site fires and explosions

10.6.2 Significance

Predicted impacts are rated in Tables 50.

Table 50: Impact significance for fires and explosion-operational phase

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Localized	Very short	Moderate	Improbable
	1	1	6	2
	Result: Low (-16)			
Mitigation measures	**Comments/Mitigation:** • All fuel storage areas must be designed to the relevant local and international oil industry standards. Hazardous area classification should be undertaken for the design and installation of electrical equipment associated with any fuel installation within the ISB;			

	• All Tullow and contractor employees at the ISB must be aware of the EHS policy and implementation thereof, in addition to the Emergency Plan and Environmental Management Plan; • In addition to ensuring that all staff are trained in what to do in the case of an emergency such as an on-site fire or explosion; The Kapese Fire Team must be properly trained and their duties understood; • All fire-fighting equipment should be readily available, accessible and functioning; • Tullow and its contractors must provide relevant signage e.g. no smoking, and display it in potentially dangerous areas. All persons working within the ISB must be trained to abide by this signage.

Mitigation Status	Extent	Duration	Magnitude	Probability
With mitigation	Localized	Very short	Low	Highly improbable
	1	1	4	1
	Result: Low (-6)			

10.7 Traffic impacts

10.7.1 Aspects and impacts

Table 51 summarizes the traffic related aspects which could potentially impact upon the environment from the proposed development of the Kapese ISB during both the construction and operational phases.

Table 51: Traffic related aspects and potential impacts

Aspect	Potential Impacts
Kapese ISB construction phase	• Heavy vehicles entering and exiting the site during loading and off-loading of construction equipment;
Kapese ISB operational	• Increase in traffic volumes to the Kapese

phase	ISB

10.7.2 Significance

Predicted impacts are rated in Tables 52 – 53.

Table 52: Impact significance for construction vehicles entering the ISB to load and off-load construction equipment

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Study area	Very short	Low	Probable
	2	1	4	3
	Result: Low (-21)			
Mitigation measures	**Comments/Mitigation:** • Tullow should insist that their road cartage contractors safely secure all loads at the point of loading using approved strapping or chains • Tullow and its contractors should continue emphasizing the use of journey management plans for all journeys • Tullow and its contractors should undertake risk assessments in the form of job safety analysis (JSA) when off-loading materials and equipment from HGVs			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Study area	Very short	Minor	Highly improbable
	2	1	2	1
	Result: Low (-5)			

Table 53: Impact significance for Increase in traffic volumes-operational phase

Mitigation Status	Extent	Duration	Magnitude	Probability

Without mitigation	Regional	Long-term	Low	Probable
	3	4	4	3
	Result: Medium (-33)			
Mitigation measures	**Comments/Mitigation:** • Tullow should insist that their road cartage contractors safely secure all loads at the point of loading using approved strapping or chains • Tullow and its contractors should continue emphasizing the use of journey management plans for all journeys • Tullow and its contractors should undertake risk assessments in the form of job safety analysis (JSA) when off-loading materials and equipment from HGVs			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Study area	Short	Minor	Improbable
	2	2	2	2
	Result: Low (-12)			

10.8 Impacts due to chemical/fuel leaks or spills

10.8.1 Aspects and impacts

Table 54 summarizes the fuel spillage or leakage aspects which could potentially impact upon the environment from the proposed development of the Kapese ISB during both the operational phase.

Table 54: Chemical/fuel leaks or spills related aspects and potential impacts

Aspect	Potential Impacts
Storage of fuel in AST(s)	• Sub-surface soil contamination from leaking AST(s)
Refilling procedure	• Contamination of soils, surface water

10.8.2 Significance

Predicted impacts are rated in Table 55.

Table 55: Impact significance for fuel spillage or leakage-operational phase

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Study area	Short	Moderate	Improbable
	2	2	6	2
	Result: Low (-20)			
Mitigation measures	**Comments/Mitigation:** Tank and Pipe work Installation • The tank installation must comply with the necessary KEBS and API standards; • The base of the tank farm should be sloped and graded to a sump to allow collection of any hydrocarbon product leaking from within the secondary containment area; • The tank farm should be lined with an impervious liner to prevent infiltration of product to the sub-surface should a leak/spill occur; • All pipelines must be fuel-grade HDPE piping with thermo-weld fittings or equivalent. Monitoring • Accurate stick records of fuel product must be maintained; • During monitoring, wet stock reconciliation records must be checked to ensure discrepancies can be identified and investigated; and If product loss is suspected, the AST and pipe work must be tested to identify potential problem areas.			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Localized	Very short	Minor	Highly improbable
	1	1	2	1

	Result: Low (-4)

10.9 Solid and liquid waste generation and management impacts

10.9.1 Aspects and impacts

Table 56 summarizes the solid and liquid waste generation and management aspects which could potentially impact upon the environment from the proposed development of the Kapese ISB during both the construction and operational phases.

Table 56: Solid and liquid waste related aspects and potential impacts

Aspect	Potential Impacts
Kapese ISB construction	• Illegal dumping of construction waste
Wastewater Treatment Plant	• Air, soil, surface water and contamination from system leakage. Vector infestation.
Hazardous waste	• Improper disposal of used oil, solvents, etc.

10.9.2 Significance

Predicted impacts are rated in Tables 57 – 59.

Table 57: Impact significance for illegal dumping of construction waste

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Regional	Short-term	Low	Probable
	3	2	4	3
	Result: Low (-27)			
Mitigation measures	**Comments/Mitigation:** • Waste must be categorized by each contractor and disposed of in accordance with the requirements of L.N. 121: Waste Management Regulations, 2006 (this			

	applies to general and hazardous waste); • General waste is to be collected by a NEMA licensed waste disposal transporter; • The contractor should provide an adequate number of waste receptacles for general waste at points around the construction site, and a single collection point for hazardous waste; • No wastewater shall be disposed to soil; • Litter and waste that is generated to be adequately stored and disposed of in an approved manner; No burning of waste is allowed; and • The use of temporary toilets during the construction phase of the development must not cause any pollution to water resources as well as pose a health hazard.

Mitigation Status	Extent	Duration	Magnitude	Probability
With mitigation	Study area	Very short	Minor	Improbable
	2	1	2	2
	Result: Low (-10)			

Table 58: Impact significance arising from the waste water treatment plant-operational phase

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Study area	Short	Low	Probable
	2	2	4	3
	Result: Low (-24)			
Mitigation measures	**Comments/Mitigation:** • The wastewater treatment plant should be bunded to prevent overflow of sewage from the tanks. • Visual inspections should be undertaken based on the OEM recommendations. <u>Monthly:</u>			

	• Sample and analyse effluent for the compliance with discharge parameters. <u>Annually:</u> • Change all lubricants as required. Infrequently: • Desludge septic tank as required.

Mitigation Status	Extent	Duration	Magnitude	Probability
With mitigation	Localized	Very short	Minor	Improbable
	1	1	2	2
	Result: Low (-8)			

Table 59: Impact significance for improper management of hazardous wastes-operational phase

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	National	Medium term	Low	Probable
	4	3	4	3
	Result: Medium (-33)			
Mitigation measures	**Comments/Mitigation:** • All hazardous wastes must be collected in separate receptacles which are properly labeled; • All hazardous wastes generated from the ISB must be collected and disposed in accordance with the requirements of L.N. 121: Waste Management Regulations, 2006; • No hazardous wastes shall be dumped anywhere between the Kapese ISB and disposal point; • A NEMA licensed transporter for hazardous waste must be appointed by each contractor that will generate hazardous waste; • Each contractor will fill out a “Waste Tracking Sheet” as			

	shown in L.N. 121: Waste Management Regulations, 2006			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Study area	Very short	Minor	Improbable
	2	1	2	2
	Result: Low (-10)			

10.10 Storm water management impacts

10.10.1 Aspects and impacts

Table 60 summarizes the storm water management aspects which could potentially impact upon the environment from the proposed development of the Kapese ISB during both the construction and operational phases.

Table 60: Storm water related aspects and potential impacts

Aspect	Potential Impacts
Kapese ISB construction	• Contamination of soils and surface water and transportation of contaminants downstream; • Soil erosion in vulnerable areas. • Flooding of ISB during storm events
Kapese ISB operation	• Flooding of ISB during storm events

10.10.2 Significance

Predicted impacts are rated in Tables 61 – 62.

Table 61: Significance of stormwater impacts-construction phase

Mitigation Status	Extent	Duration	Magnitude	Probability

Without mitigation	Study area	Short	High	Highly probable
	2	2	8	4
	Result: Medium (-48)			
Mitigation measures	**Comments/Mitigation:** • All water flow must be directed through controlled management into the existing natural drainage line; • During construction, un-channeled flow must be controlled to avoid soil erosion. If the area is to be accessed by construction vehicles, berms may be used. They should serve to channel concentrated flow into retention ponds or areas protected with hay bales for flow attenuation and sediment capture • Conduct a feasibility to determine if the western and southern bunds can be constructed; • All hazardous substances are to be stored within secondary containment in a suitable storage facility which has adequate bunding; • Conclude the site drainage designs and determine the magnitude and impact of the higher discharges downstream. Based on this, construct a drainage system that will redirect rain water away from the functional areas and prevent flooding of the ISB; • Provide a small drift and hump at the entrance to the ISB in order to prevent flooding of this point • The discharge of any pollutants such as cement, concrete, chemicals and fuels into any water sources and the stormwater system must be prevented.			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Study area	Very short	Low	Improbable
	2	1	4	2
	Result: Low (-18)			

Table 62: Significance of stormwater impacts-operational phase

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Study area	Short	Low	Probable
	2	2	4	3
	Result: Low (-24)			
Mitigation measures	**Comments/Mitigation:** • All surface spillages must be contained on site through channels and trenches, these must be diverted to an oil / water separator or sump of sufficient capacity; • All areas within the ISB where petroleum products handling (receipt and refueling) will occur should have an impermeable surface to prevent infiltration of fuel into the subsurface soils with surface runoff designed to flow towards a centralized collection point which is connected to an oil/water separator; • Each contractor is responsible for ensuring compliance with the requirements of L.N. 120: Water Quality Regulations, 2006 as it applies to their respective work area. Tullow will acquire an Effluent Discharge License (EDL) for the entire ISB and will be responsible for ensuring compliance with the conditions set within it; • The oil / water separator should be regularly checked and kept clean to prevent blockage and overflow. Any material collected must be disposed at an appropriately registered waste disposal site; • All accidental surface spills of oil or fuel must be contained on-site and diverted to the oil/water separator			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Study area	Very short	Minor	Improbable
	2	1	2	2
	Result: Low (-10)			

10.11 Noise impacts

10.11.1 Aspects and impacts

Table 66 summarizes the noise aspects which could potentially impact upon the environment from the proposed development of the Kapese ISB during both the construction and operational phases.

Table 63: Noise related aspects and potential impacts

Aspect	Potential Impacts
Kapese ISB construction	• Disturbance of surrounding communities through noisy machinery and general construction noises.

10.11.2 Significance

Predicted impacts are rated in Table 64.

Table 64: Impact significance for noise impacts-construction phase

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Study area	Short	Low	Probable
	2	2	4	3
	Result: Low (-24)			
Mitigation measures	**Comments/Mitigation:** • Construction activities should be limited to daylight hours; •			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**

With mitigation	Study area	Very short	Minor	Improbable
	2	1	2	2
	Result: Low (-10)			

10.12 Air quality impacts

10.12.1 Aspects and impacts

Table 65 summarizes the air quality aspects which could potentially impact upon the environment from the proposed development of the Kapese ISB during both the construction and operational phases.

Table 65: Air quality related aspects and potential impacts

Aspect	Potential Impacts
Kapese ISB construction and operational phase	• Dust generation, vehicle exhaust emissions

10.12.2 Significance

Predicted impacts are rated in Tables 66.

Table 66: Impact significance for air quality impacts-construction and operational phases

Mitigation Status	Extent	Duration	Magnitude	Probability
Without mitigation	Study area	Short	Low	Probable
	2	2	4	3
	Result: Low (-24)			
Mitigation measures	**Comments/Mitigation:** • During the construction and operational phases, Tullow should consider using dust suppression techniques near sensitive receptors such as homes near access roads leading to the ISB; • Construction vehicles travelling along the access roads			

	must adhere to speed limits to avoid creating excessive dust, especially during dry and windy conditions; • Where dust nuisance is unavoidable, screening is to be provided; and no fires are allowed on-site.			
Mitigation Status	**Extent**	**Duration**	**Magnitude**	**Probability**
With mitigation	Study area	Very short	Minor	Improbable
	2	1	2	2
	Result: Low (-10)			

Table 67 provides a summary of significance of each identified impact.

Table 67: Summary of significance of each identified impact

Impact	Significance			
	Construction phase		Operational phase	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Social impacts				
• Increase in employment during the construction and operational phases	**Low (+)**	**High (+)**	**Medium (+)**	**High (+)**
• Economic growth of the area	**Low (+)**	**Low (+)**	**Low (+)**	**Medium (+)**
• Opportunities for 'training and skills development'	**Low (+)**	**Medium (+)**	**Low (+)**	**Medium (+)**
• Increase in traffic and related incidents	**Medium (-)**	**Low (-)**	**Medium (-)**	**Low (-)**
• Risk of Sexually Transmitted Diseases (STIs)	**Medium (-)**	**Low (-)**	**Medium (-)**	**Low (-)**

Impact	Significance			
	Construction phase		Operational phase	
	Without mitigation	With mitigation	Without mitigation	With mitigation
• Project induced in-migration	**Medium (-)**	**Low (-)**		
• Increase in crime	**Medium (-)**	**Low (-)**	**Medium (-)**	**Low (-)**
Cultural heritage impacts				
• Paleontological finds impacts;	**Medium (-)**	**Low (-)**		
• Archaeological finds impacts;	**High (-)**	**Low (-)**		
• Impacts on graves;	**Medium (-)**	**Low (-)**		

Impact	Significance			
	Construction phase		Operational phase	
	Without mitigation	With mitigation	Without mitigation	With mitigation
• Cultural Landscape and Sense of Place impacts;	**High (-)**	**Low (-)**		
• Social and Cultural Space impacts;	**Medium (-)**	**Low (-)**	**Medium (-)**	**Low (-)**
• Loss of grazing and browsing land;	**Medium (-)**	**Low (-)**	**Medium (-)**	**Low (-)**
• Loss of income from selling charcoal;	**Medium (-)**	**Low (-)**	**Medium (-)**	**Low (-)**
• Loss of building materials for homes;	**Medium (-)**	**Low (-)**	**Medium (-)**	**Low (-)**
• Lack of accessibility for community interaction;	**Medium (-)**	**Low (-)**	**Medium (-)**	**Low (-)**

Impact	Significance			
	Construction phase		Operational phase	
	Without mitigation	With mitigation	Without mitigation	With mitigation
• Lack of accessibility to essential services	**Medium (-)**	**Low (-)**	**Medium (-)**	**Low (-)**
Ecological impacts				
•	**Medium (-)**	**Low (-)**	**Medium (-)**	**Low (-)**
• Soil erosion	**Medium (-)**	**Low (-)**	**Medium (-)**	**Low (-)**
• Habitat Alteration	**Medium (-)**	**Low (-)**	**Medium (-)**	**Low (-)**
• Disturbance of faunal movement and behavior	**Medium (-)**	**Low (-)**	**Medium (-)**	**Low (-)**

Impact	Significance			
	Construction phase		Operational phase	
	Without mitigation	With mitigation	Without mitigation	With mitigation
• Alien Invasive Species	**Medium (-)**	**Low (-)**	**Medium (-)**	**Low (-)**
• Dust and Exhaust Impacts	**Medium (-)**	**Low (-)**	**Medium (-)**	**Low (-)**
Health and safety impacts				
• Minor, serious or fatal injury to staff members employed to construct the Kapese ISB	**Medium (-)**	**Low (-)**	**Low (-)**	**Low (-)**
• Snake, scorpion and insect bites	**Low (-)**	**Low (-)**	**Low (-)**	**Low (-)**
• Radiation sources			**Medium (-)**	**Low (-)**

Impact	Significance			
	Construction phase		Operational phase	
	Without mitigation	With mitigation	Without mitigation	With mitigation
• Use of explosives			**Medium (-)**	**Low (-)**
• Use of lifting equipment	**Medium (-)**	**Low (-)**	**Medium (-)**	**Low (-)**
• Fires associated with improper chemical storage			**Medium (-)**	**Low (-)**
Fire and explosion impacts				
• On-site fires and explosions			**Low (-)**	**Low (-)**
Traffic impacts				
• Heavy vehicles entering and exiting the site during loading and off-loading of construction equipment;	**Low (-)**	**Low (-)**		

Impact	Significance			
	Construction phase		Operational phase	
	Without mitigation	With mitigation	Without mitigation	With mitigation
• Increase in traffic volumes to the Kapese ISB			**Medium (-)**	**Low (-)**
Impacts due to chemical/fuel leaks and spills				
• Sub-surface soil contamination from leaking AST(s) or refilling			**Low (-)**	**Low (-)**
Solid and liquid waste generation and management				
• Illegal dumping of construction waste	**Low (-)**	**Low (-)**	**Low (-)**	**Low (-)**
• Air, soil, surface water and contamination from system leakage.			**Low (-)**	**Low (-)**
• Improper disposal of hazardous wastes (e.g. used oil, solvents, etc.)			**Medium (-)**	**Low (-)**

Impact	Significance			
	Construction phase		Operational phase	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Stormwater management impacts				
• Contamination of soils and surface water and transportation of contaminants downstream; creation of soil erosion in vulnerable areas; flooding of ISB during storm events	**Medium (-)**	**Low (-)**	**Low (-)**	**Low (-)**
Noise impacts				
• Disturbance of surrounding communities through noisy machinery and general construction noises	**Low (-)**	**Low (-)**	**Low (-)**	**Low (-)**
Air quality impacts				
• Dust generation during construction and operations	**Low (-)**	**Low (-)**	**Low (-)**	**Low (-)**

11 Environmental and social management plan

This Environment and Social Management Plan (ESMP) seeks to manage and keep to a minimum the negative impacts of the proposed Kapese ISB project and at the same time, enhance the positive and beneficial impacts.

11.1 Objectives of the ESMP

The objectives of the ESMP are to:

- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels;
- To identify measures that could optimize beneficial impacts;
- To create management structures that address the concerns and complaints of stakeholders with regards to the development;
- To establish a method of monitoring and auditing environmental management practices during all phases of development;
- Ensure that the construction and operational phases of the project continues within the principles of Integrated Environmental Management;
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- Ensure that the safety recommendations are complied with;
- Propose mechanisms for monitoring compliance with the ESMP and reporting thereon; and
- Specify time periods within which the measures contemplated in the final environmental management plan must be implemented, where appropriate.

11.2 ESMP roles and responsibilities

Several professionals will form part of the construction team. The most important from an environmental perspective are the Project Manager, the Project EHS Officer, the Contractors that Tullow is providing work space to, and the developer (Tullow).

The Project Manager is responsible for ensuring that the ESMP is implemented during the **pre-construction** and **construction** phases of the project.

The Project EHS Officer is responsible for monitoring the implementation of the ESMP during the design, **pre-construction** and **construction** phases of the project.

Each of Tullow's appointed Contractors is responsible for abiding by the mitigation measures of the ESMP which are implemented by the Project Manager during the **construction** phase.

The Project Manager is responsible for ensuring that each of Tullow's Contractors complies with the mitigation measures and ESMP requirements during the **design**, **pre-construction** and **construction** phases of the project.

Tullow and its contractors will be responsible for implementation of the ESMP during the **operational** and **decommissioning** phases of the project. Decommissioning will however entail the appointment of a new professional team and responsibilities will be similar to those during the design, pre-construction and construction phases. It is unlikely that the Kapese ISB will be decommissioned for several years.

11.2.1 Project Manager

The Project Manager is responsible for overall management of the project and ESMP implementation. The following tasks will fall within his/her responsibilities:

- Be aware of the findings and conclusions of the Environmental and Social Impact Assessment and the conditions stated within the EIA License issued by NEMA;
- Be familiar with the recommendations and mitigation measures of this ESMP, and implement these measures;
- Monitor site activities on a daily basis for compliance;

- Conduct internal audits of the construction site against the ESMP;
- Confine the construction site to the demarcated area; and
- Rectify transgressions through the implementation of corrective action(s).

11.2.2 Environmental Manager

The Tullow Environmental Manager is responsible for the implementation of the ESMP during the construction phase as well as liaison and reporting to Tullow, Tullow's appointed Contractors and Authorities. The following tasks will fall within his/her responsibilities:

- Be aware of the findings and conclusions of the Environmental and Social Impact Assessment and the conditions stated within the EIA License;
- Be familiar with the recommendations and mitigation measures of this ESMP;
- Conduct periodic (e.g. monthly) audits of the construction site according to the ESMP and EIA License conditions;
- Educate Tullow's Contractors about the management measures of the ESMP and EIA License conditions;
- Regularly liaise with the Tullow's Contractors and the Project Manager on the ESMP implementation;
- Recommend corrective action for any environmental non-compliance incidents on the construction site; and
- Compile a regular report highlighting any non-compliance issues as well as good compliance with the ESMP.

11.2.3 Tullow Service Contractor

Each Tullow appointed Contractor (e.g. AFEX, SLB, BHI, etc.) is responsible for the implementation and compliance with recommendations and conditions of the ESMP. The respective Tullow Contractor will:

- Ensure compliance with the ESMP at all times during construction;

- Maintain an environmental register which keeps a record of all incidents which occur on the site during construction. Examples of such incidents include:
    - Public involvement/complaints;
    - Health and safety incidents;
    - Incidents involving Hazardous materials stored on site; and
    - Noncompliance incidents.

11.2.4 Service Contractor EHS Officer

Each Tullow appointed Contractor will appoint an EHS Officer to monitor activities on site on a daily basis. The EHS Officer will report to Tullow's Environmental Manager on compliance with the ESMP. The Contractor's EHS Officer must report any major incidents immediately to the Tullow Field EHS Advisor or Environmental Manager.

11.2.5 Environmental management responsibilities

The following are the environmental management responsibilities of the various parties during construction and operational phases. Unless otherwise stated the ESMP will be adhered to as follows:

- The Contractor's EHS Officer will be accountable for compliance with this ESMP during the construction phase as it applies to their work area;
- The monitoring party will be Tullow's Environmental Manager;
- The method of record keeping will be regular inspections depending on the stage of the project;
- The inspection technique will include a review of records that will be kept on site by the Contractor EHS Officer and/or site inspections;
- Tullow will bear ultimate responsibility for environmental management.

11.3 Environmental monitoring

An monitoring program will be implemented for the duration of the construction phase of the project. This program will include:

- Monthly environmental inspections to confirm compliance with the ESMP and EIA License conditions. These inspections can be conducted randomly and do not require prior arrangement with the Project Manager;
- Compilation of an inspection report complete with corrective actions for implementation;
- Monthly EHS committee meetings to be held to ensure compliance with the OSHA and its subsidiary legislation.

The EHS Officer shall keep a photographic record of any damage to areas outside the demarcated site area. The date, time of damage, type of damage and reason for the damage shall be recorded in full to ensure the responsible party is held accountable.

During the pre-construction, construction and operational phases, Tullow will implement its Grievance Mechanism.

Each Tullow appointed Contractor (e.g. AFEX, SLB, BHI, etc.) shall be responsible for acquiring all necessary permits during the construction phase of the project. Such licenses include any abstraction of water permits, local authority approvals for camp site locations and operations, extraction of aggregates from borrow pits and their rehabilitation, etc.

11.3.1 Compliance with the ESMP and associated documentation

A copy of the ESMP must be kept on site during the construction period at all times. The ESMP will be made binding on all contractors operating on the site. It should be noted that in terms of the principles of environmental management espoused through the EMCA, those responsible for environmental damage must pay the repair costs both to the environment and human health measures to reduce or prevent further pollution and/or environmental damage (the polluter pays principle).

11.3.2 Training and Awareness

11.3.2.1 Training of Construction Workers

The construction workers must receive basic training in environmental awareness, including the storage and handling of hazardous substances, minimization of disturbance to sensitive areas, management of waste, and prevention of water pollution. They must also be appraised of the ESMP's requirements.

11.3.2.2 Contractor Performance

The Tullow appointed Contractor must ensure that the conditions of the ESMP are adhered to.

11.4 ESMP requirements for pre-construction phase

The requirements that need to be fulfilled during the pre-construction phase of the project are as follows:

- There should be continuous liaison between Tullow, its appointed Contractor and the community to ensure all parties are appropriately informed of construction phase activities at all times;
- The Tullow appointed Contractor must adhere to all conditions of the ESMP;
- The Tullow appointed Contractor should plan its construction program taking cognizance of climatic conditions especially wet seasons and disruptions that can be caused by heavy rains;
- The Kapese Community Liaison Office must keep a proper record of all complaints received and actions taken to resolve the complaints;
- The Tullow Environmental Manager and Contractor's EHS officer should implement this ESMP;
- Internal environmental inspections and audits should be undertaken during and upon completion of construction. The frequency of these audits should be quarterly;

A formal communications protocol should be set up during this phase. The aim of the protocol should be to ensure that effective communication on key issues that may arise during construction be maintained between key parties such as the Project Manager, Environmental Manager, Social Performance Manager and each of Tullow's contractors. The protocol should ensure that concerns/issues raised by stakeholders are formally recorded and considered and where necessary acted upon. If necessary, a forum for communicating with key stakeholders on a regular basis may need to be set up. The communications protocol should be maintained throughout the construction phase.

Given in Table 68, is the pre-construction phase environment and social management plan for the Kapese ISB.

Table 68: Pre-construction phase Environmental and Social Management Plan

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
Pre-construction phase impacts	1) Each contractor allocated a work area within the Kapese ISB to comply with the conditions of the EIA License for the project; 2) Maintain records of environmental incidents and avail a copy of these records to relevant agencies on request throughout the construction phase; 3) Identify and confirm suitable sites for the storage areas for materials; 4) Store construction equipment in construction camps. Ensure oil changes take place on an impermeable surface such as reinforced concrete slab; 5) Provide as much as possible opportunities for employment to persons from the local areas within Kapese village and Lokichar area in general; 6) Train site staff on the following areas of environmental management; a) Environmental awareness training for construction staff, concerning the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and identification of archaeological artifacts; b) Project Manager shall ensure that the training and capabilities of the Contractor's site staff are adequate to carry out the designated tasks; c) Operators of construction equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with	Tullow, Environmental Manager	Bi-monthly

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	their tasks; d) No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor and assured competent; e) Staff should be educated as to the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources and receive the necessary safety training.		

11.5 ESMP requirements for construction phase

11.5.1 Site preparation

Site clearing will be limited to the area required by each Tullow Contractor allocated work area. Site clearing must take place in a phased manner, as and when required. Areas which are not to be constructed on within one month of time must not be cleared to reduce erosion risks. The area to be cleared must be clearly demarcated and this footprint strictly maintained.

11.5.2 Establishment of construction materials yards

Tullow is allocating work areas to each of its contractors who will be housed within the Kapese ISB. Each contractor is responsible and accountable for the construction of their work areas and materials yard.

Each Contractor will undertake establishment of their work area in an orderly manner and all required amenities shall be installed at its work area before the main workforce move onto site. Each work area shall have the necessary ablution facilities with chemical toilets at commencement of construction. The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed other than in supplied facilities.

The Contractor shall supply waste collection bins and all solid waste collected shall be disposed of using NEMA approved waste handlers. A Waste Tracking Sheet required by Legal Notice 121: Waste Management Regulations, 2006 will be obtained by the Contractor and kept on file. The disposal of waste shall be in accordance with the Waste Management Regulations, 2006. Under no circumstances may any form of waste be burnt on site.

Table 69 presents the construction phase Environment and Social Management Plan for the Kapese ISB.

Table 69: Construction phase Environmental and Social Management Plan

Impact	Environmental and Social Management Plan	Responsibility	Frequency/ Monitoring requirement
Inconsistent traffic and access management during construction	**Construction traffic** 1) Clearly define construction routes and required access roads; 2) Use the minimum number of trips for delivering construction plant and equipment; 3) Strictly control the access of all construction and material delivery vehicles especially during wet weather to avoid compaction and damage to the topsoil structure; 4) Traffic flows in/out of the ISB will be carefully controlled through the use of trained site staff positioned at key entry and exit points. 5) 6) Service vehicles and equipment regularly to avoid contamination of soil from oil and hydraulic fluid leaks, etc. Servicing of vehicles and equipment must be done off-site and on an impermeable surface such as concrete; **Access** 1) Undertake a route hazard survey of the road from Lokichar leading up to the Kapese ISB. Based on the results of the route hazard survey,	Contractor, Project Manager	Bi-weekly

Impact	Environmental and Social Management Plan	Responsibility	Frequency/ Monitoring requirement
	incorporate the relevant elements of hazard areas in the journey management plan and procedure for use during the construction and operational phases 2) Position entry and exit points strategically to ensure minimal effects on traffic; 3) Clearly signpost primary routes to the site and issue to all suppliers and Sub-Contractors. 4) Where new access roads are constructed, this must be done according to design. Drainage channels shall be suitably designed to ensure erosion does not occur, especially at the outflow points. The new access road shall be designed to allow for the natural flow of water where required. Crossing of eroded areas on access routes to new sites shall be thoroughly planned and installed according to design. All areas susceptible to erosion shall be protected with suitable erosion control measures from the onset of the project. Prevention is the ultimate aim, as restoration is normally difficult and costly. **Road maintenance** 1) All damaged roads shall be rehabilitated using suitable measures. In the event of rehabilitation work being required on private roads, such work will be done to the original specifications of the private road;		

Impact	Environmental and Social Management Plan	Responsibility	Frequency/ Monitoring requirement
	2) Access roads should be maintained in good condition by attending to potholes, corrugations and stormwater damage as soon as these develop. **General** 1) Safety requirements shall be complied with at all times during the construction phase. All equipment transported shall be clearly labeled as to their potential hazards according to specifications. All the required safety labeling on the containers and trucks used shall be in place; 2) The Contractor shall ensure that all the necessary precautions against damage to the environment and injury to persons are taken.		
Improper setup and operation of Contractor's work area	**Site of construction camp** 1) Each contractor to seek approval from Tullow for the location of their respective construction camp. Factors to consider during siting of construction camps include location of local residents and/or ecologically sensitive areas, including flood zones and slip/unstable zones. If a contractor chooses to locate the camp site on private land, he must get prior permission from both the Project Manager and respective landowner; 2) Minimize the size of the construction camp (especially where natural vegetation or grassland has had to be cleared for its construction); 3) Provide adequate drainage around the construction camp site to avoid	Contractor, Tullow Environmental Manager, Tullow Field Operations Manager	Bi-weekly

Impact	Environmental and Social Management Plan	Responsibility	Frequency/ Monitoring requirement
	standing water and/or sheet erosion. **Storage of materials (including hazardous materials)** 1) Choose storage area location by considering prevailing winds, general onsite topography and water erosion potential of the soil. Impervious surfaces must be provided where necessary; 2) Designate, demarcate, fence off and secure all storage areas to minimize the risk of crime; storage areas should be safe from access by unauthorized persons; 3) Provide fire prevention facilities at all storage facilities; 4) Store all hazardous materials such as oils, paints, thinners, fuels, chemicals, etc. in properly constructed and impermeable bunded areas. Hazardous materials must not be allowed to contaminate the subsurface or enter into drainage systems. Siting of hazardous material storage areas must be approved by the Project Manager. 5) Each contractor to acquire MSDSs for all chemicals and hazardous substances used on site. Training on environmental impacts of chemicals and hazardous substances and PPE required to worn must be provided to the users.		

Impact	Environmental and Social Management Plan	Responsibility	Frequency/ Monitoring requirement
	6) Hazardous material storage areas must be signposted clearly 7) Use a NEMA licensed waste handler for disposal of all used oils from the camp sites. A waste tracking sheet must be completed as required by L.N. 121: Waste Management Regulations 2006 whenever used oils are being disposed. 8) Dispose of any excess concrete mixes in consultation with the Project Manager. 9) Immediately contain, recover and cleanup any spillages that may occur during the construction phase. All spillages must be reported to the Field EHS Operations Manager and Project Manager. **Drainage of construction camp** 1) Ensure that all potentially contaminated run-offs from the construction camp meet the discharge limits set under Legal Notice 120: Water Quality Regulations. Run-off from the camp site must NOT discharge into neighbors' properties or into adjacent wetlands, rivers or streams without a valid EDL issued to Tullow by NEMA. **End of construction** 1) Rehabilitate all storage areas after construction has been completed on site and all excess material has been removed. Any spilled concrete shall		

Impact	Environmental and Social Management Plan	Responsibility	Frequency/ Monitoring requirement
	be removed and soil compacted during construction shall be ripped, leveled and re-vegetated; 2) Store construction materials, soil stockpiles, machinery and other equipment in designated areas; 3) The construction camp must be kept clear of litter at all times. Spillages within the construction camp need to be cleaned up immediately and disposed of in the hazardous skip bin for correct disposal. No open fires are allowed within the construction camp and no wood from surrounding vegetation may be used to create a fire.		
Lack of EHS training for construction staff	**Environmental training** 1) Ensure that all site personnel have a basic level of environmental awareness training. The Tullow contractor must submit a proposal for this training to the Tullow Environmental Manager for approval. Topics covered should include; • What is meant by “Environment”; • Why the environment needs to be protected and conserved; • How construction activities can impact on the environment;	Tullow contractor, Tullow Field EHS Officer	Monthly

Impact	Environmental and Social Management Plan	Responsibility	Frequency/ Monitoring requirement
	• What can be done to mitigate against such impacts; • Awareness of emergency and spills response provisions; and • Social responsibility during construction e.g. being considerate to local residents. 1) It is the Tullow Contractor's responsibility to provide a site foreman with no less than 1 hour's environmental training and to ensure that the foreman has sufficient understanding to pass this information onto the construction staff; 2) Training should be provided to the staff members on the use of the appropriate fire-fighting equipment. Translators are to be used where necessary; 3) Use should be made of environmental awareness posters on site; 4) The need for a "clean site" policy also needs to be explained to the workers; 5) Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their tasks.		

Impact	Environmental and Social Management Plan	Responsibility	Frequency/ Monitoring requirement
	Monitoring of environmental training 1) The Contractor must monitor the performance of construction workers to ensure that the points relayed during their induction have been properly understood and are being followed. Toolbox talks are recommended.		
Impacts related to soils and geology	**Soil erosion** 1) Provide wind screening and stormwater control to prevent soil loss from the site; 2) Use silt fences and/or sand bags in areas that are susceptible to erosion; 3) Sensitive areas need to be identified prior to construction so that the necessary precautions can be implemented. 4) Regularly maintain all erosion control mechanisms; 5) Retain vegetation where possible to avoid soil erosion. Vegetation clearance should be phased to ensure that the least area of soil is exposed to potential erosion at any one time; 6) Re-vegetate disturbed surfaces after construction activities are completed; **Soil contamination**	Tullow, Contractor, Tullow Environmental Manager	Monthly

Impact	Environmental and Social Management Plan	Responsibility	Frequency/ Monitoring requirement
	1. Each contractor will arrange to remove all construction related contaminated topsoil to the full depth of pollution and replace it at his own expense with approved topsoil; 2. Each contractor will be responsible for remediating any polluted topsoil.		
Impacts related to surface water and groundwater	**Sanitation** 1) Provide adequate sanitary facilities for male and female construction workers in accordance with the Public Health Act requirements; 2) Ensure that sanitary facilities are regularly serviced and emptied to reduce the risk of surface or groundwater pollution. **Hazardous materials** 1) Place all hazardous materials in bunded containment areas with sealed surfaces; 2) All hazardous substances must be stored at least 50m from any water body on site; 3) Contaminated wastewater must be managed by the Contractor to ensure existing water resources on the site are not contaminated. All wastewater from general activities in the work area shall be collected, treated and	Contractor	Weekly

Impact	Environmental and Social Management Plan	Responsibility	Frequency/ Monitoring requirement
	removed from the site for appropriate disposal. **Public areas** 1) Food preparation areas should be provided with adequate washing facilities and food refuse should be stored in sealed refuse bins which should be removed from site on a regular basis; 2) The Contractor should take steps to ensure that littering by construction workers does not occur and persons should be employed on site to collect litter from the site and immediate surroundings, including litter accumulating at fence lines; 3) No washing or servicing of vehicles will be allowed on permeable surfaces. **Water resources** 1) Treated water (or another source approved by the Environmental Manager) should instead be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, compacting, etc. 2) An Effluent Discharge License shall be acquired from NEMA for the camp site to ensure effluent discharge compliance in accordance with the discharge limits stated in L.N. 120: Water Quality Regulations, 2006.		

Impact	Environmental and Social Management Plan	Responsibility	Frequency/ Monitoring requirement
Impacts of air quality	**Dust control** 1) Excavations and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of dust into neighboring areas; 2) The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to a Landowner or neighboring communities; 3) A speed limit of 40km/h should be observed in the study area and 20km/h within the ISB; 4) Any complaints emanating from the lack of dust control shall be attended to immediately by the Contractor. **Rehabilitation** 1) The contractor will commence rehabilitation of exposed soil surfaces as soon as practical after completion of earthworks. **Fire prevention** 1) No open fires shall be allowed on site. All cooking shall be done in demarcated areas that are safe and cannot cause runaway fires; 2) The Contractor shall have operational fire-fighting equipment available on	Contractor	Daily

Impact	Environmental and Social Management Plan	Responsibility	Frequency/ Monitoring requirement
	site at all times. The level of firefighting equipment must be assessed and evaluated thorough a fire risk assessment process.		
Impacts of noise on surrounding areas	1) The Contractor should comply with applicable sections of Legal Notice 61: Noise and Vibration Pollution Control Regulations, 2009 for environmental noise and Legal Notice 25: Noise Prevention and Control Regulations, 2005 for occupational noise; where necessary hearing protection should be worn; 2) Construction site yards, workshops and other noisy fixed facilities should be located well away from noise sensitive areas. Truck traffic should be routed away from noise sensitive areas, where possible; 3) Construction activities are to be contained to reasonable hours during the day and evening. Night-time activities near noise sensitive areas should not be allowed; 4) With regard to unavoidable very noisy construction activities in the vicinity of noise sensitive areas, the Contractor and his EHS Officer should liaise with local residents on how best to minimize impact, and the local population should be kept informed of the nature and duration of intended activities;	Contractor	Daily

Impact	Environmental and Social Management Plan	Responsibility	Frequency/ Monitoring requirement
	5) Noise from laborers must be controlled; 6) Noise suppression measures must be applied to all construction equipment. Construction equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the Contractor may be instructed to remove the offending vehicle or machinery from site; 7) The Contractor must take measures to discourage laborers from loitering in the area and causing noise disturbance. Where possible labor shall be transported to and from the site by the Contractor or his Sub-Contractors.		
Impacts on ecology	**Existing vegetation** 1) Existing indigenous vegetation must be retained where possible. Vegetation will be removed as it becomes necessary; 2) Materials should not be delivered to the site prematurely which could result in additional areas being cleared or affected; 3) No vegetation to be used for firewood. **Rehabilitation** 1) All damaged areas shall be rehabilitated upon completion of the	Contractor	Weekly

Impact	Environmental and Social Management Plan	Responsibility	Frequency/ Monitoring requirement
	construction to as near pre-construction conditions; 2) All natural areas impacted during construction must be rehabilitated with locally indigenous vegetation typical of the representative botanical unit; 3) Rehabilitation must take place as soon as construction is complete to avoid the infiltration of alien species and soil erosion; **Permits** 1) Permits for removal of any protected species must be obtained from KFS or other relevant lead agency should such species be affected. 2) The construction workspace must be well demarcated and no construction activities must be allowed outside of the demarcated footprint; 3) Only vegetation within the construction footprint area to be excavated must be removed. Vegetation removal must be phased in order to reduce impact of construction; 4) Construction site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas. 5) Construction areas must be well demarcated and these areas strictly adhered to.		

Impact	Environmental and Social Management Plan	Responsibility	Frequency/ Monitoring requirement
	6) Soils must be kept free of petrochemical solutions that may be kept on site during construction. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora. **Utilization of resources** 1) Gathering of firewood or any other natural material onsite or in areas adjacent to the site is prohibited unless with prior approval of the Project Manager.		
Impacts arising from inconsistent waste management	**Litter management** 1) Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site; 2) A housekeeping team should be appointed to regularly maintain the litter and rubble situation on the construction site; 3) Waste disposal will need to take place in accordance with Legal Notice 121: Waste Management Regulations, 2006; 4) Littering by the employees of the Contractor shall not be allowed under any circumstances. Each Contractor's EHS Officer shall monitor the neatness of their work area as well as the Contractor's campsite; 5) Receptacle containers should be maintained on site. These should be kept	Contractor, Field EHS Advisor, Contractor EHS Officer	Weekly

Impact	Environmental and Social Management Plan	Responsibility	Frequency/ Monitoring requirement
	covered and arrangements made for them to be disposed regularly from the site; 6) Waste Tracking Sheets shall be provided for the Tullow Environmental Manager's inspection. **Hazardous waste** 1) All hazardous materials must be carefully stored and disposed offsite using NEMA approved waste handlers; 2) Contaminants will be stored safely to avoid spillage; 3) Machinery must be properly maintained to keep oil leaks in check. **Sanitation** 1) The Contractor shall install mobile chemical toilets on the site; 2) Staff shall be sensitized to the fact that they should use these facilities at all times. No indiscriminate sanitary activities on site shall be allowed; 3) There should be enough toilets available to accommodate the workforce in accordance with the Public Health Act requirements. Male and female toilets must be accommodated separately;		

Impact	Environmental and Social Management Plan	Responsibility	Frequency/ Monitoring requirement
	4) Toilets shall be serviced regularly and the Contractor's EHS Officer shall inspect toilets; 5) Under no circumstances may open areas, neighbors fences or the surrounding bush be used as a toilet facility; 6) Potable water must be provided for all construction staff. **Remedial actions** 1) Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site; 2) Excavation of contaminated soil will involve careful removal of soil using appropriate tools/machinery to storage containers until disposed of using NEMA approved waste handlers; 3) If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent materials; 4) If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure. 5) Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use.		

Impact	Environmental and Social Management Plan	Responsibility	Frequency/ Monitoring requirement
	6) Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment, and stored in adequate containers until appropriately disposed of.		

11.6 ESMP requirements for operational phase

Given in Table 70, is the operational phase ESMP for the Kapese ISB while Table 71 presents the operational phase social management plan.

Table 70: Operational phase ESMP

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
Impacts associated with construction site decommissioning	**Removal of equipment** 1) Remove all structures comprising the construction camp. Check for any previous construction related chemical soil contamination and cleanup. Return the ground conditions within the camp sites to their near original state by undertaking the necessary landscaping. **Associated infrastructure** 1) All rubble is to be removed from the site to an approved disposal site as approved by the Project Manager. Burying of rubble on site is prohibited. 2) The site is to be cleared of all litter. 3) The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials. 4) Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Project Manager. 5) All residual stockpiles must be removed or spread on site as directed	Contractor	Weekly

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	by the Project Manager.		
Impacts associated with operations and maintenance of individual work areas	**Maintenance** 1) All applicable standards, legislation, policies and procedures must be adhered to during operation; 2) Periodic inspection by Tullow should take place to monitor the status of the work area; **Public awareness** 1) Tullow should conduct an EHS and social awareness campaign to residents affected by the Kapese ISB; 2) The emergency preparedness plan must be ready for implementation at all times should an emergency situation arise. 3) A bridging document should exist between Tullow and each of their contractors on emergency response plans	Tullow, Contractor	Monthly
Impacts on biodiversity	1) Indigenous vegetation must be maintained where construction will take place and all exotic species removed as they appear and disposed of appropriately. 2) Vegetative re-establishment shall, as far as possible, make use of	Tullow	Monthly

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	indigenous or locally occurring plant varieties 3) No faunal species must be harmed by Tullow and Contractor staff during any routine maintenance of the ISB.		
Impacts on health and safety	**Emergency response plan** 1) Upon completion of the construction phase, an emergency response risk assessment should be undertaken and specific contingency plans incorporated in the ISB crisis management plan to ensure the safety of the staff and all ISB users in case of an emergency.	Tullow	Quarterly

Table 71: Social management plan

Impact	Social Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
Impacts due to increased employment in the ISB	1) The use of labor intensive construction measures should be avoided where appropriate; 2) 3) Labor to be sourced from the local community where possible 4) Local suppliers to be used where possible 5) The Project Manager must ensure that all staff working on the proposed project must be in possession of a Kenyan Identity Document or a relevant work permit.	Contactor	Weekly
General social impacts around the ISB and its vicinity	1) Contractor to ensure that communications with the community is always courteous; 2) All existing private access roads used for construction purposes, shall be maintained at all times to ensure that the local people have free access to and from their properties. Speed limits shall be enforced in such areas and all drivers shall be sensitized to this effect; 3) Any possible disruptions to essential services must be kept to a minimum and should be well advertised and communicated to the surrounding	Contractor, Contractor EHS Officer, Tullow	Bi-monthly

Impact	Social Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	communities.		
Impacts associated with influx of construction workers	1) For workers not originating from the project area, awareness will be created among construction workers about local traditions and practices; 2) Communities living in close proximity to the Kapese ISB should be given an opportunity through the local area chief's office and the Kapese CLO office to communicate their expectations of construction workers' behavior; 3) Implement methods (posters, talks, etc.) to create HIV and STI awareness amongst construction workers; 4) Payment to Kenyan construction workers should comply with applicable Kenyan Labor Laws in terms of minimum wages; 5) Where local laborers are employed on a more permanent basis, the Contractor shall mandatorily register such workers with statutory bodies such as the KRA, NHIF and NSSF and make the necessary deductions from the worker's wages for onward transmission to the statutory bodies. 6) It shall be forbidden for any contractor to purchase goods or materials from any informal settlements or business situated immediately outside or adjacent to the ISB.	Contractor Tullow Social Performance Manager	Bi-monthly
Impacts associated	1) No loitering will be allowed in the vicinity of the construction site. The	Contractor	Bi-monthly

Impact	Social Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
with job seekers	Contractor to work with relevant security agencies to evict any loiterers. 2) Construction workers should be clearly identifiable by wearing proper construction uniforms displaying the logo of the construction company. Construction workers could also be issued with identification tags	Tullow Social Performance Manager Contractor EHS Officer	
Impacts associated with attitude formation against the project	1) Engage the local community early on and throughout the construction phase about the construction activities to get their buy-in. 2) Employment and business opportunities should first be offered to the local community if the skills and goods/services are available within the community. 3) The undertakings in the ESMP should also be implemented effectively and with due diligence.	Contractor Tullow National Content Manager Contractor EHS Officer	Bi-monthly
Impacts of additional demand on existing utilities	1) Water is a scarce resource within Turkana County in general and specifically at the Kapese ISB; subsequently construction workers should be made aware of the limited availability and conservation measures to be implemented; 2) Construction camps should be located away from areas of concern to avoid pollution of water bodies.	Contractor Project Manager	Bi-monthly

Impact	Social Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
Impacts on sanitation	1) Construction workers should receive medical advice regarding correct sanitation and receive correct medical attention where required; 2) Adequate water facilities should be provided; 3) Sufficient portable chemical toilets should be provided on-site and at the construction camp; 4) Adequate sanitation services (e.g. showers) at the construction camp should be provided with effective drainage facilities to ensure that used water is carried away from the site.	Contractor Project Manager	Bi-monthly
Impacts on integration with local communities	1) An STI and HIV/AIDS awareness campaign should be launched; 2) Tullow to include training on STIs (including HIV/AIDS) for its workforce in a culturally appropriate manner; 3) Access at the construction site should be controlled to prevent commercial sex workers from either visiting and/or loitering at the construction village; 4) Local women should be empowered. This could be achieved by employing them to work on the project, which in turn would decrease their (financial) vulnerability.	Contractor Tullow Social Performance Manager	Bi-monthly
Impacts associated	1) Develop and implement appropriate measures for artifacts of archeological	Contractor	Bi-monthly

Impact	Social Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
with archeology and cultural heritage	and cultural significance unearthed during the construction phase; 2) The workforce should be made aware of reporting any possible historical or archaeological finds to the Contractor's EHS Officer so that appropriate action can be taken; 3) Any discovered artifacts shall not be removed under any circumstances; 4) Report any archaeological sites and/or graves uncovered during construction to the Project Manager; 5) Implement measures to ensure that behavior and practices of construction workers do not cause offence to local communities.		

12 Conclusions and recommendations

The proposed Kapese ISB is essential for Tullow in order to allow them to carry out exploration and appraisal activities in the South Lokichar region. The location of the base is such that it can provide support to Tullow's operations centrally in Blocks 10BB, 13T, 12A and 10BA.

Based on the public/stakeholder consultations, baseline studies and site visits undertaken, it can be concluded that:

- Tullow should implement the mitigation measures and ESMP given in this ESIA Study;
- Tullow should get assurance from their contractors who have been/will be allocated work areas, that they will comply with the requirements of this ESIA Study during the lifetime of the Kapese ISB;
- The Kapese ISB will provide gainful employment opportunities for the people of Kapese and Lokichar in general during phase 1 and 2 of the project;
- The Kapese ISB project will enable Tullow to reduce its negative environmental footprint by having core activities associated with E&A being undertaken within the ISB instead of at individual E&A sites;
- Each contractor that has a signed contract with Tullow and is allocated a work area within the ISB, must comply with the requirements of Kenyan related EHS legislation and Tullow corporate EHS standards as a minimum.
- Each Tullow contractor must demonstrate compliance with the requirements set out in the ESMP in this report as it applies to their work area and type of service provided to Tullow;
- Each contractor must have a "chance finds procedure" incorporated in their standards as part of their environmental and social management system (ESMS) for any paleontological finds within their designated work area;
- Each contractor must demonstrate to Tullow that they have endeavoured to use the hierarchy of hazard control to design, construct and operate a world class operation.

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14 Annexes

Annex 1	Social Impact Assessment Study
Annex 2	Cultural Heritage Assessment Study
Annex 3	Ecological Impact Assessment Study
Annex 4	SGS Reports on air and noise quality baseline surveys
Annex 5	SGS Report on sub-surface soil sampling and analysis