



**ATHI WATER SERVICES BOARD**

**CONSULTANCY SERVICES FOR RUIRU  
SEWERAGE NETWORK IMPROVEMENT PROJECT**



**CONSTRUCTION PHASE ENVIRONMENTAL  
AND SOCIAL MANAGEMENT AND  
MONITORING PLAN**

**FUNAN CONSTRUCTION COMPANY LIMITED**

**SEPTEMBER 2016**

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## 1.1 Introduction

This Environmental and Social Management Plan (ESMP) for the proposed Ruiru Sewerage Network Improvement Project was developed by the contractor M/s Funan Construction Company Ltd based on the Environmental and Social Impact Assessment (ESIA) report for Ruiru Sewerage Project. The ESMP is a mechanism to meet the recommended environmental and social mitigation measures. This ESMP for Ruiru Sewerage Network Improvement Project identifies the principles, approach, procedures and methods that will be used to control and minimize the environmental and social impacts of all construction activities associated with project development. It is intended to complement the project Environmental and Social Impact Assessment (ESIA) report and ensure that commitments made by Athi Water Services Board to minimize project related environmental and social impacts are upheld throughout construction period.

## 1.2 Scope and Objectives of the ESMP

This Environmental and Social Management Plan focuses on mitigating the impacts emanating from construction activities and will allow the contractor to integrate environmental components in his activities during construction process. This plan is meant to establish measures and procedures to control the identified impacts and monitor progress of implementation of the recommended mitigation measures. It will achieve the following in the long run:

- (i) Provide the National Environment Management Authority (NEMA) with a tool to make ease the evaluation of the implementation status of commitments made by the proponent during ESIA study phase;
- (ii) Provide clear and mandatory instructions to the contractor with regard to their environmental and social responsibilities during project implementation phase
- (iii) Ensure continuous compliance of contractor with Kenyan legislation and policies regarding the environment; and
- (iv) Assure the regulators and interested and affected parties the satisfaction of their demands in relation to environmental and social performance of the project.

## 1.3 Applicable Legislation

The pieces of legislation applicable to the Environmental and Social Management Plan are summarised in the Table below. World Bank environmental and social safeguards as well as international best practice must also be adhered to.

**Table 1.1: Relevant laws, rules and regulations applicable to the project**

No	Act/ Issue	Rule No/ Section	Provisions
<b>1.0</b>	<b>Fire Risk Reduction Rules 2007</b>		
1.1	Waste Management	Rule No.14 (1)	14. (1) Every occupier shall ensure that finished products, byproducts and any waste products are removed immediately they are produced so as to avoid accumulation of products or waste products.
1.2	Training in fire safety	Rule No.21. (1)	21. (1) Every occupier shall ensure that all workers are instructed in the safe use of fire fighting appliances.
1.3	First Aid	Rule No.25. (1)	25. (1) Every occupier shall make necessary arrangements to provide first aid to any person injured in a fire and in addition, arrange for the

No	Act/ Issue	Rule No/ Section	Provisions
			transportation of the injured person to the nearest health facility.
1.4	Fire fighting appliances	Rule No.29. (1)	29. (1) Every occupier shall provide means of extinguishing fire at the work place.
<b>2.0</b>	<b>Noise Prevention and Control Rules 2005</b>		
2.1	Permissible noise levels	Rule No. 4 {(1) a}	4. (1) No worker shall be exposed to a noise level in excess of (a) the continuous equivalent of ninety dB (A) in eight hours within any twenty four hours duration
	Noise prevention programme	Rule No. 5 (1)	5. (1) Where noise in a workplace exceeds the continuous equivalent of eighty five dB (A) the occupier must develop and implement an effective noise control and hearing conservation programme.
	Hearing protection	Rule No, 5 {(2) d}	(2) The programme must be in writing and should address (d) hearing protection,
<b>3.0</b>	<b>Occupational Safety and Health Act (OSHA) 2007</b>		
3.1	Duties of occupiers	Section 6 (1)	6. (1) Every occupier shall ensure the safety, health and welfare at work of all persons working in his workplace.
		{Section 6 (2) a, b and c}	(2) Without prejudice to the generality of an occupier's duty under subsection (1), the duty of the occupier includes— (a) the provision and maintenance of plant and systems and procedures of work that are safe and without risks to health; (b) arrangements for ensuring safety and absence of risks to health in connection with the use, handling, storage and transport of articles and substances; (c) the provision of such information, instruction, training and supervision as is necessary to ensure the safety and health at work of every person employed;
3.2	Duty to prepare safety and health policy statement	Section 7 {(1) a and b}	7. (1) Except in such cases as may be prescribed, it is the duty of every occupier to— (a) prepare and, as often as may be appropriate, revise a written statement of his general policy with respect to the safety and health at work of his employees and the organisation and arrangements for the time being in force for carrying out that policy; and (b) to bring the statement and any revision of it to the notice of all of his employees.
3.3	Notices of accidents and dangerous occurrences	Section 21 (1,2,3 and 5)}	21. (1) An employer or self-employed person shall notify the area occupational safety and health officer of any accident, dangerous occurrence, or occupational poisoning which has occurred at the workplace. (2) Where an accident in a workplace, causes the death of a person therein, the employer or self employed person shall— (a) inform the area occupational safety and health officer within twenty-four hours of the occurrence of

No	Act/ Issue	Rule No/ Section	Provisions
			<p>the accident; and</p> <p>(b) send a written notice of the accident in the prescribed form to the area occupational safety and health officer within seven days of the occurrence of the accident.</p> <p>(3) Where an accident in a workplace causes non-fatal injuries to a person therein, the employer shall send to the area occupational safety and health officer, a written notice of the accident in the prescribed form within seven days of the occurrence of the accident.</p> <p>(5) An employer shall cause all workplace injuries to be entered in the general register specified in section 122.</p>
3.4	Cleanliness	Section 47 (1)	47. (1) Every workplace shall be kept in a clean state, and free from effluvia arising from any drain, sanitary convenience or nuisance,
3.5	Sanitary conveniences	Section 52 (1)	52. (1) Sufficient and suitable sanitary conveniences for the persons employed in the workplace shall be provided, maintained and kept clean, and effective provision shall be made for lighting the conveniences; and, where persons of both sexes are or are intended to be employed (except in the case of workplaces where the only persons employed are members of the same family dwelling there), such conveniences shall afford proper separate accommodation for persons of each sex.
3.6	Firefighting equipment	Section 81 (1) a	<p><b>81.</b> (1) In every workplace or workroom there shall be—</p> <p>(a) provided and maintained, and conspicuously displayed and free from any obstruction so as to be readily accessible, means for extinguishing fire, which shall be adequate and suitable having regard to the circumstances of each case; and</p>
	Trained personnel	Section 81 (b)	(b) present, persons trained in the correct use of such means of extinguishing fire during all working hours.
3.7	Evacuation Procedures	Section 82(1)	<b>82.</b> (1) Every occupier of a workplace shall design evacuation procedures to be used during any emergency and have the procedures tested at regular intervals.
3.8	Measures to deal with emergencies and accidents including First Aid arrangements	Section 82 (3)	(3) Every occupier shall be required to provide where necessary, measures to deal with emergencies and accidents including adequate first aid arrangements.
3.9	Supply of drinking water	Section 91 (1)	<b>91.</b> (1) Every occupier shall provide and maintain an adequate supply of wholesome drinking water at suitable points conveniently accessible to all persons employed.
3.10	First Aid Box or cupboard of prescribed standard	Section 95	95. Every occupier shall be provide and maintain so as to be readily accessible, a first-aid box or cupboard of the prescribed standard.
3.11	Underage employment	Section 97	<b>97.</b> Employer shall not allow a person below the

No	Act/ Issue	Rule No/ Section	Provisions
			apparent age of eighteen years to be employed at any workplace or work process, or perform work, which by its nature or the circumstances, in which it is carried out, is likely to harm the person's safety or health.
3.12	Training for machine operators and use	Section 99 {(1) a and b}	<b>99.</b> (1) No person shall be employed at any machine or in any process, being a machine or process liable to cause ill health or bodily injury, unless he has been fully instructed as to the dangers likely to arise in connection therewith and the precautions to be observed, and— (a) has received sufficient training in work at the machine or in the process; or (b) is under adequate supervision by a person who has a thorough knowledge and experience of the machine or process.
3.13	Protective clothing and appliances	Section 101 (1)	<b>101.</b> (1) Every employer shall provide and maintain for the use of employees in any workplace where employees are employed in any process involving exposure to wet or to any injurious or offensive substance, adequate, effective and suitable protective clothing and appliances, including, where necessary, suitable gloves, footwear, goggles and head coverings.
3.14	14. Eye protection	Section 102 (1 and 2)	<b>102.</b> (1) Every employer shall provide suitable goggles or effective screens to protect the eyes of person employed engaged in any of the processes specified in the Eighth Schedule. (2) Every employer shall ensure that where in any workplace electric arc welding is carried on, effective provision is made, by screening or otherwise, to prevent employees, other than employees engaged in the welding process, being exposed to the electric arc flash.
3.15	Posting of Abstract of Act, rules and notices	Section 121 (1)	<b>121.</b> (1) There shall be kept posted in a prominent position in every workplace— (a) the prescribed abstract of this Act; (b) a notice of the address of the Director and of the area occupational safety and health officer; (c) printed copies of any rules made under any provision of this Act which are for the time being in force in the workplace, or the prescribed abstract of such rules; (d) notices stating the danger or ill health that may be caused and precautionary measures to be observed in areas where persons are exposed to injurious or offensive substances; and (e) any other notice and document required by this Act to be posted in the workplace.
3.16	General Register	Section 122 {(1) a, b, c}	<b>122.</b> (1) There shall be kept in every workplace a register, in the prescribed form, called the general register, and there shall be entered in or attached to that register— (a) the certificate of registration of the workplace;

No	Act/ Issue	Rule No/ Section	Provisions
			(b) every other certificate issued in respect of the workplace by the Director under this Act; (d) the prescribed particulars as to every accident and case of occupational disease occurring in the workplace of which notice is required to be sent to a occupational safety and health officer under the provisions of any law for the time being in force;
<b>4.0</b>	<b>Noise and Excessive Vibrations Pollution Control Regulations 2009</b>		
4.1	General prohibitions	Regulation 3 (1 and 2) a-f	3. (1) Except as otherwise provided in these Regulations, 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. (2). In determining whether noise is loud, unreasonable, unnecessary or unusual, the following factors may be considered- (a) time of the day; (b) proximity to residential area; (c) whether the noise is recurrent, intermittent or constant; (d) the level and intensity of the noise; (e) whether the noise has been enhanced in level or range by any type of electronic or mechanical means; and, (f) whether the noise can be controlled without much effort or expense to the person making the noise.
4.2	Excessive Vibrations	Regulation 4 (1) a and b	4. (1) Except as otherwise provided in these Regulations, no person shall- (a) make or cause to be made excessive vibrations which annoy, disturb, injure or endanger the comfort, repose, health or safety of others and the environment; or (b) cause to be made excessive vibrations which exceed 0.5 centimetres per second beyond any source property boundary or 30 metres from any moving source;
4.3	Permissible noise levels	Regulation 5	5. No person shall make, continue or cause to be made or continued any noise in excess of the noise levels set in the First Schedule to these Regulations, unless such noise is reasonably necessary to the preservation of life, health, safety or property.
4.4	Noise from machinery	Regulation 11 (1)	(1) Any person wishing to- (a) operate or repair any machinery, motor vehicle, construction equipment or other equipment, pump, fan, air-conditioning apparatus or similar mechanical device; or (b) engage in any commercial or industrial activity, which is likely to emit noise or excessive vibrations shall carry out the activity or activities within the relevant levels prescribed in the First Schedule to these Regulations.

No	Act/ Issue	Rule No/ Section	Provisions
			(2) Any person who contravenes this Regulation commits an offence.
4.5	Construction at night	Regulation 13 (1)	(1) Except for the purposes specified in sub-Regulation (2) hereunder, no person shall operate construction equipment (including but not limited to any pile driver, steam shovel, pneumatic hammer, derrick or steam or electric hoist) or perform any outside construction or repair work so as to emit noise in excess of the permissible levels as set out in the Second Schedule to these Regulations.
<b>5.0</b>	<b>Waste Management Regulations 2006</b>		
5.1	Responsibility of waste generators	Regulation 4 (1, 2 and 3)	4. (1) No person shall dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated waste receptacle. (2) Any person whose activities generate waste shall collect, segregate and dispose or cause to be disposed off such waste in the manner provided for under these Regulations. (3) Without prejudice to the foregoing, any person whose activities generates waste has an obligation to ensure that such waste is transferred to a person who is licensed to transport and dispose of such waste in a designated waste disposal facility.
<b>6.0</b>	<b>Water Quality Regulations 2006</b>		
6.1	Prevention of water pollution	Regulation 4 (1 and 2)	4. (1) Every person shall refrain from any act which directly or indirectly causes, or may cause immediate or subsequent water pollution, and it shall be immaterial whether or not the water resource was polluted before the enactment of the Act. (2) No person shall throw or cause to flow into or near a water resource any liquid, solid or gaseous substance or deposit any such substance in or near it, as to cause pollution.

**Table 1.2: World Bank Environmental and Social Safeguards applicable to the project**

OP No.	Application	Provisions
4.01	Environmental Assessment	Help ensure the environmental and social soundness and sustainability of investment projects. The policy also supports integration of environmental and social aspects of projects in the decision-making process.
4.04	Natural Habitats	Promote environmentally sustainable development by supporting the protection, conservation, maintenance, and rehabilitation of natural habitats and their functions.
4.11	Physical Cultural Resources (PCR)	Assist in preserving PCR and in avoiding their destruction or damage. PCR includes resources of archeological, paleontological, historical, architectural, religious (including graveyards and burial sites), aesthetic, or other cultural significance.

OP No.	Application	Provisions
4.12	Involuntary Resettlement	Avoid or minimize involuntary resettlement and, where this is not feasible, assist displaced persons in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

#### **1.4 Principles of Environmental and Social Management Plan**

The project under construction will be implemented taking into account the need to minimize potential negative impacts and maximize its potential positive impacts on the biophysical and socio-economic environment as well as health and safety of workers and the public. This commitment has been made by the contractor and must be complied with throughout construction phase of the project.

#### **1.5 Responsibility**

The contractor assumes full responsibility for implementing and monitoring the required measures to mitigate or enhance the environmental impacts. The effectiveness of mitigation measures will be evaluated throughout the implementation phase of the project.

#### **1.6 Responsibilities in Environmental and Social Management**

##### **1.6.1 General**

The Client through the supervising consultant and the contractor are the main entities responsible for implementing this ESMP. In the interest of environmental protection, health and safety of workers, the public, and in their own interest, the contractor will ensure that provisions contained in this ESMP are complied with in order to ensure sustainable environmental management.

##### **1.6.2 Responsibility of the Client**

The Client, through the supervising consultant will ensure that all project operations are conducted in accordance with the applicable environmental regulations and in accordance with this ESMP. The project proponent in partnership with the contractor will ensure that the ESMP and other requirements related to health, safety and environment are implemented in full. The Client will strive to manage operations in a manner to protect the environment and health and safety of employees, contractors, workers and the general public. To achieve this objective, the Client and/or through the supervising consultant will:

- (i) Request the contractor to operate on the basis of valid authorizations/approvals/ licenses for the activities to be implemented;
- (ii) Ensure that the various project activities comply with the mitigation measures proposed in the Environmental and Social Management and Monitoring Program (ESMP);
- (iii) Ensure that there are contingency plans and resources for employees health and contingency plans to respond to accidents at work (Emergency Response Plan);
- (iv) Make regular inspections to all the different activities with regard to social aspects, health, safety and environment and check for any non-conformity with the ESMP attributable to the Contractor and identify the steps taken for its correction;
- (v) Conduct an initial induction for construction activities with contractors before the commencement of operations;

- (vi) Monitor the performance of their own teams, or designate a representative to that effect;
- (vii) Approve work procedures established for each phase of the project and ensure that the various proposed activities are implemented in accordance with the approved plans;
- (viii) Establish and implement a complaints management procedure that allows treatment/appropriate response to them;
- (ix) Ensure that any corrective activities recommended by the audits or inspections (performed internally or externally) are implemented within the time pre-set.

### **1.6.3 Responsibility of workers**

The workers will ensure that all their operations are conducted in accordance with the ESMP and will ensure that the ESMP and other requirements related to safety, environment and health are implemented in full in order to protect the environment and health and safety of the general public. To achieve this, the workers shall:

- (i) Plan their activities, aiming to eliminate or minimize impacts on the environment, through preventive activities or mitigation measures;
- (ii) Comply with environmental laws, pollution prevention program and manage instruments to correct environmental damage; and
- (iii) Meet all the requirements of environmental laws and regulations applicable to this project including laws on noise levels and solid waste management.

### **1.6.4 Responsibility of the Contractor**

The contractor will identify individuals responsible for overall management of the environment, social management, safety and health management during construction phase of the project. The Contractor shall be responsible for relevant training of their staff, who must be able to complete the project activities in an efficient and appropriate manner in accordance with the contractual requirements of the project proponent to the agreed work. Among many tasks, the contractors shall:

- (i) Submit to the proponent the work procedures/methods or equivalent documents for approval;
- (ii) Operate on the basis of valid licenses/approvals/authorizations for the activities to be implemented;
- (iii) Employ techniques, practices and construction methods to ensure compliance with the ESMP;
- (iv) Prevent or minimize the occurrence of accidents/incidents which might cause damage to the environment and be able to respond positively to an accident/incident if it occurs;
- (v) Meet the working procedures and environmental and health and safety requirements established by contract with the proponent; ensure compliance with them by sub-contractors who might be hired by him;
- (vi) Minimize environmental damage, waste control, avoid pollution, prevent loss or damage on any private property or natural resources and minimize project negative effects on the users and occupants of surrounding lands and the public;
- (vii) Provide Personal Protective Equipment (PPE) to workers which is appropriate to the tasks to be performed and ensure that they are used;
- (viii) Implement all corrective activities agreed in audit (internal or performed by other agencies) or inspections, within the pre-established deadline;
- (ix) Manage the complaints process on the elements that fall within their jurisdiction, or refer complaints to the proponent, so that they can receive treatment/appropriate response;

- (x) Prepare a rehabilitation plan which shall include preliminary designs on the temporary and permanent restoration plan during both the construction and post-construction and maintenance period (as applicable).

## **1.7 Traffic Management**

### **1.7.1 General**

Construction site vehicle incidents can and should be prevented by effective management of transport operations throughout the construction process. Key issues in dealing with traffic management on site include keeping pedestrians and vehicles apart, minimising vehicle and people movement within the site, controlling turning vehicles, enhancing visibility and installation of signs and instructions as explained below:

### **1.7.2 Keeping pedestrians and vehicles apart**

This can be achieved through:

- Provision of separate entry and exit gateways for pedestrians and vehicles;
- Installing a barrier between the roadway and construction site.

### **1.7.3 Minimising vehicle movements**

To limit the number of vehicles on the active construction site, the following should be done.

- Workers and visitors to the site should park away from the active construction area;
- Controlling entry to the work area; and
- Planning storage areas so that delivery vehicles do not have to cross the active construction site.

### **1.7.4 People on site**

The contractor will take steps to make sure that all workers are fit and competent to operate the vehicles, machines and attachments they use on site by doing the following:

- Making checks when recruiting drivers/operators to ensure that they are fit and competent to operate vehicles and equipment on site;
- Managing the activities of visiting drivers especially those delivering materials;
- Ensuring that untrained or inexperienced workers should not be allowed to drive construction vehicles or operate equipment without authority; and access to vehicles should be managed and people alerted of the risk.

### **1.7.5 Visibility**

If vehicles reverse in areas where pedestrians/construction workers cannot be excluded, the risk of accident is elevated and visibility becomes a vital consideration. The following should be put in place:

- Construction vehicles and equipment should be fitted with aids for drivers including mirrors, reversing alarms that help drivers see movement all round the vehicle;
- The contractor should appoint trained signalers to control vehicular manouvres within the construction site where necessary.

### **1.8 Environmental and Social Monitoring**

Environmental and Social monitoring and audits are essential in project's life span as they are conducted to establish if project implementation has complied with set environmental management standards for Kenya as spelt out in EMCA 2015 and the Environmental (Impact Assessment) and Audit Regulations 2003. In this Project, environmental monitoring and audit will be conducted to ensure that identified potential negative impacts are mitigated during the project's implementation period. Environmental concerns that will be monitored and audited during the project's construction period include among others air pollution, occupational health and safety issues (including worker accidents and hazards) and socio-economic disruptions.

**Table 1.3: Monitoring Plan**

Parameter	Location	Proposed method	Frequency	Responsibility	Estimated Annual Cost (Kshs)
Dust pollution	Access roads Construction sites	Observations, Incident reporting Weekly reporting	Daily by contractor and weekly by consultant	Contractor and supervising environmentalist	Use capacity internal
Traffic safety	Access Roads Construction areas Material storage areas	Daily checklists Incident reporting Weekly reporting	Daily by contractor and weekly by consultant	Contractor and supervising environmentalist	Use capacity internal
Open manhole chambers and pits	Areas proposed for manhole casting	Daily checks Incident reporting Weekly reporting	Daily by contractor and weekly by consultant	Contractor and supervising environmentalist	Use capacity internal
Disrupted water services	Along trenched areas	Daily checks Incident reporting Weekly reporting	Daily by contractor and weekly by consultant	Contractor and supervising environmentalist	Use capacity internal
Blocked roads	Within service lines	Daily checks Weekly reporting	Daily by contractor and weekly by consultant	Contractor and supervising environmentalist	Use capacity internal
Noise pollution	Construction site Project adjacent communities Concrete batching areas	Visual and auditory observations Report forms Daily reporting	Daily by contractor and weekly by consultant	Contractor and supervising environmentalist	Use capacity internal
Blocked drainage systems	Construction site Along restored roads	Visual observation Weekly reporting	Daily by contractor and weekly by consultant	Contractor and supervising environmentalist	Use capacity internal
Occupational accidents and incidents	Construction site Equipment storage areas Access roads	Daily checks Incident reports Weekly reporting	Daily by contractor and weekly by consultant	Contractor and supervising environmentalist	Use capacity internal
Pollution from spoils	construction sites	Waste tracking sheets Daily checks Weekly reporting	Daily by contractor and weekly by consultant	Contractor and supervising environmentalist	Use capacity internal
Land take and compensation	Construction sites	Valuation report Grievance reporting Payment schedules	Daily by the Client and consultant	Client sociologists and consultant	As per the RAP report

**Table 1. 4: Construction phase Environmental and Social Management Plan**

Activity / Issue	Action required	Responsibility	Parameters to monitor	Monitoring Means	Frequency of monitoring	Estimated Annual cost (Kshs)
Poor environmental and social management	The contractor will identify an individual responsible for overall management of the environment, social management, safety and health management during construction phase	Contractor	<ul style="list-style-type: none"> <li>Presence of Environment, Health and safety specialist in contractor's team</li> </ul>	Observation during weekly site inspections	One off	600,000.00
Encroachment of neighbouring facilities during civil works	All civil works should be restricted to within road reserves and storm water drainage channels for Ruiru Municipality.	Contractor	<ul style="list-style-type: none"> <li>Approved program of works</li> </ul>	Document review during weekly site inspections  Observation during weekly site inspections	Weekly during construction phase	Nil- Standard Best Practice
Destruction of private properties outside project alignment area during excavation works	Working width of construction area should be clearly demarcated using coloured pegs or whitewash	Contractor	Presence of demarcation pegs/white wash	Observation prior to commencement of excavation works	Weekly during construction phase	Nil- Standard Best Practice
Solid waste generation at contractor's camp	Place solid waste collection bins in offices at the contractor site	Contractor	<ul style="list-style-type: none"> <li>Presence of solid waste collection bins at the contractor's camp</li> </ul>	Observation during monthly site inspections	Monthly during construction phase	5,000.00
	Segregate waste generated into various waste streams for easy disposal	Contractor	<ul style="list-style-type: none"> <li>Evidence of waste segregation at the contractor' site</li> </ul>	Observation during monthly site inspections	Monthly during construction phase	Use internal capacity
	Solid waste generated from offices at the camp should be temporarily stored at a weather proof central place awaiting collection for disposal by a contracted solid waste handler	Contractor	<ul style="list-style-type: none"> <li>Evidence of weather proof area for storage of solid waste pending collection for disposal by a contracted solid waste handler</li> </ul>	Observation during monthly site inspections	Monthly during construction phase	15,000.00
Potential pollution from hazardous wastes like	Potentially hazardous waste should be kept within defined areas at the store.	Contractor	Availability of a special area within the store for storage of potentially hazardous wastes	Document review during Monthly site inspections	Monthly during construction phase	Nil- Standard Best Practice

Activity / Issue	Action required	Responsibility	Parameters to monitor	Monitoring Means	Frequency of monitoring	Estimated Annual cost (Kshs)
generator fuel	Records of their use and disposal should be kept in a register at the site office.		Availability of potentially hazardous waste register Availability of contracts for hazardous waste disposal	Document review at the beginning of implementation phase		
Disposal of potentially hazardous substances and waste	All potentially hazardous substances should be disposed of through a licensed hazardous waste handler.  Records of their disposal should be kept in a file at the contractor's office	Contractor	<ul style="list-style-type: none"> <li>Evidence of disposal through a licensed hazardous waste handler</li> </ul>	Document review during monthly site inspections	Monthly during construction phase	120,000.00
Spoil generation as a result of excavation works	All spoil generated as a result of excavation and trenching works should be used to backfill the trenched pits and for restoration of disturbed areas within the work places.	Contractor	<ul style="list-style-type: none"> <li>Evidence of restoration of the work areas</li> <li>Number of complaints from local residents filed with either the contractor or consultant</li> </ul>	Observation during weekly site inspections	Weekly during construction phase	BoQ Item No. K151.1– K151.4
	Excavated and stockpiled soil material to be stored and bermed on the higher lying areas of the site and not in any storm water run-off channels or any other areas where it is likely to cause erosion or where water would naturally accumulate.	Contractor	<ul style="list-style-type: none"> <li>Evidence of storage of stockpiled soils on high lying areas</li> <li>Evidence of storage of stockpiled soil material away from storm water runoff channels</li> </ul>	Observation during weekly site inspections	Weekly during construction phase	Nil- Standard Best Practice
Trash thrown into open manhole chambers	All trash from open manhole chambers should be disposed of in disposal locations approved by Ruiru Municipal Council	Contractor	<ul style="list-style-type: none"> <li>No trash around manhole chambers</li> </ul>	Observation during weekly site inspections	Weekly during construction phase	Nil- Standard Best Practice
Visual intrusion emanating from stockpiled spoils	Excavated and stockpiled soil material should be used to backfill excavated trenches and restoration of disturbed areas.	Contractor	<ul style="list-style-type: none"> <li>Evidence of use of stockpiled materials in site restoration</li> </ul>	Observation during weekly site inspections	Weekly during construction phase	BoQ Item No. K151.1– K151.4

Activity / Issue	Action required	Responsibility	Parameters to monitor	Monitoring Means	Frequency of monitoring	Estimated Annual cost (Kshs)
	Excess spoil that cannot be used as fill materials should be disposed of in approved tips		<ul style="list-style-type: none"> <li>Evidence of disposal of excess spoil in approved tips</li> </ul>	Observation during weekly site inspections	Weekly during construction phase	BoQ Item No. K151.1– K151.4
Wastewater from drainage of manhole chambers	<p>Water from drainage of filled manholes should be directed to existing storm water drainage channels</p> <p>The contractor should ensure that storm water drainage channels are not clogged with foreign materials before directing pumped water into them</p>	Contractor	<ul style="list-style-type: none"> <li>Presence on method statement on wastewater drainage from filled manhole chambers</li> <li>Evidence of existing storm water drainage channels</li> </ul>	<p>Observation during weekly site inspections</p> <p>Document review at the beginning of implementation phase</p>	Weekly during construction phase	Nil- Standard Best Practice
Storm water Management and control	The contractor should restore all storm water drainage channels blocked as a result of his activities at the site.	Contractor	<ul style="list-style-type: none"> <li>Presence of unclogged storm water drainage channels within construction area</li> </ul>	<p>Observation during weekly site inspections</p> <p>Periodic checks of storm water drainage channels for blockages</p>	Weekly during construction phase	BoQ item No. K751
Fire incidents at the contractor's camp	Reasonable and precautionary steps to be put in place to manage fire incidents including having a method statement on management of fire incidents at the camp.	Contractor	<ul style="list-style-type: none"> <li>Presence of write ups on fire precautions</li> <li>Presence of method statement on management of fire incidents</li> <li>Service schedules of firefighting equipment</li> </ul>	Document reviews during weekly site inspections	Weekly during construction phase	Use internal capacity
	Train a section of staff in fire safety	Contractor	<ul style="list-style-type: none"> <li>Records/certificates of trained staff on fire prevention and management</li> </ul>	Document reviews during weekly site inspections	Weekly during construction phase	80,000.00
	The contractor to provide basic firefighting equipment at the camp including fire blanket in	Contractor	<ul style="list-style-type: none"> <li>Presence of firefighting equipment at various sections of the</li> </ul>	Observation during weekly site inspections	Weekly during construction phase	30,000.00

Activity / Issue	Action required	Responsibility	Parameters to monitor	Monitoring Means	Frequency of monitoring	Estimated Annual cost (Kshs)
	the kitchen and fire extinguishers at the main office building and at the workshop area		contractor's camp			
	All fire incidents at the site should be recorded and reported to relevant authorities as soon as they occur.	Contractor	<ul style="list-style-type: none"> <li>Presence of fire incident records</li> <li>Availability of evidence of fire incident report to the authorities</li> </ul>	Document review during weekly site inspections	Weekly during construction phase	Use internal capacity
Dust pollution during material transportation	All vehicles transporting construction materials should be covered with tarpaulins to minimise material being blown away by wind during transportation	Contractor/ material suppliers	<ul style="list-style-type: none"> <li>Presence of tarpaulins on material delivery vehicles</li> </ul>	Observation during material deliveries	<i>Ad hoc</i> basis	Nil- Standard Best Practice
Occupational accidents from machinery failures	<p>All vehicles, trucks, plants and general construction machinery should be maintained in good condition to mitigate premature failure which may result to occupational injuries</p> <p>All construction vehicles and machinery should be routinely serviced in compliance with manufacturer's manual</p>	Contractor	<ul style="list-style-type: none"> <li>Machinery servicing schedules</li> <li>Maintenance records of site equipment and machinery</li> </ul>	Document review during Monthly site inspections	Monthly during construction phase	100,000.00
	Only suitably qualified personnel to operate construction vehicles and machinery.	Contractor	<ul style="list-style-type: none"> <li>Academic and professional certificates as evidence of personnel qualifications</li> </ul>	<p>Document review during weekly site inspections</p> <p>Interview of equipment operators</p>	Weekly during construction phase	Nil- Standard Best Practice
	Handling of equipment and materials to be supervised and adequately instructed.	Contractor	<ul style="list-style-type: none"> <li>Inspection notes as evidence of supervision of material handling</li> </ul>	Document review during weekly site inspections	Weekly during construction phase	Nil- Standard Best Practice

Activity / Issue	Action required	Responsibility	Parameters to monitor	Monitoring Means	Frequency of monitoring	Estimated Annual cost (Kshs)
Occurrence of workplace accidents during work executions	The contractor should prepare method statements covering procedures and response plan for the main activities which could generate emergency situations at the work areas including among others: <ul style="list-style-type: none"> <li>• Accidental fires</li> <li>• Accidental leaks and spillages</li> <li>• Vehicle and plant accidents</li> <li>• Blasting at the quarry site</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>• Availability of method statements on accidental fires; management of accidental leaks and spillages; management of vehicle accidents at the site and blasting at the quarry site</li> <li>• Availability of equipped First Aid kit</li> <li>• Evidence of staff training on emergency procedures</li> <li>• Number of emergencies recorded</li> </ul>	Document review during weekly site inspections	Weekly during construction phase	Use internal capacity
	Maximum speed limit for construction vehicles to be 10 km/hr.	Contractor	<ul style="list-style-type: none"> <li>• Presence of speed limit signage at the site</li> </ul>	Observation during weekly site inspections	Weekly during construction phase	Nil- Standard Best Practice
	The contractor should routinely create awareness among employees on the procedures for dealing with spills and leaks.  The contractor should pin at a notice board within the contractor's office at the camp relevant emergency telephone numbers including police, ambulance and fire service	Contractor	<ul style="list-style-type: none"> <li>• Evidence of awareness materials for staff</li> <li>• Presence of spill kits at the construction site</li> <li>• Presence of emergency telephone numbers at the site</li> </ul>	Observation during monthly site inspections	Monthly during construction phase	50,000.00
Poor management of health and safety issues at the work areas	The contractor should collect and collate all health and safety rules, regulations and laws applicable to site operations	Contractor	<ul style="list-style-type: none"> <li>• Presence of a file containing health and safety regulations applicable to site operations</li> </ul>	Document review during monthly site inspections	Monthly during construction phase	Use internal capacity

Activity / Issue	Action required	Responsibility	Parameters to monitor	Monitoring Means	Frequency of monitoring	Estimated Annual cost (Kshs)
	The contractor to comply with all standard and legally required health and safety regulations as promulgated under the Occupational Health and Safety Act 2007 and subsidiary legislations	Contractor	<ul style="list-style-type: none"> <li>• Presence of abstract copy of Occupational Safety and Health Act at the contractor camp</li> <li>• Evidence of compliance with OSHA 2007 and subsidiary legislations</li> </ul>	Observation during monthly site inspections	Monthly during construction phase	Use internal capacity
Lack of records of accidents, incidents and dangerous occurrences	The contractor to prepare an accident incident form for daily recording of accidents, incidents and dangerous occurrences at workplaces	Contractor	<ul style="list-style-type: none"> <li>• Presence of an accident/ incident form</li> </ul>	Document review during monthly site inspections	Monthly during construction phase	Use internal capacity
	The contractor to provide all supervisors with the forms for daily recording of accidents, incidents and dangerous occurrences at their places of work.	Contractor	<ul style="list-style-type: none"> <li>• Presence of the forms at the work areas</li> </ul>	Document review during weekly site inspections	Weekly during site inspections	Use internal capacity
	Supervisors to submit the forms on a daily basis to the office manager for filing in an accident/incident register	Contractor	<ul style="list-style-type: none"> <li>• Presence of the forms in a file at the contractor's office</li> </ul>	Document review during monthly site inspections	Monthly during construction phase	Use internal capacity
Lack of requisite Personal Protective Equipment by workers	All staff should be provided with requisite PPEs including safety shoes, gum boots, hand gloves eye shields, nose masks, ear muffs and reflector jackets	Contractor	<ul style="list-style-type: none"> <li>• Evidence of provision of PPEs to staff</li> </ul>	Observation during weekly site inspections	Weekly during construction phase	250,000.00
	Provide protective and safety equipment and clothing for use by consultant staff	Contractor	<ul style="list-style-type: none"> <li>• Evidence of provision of PPEs to staff</li> </ul>	Observation during weekly site inspections	Weekly during construction phase	BoQ item No. A234
Lack of First Aid kit at the contractor's site office and work areas	The contractor to provide a standard first aid kit at the main office at the contractor's camp and at all work areas	Contractor	<ul style="list-style-type: none"> <li>• Presence of First Aid kit in offices and other work areas</li> </ul>	Observation during weekly site inspections	Weekly during construction phase	20,000.00

Activity / Issue	Action required	Responsibility	Parameters to monitor	Monitoring Means	Frequency of monitoring	Estimated Annual cost (Kshs)
Lack of sanitation facilities	The contractor to provide adequate sanitation facilities for the construction workers at the contractor's camp and in all work areas	Contractor	<ul style="list-style-type: none"> <li>Evidence of sanitation facilities at the contractor camp and work areas</li> </ul>	Observation during weekly site inspections	Weekly during construction phase	To be determined
Noise and vibration pollution during work executions	Construction and the use of construction machinery to be limited to working hours between 0600hr and 1800hr. No construction works should be carried out at night	Contractor	<ul style="list-style-type: none"> <li>Presence of work schedule for construction works</li> </ul>	Observation during weekly site inspections	Weekly during construction phase	Nil- Standard Best Practice
	Construction equipment should be routinely serviced to mitigate excessive noise	Contractor	<ul style="list-style-type: none"> <li>Presence of service logs for site machinery</li> </ul>	Observation during weekly site inspections	Weekly during construction phase	BoQ item No. A415.1-A415.20
	Construction activities should abide by provisions of Noise and Excessive Vibrations Pollution Control Regulations 2009	Contractor	<ul style="list-style-type: none"> <li>Evidence of compliance with noise regulations</li> </ul>	<p>Document review during weekly site inspections</p> <p>Interview of project neighbours</p>	Weekly during construction phase	Nil- Standard Best Practice
Noise pollution as a result of blasting at the material extraction sites	Prior to blasting at material extraction site, the contractor must inform the adjacent landowners and local administration and obtain relevant permits from Mines and Geology Department	Contractor	<ul style="list-style-type: none"> <li>Presence of notices to blast</li> <li>Blasting permits from Mines and Geology department</li> </ul>	<p>Document review during monthly site inspections</p> <p>Interview of project neighbours</p>	Monthly during construction phase	BoQ item No. A420.5
Blasting and drilling at material extraction site	In the event of blasting or rock drilling, all necessary precautions should be taken to prevent damage to special features and the general environment, which includes the minimisation of, and if required, removals of any fly rock.	Contractor	<ul style="list-style-type: none"> <li>Blasting permits from Mines and Geology Department</li> <li>Precautions for blasting or drilling stating procedures</li> <li>Number of complaints from the local community</li> </ul>	<p>Document review during monthly site inspections</p> <p>Interview of project neighbours</p>	Monthly during construction phase	Ditto

Activity / Issue	Action required	Responsibility	Parameters to monitor	Monitoring Means	Frequency of monitoring	Estimated Annual cost (Kshs)
	Environmental damage caused by blasting / drilling shall be repaired at the contractor's expense to the satisfaction of the Resident Engineer	Contractor	<ul style="list-style-type: none"> <li>Method statement on environmental restoration plan</li> </ul>	Document review during monthly site inspections	Monthly during construction phase	To be determined depending on the extent of damage
	No blasting to be done on Sundays. Careful sealing off of the site and surrounding area to be carried out to ensure that all personnel are removed from the site and its immediate surrounds.	Contractor	<ul style="list-style-type: none"> <li>Presence on standard operating procedures with regard to blasting activities</li> </ul>	Document review during monthly site inspections	Monthly during construction phase	Nil- Standard Best Practice
	Placement of site notices at visible locations a few days prior to any blasting informing the public of the planned activities.	Contractor	<ul style="list-style-type: none"> <li>Presence of blasting notices</li> </ul>	Document review during monthly site inspections Interview of project neighbours	Monthly during construction phase	Nil- Standard Best Practice
	Adequate warning must be provided prior to blasting to all site staff and neighbours. All-clear signals must also be clearly given	Contractor	<ul style="list-style-type: none"> <li>Presence of warning notices within the area</li> </ul>	Document review during monthly site inspections Interview of project neighbours	Monthly during construction phase	Nil- Standard Best Practice
Safety and security of personnel at the contractor's site	Hiring process to maximize recruitment of local workers.	Contractor	<ul style="list-style-type: none"> <li>Local workers vs migrant workers</li> </ul>	Review records during hiring process	Before and during construction, following every hiring event	Nil- Standard Best Practice
	Contact details of the police should be displayed at the notice board at the contractor's office.	Contractor	<ul style="list-style-type: none"> <li>Presence of contact details of the police and security company</li> </ul>	Document review during monthly site inspections	Monthly during construction phase	Nil- Standard Best Practice
	Security personnel should be stationed at the gate to the contractor's camp	Contractor	<ul style="list-style-type: none"> <li>Presence of security personnel at the gate</li> </ul>	Observation during monthly site inspections	Monthly during construction phase	Administrative costs

Activity / Issue	Action required	Responsibility	Parameters to monitor	Monitoring Means	Frequency of monitoring	Estimated Annual cost (Kshs)
	Access to the contractor's camp should be limited to construction staff through access control at the gate.	Contractor	<ul style="list-style-type: none"> <li>Presence of access control to the construction site</li> </ul>	Observation during monthly site inspections	Monthly during construction phase	Nil- Standard Best Practice
	Prevent presence of unauthorized personnel at the camp, including minors.	Contractor	<ul style="list-style-type: none"> <li>Presence of people not employed by the contractor</li> <li>Presence of minors on site</li> </ul>	Daily site inspections	Daily monitoring during construction.	Nil- Standard Best Practice
Tree/Vegetation removal	Effectively monitor the working strip required for the construction of the lateral sewers to prevent excessive vegetation removal	Contractor	<ul style="list-style-type: none"> <li>Presence of monitoring records</li> </ul>	Document review during weekly site inspections	Weekly during construction phase	Nil- Standard Best Practice
	Adequately compensate individuals whose crops and trees may be destroyed during construction process	Contractor	<ul style="list-style-type: none"> <li>Availability of payment vouchers to Project Affected Persons (PAPs)</li> </ul>	Document review during monthly site inspections	Monthly during construction phase	BoQ item No. A420.6
Water service disruptions during construction activities	Notify Ruiru Juja Water and Sewerage Company (RUJWASCO) in writing to enable them disconnect water services ahead of excavation works	Contractor	<ul style="list-style-type: none"> <li>Evidence of notification of RUJWASCO</li> <li>Evidence of service restorations</li> </ul>	Document review during weekly site inspections	Weekly during construction phase	BoQ item No. A420.1
	Ensure that water services are restored within 24 hours and keep records of restoration as evidence.					
Electricity service disruptions during excavation works	Notify Kenya Power and Lighting in writing about intended works to enable them disconnect the services ahead of excavation works	Contractor	<ul style="list-style-type: none"> <li>Evidence of notification of Kenya Power</li> <li>Evidence of service restorations</li> </ul>	Document review during weekly site inspections	Weekly during construction phase	BoQ item No. A420.1
	Ensure that electricity services are restored within 24 hours and					

Activity / Issue	Action required	Responsibility	Parameters to monitor	Monitoring Means	Frequency of monitoring	Estimated Annual cost (Kshs)
	keep records of restoration as evidence					
Blocked / restricted access to homes and business premises due to stockpiles of excavated soil	Topsoil and subsoil to be placed on opposite sides of the trench and kept separate throughout construction and rehabilitation	contractor	<ul style="list-style-type: none"> <li>Evidence of separation of top and subsoil</li> </ul>	Document review during weekly site inspections	Weekly during construction phase	Nil- Standard Best Practice
	A narrow strip of road should be left open for purposes of access by residents	Contractor	<ul style="list-style-type: none"> <li>Presence of access strip for residents</li> </ul>	Observation during weekly site inspections	Weekly during construction phase	Nil- Standard Best Practice
	Topsoil must not be stockpiled for an extensive period (> 1 month). This is to prevent the redundancy of the existing seed bank as well as the alteration of the soil characteristics	Contractor	<ul style="list-style-type: none"> <li>Evidence of removal of stockpiled soil within less than 1 month after excavation</li> </ul>	Observation during weekly site inspections	Weekly during construction phase	Nil- Standard Best Practice
Damage to existing access roads	The contractor to restore all roads damaged during construction process to pre-construction conditions	Contractor	<ul style="list-style-type: none"> <li>Evidence of restoration of damaged roads</li> </ul>	Observation during weekly site inspections	Weekly during construction phase	BoQ No. K751
Blocked drainages due to excavation works	All storm water drainage systems should be inspected prior to commencement of works	Contractor	<ul style="list-style-type: none"> <li>Photographic evidence of pre construction condition of drainage systems</li> </ul>	Observation during weekly site inspections	Weekly during construction phase	Nil- Standard Best Practice
	All drainages should be unblocked to pre-construction conditions	Contractor	<ul style="list-style-type: none"> <li>Evidence of unblocking of drainage systems</li> </ul>	Observation during weekly site inspections	Weekly during construction phase	BoQ item No. K751
Health and safety risks from open excavated/ manhole pits	Signs and/or danger tape to be erected around the exposed excavations to warn the public of inherent dangers.	Contractor	<ul style="list-style-type: none"> <li>Presence of signs and danger tapes</li> </ul>	Observation during weekly site inspections	Weekly during construction phase	Nil- Standard Best Practice
Aesthetic/ visual intrusion	Remove spoil material from the area once the trench has been filled	Contractor	<ul style="list-style-type: none"> <li>Method statement on site restoration</li> <li>Evidence of spoil removal</li> </ul>	Observation during weekly site inspections  Document review during weekly site inspections	Weekly during construction phase	BoQ item No. K151.1-K151.4

Activity / Issue	Action required	Responsibility	Parameters to monitor	Monitoring Means	Frequency of monitoring	Estimated Annual cost (Kshs)
De-mobilisation	The site is to be cleared of all construction materials, including litter prior to hand over	Contractor, AWSB RUJWSCO	<ul style="list-style-type: none"> <li>Evidence of clearance of site</li> </ul>	Observation at the end of construction phase	One off at the end of construction phase	BoQ item No. A310
	Fences, barriers and demarcations associated with the construction phase must be removed from the site	Contractor	<ul style="list-style-type: none"> <li>Evidence of removal fences, barriers and demarcations associated with construction phase</li> </ul>	Observation at the end of construction phase	One off at the end of construction phase	Ditto
	The site must be fully rehabilitated and stabilised (for example, through revegetation)	Contractor	<ul style="list-style-type: none"> <li>Number of trees planted as evidence of site rehabilitation and stabilisation</li> </ul>	Observation at the end of construction phase	One off at the end of construction phase	Ditto
	Decommission all contractor camp services including electricity, water and sanitation facilities	Contractor	<ul style="list-style-type: none"> <li>Evidence of removal of the services</li> </ul>	Observation at the end of construction phase	One off at the end of construction phase	BoQ item No. A320
	A meeting must be held on site between the Engineer, Environmentalist and the Contractor to approve all remediation activities and ensure that the site has been restored to a condition approved by the Engineer	Contractor and supervising consultant	<ul style="list-style-type: none"> <li>Minutes of the meeting</li> </ul>	Document review	One off at the end of construction phase	Administrative costs
	Rehabilitation Activities of Environmental Cases indentified must continue throughout the defect liability period	Contractor and supervising consultant	<ul style="list-style-type: none"> <li>Availability of rehabilitation progress report</li> </ul>	Document review at the end of construction phase	One off at the end of construction phase	BoQ item No. A310
<b>Total</b>						<b>1,270,000.00</b>