



# RIDER IRON AND STEEL GHANA LTD.



## Environmental and Social Impact Assessment for the Proposed Odumase –Konongo Factory

**DRAFT ESIA REPORT**

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## ABBREVIATIONS AND ACRONYMS

|        |                                                       |
|--------|-------------------------------------------------------|
| BOF    | Basic Oxygen Furnace                                  |
| EAf    | Electric Arc Furnace                                  |
| EFAT   | Emergency First Aid Teams                             |
| EIA    | Environmental Impact Assessment                       |
| EIF    | Electric Induction Furnace                            |
| EIS    | Environmental Impact Statement                        |
| EP     | Environmental Permit                                  |
| EPA    | Environmental Protection Agency                       |
| EPC    | Enclave Power Company                                 |
| EPFI   | Equator Principle's Financial Institution Reporting   |
| EPZ    | Export Processing Zone                                |
| EPZ    | Export Processing Zone                                |
| HSE    | Health, Safety and Environment                        |
| IESIA  | Integrated Environmental and Social Impact Assessment |
| ITCZ   | Inter-Tropical Convergence Zone                       |
| MT     | Metric Tonnes                                         |
| NADMO  | National Disaster Management Organization             |
| NEAP   | National Environmental Action Plan                    |
| NEP    | National Environmental Policy                         |
| NLCD   | National Liberation Council Decree                    |
| PEMP   | Preliminary Environmental Management Plan             |
| PPE    | Personnel Protection Equipment                        |
| RISGL  | Rider Iron and Steel Ghana Ltd                        |
| SEA    | Strategic Environmental Assessment                    |
| TDC    | Tema Development Corporation                          |
| TMA    | Tema Municipal Authority                              |
| TPY    | Tons Per Year                                         |
| ToR    | Terms of Reference                                    |
| UNHCR  | United Nations High Commissioner for Refugees         |
| UNICEF | United Nations Children's Fund                        |
| WFP    | World Food Program                                    |
| 1D1F   | One District One Factory                              |

## EXECUTIVE SUMMARY

### Introduction

Steel, which has a wide range of industrial applications, is produced from iron in a variety of ways. However, recycling of scrap has become an economic and environmentally friendly way of producing steel for industrial applications as the recycling of scrap reduces the need for mining 'new' iron ores. In light of this, and due to the increasing global demand for steel products, Rider Iron and Steel Ghana Limited (RISGL) is proposing a steel project in Odumase – Konongo Kumasi to produce 300, 000 ton steel per year (tpy) from scrap metal to supplement their current 80,000 tpy steel production in Tema.

RISGL proposes to construct the new 300,000MT/year continuous casting steel factory with 2 x 20MT + 2 x 40MT furnaces to produce steel products mainly rebars, steel wires, angle bars and flat bars from locally acquired scrap metal under the 'One district, One factory'(1D1F) Policy initiative by the Government of Ghana. In keeping with the Environmental Assessment Regulations 1999, LI 1652, Rider Iron and Steel Ghana Ltd (RISGL) has successfully registered the project with the Ghana EPA which initiated the environmental assessment process.

The EPA in a response letter dated 9<sup>th</sup> September 2019 and referenced CU: 2063/01/02 classified the proposed project as one which requires an Environmental and Social Impact Assessment (ESIA) to help understand the likely implications of the proposal on the physical and social environments in order to inform the environmental permitting decision-making process.

### Relevant Policies, Legal and Administrative Framework

RISGL is committed to adhering to the requirements of all applicable policies and laws associated with the proposed Konongo Project. This is to ensure sustainable development and compliance with national and international regulations. The policies, legal and administrative framework identified to be relevant to the project have been categorized under the following headings and discussed in Section 2 of this report;

- National and Sector Policy plans;
- National Legal Framework;
- Institutional framework;
- International Conventions
- IFC Performance Standards
- Ghana National Environmental standards and
- Relevant Legal approvals i.e. permits licenses etc

### Project Description

The proposed project is located in Gruho in Odumase near Konongo in the Ashanti Region of Ghana. The site is about 5km from a defunct mine and is bounded on the west by the main Konongo-Kumasi highway, on the south by Odumase and on the North by a small village named Ohene Nkwanta, and on the east by farmlands.

The physical facilities of the proposed steel factory include a 2 x 20MT + 2 x 40MT furnace with a hydraulic tilting system, a continuous caster, a rolling machine and bar rolling finishing equipment. Ancillary systems for the steel plant are an electric substation with transformers and rectifiers, pumping stations for cooling water circulation, a cooling tower for circulating water and an emissions

dedusting and air filtering system. Other facilities are overhead cranes and magnetic lifts for lifting scrap and other equipment, standby generators for pumping water in case of emergency, a scrap yard for sorting and compressing steel into billets, axle weighing bridges and office space. No residential facilities will be provided on site.

## Steel Manufacturing Process

### *General Overview*

The induction furnace will be used in steelmaking. Scrap metal will be the main raw material to serve as feedstock. The scrap will be loaded in large buckets and melted to form molten (known as hot metal). The molten will be tapped into ladles. After undergoing ladle treatment, such as alloying, degassing and arriving at the correct temperature, the ladle will be transported to the top of casting machine.

From the ladle, the hot metal will be transferred via a refractory shroud(Pipe) to a holding bath called a tundish. The tundish allows a reservoir of metal to feed the casting machine to form billets (raw material for further processing eg. rolling). The billets will be cut into predetermined lengths by mechanical shears or by travelling oxyacetylene torches, marked for identification and taken to the final forming process

*The processes involved in the steel manufacturing processes have been summarized as follows;*

*Primary Steelmaking: Steel scrap is loaded and recycled in an Electric Arc Furnace to form molten*

*Secondary Steelmaking: The molten is treated to adjust the steel composition. This is done by adding or removing certain elements and/or manipulating the temperature and production environment by stirring, ladle injection ,degassing and composition adjustment by Sealed argon bubbling with Oxygen Blowing*

*Continuous Casting: In this step, the molten steel is cast into a cooled mold causing a thin steel shell to solidify. The shell strand is withdrawn using guided rolls and fully cooled and solidified. The strand is cut into desired lengths depending on application; slabs for flat products (plate and strip), blooms for sections (beams), billets for long products (wires) or thin strips.*

*Primary Forming: The steel that is cast is then formed into various shapes, often by hot rolling, a process that eliminates cast defects and achieves the required shape and surface quality. Hot rolled products are divided into flat products, long products, seamless tubes, and specialty products.*

### Resource Utilization

#### *Primary Material Source*

The steel plant is designed to operate on 100% scrap feedstock. Hence materials required for operation is mainly steel scrap. This will be obtained from the local market through third party contractors and transported to the plant by road. In case domestic supply does not meet demand, steel scrap will be imported from the regional market and from the Asian region to augment supply. The main utilities required for the plant include water, electricity power and telecommunication facilities.

#### *Energy source*

Electricity supply to the proposed steel factory will be from the GRIDCo National Interconnected Transmission System (NITS). The project will construct a 5.1 km, 34.5 kV medium voltage, double circuit 265 mm<sup>2</sup> (40MVA each) ACSR conductor feeder to connect the Rider Iron and Steel Plant to the transmission grid from the existing 161kV Konongo substation. The Management of the Company has officially applied to GRIDCo for direct power supply to their proposed new plant and are awaiting their official response, (See annex 3-3). So far, GRIDCo has been very positive about the request.

#### *Water sources*

RISGL will connect to the Ghana Water Company Ltd water transmission line which takes its raw water from Barekese Headworks. In addition, the project proposes to construct a minimum of six (6.no) boreholes to supplement operations at the factory. The hydrogeological characteristics of the project area is very favourable and adequate groundwater to augment the GWSC supply is expected.

#### Waste Generation and Emissions

The steel plant will generate emissions in the form of dust and flue gas, slag and by products of the scrap sorting process. Storm and surface water runoff may transport pollutants from the site. The proposed disposal options for waste and emissions generated are discussed in section 3

#### Project Alternatives

Project development options and designs were evaluated to present the most feasible alternatives. These options were assessed according to their suitability to meet the project objectives. The alternatives are discussed under the following headings:

- Site Selection
- Raw material Type
  - Scrap Material
  - Iron ore, Coal and limestone
- Technology Analysis
  - Basic Oxygen Furnace (BOF)
  - Electrical Arc Furnace (EAF)
  - Electric Induction Furnace
- No action option.

#### Baseline environmental and Social Conditions

This section provides a description of the environmental and socio-economic baseline within the project site and areas where the direct and indirect impacts of the project are likely to occur. In addition to the primary data collected through site specific sampling campaigns, information available from secondary sources have also been used to fully describe the baseline conditions at the project site.

#### Stakeholder Consultations

Key stakeholders for the proposed RISGL Konongo project have been consulted. These include regulatory bodies, local government institutions and very importantly, project affected persons. Stakeholder consultation is an on- going process and would continue throughout project implementation. So far, the activity has achieved the following:

- created awareness and provided information about the proposed project to stakeholders;
- Provided opportunities for stakeholders to discuss their opinions and concerns as well as their expectations;
- Discussed with stakeholders the alternatives considered to reduce anticipated impacts, both on the physical environment and socio- economic wellbeing;
- Inform the process of developing appropriate mitigation and management options.

#### *Stakeholders Consulted*

These include:

- Environmental Protection Agency (EPA), Head office and Konongo office;
- Ghana National Fire Service (GNFS), Konongo
- Asante Akim Central Municipal Assembly
- Odumase Traditional Authority- Chief and Elders
- Neighbouring Community – Ohene Nkwanta
- Konongo-Odumase Government Hospital
- The Motor and Transport Division (MTTD) of the Police Service, Konongo district
- Water Resources Commission;
- Electricity Company of Ghana, Konongo district
- Department of Urban Roads, Konongo
- National Disaster and Management Organization(NADMO)
- Assemblyman for Ohene Nkwanta and Alafia Commuities
- Ohene Nkwanta and Alafia Communities
- Project Affected Persons (Farmers)
- Konongo – Odumase District Health Directorate
- Asante Akim Central Municipal Assembly
- Representative of Neighbouring Communities

#### *Key Issues of Concern*

The key issues of concern from consultations are summarized in the table below

| Name /Organization                     | Concern /Issue                                                                                                                                                                                                           | Response                                                                                                                                                                                                                                   |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Asante Akim Central Municipal Assembly | <u>Environment and Health</u><br>Concerns were raised on emissions from the factory into the atmosphere and its effects on the health of inhabitants in and around the area.                                             | RISGL will install a flue gas dedusting and air cleaning system to control the emissions into the environment in accordance with best practice. All emissions will meet Ghana EPA and IFC performance standards                            |
| Environmental Protection Agency        | <u>Traffic</u><br>The location of the proposed steel factory is off the Kumasi –Konongo highway. The area is accident-prone and hence the proposed entrance to the factory should be assessed and the concern mitigated. | A traffic impact assessment has been conducted by the Ghana Highway Authority. Recommendations by the GHA have been included in the ESIA as mitigation measures for this concern. The traffic Assessment report is included in this report |

|                                                                |                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project affected Persons                                       | <u>Compensation</u><br>Alternative dwellings were not provided for those whose hamlets were on the site<br><u>Grievance Redress mechanism</u><br>The current GRM in place is not favourable for the PAPS and they would want a better-structured GRM in place, probably channelling grievances through the Assembly rather than traditional authority. | The occupants of the hamlets have been fully paid as compensation for the loss of crops and hamlets from the valuation report.<br><br>A Grievance Redress Mechanism has been proposed in the ESIA. This would be adopted by RISGL to aid solve issues /concerns of PAPS |
| Health Directorate ,<br>Assembly member ,<br>Community Members | <ul style="list-style-type: none"> <li>• <u>Air Pollution</u></li> </ul> There were concerns that emissions from the factory would contribute to the increase in upper respiratory infections the community                                                                                                                                            | The project will include a flue gas dedusting and air cleaning system to filter and clean the emissions produced.<br>Regular air quality monitoring has been proposed to assess any changes over time.                                                                  |

A scoping notice was published in the Ghanaian Times newspaper on Thursday, 20<sup>th</sup> October, 2019 inviting public comments on the proposed project. The mandatory 21 days' disclosure period has since expired and no adverse comments were received from the public.

#### Project activities of Environmental and Social Concern

Project Activities of Environmental and Social Concern for the different phases of the project have been summarized as follows:

##### Preparatory phase:

- Land acquisition
- Survey work, feasibility studies to analyse effectiveness of project designs;
- Stakeholder consultations/ meetings including project affected persons
- Statutory permitting activities from EPA, Municipal Assembly and Department of Factories Inspectorate etc

##### Construction phase

- Site clearance including vegetation clearance and removal of topsoil;
- Excavation of earth (soil), installation and erection of equipment,
- Transportation of materials and equipment;
- Commissioning and testing activities;
- Disposal of construction spoil and waste in general; and
- Decommissioning of work camp

##### Operational and maintenance

- Sorting of steel scrap and loading into furnace,
- Operation of furnace and rolling mill,
- Management of slag waste from furnace,

- Cooling water and general waste from factory,
- Management of atmospheric emissions from the factory
- Storage and transport of finished products
- Maintenance of machinery and equipment
- Wastewater treatment, storage and disposal
- Solid waste generation and disposal;
- Factory management and Security
- Resource sourcing and utilisation;
- Emergency response.

### Identification of Potential Impacts

The identified potential environmental and social issues and impacts have been discussed based on the nature of the project and project area of influence.

The potential positive impacts of the project include:

- Employment opportunities and improved local economy; Workers will be employed for the various aspects of feasibility and construction activities. During the project implementation phase about 950 workers ie, skilled ,unskilled and semi-skilled will be employed. The project implementation will provide direct and indirect job opportunities over its useful life to both skilled and unskilled persons nationwide. For example, small scrap collectors will earn an income while also cleaning up the communities. Local contractors/consultancy companies will be contracted to carry out various project activities and these will create job opportunities for the local firms. The project is under the 1D1F policy initiative and will create massive employment particularly for the youth in rural towns and thereby improve levels and standard of living, as well as reduce rural-urban migration
- Availability of steel and iron rods at competitive prices for national infrastructural development; The proposed project is expected to increase iron rod production to about 300,000MT/year. Currently, there is a significant and steady increase in the importation of iron rods and steel coils into the country, which is adversely affecting the local Steel Industry. An increase in production will reduce importation, increase production and product availability on the market
- Improved institutional & national revenue; Revenue will accrue to the State in the form of tax deductions from wages of workers and Contractor fees. Government agencies e.g. EPA will charge processing and permit fees, which will increase the revenue base of these institutions

The adverse environmental and social issues which could possibly arise from the various stages of the project have been listed below and evaluated in Section 6

#### Preparatory and Planning Phase

- Land Acquisition
- Anxiety on the part of affected persons including concerns from unresolved grievances
- Occupational Health & Safety

#### Construction Phase

- Air quality deterioration
- Vibration and noise nuisance

- Loss of vegetation and impacts on flora and fauna
- Sanitation issues
- Occupational health & safety and labour
- Public health & safety issues
- Traffic issues
- Loss of livelihood and access to land
- Surface water contamination/ impact on aquatic organisms

#### Operation and Maintenance Phase

- Air quality deterioration
- Impact on Climate Change
- Waste storage and disposal
- Occupational health and safety and labour
- Traffic Issues
- Public health & safety issues

#### Decommissioning Phase

- Occupational/ public safety and traffic
- Waste disposal

#### Impact Mitigation and Management

The mitigation and management measures for the identified significant adverse impacts are provided in the table labelled *Summary of potential impacts and mitigation measures* below. The application of the mitigation measures in general is expected to reduce major and moderate impacts to minor or negligible impacts that may not require further mitigation.

| Anticipated Environmental & Social Impacts          | Receptor(S)                                       | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Planning and Preparatory Phase                      |                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Acquisition of land                                 | Potentially affected persons                      | <ul style="list-style-type: none"> <li>• Ensure all stakeholders are engaged in the early stage of the project.</li> <li>• All necessary documentation needed for acquiring the land must be approved.</li> <li>• Disclose publicly all relevant information on the project.</li> <li>• Prepare and implement an Abbreviated Resettlement Action Plan with an effective grievance redress mechanism in place</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Anxiety on the part of potentially affected persons | Potentially affected persons                      | <ul style="list-style-type: none"> <li>• Stakeholder interactions to educate all on proposed project activities, impacts and proposed mitigation measures.</li> <li>• Develop and implement grievance mechanism as a part of a wider Stakeholder Engagement Plan enabling concerns to be documented and resolved in a timely fashion.</li> <li>• The Odumase Traditional Council will be consulted prior to the commencement of work to ensure that all the necessary customary rites are performed and a mechanism found/agreed with the stool to ensure peaceful coexistence.</li> <li>• Prepare and implement an Abbreviated Resettlement Action Plan with an effective grievance redress mechanism in place</li> </ul>                                                                                                                    |
| Occupational health and safety                      | RISGL staff and agents (consultants/ contractors) | <ul style="list-style-type: none"> <li>• The various third party agents to be engaged will be required to comply with RISGL Occupational Health and Safety Policy.</li> <li>• All agents on site will be required to provide first Aid Kits to treat minor ailments and cuts. However, major cases will be referred to the Konongo –Odumase Government hospital for treatment or referral to the Komfo Anokye Teaching hospital.</li> <li>• Provision and use of appropriate personal protective equipment such as safety boots and coats, hand gloves, earplugs and nose masks when carrying out work on site. Supervisors will be mandated to ensure the use of these protective devices and implement sanctions when necessary.</li> <li>• Ensure that well-trained workers will be engaged for the various construction roles.</li> </ul> |

| Anticipated<br>Environmental<br>Social Impacts          | &<br>Receptor(S)                             | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Construction Phase Impacts</i>                       |                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Air Quality<br>Deterioration                            | Workers/<br>communities<br>and<br>road users | <ul style="list-style-type: none"> <li>• Ensure that equipment's such as generators, machines and vehicles with atmospheric emissions do not exceed emission standards imposed by industry and the EPA.</li> <li>• Regular air quality monitoring for dust emissions, exhaust gases and fumes at onsite and offsite locations will be conducted to assess atmospheric pollution performance of the construction activities.</li> <li>• The Project will implement a dust emissions control program including measures such as wet sweeping and covering to minimize atmospheric dust from constructional activities.</li> <li>• All excavation activities would be closely supervised to ensure minimal disturbance to surrounding land users and dust.</li> <li>• Ensure that all construction personnel use approved PPE during construction activities</li> </ul> |
| Vibration and noise<br>nuisance                         | Workers/<br>communities<br>and<br>road users | <ul style="list-style-type: none"> <li>• The contractor to employ standard noise abatement measures and engineering best practices to ensure that the impacts are minimized to acceptable limits.</li> <li>• The contractor to ensure that earthworks and other construction activities will be phased out or controlled to reduce noise generation during construction.</li> <li>• All equipment to be operated and maintained in accordance with appropriate industry and equipment standards including specifications for noise levels and manufacturer's specifications (including regular checks and maintenance).</li> <li>• Machines in intermittent use to be shut down in the intervening periods between works or throttled down to a minimum.</li> </ul>                                                                                                  |
| Loss of vegetation and<br>impacts on flora and<br>fauna | Terrestrial<br>Flora,<br>Fauna               | <ul style="list-style-type: none"> <li>• The Terrestrial ecological studies for the ESIA assessment showed that there are some species of conservation concern within the project area. Seedlings of these plants could be raised and distributed to farmers in the projects area of influence to plant. Timber species of merchantable size should be removed in accordance with national regulations</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

| Anticipated<br>Environmental<br>Social Impacts | & Receptor(S)    | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                |                  | <ul style="list-style-type: none"> <li>• Limit construction activities to only designated places and clearly mark out all vegetation, which will not be cleared, so that they are clearly visible as “no-go areas” to construction staff and vehicles.</li> <li>• Dismantle and remove all equipment and machinery after construction from site.</li> <li>• Rehabilitate trenches and disturbed areas as soon as possible.</li> <li>• Construction zones to be created so as to minimize the work footprint. Zones will be demarcated and construction crews will restrict works to demarcated roads. A construction-phase site drainage plan will be established to include measures to reduce runoff across the site and to minimize erosion.</li> <li>• A monitoring program shall be established to include a site evaluation of over land run-off and sedimentation in water courses as well as effectiveness of erosion control measures (i.e. netting and sand bags) will decrease the magnitude of the potential for increased soil erosion</li> </ul> |
| Sanitation/Waste<br>Generation concerns        | Public , Workers | <u>General Waste</u> <ul style="list-style-type: none"> <li>• The contractor to appoint an HSE coordinator. The coordinator shall prepare and implement a Waste Management Plan which specifies procedures and, incorporates the existing waste management plan for the project This is to facilitate tracking of loads, and protocols for the maintenance of records of the quantities of wastes generated, recycled and disposed.</li> <li>• Waste remaining after implementation of the waste hierarchy measures will be collected by private waste management companies for onward disposal.</li> <li>• The contractor should provide adequate waste bins at the temporary work camps to minimise littering and indiscriminate dumping .</li> <li>• Good site practices to be implemented to avoid waste generation and promote waste minimisation.</li> </ul>                                                                                                                                                                                             |

| Anticipated<br>Environmental<br>Social Impacts            | & Receptor(S) | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                           |               | <p><u>Construction Waste</u></p> <ul style="list-style-type: none"> <li>• All scraps or other solid wastes to be disposed of at the approved disposal site of the AACMA.</li> <li>• Excavated soils/concrete to be reused as much as possible for backfilling trenches dug during construction.</li> <li>• Excavated material to be used on site to the extent practical.</li> </ul> <p><u>Hazardous Waste</u></p> <ul style="list-style-type: none"> <li>• All hazardous waste (e.g. oily waste) generated during construction/installation will be appropriately stored as per manufacturer's instructions. For onward recycling, treatment or disposal, EPA approved hazardous waste collectors will be engaged for collection and disposal of all hazardous waste.</li> </ul>                                                                                                                     |
| Occupational Health and Safety Concerns and Labour Issues | Workers       | <ul style="list-style-type: none"> <li>• Conduct activities in the factory in accordance with relevant national and international laws and regulations on occupational health and safety. This includes Labour Act, 2003 (Act 651), the Factory, Offices and Shops Act, 1970 (Act 328), the Fire Service Act, 1997 (Act 537), Building Regulations, 2003 (LI 1724) and , 155 and 16</li> <li>• In accordance with ILO Convention 138) persons under 15 years old will not be employed. Employment of a young person must be suitable for his or her physical, emotional and developmental capacity.</li> <li>• Workers should be free from discrimination of any kind (gender, race, ethnicity, religion etc) in employment or working conditions working conditions, and social benefits.</li> <li>• All work will be carried out under conditions with appropriate work safety standards</li> </ul> |

| Anticipated<br>Environmental<br>Social Impacts | &<br>Receptor(S) | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                |                  | <p><u>Adoption of Health and Safety Policies</u></p> <ul style="list-style-type: none"> <li>• The contractor to establish and maintain high standards of occupational health, safety and environmental protection in line with RISGLs policy, to prevent personal injury or illness, property damage, fires, security losses and environmental pollution.</li> <li>• The contractor required to prepare and implement health, safety and environmental protection at the workplace to guide the construction activities in compliance with the policy of RISGL. The responsibility for implementing this policy lies directly and personally with the contractor through its workers. The policy objectives shall include the following:</li> <li>• Conduct activities in accordance with relevant national and international laws and regulations on occupational health and safety. This includes Labour Act, 2003 (Act 651), the Factory, Offices and Shops Act, 1970 (Act 328), the Fire Service Act, 1997 (Act 537), Building Regulations, 2003 (LI 1724), MARPOL Convention 73/78, ILO Convention 152, 155 and 160; <ul style="list-style-type: none"> <li>o establish regulatory and organizational framework for the efficient and effective management of occupational health, safety and environment issues;</li> <li>o maintain safe plant, machinery and equipment;</li> <li>o maintain safe and healthy work place for all users</li> <li>o maintain incident and injury-free working environments;</li> <li>o prevent occupational related diseases/ illness among workers; and</li> <li>o promote and maintain a clean, healthy and hygienic environment.</li> <li>o Support employment of local community members where possible.</li> </ul> </li> </ul> <p><u>The Contractors OHSP</u></p> |

| Anticipated<br>Environmental<br>Social Impacts | &<br>Receptor(S) | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                |                  | <ul style="list-style-type: none"> <li>• The contractor required to develop an Occupational Health and Safety Plan to international standards, including requirements for PPE, task risk assessment, mandatory training, audit and monitoring, incident reporting etc.</li> <li>• The Contractor to apply the hazard hierarchy when planning work to avoid/eliminate risks and reduce risk to as low as reasonably practical.</li> <li>• The contractors to educate workers on its health and safety policy. The adoption of the health and safety policy at site will serve as a precautionary measure to prevent/ minimize the possibility of accidents and reduce health associated risks.</li> <li>• The contractors to train selected workers as first aid givers and provide adequate first aid kits at the construction areas to treat minor ailments and cuts. However, major cases will be referred to the Konongo-Odumase Government Hospital for treatment or referral to the Komfo Anokye Teaching Hospital.</li> </ul> <p><u>Use of Experienced Personnel</u></p> <ul style="list-style-type: none"> <li>• The contractors to ensure that well-trained workers will be engaged for the various construction roles. Only drivers with the requisite licenses will be allowed to handle vehicles and earth-moving equipment into the site. Initial training and testing in machine/ equipment handling and safe working procedures will be given to all new drivers, operators and other field workers to help minimize the occurrence of accidents on site.</li> <li>• The contractors to ensure that regular defensive driving training sessions are organized for the drivers to ensure their safety and the safety of the general public.</li> </ul> <p><u>Provision of Personal Protective Equipment (PPE)</u></p> <ul style="list-style-type: none"> <li>• The contractor to ensure that workers are provided with the appropriate personal protective equipment such as safety boots and coats, hand gloves, earplugs and nose masks. Supervisors will be mandated to ensure the use of these protective devices and implement sanctions when necessary.</li> </ul> |

| Anticipated<br>Environmental<br>Social Impacts      | & Receptor(S)          | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                     |                        | <p><u>Phasing out of Material Movements/ Scheduling Material Movements</u><br/>Movement of tanks, pipes and other construction materials to site or storage areas to be carried out in phases and properly regulated to control the number of cargo vehicles coming into the project site at any given time to reduce the risk of accidents.</p> <p><u>Use of Equipment</u><br/>All equipment's to be used will be in good condition and scheduled regular maintenance will be ensured to reduce/minimize of accidents.</p> <p><u>Worker Rights and Wellbeing</u><br/>The Contractor to develop and implement a Human Resource Policy and plan that adheres to the requirements of IFC PS2, including requirements for workers to have contracts, Workers Grievance Mechanism and develop retrenchment plans if there is a requirement for collective dismissals.</p> <ul style="list-style-type: none"> <li>• Ensure that children and minors are not employed directly or indirectly on the project. The contractor should enforce Zero tolerance policy for child labor</li> <li>• Mandatory and regular training for workers on required lawful conduct in host community and legal consequences for failure to comply with laws;</li> </ul> <p>Ensure Code of conduct is signed by all workers</p> <ul style="list-style-type: none"> <li>• Provision of cultural sensitization training for workers regarding engagement with local community to prevent any social conflicts</li> </ul> |
| Public Health and<br>Safety and Security<br>Impacts | Public/Communitie<br>s | <p><u>Restriction of Access</u></p> <p>(a) RISGL will maintain security at the proposed site to ensure that only authorised persons are allowed into the construction area.</p> <p>(b) The security personnel will be trained to respect the human rights of the local people</p> <p>(c) IFC PS4 will be used as the standard in relation to hiring, training and monitoring of security personnel.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

| Anticipated<br>Environmental<br>Social Impacts | &<br>Receptor(S) | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                |                  | <p><u>Public Health /Toilet facilities</u></p> <ul style="list-style-type: none"> <li>• The contractor to provide mobile toilet facilities for workers during construction.</li> </ul> <p><u>Use of warning signs</u></p> <ul style="list-style-type: none"> <li>• Uncovered trenches or deep excavations will be protected using indicator linings or illustrative warning notices or wire mesh (whichever best suits the situation) to prevent fall hazards. All trenches and excavation will be covered as soon as possible.</li> <li>• As much as possible the contractor will adopt progressive opening of trenches to reduce risks to as low as reasonably practicable <ul style="list-style-type: none"> <li>• Caution/warning signs should be placed at vantage points around the project site</li> </ul> </li> </ul> <p><u>Scheduling of Work</u></p> <p>The contractor will analyse traffic flows and ensure that the transport of equipment is carried out during low peak periods.</p> <p><u>Announcement and Notification of Work</u></p> <p>The AACMA will be informed at least seven days before start of work. RISFL will make announcements and give notices for work schedule through local FM stations as well as , Assemblymen and Unit Committee leaders.</p> <p><u>Transport of Equipment and Materials</u></p> <p>A Traffic Management Plan to be prepared by the contractor for the movement of materials.</p> <p>Flagmen will be employed to man all major intersections to assist with passage of trucks conveying materials and equipment, on the route to the construction site and storage area.</p> <p>All the vehicles to be used for the project and especially in transporting equipment and materials will be serviced regularly and all the drivers to be engaged/ assigned would be required to hold the requisite driver's license as prescribed by the Drivers and Vehicles</p> |

| Anticipated<br>Environmental<br>Social Impacts | & Receptor(S)                                   | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                |                                                 | <p>Licensing Authority (DVLA), and would be educated on public safety issues. Adequate traffic management measures will be instituted to caution the public and to create safety awareness.</p> <p>Some adequate measures and conditions to be instituted by the contractor in the transport of materials include the following:</p> <ul style="list-style-type: none"> <li>• All temporary traffic controls will be done in consultation with the Department of Urban Roads (DUR) and MTTD;</li> <li>• Haulage of materials will be limited to off-peak hours;</li> <li>• All trucks conveying materials will carry appropriate warning signals such as red flag and rotating amber lights;</li> <li>• Road worthy dump trucks will be used;</li> <li>• Very experienced drivers will be engaged;</li> <li>• Traffic wardens will monitor dump truck movements and ensure public and traffic safety; and</li> <li>• Speed limits of between 20-30 km/hour will be allowed along the route to the fishing harbour area for all trucks.</li> <li>• Carry out regular inspections of haulage roads. In the event truck failure along haulage routes, such trucks will be towed within 24 hours.</li> </ul> |
| Traffic Impacts                                | RISGL vehicles, commercial and private vehicles | <ul style="list-style-type: none"> <li>• Rider Steel will prepare and implement a Traffic Management Plan (TMP), including a Journey Management Plan (JMP) for trips to and from site</li> <li>• All drivers (employed by Rider Steel or by contractors) will be required to undergo driver training that includes instruction on speed limits and the hazards associated with the routes they will be travelling.</li> <li>• Transport of materials will as much as possible be carried out during off-peak traffic hours to minimise the impact on traffic on the N6 Highway.</li> <li>• Illustrative warning signage and indicators will be provided in and around the facility.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

| Anticipated<br>Environmental<br>Social Impacts | & Receptor(S)   | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                |                 | <ul style="list-style-type: none"> <li>Consider road engineering measures such as bumps to slow vehicles down about 50 metres to the turning that goes into the project site</li> <li>Warning signs will be provided on the highway when approaching the project site</li> <li>In conjunction with the Ghana Highway Authority ensure that the visibility splay distance (distance which allows drivers who are entering main roads from minor roads to see oncoming vehicles and vice versa) when constructing the road to the project site is adequate. This will enable emerging drivers from the project site as well as those on the highway have sufficient visibility in each direction to see oncoming vehicles in sufficient time to prevent road accidents.</li> </ul>                                    |
| Loss of livelihood and access to land          | PAPs            | <ul style="list-style-type: none"> <li>Ensure that compensation/ livelihood assistance arrangements are implemented and documented prior to the start of the project as required</li> <li>Appropriate compensation value for affected person will be paid.</li> <li>Monitoring will be undertaken to determine potential compensation/livelihood assistance measures required and verify that they have been effective.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                  |
| Operations/Maintenance Phase                   |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Air Quality<br>Deterioration                   | Workers, Public | <ul style="list-style-type: none"> <li>Make use of equipment's, generators, machines and vehicles with atmospheric emissions meeting standards imposed by industry and the EPA.</li> <li>Ensure that all equipment and engines are maintained and operated as original designed.</li> <li>Prohibit the use of poorly maintained equipment for operations .</li> <li>Ensure that all equipment is properly operated according to standard operating procedure that will ensure safe operation of equipment/vehicle/generator while meeting environmental emission best practices.</li> <li>Monitor dust emissions, exhaust gases and fumes at onsite and offsite locations (preferable same sample sites monitored during the ESIA) to assess atmospheric pollution performance of operational activities</li> </ul> |

| Anticipated Environmental & Social Impacts | Receptor(S)                           | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                            |                                       | <ul style="list-style-type: none"> <li>• The flue gas dedusting and air cleaning system will be used to reduce emissions.</li> <li>• Ensure that workers and persons on site always use the approved PPE to minimize effect of inhalation of dust and noxious fumes on worker health.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Noise and Vibration Nuisance               | Workers ,<br>Neighbouring communities | <ul style="list-style-type: none"> <li>• Noise and vibration impacts associated with the operation of the plant to be adequately managed will be from: <ul style="list-style-type: none"> <li>▪ the melting furnace;</li> <li>▪ rolling mill and hammering processes;</li> <li>▪ cooling tower facility;</li> <li>▪ generators, cars, truck and heavy duty vehicles; and</li> <li>▪ domestic noise associated with air conditioners, persons, etc.</li> </ul> </li> <li>• Develop work guidelines for truck operators that specify noise emission limits and provide guidance for minimizing noise from activities. This will include requirements for equipment maintenance and operation and operational controls such as specification of limits to engine idling.</li> <li>• Carry out regular monitoring of noise levels at the established sampling sites. Should noise exceed the specified noise criteria, corrective measures will be taken including operational controls and use of sound baffling devices or techniques.</li> <li>• Monitor public complaints about noise and take corrective measures where required.</li> <li>• Provide appropriate PPEs for workers use.</li> </ul> |
| Impact on Climate Change                   | Public                                | <ul style="list-style-type: none"> <li>• Explore breakthrough technologies for low-carbon steel technologies production</li> <li>• Ensure efficient use of resources, re-use and recycling for sustainable development</li> <li>• The flue gas deducting and air cleaning system will be used to reduce air emissions</li> <li>• Educate the drivers and contractors on road transport effects contributing to GHG emissions for sustainable development.</li> <li>• Reduce Carbon footprint by <ul style="list-style-type: none"> <li>▪ Monitoring Energy use</li> <li>▪ Regular review of logistics eg bulk delivery of supply</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| Anticipated Environmental & Social Impacts                | Receptor(S) | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                           |             | <ul style="list-style-type: none"> <li>▪ Consider renewable energy sources (solar) to supplement regular supply from the ECG.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Occupational Health and Safety Concerns and Labour Issues | Workers     | <ul style="list-style-type: none"> <li>• Conduct activities in the factory in accordance with relevant national and international laws and regulations on occupational health and safety. This includes Labour Act, 2003 (Act 651), the Factory, Offices and Shops Act, 1970 (Act 328), the Fire Service Act, 1997 (Act 537), Building Regulations, 2003 (LI 1724) and , 155 and 16</li> <li>• In accordance with ILO Convention 138) persons under 15 years old will not be employed. Employment of a young person must be suitable for his or her physical, emotional and developmental capacity.</li> <li>• Workers should be free from discrimination of any kind (gender, race, ethnicity, religion etc) in employment or working conditions working conditions, and social benefits.</li> <li>• All work will be carried out under conditions with appropriate work safety standards to protect him or her from exposure to potential hazards</li> <li>• Train workers on all procedures on materials handling, chemical hazards, fire and explosions, confined spaces and on site-traffic hazards.</li> <li>• Ensure regular medical checks for all staff and workers</li> <li>• All workers must be well informed of the grievance redress procedures</li> <li>• Train workers on all procedures on materials handling, chemical hazards, fire and explosions, confined spaces and on site-traffic hazards.</li> </ul> <p><u>Preventive Measures</u></p> <ul style="list-style-type: none"> <li>• Prepare comprehensive maintenance programme on commencement of operations to put in place measures to avert any serious breakdowns or failures. The required maintenance for the systems will include among others: <ul style="list-style-type: none"> <li>o Environmental incident/accident investigation;</li> <li>o Routine equipment maintenance/inspection schedule;</li> <li>o Annual equipment inspection and maintenance record;</li> </ul> </li> </ul> |

| Anticipated<br>Environmental<br>Social Impacts | & Receptor(S)                                                                 | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                |                                                                               | <ul style="list-style-type: none"> <li>o Procedure for pre-arranged repair service;</li> <li>o Procedure for preventive maintenance</li> </ul> <ul style="list-style-type: none"> <li>• At the substation, as much as possible avoid working on live electrical parts except when de-energizing the equipment creates additional hazards or when the equipment must be energized to allow for testing that can only be performed live.</li> </ul> <p><u>Emergency Provisions</u></p> <ul style="list-style-type: none"> <li>• All workers will be trained on emergency response procedures including fire, mechanical failures etc. that will arise from operations to minimize any hazards to humans and the environment. Management will ensure a triennial review of the plan.</li> </ul> <p><u>Housekeeping</u></p> <ul style="list-style-type: none"> <li>• Good housekeeping practices will be an integral part of operations to maintain a well laid out working space and avert accidents resulting from slips and falls.</li> <li>• Provide PPEs for all works</li> </ul> |
| Public Health and safety                       | Local communities along the haulage route, land, air, water<br>General Public | <ul style="list-style-type: none"> <li>• Provide procedures for community reporting of observed incidents/community grievance redress mechanism.</li> <li>• Will identify emergency scenarios and develop emergency preparedness and response plans with allocation of responsibilities to local communities and authorities, (where appropriate)</li> <li>• Conduct safety awareness and education programs for neighbouring community.</li> <li>• After construction, boreholes and ancillary facilities shall be sealed and secured in such a way as to reduce likelihood of contamination of groundwater resource.</li> <li>• Develop and implement a Groundwater Management Plan including monitoring to ensure that water use is optimized.</li> <li>• Organise, in collaboration with the Asante Akim Central municipal Assembly, awareness creation seminars and educational programmes for all workers and the</li> </ul>                                                                                                                                                 |

| Anticipated<br>Environmental<br>Social Impacts                          | &<br>Receptor(S)                              | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                         |                                               | <p>general public on the behavioural changes required to prevent the spread of HIV/AIDS and other STDs.</p> <ul style="list-style-type: none"> <li>• Cooling water will be recycled and vaporized to prevent contamination of the Anunu River, which is used by Ohene Nkwanta Community for domestic purposes.</li> <li>• Ensure that run off from the factory is channelled into the drains to prevent contamination of surface water bodies</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Traffic Impacts                                                         | Public,<br>Communities along<br>Haulage route | <ul style="list-style-type: none"> <li>• Rider Steel will prepare and implement a Traffic Management Plan (TMP), including a Journey Management Plan (JMP) for trips to and from site</li> <li>• All drivers (employed by Rider Steel or by contractors) will be required to undergo driver training that includes instruction on speed limits and the hazards associated with the routes they will be travelling.</li> <li>• Transport of materials will as much as possible be carried out during off-peak traffic hours to minimise the impact on traffic on the N6 Highway.</li> <li>• Illustrative warning signage and indicators will be provided in and around the facility.</li> <li>• Consider road engineering measures such as bumps to slow vehicles down about 50 metres to the turning that goes into the project site</li> <li>• Warning signs will be provided on the highway when approaching the project site</li> <li>• In conjunction with the Ghana Highway Authority ensure that the visibility splay distance (distance which allows drivers who are entering main roads from minor roads to see oncoming vehicles and vice versa) is adequate and free. This will enable emerging drivers from the project site as well as those on the highway have sufficient visibility in each direction to see oncoming vehicles in sufficient time to prevent road accidents.</li> </ul> |
| Emergency situations/<br>Sustainability of the<br>RISGL Konongo Project | Public, GoG,<br>Investors, RISGL              | <ul style="list-style-type: none"> <li>• Management will develop and implement an emergency response plan to handle all emergencies including fire, and accidents from all its operations to minimize any</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| Anticipated<br>Environmental<br>Social Impacts | & Receptor(S)            | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                |                          | <p>hazards to humans and the environment. Management will ensure a triennial review of the plan.</p> <ul style="list-style-type: none"> <li>• A comprehensive maintenance programme will be put in place to avert any serious breakdowns or failures or accidents. The required maintenance for the systems will include among others: <ul style="list-style-type: none"> <li>o Environmental incident/accident investigation;</li> <li>o Carry out mock emergency response drills</li> <li>o Routine equipment maintenance/inspection schedule;</li> <li>o Annual equipment inspection and maintenance record;</li> <li>o Procedure for pre-arranged repair service;</li> <li>o Procedure for preventive maintenance;</li> <li>o Procedures for handling materials;</li> </ul> </li> <li>• Coordinate with the assembly , the traditional authority and the neighbouring communities to identify corporate social responsibilities beneficial to the community <ul style="list-style-type: none"> <li>• Ensure resource use efficiency influencing supply chain sustainability</li> </ul> </li> <li>• Adopt a comprehensive monitoring plan to ensure effective implementation of mitigation and management measures.</li> </ul> |
| Decommissioning Phase                          |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Occupational Health and Safety                 | Workers                  | <p>A retrenchment policy will be developed and included in the condition of service/service agreement for workers for them to know what they will be entitled to during retrenchment and closure of the affected company/ operator.</p> <p>(Also apply mitigation measures for construction phase )</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Waste Disposal                                 | Public , Workers General | (apply mitigation measures for construction phase )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## Provisional Environmental Management Plan

A Provisional Environmental Management Plan (PEMP) is developed for the project in accordance with the Environmental Assessment Regulations of 1999, LI 1652 to assist the project to be carried out in an environmentally safe and sustainable manner. The provisional EMP addresses issues related to the following:

- Adoption of Environmental Health and safety Policy and Operational Procedures;
- Environmental Health and Safety Management Structuring;
- HSE Management Structure
- Worker Information and Training;
- Public and community participation;
- Environmental and social monitoring programmes;
- Dispersion Modelling
- Audits and Reviews;
- Social Responsibility Arrangements;
- Environmental Report;
- Emergency response; and
- Document Control and tracking.

A detailed EMP will be prepared and submitted to the EPA within 24 months of commencement of operations as required by law.

## Grievance Redress Mechanism

A grievance is any query, call for clarification, problems, and concerns raised by individuals or groups related to activities undertaken or processes applied by the project. Grievances can be an indication of growing stakeholder concerns and can escalate if unidentified and resolved. The management of grievances is therefore a vital component of stakeholder management in ensuring the sustainability of the project. The proposed Grievance Redress Mechanism (GRM) will respond to all queries or clarifications about the project during both the construction (including planning and preparatory phase) and operation stages, and the implementation problems that may arise will be resolved and grievances addressed efficiently and effectively. An effective and efficient GRM should have multiple avenues or channels for lodging complaints, transparency, promptness and timeliness of responses and clear procedures.

The general steps of the grievance process comprise:

- ◆ Registration of complaints;
- ◆ Determining and implementing the redress action;
- ◆ Verifying the redress action; and
- ◆ Monitoring and Evaluation.

## Environmental and Social Monitoring

A comprehensive monitoring plan has been developed for the project to help track the implementation of mitigation measures recommended for the identified adverse environmental and social impacts. The monitoring plan includes the proposed responsible institutions or persons and estimated budget/cost requirements. However detailed cost analysis from prospective consultants and experts to be engaged as part of the monitoring programme will be needed to confirm cost requirements. About GHS 341,000 annually (excluding contractor budget) will be required for environmental management including reporting. This figure is subject to review following

confirmation from cost studies to be carried out after project development and does not include the contractor's estimates

## Conclusion

RISGL is committed to ensuring sustainable environmental management and safeguarding the health and safety of the community members and all other workers as well as the general public in the implementation of the proposed sewer decentralization Project. RISGL is also aware of the provisions in the Environmental Protection Agency Act 1994, Act 490 and Environmental Assessment Regulations 1999, LI 1652. In keeping with these laws, this ESIA has identified and assessed key environmental and social impacts and concerns that may arise from the implementation of the proposed project.

Consultations with stakeholders, review of relevant literature, field inspections and studies underpinned the identification of the project adverse environmental and social impacts. Mitigation measures have been provided to address these impacts and any residual impacts arising after application of the full mitigation measures will be minor or negligible.

## 1.0 INTRODUCTION

### 1.1 Background

Steel, which has a wide range of industrial applications, is produced from iron in a variety of ways. However, recycling of scrap has become an economic and environmentally friendly way of producing steel for industrial applications as recycling of scrap reduces the need for mining 'new' iron ores. In light of this, and also due to the increasing global demand for steel products, Rider Iron and Steel Ghana Limited (RISGL) is proposing a steel project in Odumase – Konongo Kumasi to produce 300,000 ton steel per year (tpy) to supplement their current 80,000 tpy steel production in Tema.

RISGL proposes to construct the new 300,000MT/year continuous casting steel factory with 2 x 20MT + 2 x 40MT furnaces to produce steel products mainly rebars, steel wires, angle bars and flat bars from locally acquired scrap metal under the government's 'One district, One factory'(1D1F) policy initiative. The 'One district, one factory'(1D1F) Policy is a Government of Ghana policy aimed at creating jobs for Ghanaians through the setting up of factories and industries which will in turn move the country towards greater industrialization. The initiative aims to achieve this through a massive private sector led nationwide industrialization drive, which will equip and empower communities to utilize their local resources in manufacturing products that are in high demand both locally and internationally.

In line with the national environmental permitting requirements as provided under the Environmental Assessment Regulations of 1999, Legislative Instrument (LI) 1652, RISGL registered the proposed project with the Environmental Protection Agency (EPA). The EPA in a response letter dated 9<sup>th</sup> September 2019 and referenced CU: 2063/01/02(see Annex 1-1 for copy of EPA letter) classified the proposed project as one which requires an Environmental and Social Impact Assessment (ESIA) to be carried out to help understand the likely implications of the proposal in order to inform the environmental permitting decision-making prior to project implementation.

A Scoping Report was duly submitted to the EPA, and the Agency in their response letter referenced CU: 2063/01/04 provided review comments and advised that the EIA should be carried out. This report is therefore the Draft Environmental and Social Impact Statement (ESIS) to the EPA as per the Agency's request in the response letter to the scoping. The EPA's response letter to the Scoping Report and a table showing sections where the review comments have been addressed are attached as Annex 1-2.

### 1.2 Rationale for Proposed Project

Ghana is currently a net importer of steel for its industries. However, the large volume of steel scrap available in the country coupled with the increasing demand for steel products has made it necessary to recycle steel scrap in the country. This contributes immensely to the global need to recycle waste scrap and for the reduction in environmentally harmful impacts and greenhouse emissions.

Presently, the installed capacity of all public and private steel rolling mills in the country is about 313,000 to 425,000 metric tons annually for all kinds of steel products but actual production capacity is considerably less at approximately 200,000 -250,000 metric tons annually. An additional 300,000 ton per year (tpy) steel producing factory will contribute to increased annual steel production to

enhance supply to the local and international market while making good use of recycled scrap in the country.

### 1.3 Purpose and Aim of the ESIA Study

The purpose of the ESIA study is to identify and address possible direct and indirect significant adverse environmental and social impacts to arise from the proposed project to engender project acceptability and sustainability.

The study also aims at satisfying both legal and institutional obligations specified under Environmental Protection Agency Act 1994 (Act 490), Environmental Assessment Regulations 1999 (LI 1652) and the relevant World Bank Safeguard Policies and Procedures.

The ESIA will also aid in decision making to achieve optimum project designs by considering the potential environmental and social costs in comparison with potential benefits.

### 1.4 Objectives of the ESIA Study

The specific objectives of the ESIA study are to:

- Provide technical description of the project and identify activities of environmental/social concerns;
- Establish the baseline environmental conditions;
- Predict and examine all the significant environmental impacts on the surrounding communities and the general environment during implementation of the proposed project and advise on appropriate mitigation and abatement measures against potential adverse impacts; and
- Assess the socio-economic and cultural benefits and disadvantages associated with the project for an informed decision to be made on the level of environmental compromise and permitting by relevant stakeholders.
- Prescribe relevant monitoring/supervisory regime to ensure that prescribed mitigations are well implemented.

### 1.5 Scope of Work for the ESIA Study

The scope of work for the ESIA study comprise, to:

- Provide adequate description of the proposed project and identify all activities of environmental/social concern;
- Establish the existing environmental and socio-economic baseline conditions of the project area of influence;
- Predict and examine all the significant environmental impacts on the surrounding communities and the general environment during implementation of the proposed project and advise on appropriate mitigation and abatement measures against potential adverse impacts;
- Provide a monitoring program for predicted impacts;
- Provide a costed provisional Environmental and Social Management Plan (ESMP);
- Document the socio-economic and cultural advantages and disadvantages associated with the proposed project for stakeholders and interested groups to make an informed decision on the level of environmental compromise and permitting.

- Provide procedures to be followed in the unlikely event of decommissioning

## 1.6 Approach/Methodology for the Study

The approach and methodology for the ESIA involved the following:

- Desktop study, Review of project technical reports and available literature ;
- Reconnaissance visit and site inspections;
- Public/stakeholder consultations;
- Baseline information gathering, including:
  - o Climatological/weather study;
  - o Air quality and Noise monitoring;
  - o Surface water monitoring
  - o Ground water sampling
  - o Geology and Hydrogeology;
  - o Land use study;
  - o Topographic survey;
  - o Socio-economic characteristics (demography, gender, employment, industry).
- Impact analysis;
- Identification and assessment of environmental and social impacts; and
- Development of mitigation and monitoring measures as well as management plans

### 1.6.1 Review of available Literature

The major documents reviewed include:

- Documents from the project implementers on scope of the project;
  - o Feasibility Study for 300,000MT/year of steel production factory in Kumasi, Ghana (February 2019)
  - o Preliminary geotechnical and geophysical studies at site for proposed steel factory at Konongo- Odumase, Ashanti region (June 2019)
- Environmental Impact Assessment Guidelines for the General Construction and Services Sector (2011),;
- Environmental Assessment in Ghana, A Guide (1996) guidance on the procedures to be adhered to when undertaking an EIA;
- Environmental Impact Statement Proposed Rider Iron and Steel Manufacturing Plant, Tema Export Processing Zone, December 2012.
- Final Environmental and Social Impact Statement for the Tema LNG terminal Ghana Project, 2018;
- World Bank Group Environmental Health and Safety Guidelines;
  - o IFC EHS Guidelines for Integrated Steel Mills (April 2007);
- District Analytical Report, Ashanti Region, 2010 Population and Housing Census, October 2014;
- District Analytical Report, Asante Akim Central Municipal Assembly, 2010 Population and Housing Census, October 2014
- Asante Akim Central Municipal Assembly Medium Term Development Plan 2014 -2017, December 2014.
- Relevant literature from internet sources (see bibliography).
- Satellite images of the project area; and
- 1:50,000 topographical maps of the project area.

### 1.6.2 Field Visits

Field visits to the proposed project site were carried out in October and November 2019 to assess potential environmental and social issues and conditions to be affected or are likely to develop from the implementation of the proposed project and conduct baseline studies within the project area.



Plate 1-1: Field visit to the project site (Left) and Ohene Nkwanta Community borehole (Right) (SAL 2019)

### 1.6.3 Public/ Stakeholder Identification and Consultations

The RISGL project engineers were engaged severally to understand the project scope, design and implementation and to obtain relevant project documents. Key stakeholders have also been consulted to obtain their comments and concerns on the proposed project with respect to the potential environmental and socio-economic issues. The stakeholders consulted are as follows:

1. Project proponent

- Rider Iron and Steel GH Ltd

2. Other stakeholders

- Environmental Protection Agency (EPA), Head office and Konongo office;
- Ghana National Fire Service (GNFS); Konongo
- Water Resources Commission;
- Electricity Company of Ghana, Konongo district
- The Motor and Transport Division (MTTD) of the Police Service, Konongo district
- Department of feeder and urban roads, Konongo
- Konongo – Odumase District Health Directorate

3. Administrative Authorities

Asante Akim Central Municipal Assembly

4. Representative of Neighbouring Communities

- Traditional Authorities
- Assembly member;
- Ohene Nkwanta and Alafia Communities

6 Project Affected Persons (farmers)

#### *1.6.4 Data Analysis and Reporting*

The relevant data and information obtained from the desktop study/literature reviews, stakeholder consultations and field visits were collated, analysed where necessary and have been presented in this ESIA. The ESIA presentation is in line with the EPA format and the major headings of the report are:

- i. Non-Technical Executive summary
- ii. Introduction
- iii. Policy, Legislative and Administrative Requirements
- iv. Description of project and alternatives
- v. Description of existing environment/baseline
- vi. Stakeholder consultations
- vii. Potential Environmental impacts identification and Evaluation
- viii. Impact Mitigation and enhancement measures
- ix. Provisional Environmental Management Plan
- x. Decommissioning
- xi. Conclusion
- xii. Annexes

## 2.0 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

The ESIA process is undertaken in line with the national and international regulations and standards, including those of International Finance Institutions (IFI). The relevant national and sector policies and plans, national legal and institutional frameworks, international conventions and World Bank safeguard policies, and national environmental quality guidelines to guide the implementation of Rider Iron and Steel Konongo Project to ensure its sustainable development and compliance with national and international regulations are briefly described in this chapter.

### 2.1.1 National and Sector Policies and Plans

The national and sector policies and plans identified to be relevant to the proposed Rider Iron and Steel Gh Ltd Project include the following:

- Energy Commission Act 1997, Act 541
- National Environmental Policy ,2012
- National Land Policy, 1999
- National Climate Change Policy, 2013
- Coordinated Program of Economic a Social Development Policy), 2017-2024
- National Employment Policy,2014
- National Health Policy ,2007
- One District One Factory Policy , 2019

The key compliance requirements for the policies listed above are summarised in Table 2-1.

Table 2-1: Summary of National and Sector Policies and Plans

| <i>Policy Framework</i>             | <i>Summary of core requirements</i>                                                                                                                                                                                                                                                                                                                                                                              | <i>Relationship to proposed project</i>                                                                                                                                                                          |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Energy Commission Act 1997, Act 541 | The Energy Commission Act 1997 (Act 541) provide for its functions relating to the regulations, management, development and utilisation of energy resources, provide for the granting of licences for the transmission, wholesale supply, distribution and sale of electricity and natural gas, refining, storage bulk distribution marketing and sale of petroleum products and to provide for related matters. | Rider Iron and Steel Gh Ltd has obtained a permit from the energy commission to operate as an electricity bulk customer for electricity consumption at the proposed Rider Iron and steel Gh Ltd, Konongo factory |
| National Land Policy, 1999          | The National Land Policy provides for the protection of water bodies and the environment in the long-term national interest under any form of land usage be for human settlements, industry and commerce, agriculture, forestry and mining. Key aspects of Section 4.4 (Ensuring Sustainable Land Use) of the Policy relevant to the Project are provided below:                                                 | The proposed project will ensure the integrity of all natural resources ie water bodies,                                                                                                                         |

| Policy Framework                    | Summary of core requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Relationship to proposed project                                                                                                                                                                |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                     | <p>(d) The use of any land in Ghana for sustainable development, the protection of water bodies and the environment and any other socioeconomic activity will be determined through national land use planning guidelines based on sustainable principles in the long term national interest.</p> <p>(e) Land categories outside Ghana's permanent forest and wildlife estates are available for such uses as agriculture, timber, mining and other extractive industries, and human settlement within the context of a national land use plan.</p> <p>(i) Unless approved by the appropriate public authority, no land use change of any kind will be countenanced.</p> <p>All land and water resources development activities must conform to the environmental laws in the country and where Environmental Impact Assessment report is required this must be provided. Environmental protection within the 'polluter pays' principle will be enforced.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <p>forests, etc. within the project area. Farmers who will lose their farmlands will be duly compensated by RSGL. Land will be properly acquired from the right owners and duly registered.</p> |
| National Environmental Policy, 2012 | <p>The Ghana National Environmental Policy was first formulated in 1995. The ultimate aim of the National Environmental Policy of Ghana is to improve the surroundings, living conditions and the quality of life of the entire citizenry, both present and future. It seeks to promote sustainable development through ensuring a balance between economic development and natural resource conservation. The policy thus makes a high quality environment a key element supporting the country's economic and social development.</p> <p><u>Specifically, the policy seeks to:</u></p> <ul style="list-style-type: none"> <li>• Maintain ecosystem and ecological processes essential for the functioning of the biosphere;</li> <li>• Ensure sound management of natural resources and the environment;</li> <li>• Adequately protect humans, animals and plants, their biological communities and habitats against harmful impacts and destructive practices, and preserve biological diversity;</li> <li>• Guide development in accordance with quality requirements to prevent, reduce, and as far as possible, eliminate pollution nuisances;</li> <li>• Integrate environmental considerations in sectoral structural and socio-economic planning at the national, regional, district and grassroots levels;</li> <li>• Seek common solutions to environmental problems in West Africa, Africa and the world at large.</li> </ul> <p><u>Principles of the National Environmental Policy</u></p> <p>In order not to deviate from the Policy in the National Environmental Action Plan, 1991, by the then Environmental Protection Council (EPC), this strategic plan take into consideration the following principles that are consistent with the above policy:</p> <ul style="list-style-type: none"> <li>• Optimum sustainable yield in the use of resources and ecosystems;</li> </ul> | <p>The proposed project will promote sustainable development by including economic, social and environmental considerations.</p>                                                                |

| <i>Policy Framework</i>                                                   | <i>Summary of core requirements</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <i>Relationship to proposed project</i>                                                                                                                                                              |
|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                           | <ul style="list-style-type: none"> <li>• Use of most cost effective means to achieve environmental objectives;</li> <li>• Use of incentives in addition to regulatory measures;</li> <li>• Delegation of decision-making and action to the most appropriate level of government;</li> <li>• Polluter pays for the cost of preventing and eliminating pollution and nuisances caused by him/her;</li> <li>• Public participation in environmental decision-making;</li> <li>• International co-operation;</li> <li>• Citizens have the right to safe, healthy environment</li> <li>• All sectors of society are responsible for ensuring a sustainable environment, viz. government, business, industry and the citizenry.</li> </ul>                                                                                                                                                 |                                                                                                                                                                                                      |
| National Climate Change Policy, 2013                                      | The National Climate Change Policy provides strategic direction and coordinates issues of climate change in Ghana. The three objectives of the Policy are (1) effective adaptation, (2) social development and (3) mitigation. To address the adaptation issues in Ghana, five thematic areas have been prioritised. These are (1) energy and infrastructure, (2) natural resources management, (3) agriculture and food security, (4) disaster preparedness and response and (5) equitable social development.                                                                                                                                                                                                                                                                                                                                                                      | The project has potential impact on climate change. The project will ensure that the appropriate monitoring, mitigation, and adaptation measures are adopted to reduce the impact of climate change. |
| Coordinated Program of Economic and Social Development Policy (2017-2024) | The transformation agenda under the program presents industrialisation, through agro-processing and industry and will serve as the anchors of the flagship “One District, One Factory” initiative. A supportive policy, framework will focus on energy for industry, removing structural and institutional bottlenecks, and facilitating access to land. In support of Government’s industrialisation drive. Land will be secured at strategic locations for the development of industrial and business parks and enclaves across the country. These will be provided with integrated infrastructure and made accessible to export-oriented, import-substitution industries, light industries, technology companies and sales outlets. Government will also free up surplus and underutilised land held by the state for housing and commercial uses, to boost economic development. | The proposed project is a beneficiary of the One district on factory project, acquisition of land was facilitated by the program initiative.                                                         |
| National Health Policy, 2007                                              | The National Health Policy document (September 2007) which aims at creating wealth through health, among other things places emphasis on improvements in personal hygiene, immunisation of mothers and children. The National Health Policy also argues that a healthy population could only be achieved if there were improvements in environmental hygiene and sanitation, proper housing and town planning, provision of safe water, safe food and nutrition and encouragement of regular physical exercise.                                                                                                                                                                                                                                                                                                                                                                      | The proposed project will seek to adopt the practices and measures to maintain and improve environmental sanitation.                                                                                 |
| National Employment Policy, 2014                                          | <ul style="list-style-type: none"> <li>• The goal of the National Employment Policy (NEP) is to create gainful and decent employment opportunities for the growing labour force to improve their living conditions and contribute to economic growth</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | The proposed project will seek to create jobs for                                                                                                                                                    |

| <i>Policy Framework</i>                | <i>Summary of core requirements</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <i>Relationship to proposed project</i>                                                      |
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|                                        | <p>and national development within the framework of equity, fairness, security and dignity. The key objectives to be pursued in order to achieve the overall goal are:</p> <ol style="list-style-type: none"> <li>1. To create more decent jobs to meet the growing demand for employment.</li> <li>2. To improve the quality of jobs for those who are employed.</li> <li>3. To increase labour productivity.</li> <li>4. To strengthen governance and labour administration</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p>people from neighbouring towns Konongo and Odumase as well as surrounding communities</p> |
| One District One Factory (1D1F) , 2019 | <p>The "One District One- Factory", programme is a key component of the industrial Transformation Agenda of the Government. The Government's role in this programme is to facilitate the establishment of District Enterprises by creating the enabling environment including the provision of infrastructure such as access roads, water and electricity.</p> <p>The programme is designed to achieve basically the following objectives:</p> <ol style="list-style-type: none"> <li>i. To create massive employment particularly for the youth in rural and periurban communities, thereby improve levels and standard of living, as well as reduce rural-urban migration.</li> <li>ii. To add value to the natural resources of each District and exploit the economic potential of each District based on its comparative advantage.</li> <li>iii. To ensure even and spatial spread of industries and thus stimulate economic activity and growth in different parts of the country.</li> <li>iv. To promote exports and increase foreign exchange earnings to support the Government's development agenda, as well as reduce the volume of imports through import substitution.</li> </ol> | <p>This project is a beneficiary under the 1D1F programme</p>                                |

### 2.1.2 National Legal Framework

The relevant environmental laws and regulations to guide Tema Rider Iron and Steel Gh Ltd through the conceptualization stage of the project to implementation, monitoring and decommissioning include, but not limited to, the under listed. The regulations are further summarised in Table 2-2.

#### Sector Regulations

- Ghana Investment Promotion Centre Act 1994, Act 478

#### Environmental assessment

- Environmental Protection Agency (EPA) Act 1994, Act 490
- Environmental Assessment Regulations 1999, LI 1652
- Fees and Charges (Amendment) Instrument 2015 (L.I. 2228)

#### Environmental Protection

- Water Resources Commission Act 1996 (Act 522)
- Water Use Regulation (WUR) 2001, LI 1692

- Ghana Meteorological Agency Act 2004, Act 687
- Hazardous and Electronic Waste control and Management Act 2016 (Act 917) and
- Hazardous, Electronic and other waste (Classification), Control and Management Regulations 2016, LI2250

#### Labour and Safety in the Workplace

- Factories, Offices and Shops Act 1970, Act 328
- The Labour Act 2003, Act 651
- The Children's Act 1998, Act 560
- Workmen's Compensation Law 1987
- Ghana National Fire Service Act 1997
- The Fire Precaution (Premises) Regulations 2003, LI 1724

#### Development Planning

- Local Governance Act 2016, Act 936
- Town and Country Planning Ordinance, 1945, CAP 84

#### Land Regulations

- Lands Commission (LC) Act 2008, Act 767
- The Survey Act 1662, Act 127
- Office of the Administrator of Stool Lands Act 1994, Act 481

Table 2-2: Summary of National and Sector Legal Frameworks

| <i>Legal Framework</i>                                  | <i>Summary of core requirements</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <i>Relationship to proposed project</i>                                                                                                                               |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sector Regulations</b>                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                       |
| Ghana Investment Promotion Centre Act 1994, Act 478     | The Ghana Investment Promotion Centre Act 1994 (Act 478) requires that every investor wishing to invest in the country must in its appraisal of proposed investment projects or enterprises, "...have regard to any effect the enterprise is likely to have on the environment and measures proposed for the prevention and control of any harmful effects to the environment...".                                                                                                                                                                                                                                                 | Rider Iron and Steel Gh Ltd acknowledges the proposed project has environmental impacts, and mitigation measures will be proposed in the ESIA to address the impacts. |
| <b>Environmental assessment</b>                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                       |
| Environmental Protection Agency (EPA) Act 1994, Act 490 | The EPA was established under the Environmental Protection Agency Act (Act 490 of 1994) as the leading public body responsible for the protection and improvement of the environment in Ghana. It is responsible for enforcing environmental policy and legislation, prescribing standards and guidelines, inspecting and regulating businesses and responding to emergency incidents. It is responsible for issuing environmental permits and pollution abatement notices for controlling waste discharges, emissions, deposits or others sources of pollutants and issuing directives, procedures or warnings for the purpose of | The proposed project is being developed in accordance with Environmental Assessment (EA) procedures for approval and permitting by the EPA.                           |

| <i>Legal Framework</i>                                   | <i>Summary of core requirements</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <i>Relationship to proposed project</i>                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                          | controlling noise. The EPA has the authority to require an EIA and is responsible for ensuring compliance with EIA procedures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                      |
| Environmental Assessment Regulations 1999, LI 1652       | <p>The Environmental Assessment Regulations 1999 (LI 1652) enjoins any proponent or person to register an undertaking with the Agency and obtain an Environmental Permit prior to the commencement of the project. The regulations require that “No environmental permit shall be issued by the Agency for any of the undertakings mentioned in Schedule 2 to these Regulations unless there is submitted by the responsible person to the Agency, an environmental impact assessment in accordance with these Regulations in respect of the undertaking”.</p> <p><u>Application for environmental permit</u></p> <p>4. (1) A person required under regulation 1 or 2 to register an undertaking and obtain an environmental permit shall submit to the Agency an application in such form as the Agency shall determine.</p> <p>2. There shall be paid for the application such fee, as the Agency shall determine.</p>           | The proposed project falls in Schedule 2 and therefore an EIA is mandatory, as per the regulations.                                                                                                                                                                                                                                                  |
| Fees and Charges (Amendment) Instrument 2015 (L.I. 2228) | The Fees and Charges (Amendment) Instrument 2015 (L.I. 2228) provides comprehensive rates, fees and charges collectable by Ministries, Department and Agencies (MDAs) for goods and services delivered to the public. The LI 2228, therefore, repeals the Environmental Assessment Regulations (Amendment) 2002 (LI 1703) which originally stipulated the fees and charges to be paid by proponents with respect to Environmental Permits and Certificates.                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | All stipulated fees and charges shall be Paid in order to obtain permit from the EPA.                                                                                                                                                                                                                                                                |
| <b>Environmental Protection</b>                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                      |
| Water Resources Commission Act 1996 (Act 522)            | <p>The Water Resources Commission Act 1996 (Act 522) establishes and mandates the Water Resources Commission as the sole agent responsible for the regulation and management and the utilisation of water resources and for the co-ordination of any policy in relation to them.</p> <p>Section 13 prohibits the use of water (divert, dam, store, abstract or use water resources or construct or maintain any works for the use of water resources) without authority. Section 16 empowers the Commission to grant Water Rights (water use permits) to prospective users. The Act states under Section 24 that, except in accordance with the provisions of this Act or with the approval of the Environmental Protection Agency, any person who pollutes or fouls a water resource beyond the level that the EPA may prescribe, commits an offence and is liable on conviction to a fine or a term of imprisonment or both.</p> | The construction and operations of the steel plant, including effluent management and storm water disposal will comply with these guidelines and legislation regarding discharge into the environment .In the event water abstraction/diversion of any river during construction or project implementation, a permit will be obtained from the WRC.. |

| <i>Legal Framework</i>                                                                                                                                                               | <i>Summary of core requirements</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <i>Relationship to proposed project</i>                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Water Use Regulation (WUR) 2001, LI 1692                                                                                                                                             | <p>The Water Use Regulations, 2001 (LI 1692) list such activities for which water use permit is required and this includes domestic, commercial, municipal, industrial water use among others. The Regulations also prescribe the raw water charges and processing fees to be paid by prospective water users with respect to the water use permits. The Water Use Regulations 2001, LI 1692 prohibits the use of water resources without authority from the Water Resources Commission.</p> <p>The Act provides under section 16 for any person to apply to the Commission in writing for the grant of water right. The Regulations also prescribe the raw water charges and processing fees to be paid by prospective water users with respect to the water use permits. The Commission is also mandated to request for evidence that an environmental impact assessment or an environmental management plan has been approved by the EPA before issuance of the Water Use Permit.</p> | Any utilization of raw water resources for the proposed project will require a water use permit                         |
| Ghana Meteorological Agency Act 2004, Act 687                                                                                                                                        | This ACT establishes the Ghana Meteorological Agency, which replaces the Meteorological Services Department. The Agency is to provide meteorological information, advice, and warnings for the benefit of agriculture, civil and military aviation among others to mitigate the effects of natural disasters such as floods, storms and droughts on socio-economic development and projects. The Agency is to provide the accurate data on climatic data which are relevant for establishing climate change trends.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Climate information will be obtained from the Agency to guide project implementation.                                   |
| Hazardous and Electronic Waste control and Management Act 2016 (Act 917) and Hazardous, Electronic and other waste (Classification), Control and Management Regulations 2016, LI2250 | The hazardous and Electronic waste and control ACT 2016 (ACT 917) provides list of hazardous and other waste. It also provides control, management and disposal of electrical and electronic waste. Hazardous waste generally refers to waste with properties that makes it potentially dangerous or harmful to human health or the environment and they include liquids, solids or gases which cannot be treated or disposed of by common means. The Act will also ensure that harmful elements associated with hazardous and other waste products are captured and processed safely to preserve critical ecological components such as the soil, groundwater, flora and fauna                                                                                                                                                                                                                                                                                                          | The ACT will guide the project on hazardous and electronic waste management and disposal during project implementation. |
| <b>Labour and Safety in the Workplace</b>                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                         |
| Factories, Offices and Shops Act 1970, Act 328                                                                                                                                       | The Factories, Offices and Shops Act of 1970 (Act 328), as amended by the Factories Offices and Shops (Amendment) Law 1983 PNDCL 66, the Factories Offices and Shops (Amendment) Law 1991 PNDCL 275 s.1 (a), and the Ghana National Fire Service Act, 1997 (Act 537) requires all proponents to register every factory/workplace with the Chief Inspector of Factories Inspectorate Department. The Act requires all factories, offices and shops to among others to notify the Chief Inspector of accidents, dangerous occurrences and industrial diseases, post in a prominent position in every factory the prescribed abstract of the act and other notices and documentations, as well as outlines the                                                                                                                                                                                                                                                                              | The project will be registered with the Factories Inspectorate Division and any accident reported as per Act 328, 1970. |

| <i>Legal Framework</i>                                   | <i>Summary of core requirements</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <i>Relationship to proposed project</i>                                                                                     |
|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
|                                                          | regulations to safeguard the health and safety of workers. The Act compliments the provisions made in the Factories (Dock Safety) Regulations 1960, LI 86.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                             |
| The Labour Act 2003, Act 651                             | Section 118(1) of the Labour Act 2003 (Act 651) stipulates that it is the duty of an employer to ensure that every worker employed works under satisfactory, safe and healthy conditions. Act 651 contains a number of specific provisions relating to an employer's duty of care to its workers. These include providing and maintaining "at the workplace, plant and system of work that are safe and without risk to health" and taking "steps to prevent contamination of the workplaces by, and protect the workers from, toxic gases, noxious substances, vapours, dust, fumes, mists and other substances or materials likely to cause risk to safety or health". A worker is required to report situations that he believes may pose "an imminent and serious danger to his or her life, safety or health". | Rider Iron and Steel Gh Ltd put in place measures to ensure safety and well-being of its workers in accordance with the act |
| The Children's Act 1998, Act 560                         | The Act spells out the rights of the child, quasi-judicial/judicial child adjudication, parentage /custody/access/maintenance, fosterage/ adoption and employment of children issues. The Act defines a child as a person below the age of 18 years. The minimum age for admission of a child to employment is fifteen years and the minimum age for the engagement of a person in hazardous work is eighteen years. No person shall engage a child in exploitative labour, and labour is exploitative of a child, if it deprives the child of its health, education or development.                                                                                                                                                                                                                                | The project will comply with this Act to ensure no child labour is employed.                                                |
| Workmen's Compensation Law 1987                          | It is to provide for the payment of compensation to workmen for personal injuries caused by accidents arising out and in the course of their employment. The tenets of the law places a large share of the burden of supporting workers injured at the workplace on the shoulders of the employers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | This will apply to this project and the safety of all workers will be the responsibility of the proponent                   |
| Ghana National Fire Service Act 1997                     | The Act re-establishes the National Fire Service to provide for the management of undesired fires and to make provision for related matters. The objective of the Service is to prevent and manage undesired fire. For the purpose of achieving its objective; the Service is to organize public fire education programmes to create and sustain awareness of the hazards of fire, heighten the role of the individual in the prevention of fire and provide technical advice for building plans in respect of machinery and structural layouts to facilitate escape from fire, rescue operations and fire management. The GNFS has a rural fire department responsible for the control and management of bushfires.                                                                                                | Fire certificate and permits will be obtained for the operation of the project.                                             |
| The Fire Precaution (Premises) Regulations 2003, LI 1724 | The Fire Precaution (Premises) Regulations 2003 (LI 1724) requires all premises intended for use as workplaces to have Fire Certificates and confers enforcement powers on the Ghana                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A Fire certificate will be obtained for the operation of the project.                                                       |

| <i>Legal Framework</i>                            | <i>Summary of core requirements</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <i>Relationship to proposed project</i>                                                                                                                                                                                  |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                   | National Fire Service (GNFS) to demand a fire certificate for premises that are put to use as a place of work.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                          |
| <b>Development Planning</b>                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                          |
| Local Governance Act 2016, Act 936.               | This Act establishes and regulates the local government system and gives authority to the RCC and the District Assembly to exercise political and administrative power in the Regions and District, provide guidance, give direction to, and supervise all other administrative authorities in the regions and district respectively. The Assembly is mandated to initiate programmes for the development of basic infrastructure and provide municipal works and services as well as be responsible for the development, improvement and management of human settlements and the environment in the district.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | The proposed project is situated within the Asante Akim Central Municipality in the Ashanti Region. The Assembly shall be fully engaged during the implementation of the project.                                        |
| Town and Country Planning Ordinance, 1945, CAP 84 | The Town and Country Planning Act 1945, CAP 84 seeks to ensure the orderly and progressive development of land, town and other areas whether urban or rural for conserving and developing resources and to preserve and improve amenities thereof, and for related matters. It is the principal legislation in force regulating the general planning and development of human settlements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | The project area is zoned as industrial                                                                                                                                                                                  |
| <b>Land Regulations</b>                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                          |
| Lands Commission (LC) Act 2008, Act 767           | <p>This act provides for the management of public lands and other lands and for related matters. The Commission manages public lands and any other lands vested in the President by the Constitution or by any other enactment or the lands vested in the Commission. The act advises the Government, local authorities and traditional authorities on the policy framework for the development of particular areas to ensure that the development of individual pieces of land is co-ordinated with the relevant development plan for the area concerned.</p> <p>The commission formulates and submits to Government recommendations on national policy with respect to land use and capability; advise on, and assist in the execution of, a comprehensive programme for the registration of title to land throughout the Republic in consultation with the Title Registration Advisory Board established under section 10 of the Land Title Registration Act, 1986;</p> <p>The Minister may, with the approval of the President, give general directions in writing to the Commission on matters of policy in respect of the management of public lands. The commission has the following divisions:</p> <ul style="list-style-type: none"> <li>• Survey and Mapping;</li> <li>• Land Registration;</li> <li>• Land Valuation;</li> <li>• Public and Vested Lands Management; and</li> <li>• Any other Division the Commission may determine.</li> </ul> | The proposed project requires land acquisition and registration and falls under the lands commission. The Project will be implemented in line with the objectives of the Commission for sustainable development of land. |

| <i>Legal Framework</i>                                       | <i>Summary of core requirements</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <i>Relationship to proposed project</i>                                                                                   |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| The Survey Act 1662, Act 127                                 | <p>The Survey Act 1962, Act 127 relates to geological, soil and land survey. The part I of the Survey Act, 1962 states that the Director of Geological Survey and every officer of the Geological Survey Department shall have the power of—</p> <p>(a) going to any part of the surface of any land or any underground passages or workings there under in order to make surveys, take samples, make borings and do and cause to be done all things necessary for carrying out the geological survey of such land or for making any report thereon; or</p> <p>(b) calling for the production of, inspecting and taking copies or extracts from, any books, papers, plans and documents dealing with prospecting or the operation of mining on any land which is the subject of a mining concession.</p> <p>Part II of the Act deals with demarcation and survey of lands. Under the law, the sector minister may appoint official surveyors and the Chief Survey Officer (Director of Surveys) may license private surveyors. It is the official surveyor or licensed surveyor that shall certify plans for attachments to instruments of conveyance, leases, assignment, charge or transfer. Under the law it is an offence to damage, destroy or alter any boundary mark.</p> <p>The Act 127 with its amendments gave legal backing to the Director of Surveys to carry out cadastral and other surveys through official surveyors who work directly under him at the Survey Division of the Lands Commission. It also gave authority to the Director of Surveys to recommend from time to time experienced surveyors to the Minister responsible for Lands to be licensed to undertake surveys.</p> | All plans on the proposed project land acquired will be certified by official surveyors.                                  |
| Office of the Administrator of Stool Lands Act 1994, Act 481 | <p>The OASL Act 1994, Act 481 establishes the Office of the Administrator of Stool Lands as enshrined in Article 267 (2) of the 1992 Constitution and it is responsible for establishment of stool land account for each stool, collection of rents and the disbursement of such revenues. The Administrator is charged with the management of stool lands and in accordance with the provisions in the 1992 Constitution, 10% of the gross revenue goes to the Administrator of Stool Lands for administrative expenses whilst the remainder is disbursed as follows:</p> <ul style="list-style-type: none"> <li>• 25% to the stool through the traditional authority for the maintenance of the stool;</li> <li>• 20% to the traditional authority; and</li> <li>• 55% to the District Assembly, within the area of authority of which the stool lands are situated.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | The appropriate traditional and stool land owners- Odumase traditional Council, have been consulted for land acquisition. |

### 2.1.3 Institutional Framework

The EIA process followed for this project is consistent with the regulations in Ghana and involves consultations throughout the life cycle of the Project with a number of governmental authorities, which are likely have an interest in the project. These include ministries, departments and agencies as well as regional and local agencies.

The proposed project falls directly under the jurisdiction of the Ministry of Energy. The objectives of the Ministries are attained through the actions of their respective departments and agencies. The key agencies whose mandates will be triggered by the proposed Rider Iron and Steel Gh Ltd are summarised in Table 2-3 in relation to their respective Ministries.

Table 2-3: Key sector agencies

| No. | Sector Ministry                                                    | Key Agencies                                    | Relationship with Project                                                                                                                                                                                                                                                                                    |
|-----|--------------------------------------------------------------------|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.  | Ministry of Trade and Industry                                     | Ghana Investment promotion centre               | National entity responsible for the formulation, implementation and monitoring of Ghana's internal and external trade. It is the sector ministry that ensures that Ghana derives maximum benefit from internal trade relations and that domestic trade is conducted in a smooth and orderly manner.          |
| 2.  | Ministry of Energy                                                 | Energy Commission                               | Licensing the company for bulk supply of electricity                                                                                                                                                                                                                                                         |
| 3.  |                                                                    | Ghana Grid Company –GRIDCO                      | Provision of bulk supply of electricity to the factory                                                                                                                                                                                                                                                       |
| 4.  | Ministry of Interior                                               | Ghana National Fire Service                     | National institution responsible for the prevention and management of undesired fire.                                                                                                                                                                                                                        |
| 5.  | Ministry of Employment and Labour Relations                        | Department of Factories Inspectorate            | Regulations for health and safety of workers                                                                                                                                                                                                                                                                 |
|     |                                                                    | Labour Department                               | It exists to enforce labour laws and regulations in Ghana and provide, for the benefit of workers and employers, employment-related services such as job-matching, job counselling and mediation; and to generate reliable labour market information for employment policy and national development planning |
| 6.  | Ministry of Water Resources and Sanitation                         | Water Resources Commission                      | Sole agent responsible for the regulation, management and utilisation of surface water resources. It issues water rights to potential water users                                                                                                                                                            |
| 7.  | Ministry of Environment, Science, Technology and Innovation(MESTI) | Environmental Protection Agency (EPA)           | Regulating the environment and ensuring the implementation of government policies on the environment. Issues permits for development projects.                                                                                                                                                               |
|     |                                                                    | Land Use and Spatial Planning Authority         | Regulator for land use and spatial planning                                                                                                                                                                                                                                                                  |
| 8.  | Ministry of Planning                                               | National Development Planning Commission (NDPC) | Advises the President on development planning policy and strategy                                                                                                                                                                                                                                            |
| 9.  | Ministry of Local Government                                       | Asante Akim Central Municipal Assembly          | The planning authority, charged with the overall development of the district                                                                                                                                                                                                                                 |

| No. | Sector Ministry | Key Agencies            | Relationship with Project         |
|-----|-----------------|-------------------------|-----------------------------------|
| 10. |                 | Traditional Authorities | Provision of land for the project |

#### 2.1.4 International Conventions

Ghana is signatory to a number of international conventions that have been established by the United Nations or its specialized agencies to sustainably manage and/or protect the environment. The ones that should be considered for the Project are:

- United Nations (UN) Convention on Biological Diversity 1994;
- United Nations Framework Convention on Climate Change (UNFCCC);
- ILO Conventions.
  - o Convention Concerning the Protection of Workers against Occupational Hazards in the Working Environment due to Air Pollution, Noise, and Vibration (ILO No. 148) 1987;
  - o ILO Convention 29 (1930) Forced Labour - Article 5
  - o ILO Convention 105 (1957) Abolition of Forced Labour - Article 1
  - o ILO Convention 138 (1973) Minimum Age - Articles 1-3
  - o ILO Convention 87 (1948) Freedom of Association and Protection of Right to Organise - Articles 2- 11
  - o ILO Convention 98 (1949) Right to Organise and Collective Bargaining - Articles 1-4
  - o ILO Convention 100 (1951) Equal Remuneration - Articles 1-3
  - o ILO Convention 111 (1958) Discrimination (Employment and Occupation)
  - o ILO Convention 97 (1949) Migration for Employment - Articles 1-9 and
  - o ILO Convention 143 (1975) Migrant Workers (Supplementary Provisions) - Articles 1- 12;

##### United Nations (UN) Convention on Biological Diversity 1994

The Convention on Biological Diversity (CBD) is an international legally binding treaty. The Convention has three main goals:

- conservation of biological diversity (or biodiversity);
- sustainable use of its components; and
- fair and equitable sharing of benefits arising from genetic resources

In other words, its objective is to develop national strategies for the conservation and sustainable use of biological diversity. It is often seen as the key document regarding sustainable development.

##### United Nations Framework Convention on Climate Change (UNFCCC)

The United Nations Framework Convention on Climate Change (UNFCCC) provides the basis for global action to protect the climate system for present and future generations. The Convention on Climate Change sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. It recognizes that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases. The Convention enjoys near universal membership, with 189 countries having ratified.

The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas (GHG) concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within

a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

Under the Convention, governments:

- Gather and share information on greenhouse gas emissions, national policies and best practices.
- Launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and
- Cooperate in preparing for adaptation to the impacts of climate change.

#### Stockholm Convention on Persistent Organic Pollutants

Stockholm Convention on Persistent Organic Pollutants is an international environmental treaty, signed in 2001 and effective from May 2004, that aims to eliminate or restrict the production and use of persistent organic pollutants (POPs).

#### Basel Convention on the control of transboundary movements of hazardous wastes and their disposal

This is an international treaty that was designed to reduce the movements of hazardous waste between nations, and specifically to prevent transfer of hazardous waste from developed to less developed countries (LDCs). It does not, however, address the movement of radioactive waste. The Convention is also intended to minimize the amount and toxicity of wastes generated, to ensure their environmentally sound management as closely as possible to the source of generation, and to assist LDCs in environmentally sound management of the hazardous and other wastes they generate.

#### ILO Conventions

##### *Convention Concerning the Protection of Workers against Occupational Hazards in the Working Environment due to Air Pollution, Noise, and Vibration (ILO No. 148) 1977*

Article 9 of the 1977 Convention of ILO states that as far as possible, the working environment shall be kept free from any hazard due to air pollution, noise or vibration,

- (a) by technical measures applied to new plant or processes in design or installation, or added to existing plant or processes; or, where this is not possible,
- (b) by supplementary organisational measures.

##### *ILO Convention 29 (1930) Forced Labour - Article 5*

No concession to companies shall involve any form of forced or compulsory labour.

##### *ILO Convention 105 (1957) Abolition of Forced Labour - Article 1*

Not make use of any form of forced or compulsory labour

##### *ILO Convention 138 (1973) Minimum Age - Articles 1-3*

Abolition of child labour and definition of national minimum age for labour not less than 15-18 years (depending on occupation).

##### *ILO Convention 87 (1948) Freedom of Association and Protection of Right to Organise - Articles 2- 11*

Freedom to join organisations, federations and confederations of their own choosing; with freely chosen constitutions and rules; measures to protect the right to organise.

*ILO Convention 98 (1949) Right to Organise and Collective Bargaining - Articles 1-4*

Protection against anti-union acts and measures to dominate unions; established means for voluntary negotiation of terms and conditions of employment through collective agreements.

*ILO Convention 100 (1951) Equal Remuneration - Articles 1-3*

Equal remuneration for men and women for work of equal value.

*ILO Convention 111 (1958) Discrimination (Employment and Occupation)*

Equality of opportunity and treatment in respect to employment and occupation; no discrimination on the basis of race, colour, sex, religion, political opinion, national extraction or social origin.

*UN Declaration on the Rights of Indigenous Peoples (2007) - Articles 2, 8(2e), 9, 15(2), 16(1), 21(2), 22, 24(1), 29(1), 46(3)*

No discrimination based on origin or identity; free to express identity based on custom; special attention to and full protection of rights of indigenous women.

*ILO Convention 97 (1949) Migration for Employment - Articles 1-9*

Provision of information; no obstacles to travel; provision of health care; non-discrimination in employment, accommodation, social security and remuneration; no forced repatriation of legal migrant workers; repatriation of savings.

*ILO Convention 143 (1975) Migrant Workers (Supplementary Provisions) - Articles 1- 12*

Respect basic human rights; protection of illegal migrants from abusive employment; no trafficking in illegal migrants; fair treatment of migrant labour.

## 2.1.5 IFC Performance Standards

International Finance Corporation (IFC) applies the Performance Standards to manage social and environmental risks and impacts and to enhance development opportunities in its private sector financing in its member countries eligible for financing.

The Performance Standards may also be applied by other financial institutions electing to apply them to projects in emerging markets. Together, the eight Performance Standards establish standards that the client is to meet throughout the life of an investment by IFC or other relevant financial institution. They are summarised in Table 2-4.

Table 2-4: Summary of IFC Performance Standards

| No  | IFC Performance Standards                             | Summary of core requirements                                                                                                                             | Potential for Trigger | Remarks or recommendation for proposed project      |
|-----|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------------------------|
| PS1 | <i>Assessment and Management of Environmental and</i> | Identify and evaluate environmental and social risks and impacts of the project and adopt measures anticipate, avoid and when avoidance is not possible, | Triggered             | The proposed project will impact on the biophysical |

| No  | IFC Performance Standards                                                               | Summary of core requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Potential for Trigger | Remarks or recommendation for proposed project                                                                                                                                  |
|-----|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | <i>Social Risks and Impacts</i>                                                         | minimise and or compensate Project Affected People/Communities and Environmental Area of Influence. The achievement of the above, Clients should established an effective ESMS, which ensures stakeholders/community participation and grievance redress mechanisms.                                                                                                                                                                                                                                                                                                                                                                                                       |                       | environment, socio-cultural and livelihood.                                                                                                                                     |
| PS2 | <i>Labor and Working Conditions of workers</i>                                          | Management of projects should ensure workers safety promote the fair treatment, non-discriminatory and equal opportunity of workers and establish, maintain and improve the worker-management relationship, and comply with national employment and labour laws of host country.                                                                                                                                                                                                                                                                                                                                                                                           | Triggered             | Worker's safety and congeniality of workers' condition is cardinal in the successful project implementation.                                                                    |
| PS3 | <i>Resource Efficiency and Pollution Prevention</i>                                     | Avoid or minimise adverse impacts on human health and the environment through avoidance or minimisation of pollution including release of greenhouse gases from project and promote sustainable use of resources such as energy and water. Clients are also expected to ensure the use of efficient pollution abatement machinery to reduce pollution.                                                                                                                                                                                                                                                                                                                     | Triggered             | The implementation of the Rider Iron and Steel Gh project will involve the use of high quantities of resources eg electricity and the resultant emissions into the environment. |
| PS4 | <i>Community Health, Safety and Security</i>                                            | To evaluate the risks and impacts to the health and safety of the Affected Communities during the project lifecycle and establish preventive and control measures consistent with Best International Practices and commensurate with their nature and magnitude of impacts.                                                                                                                                                                                                                                                                                                                                                                                                | Triggered             | The operation of the proposed steel factory will have an impact on the nearby community .The communities have been engaged on the project.                                      |
| PS5 | <i>Land Acquisition and Involuntary Resettlement</i>                                    | As much as possible project siting and activities should not displace people. However, where avoidance is not possible, displacement should be minimised by alternative project design considerations. No force eviction should be undertaken by client. Land acquisition should be done in a manner as to minimise adverse social and economic impacts through the provision of compensation packages and to ensure a humane resettlement procedure, disclosure of information, consultation and participatory of PAPs. It should be the client's duty to ensure the physical and economic wellbeing of displaced people are not worst of than their pre displaced lives. | Triggered             | The land for the project has been duly acquired and affected properties and persons identified and compensated. Abbreviated RAP to be provided.                                 |
| PS6 | <i>Biodiversity Conservation and Sustainable Management of Living Natural Resources</i> | All clients should identify both direct and indirect project related impacts that could potentially threaten biodiversity and ecosystem services. The following indicators should be used as a guide: habitat loss, degradation and fragmentation, invasive alien species, overexploitation, hydrological changes, nutrient loading, and pollution.                                                                                                                                                                                                                                                                                                                        | Triggered             | Site preparation/construction works would impact on local biodiversity. Aquatic and Terrestrial ecological studies during the ESIA will confirm the impact on biodiversity.     |

| No  | IFC Performance Standards                | Summary of core requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Potential for Trigger | Remarks or recommendation for proposed project                                                                                                |
|-----|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| PS7 | <i>Indigenous People</i>                 | The client will identify, through an environmental and social risks and impacts assessment process, all communities of Indigenous Peoples within the project area of influence who may be affected by the project, as well as the nature and degree of the expected direct and indirect economic, social, cultural (including cultural heritage), and environmental impacts on them. Adverse impacts on Affected Communities of Indigenous Peoples should be avoided where possible. Indigenous People are defined as a social group with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. | Not triggered         | There are no indigenous people on the project site or within the project communities of influence                                             |
| PS8 | <i>Preservation of Cultural Heritage</i> | Client must protect cultural heritage from the adverse impacts of project activities and support its preservation. Clients should also promote the equitable sharing of benefits from the use of cultural heritage.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Not triggered         | There is no cultural site of historical, archeological religious, or other cultural significance in the project's physical area of influence. |

### 2.1.6 National Environmental Quality Standards

In addition to national and sector policies and plans described above, the environmental standards relevant to the Project are presented below.

- Ghana Standard (GS 1236: 2019) for Environment and Health Protection- Requirement for Ambient Air Quality and Point Source/Stack Emissions specifies the requirements and methods of analysis for ambient air. It also specifies the requirements and test methods for point source or stack emissions based on the sources of energy.
- *Ghana Standard (GS 1222: 2018) for Health Protection- Requirements for Ambient Noise Control* specifies the requirements for acceptable ambient noise levels within categorized locations. The ambient noise levels of the classified zones shall conform to the requirements given in the table below. According to the Standards, the test method should be in accordance with the relevant test methods given in GS 1253:2018 (Acoustics- Guide for the measurement of outdoor A-weighted sound levels
- Ghana Standard Environmental Protection –Requirements for effluent Discharge GS 1212:2019 specifies requirements for sector specific effluent quality and also gives guideline discharge into the environment
- Target Water Quality Ranges (TWQR) of the Ghana Raw Water Quality Criteria and Guidelines (Volume 1): Domestic Water use .This provides the national Ghana Raw Water Quality Criteria and Guidelines levels as administered by the water Resources Commission.

### 2.1.7 Relevant Legal Approvals – Permit/Licenses/Certificates

The relevant approvals required for the implementation of the Project are summarized in Table 2-5. The list is indicative and will be updated as the project design progress

Table 2-5: Key regulatory approvals

| Regulatory body                        | Permits/licenses and certificates                                     | Applicable | Project Phase                                  | Remarks /Status                                             |
|----------------------------------------|-----------------------------------------------------------------------|------------|------------------------------------------------|-------------------------------------------------------------|
| Environmental Protection Agency        | Environmental Permit                                                  | Yes        | Prior to Construction Phase                    | After acceptance of final EIS by the EPA.                   |
|                                        | Environmental Certificate                                             | Yes        | Within 24 months of commencement of Operations | After preparation of first EMP. Renewable every three years |
| Ghana National Fire Service            | Fire Permit/ Certificate                                              | Yes        | Construction of office buildings/ facilities   | Renewable on annual basis                                   |
| Asante Akim Central Municipal Assembly | Development and building approvals (for office buildings/ facilities) | Yes        | Prior to construction of facilities            | -                                                           |
| Factories Inspectorate Department      | Certificate of Registration                                           | Yes        | Construction and Operation phase.              | Renewable on annual basis                                   |
| Energy Commission                      | Electricity Supply Licence                                            | Yes        | Prior to Construction                          | Renewable biannually                                        |

### 3.0 BRIEF DESCRIPTION OF THE PROPOSED PROJECT

#### 3.1 Location of the Proposed Project

The proposed project is located in Gruho in Odumase near Konongo in the Ashanti Region of Ghana. The 44-acre project site is about 5km from a defunct mine and is bounded on the west by the main Konongo-Kumasi highway, on the south by Odumase and on the North by a small village named Ohene Nkwanta ( about 1.5km from the project site) and on the east by farmland as illustrated in Figure 3-1. The area has been zoned by the Asante Akim Municipal Assembly for industrial Activity as shown in Annex 3-1.



Figure 3-1; Location of the proposed project (Traffic Impact Assessment Report , 2019).

### 3.1.1 Proposed General Layout and Physical description

The physical facilities of the proposed steel factory include a 2 x 20MT + 2 x 40MT furnace with a hydraulic tilting system, a continuous caster, a rolling machine and bar rolling finishing equipment. . No residential facilities will be provided on site. The general layout of the plant is provided in Annex 3-2

## 3.2 Permanent Ancillary Infrastructure

Ancillary systems for the steel plant are an electric substation with transformers and rectifiers, pumping stations for cooling water circulation, a cooling tower for circulating water and an emissions dedusting and air filtering system. Other facilities are overhead cranes and magnetic lifts for lifting scrap and other equipment, standby generators for pumping water in case of emergency, a scrap yard for sorting and compressing steel into billets, axle weighing bridges and an office space.

### 3.2.1 Specifications of Pumping Stations

The sources of water considered for the project will be from ground water and a connection to the Ghana water company Limited lines. The specifications for the pumping stations are provided in Table 3-1.

Table 3-1: Specifications for Pumping Stations

| No | Description                                                                                                                                                  | Depth     | Diameter | Quantity                        |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------|---------------------------------|
| 1. | Pumping Station<br>(Borehole/Groundwater )                                                                                                                   | 120 -150m | 6 inch   | 6                               |
|    | <ul style="list-style-type: none"> <li>Furnace pumping station</li> <li>Continuos caster pumping station</li> <li>Rolling machine pumping station</li> </ul> | -         | -        | DFW100-160/2/15,3<br>1 Set each |

### 3.2.2 Specifications for electric sub station

Direct power supply from the National Interconnected Transmission System (NITS). will be required for the proposed new factory in Konongo. Based on an assessment to identify transmission system constraints and network upgrades required for the delivery of reliable supply to the facility, under normal and contingency conditions the following recommendations for the sub station have been proposed by Ghana Grid Company (GRIDCO). The proposed option seeks to minimize or eliminate any adverse impact the new load will have on the stability or security of the grid.

The proposed factory is located approximately 5.1 km away from the existing GRIDCo 161 kV Konongo line. Rider Iron & Steel Company Limited will be connected by breaking into the 364MVA ACSR conductor from Nkawkaw to Anwomaso 3km from Konongo. A 2 km 161kV high voltage line from the POC to Rider Iron and Steel Plant will be constructed.

The substation will be constructed next next to Rider Iron and Steel with a minimum of 33MVA and a 161/34.5/11.5 kV transformer installed to support the initial demand of 30 MVA to supply the load.

A 4.98 MVAR will be installed to bring the voltage at the Plant to acceptable value and keep the power factor at acceptable limits.

### 3.3 Steel Manufacturing Process

The steel manufacturing processes have been explained in detail below and include the following;

- Primary steelmaking
- Secondary steelmaking
- Casting and;
- First forming

#### Primary steelmaking

RSGL will use scrap steel from the local market as its primary feedstock to produce steel rods of various thicknesses and other products that the company may determine based on competition for local consumption and export opportunities.

Scrap metal will be delivered to a scrap bay, located next to the melt shop. Scrap generally comes in two main grades: shred (white goods, cars and other objects made of similar light-gauge steel) and heavy melt (large slabs and beams). The scrap will be loaded into large buckets called baskets, with "clamshell" doors for a base. The scrap will be layered in the basket to ensure good furnace operation; heavy melt will be placed on top of a light layer of protective shred. These layers should be present in the furnace after charging. Once the scrap has been completely melted down, another bucket of scrap can be charged into the furnace and melted down.

#### Secondary Steelmaking

After the second charge is completely melted, refining operations will check and correct the steel chemistry and superheat the melt above its freezing temperature in preparation for tapping. Temperature sampling and chemical sampling will take place via automatic lances. Oxygen and carbon can be automatically measured via special probes that dip into the steel, but for all other elements, a "chill" sample—a small, solidified sample of the steel—is analyzed on an arc-emission spectrometer.

2 x 20MT Induction Furnaces with an operation frequency of 250Hz in phase 1 and a 2 x 40MT will be added for phase 2 will be used. The theoretical minimum amount of energy required to melt a ton of scrap steel is 300 kWh (melting point 1520°C/2768°F).

Molten metal (also known as hot metal) is tapped into the ladle furnaces. After undergoing ladle treatments, such as alloying and degassing, and arriving at the correct temperature, the ladle will be transported to the top of the casting machine. We have chosen R5.25 three stand casting machine. The ladle will sit in a slot on a rotating turret at the casting machine; while one ladle is 'on cast' (feeding

the casting machine) the other will be made ready, and can be switched to the casting position once the first ladle is empty.

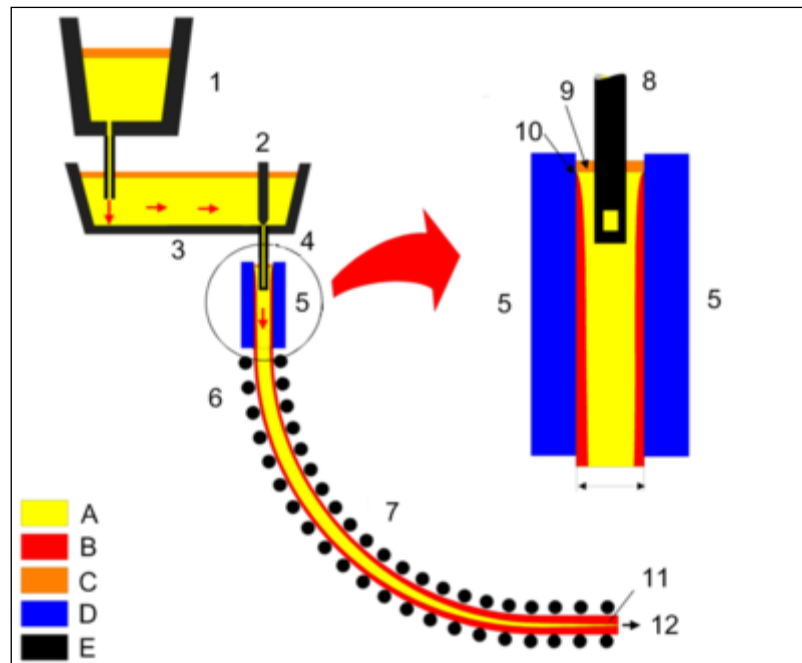
From the ladle, the molten will be transferred via a refractory shroud (pipe) to a holding bath called a tundish. The tundish will allow a reservoir of metal to feed the casting machine while ladles are switched, thus acting as a buffer of hot metal, as well as smoothing out flow, regulating metal feed to the molds and cleaning the metal. Metal will be drained from the tundish through another shroud into the top of an open-base copper mold depending on the casting speed of 3m/min and our section size 120 x 120mm. The mold will be water-cooled to solidify the hot metal directly in contact with it; this is the primary cooling process. It also oscillates vertically (or in a near vertical curved path) to prevent the metal sticking to the mold walls. A lubricant will be added to the metal in the mold to prevent sticking, and to trap any slag particles—including oxide particles or scale—that may still be present in the metal and bring them to the top of the pool to form a floating layer of slag.

### Casting

The mold is water-cooled to solidify the molten directly in contact with it; this is the primary cooling process. It also oscillates vertically (or in a near vertical curved path) to prevent the metal sticking to the mold walls. A lubricant will be added to the metal in the mold to prevent sticking, and to trap any slag particles—including oxide particles or scale—that may still be present in the metal and bring them to the top of the pool to form a floating layer of slag. In the mold, a thin shell of metal next to the mold walls solidifies before the middle section, now called a strand, exits the base of the mold into a spray-chamber; the bulk of metal within the walls of the strand is still molten. The strand is immediately supported by closely spaced, water cooled rollers; these act to support the walls of the strand against the ferrostatic pressure of the still-solidifying liquid within the strand. To increase the rate of solidification, the strand is also sprayed with large amounts of water as it passes through the spray-chamber; this is the secondary cooling process. Final solidification of the strand may take place after the strand has exited the spray-chamber.

### First forming

After exiting the spray-chamber, the billet will pass through 9 strands of Horizontal and Vertical mills to bring down the thickness of the billet to the required size. Finally, the strand is cut into predetermined lengths by mechanical shears, is marked for identification and taken to the next forming process.



1. Ladle 2. Stopper 3. Tundish 4. Shroud 5. Mold 6. Roll support 7. Turning Zone 8. Shroud 9. Bath level 10. Meniscus 11. Withdrawal unit  
12. Slab ,A. Liquid metal B. Solidified metal C. Slag D. Water-cooled copper plates E. Refractory material  
Figure 3-2: Process Flow Diagram (RISGL Feasibility Study Report)

### 3.3.1 Specifications of furnace

The specifications of the furnace and Hydraulic tilting system are provided in Table 3-2.

Table 3-2: Specifications for furnace and hydraulic tilting system

|                 | Medium frequency Induction Furnace                                                                                                                    |                   |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
|                 | Description                                                                                                                                           | Rating            |
| 1               | MF Output Power- Rated (KW)                                                                                                                           | 7500              |
| 2               | At Input KVA                                                                                                                                          | 8225              |
| 3               | Line PF                                                                                                                                               | 0.92 – 0.96       |
| 4               | Solid State Power Supply Unit Input Voltage (Nominal) (Volts)                                                                                         | 1000 x 2          |
| 5               | Frequency (Hz)                                                                                                                                        | 500               |
| 6               | MF Output Voltage (Volts )                                                                                                                            | 3600              |
| 7               | Solid State Power Supply Unit Efficiency (%)                                                                                                          | 97                |
| 8               | Nominal Capacity of furnace in Kg for Steel                                                                                                           | 20000             |
| 9               | Melting Rate of Steel at 16200 C on charge material with clean and sized scrap and furnace in hot condition with recommended lining thickness (Kg/Hr) | 14300             |
| 10              | Water Storage capacity of emergency overhead tank (Litres)                                                                                            | 80000             |
| Tilting Furnace |                                                                                                                                                       |                   |
|                 | Range of medium frequency power                                                                                                                       | 1600 – 9000<br>KW |
|                 | Incoming voltage of medium frequency power                                                                                                            | 1000 + 1000 V     |
|                 | Max incoming current                                                                                                                                  | 1200A             |
|                 | Pulses                                                                                                                                                | 12-24 Pulses      |
|                 | Medium frequency voltage                                                                                                                              | 7500              |
|                 | Medium frequency                                                                                                                                      | 500 Hz            |

### 3.3.2 Continuous caster system

The details of the continuous caster system are provided in Table 3-3.

Table 3-3: Details of Continuous Caster System

| No | Description                                     | Features                                  | Quantity |
|----|-------------------------------------------------|-------------------------------------------|----------|
| 1  | Continuous Casting Machine of 6/11 meter Radius | Chain Dummy Bar with withdrawal mechanism | 1.no     |

|  |  |                                                                                     |      |
|--|--|-------------------------------------------------------------------------------------|------|
|  |  | 2-Strand with provision for 3rd Strand complete with Electrical and Cooling systems | 1.no |
|  |  | Manual Gas Cutting System                                                           | 1.no |

### 3.3.3 Technical specifications for rolling Mill

The technical specifications for the rolling mill are summarized in Table 3-4.

Table 3-4: Technical Specifications for rolling mill

| No | Description              | Type                                                                                                                                                                                                                                                                                                                                                |
|----|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Mill                     | Rod/Bar Mill                                                                                                                                                                                                                                                                                                                                        |
| 2  | Type                     | Automatic                                                                                                                                                                                                                                                                                                                                           |
| 3  | Capacity                 | 15,000 MT /Year                                                                                                                                                                                                                                                                                                                                     |
| 4  | Input (Kgs)              | Billet:100 mm sq. – 4000 MM Long – 300 Kgs.<br>Billet 125 mm sq. – 2000/4000 MM Long – 250/500                                                                                                                                                                                                                                                      |
| 5  | Output                   | 8mm and 10 mm in 'SLITTING' Arrangement.<br>12 to 32 mm in Single Rod on Cooling Bed                                                                                                                                                                                                                                                                |
| 6  | Billet Reheating Furnace | Capacity – 30 MT per Hour<br>Roof - Suspended<br>Inside Width – 4600mm<br>Fuel – Oil                                                                                                                                                                                                                                                                |
| 7  | Mill Detail              | 510 mm Mill - Single Stand 3 Hi on Roller Bearings<br>driven by 1500 H.P. A.C. motor<br>360 mm Mill - 4 Stands 2 Hi on Roller Bearing drive with 450<br>K.W. D. C. Motors<br>320 mm Mill - 4 Stands 2 Hi on Roller Bearing drive with 300<br>K.W. D. C. Motors<br>280 mm Mill - 4 Stands 2 Hi on Roller Bearing drive<br>with 450 K.W. D. C. Motors |

### 3.4 Flue Gas dedusting and Air Cleaning System

Fine and extremely fine dusts are generated during industrial production processes eg.crushing, grinding , etc. Though the electric induction furnace has a better environmental performance than most types of furnace, it nevertheless generates significant quantities of flue gas and dust during operation. Typical flue gas components include SiO<sub>2</sub>, FeO, Fe<sub>2</sub> O<sub>3</sub> , etc. These emissions can impact negatively on the atmosphere and operating environment, affecting the physical and mental health of plant worker as well as ambient air quality around the plant.

The proposed project will consider a gas dedusting and air cleaning system based on the likely emissions from the furnace. The contaminated gas will be loaded on the filter media from outside. The pollutants will then be separated at the filter medium by way of filtration so that purified gas

escapes at the inside of the filter bag. The particles remaining on the outside will form an agglomerated filter cake. It will be removed via a compressed air impulse which is either time-controlled or triggered by differential pressure. The air cleaning system is expected to capture greater than 90% of dust and particles in the flue gas, and to release emissions with particulate concentration not greater than 50 mg/m<sup>3</sup>.

### 3.4.1 Specifications for flue gas dedusting and air cleaning system

The technical Specifications for the flue gas dedusting and air-cleaning system is summarized in Table 3-5.

Table 3-5; Technical specifications for flue gas dedusting and air cleaning system

| No  | Name                            | Unit                        | Numerical value                                                   |
|-----|---------------------------------|-----------------------------|-------------------------------------------------------------------|
| 1.  | Disposal Air volume             | m <sup>3</sup> /hr          | 240,000                                                           |
| 2.  | Filter Area                     | m <sup>2</sup>              | 400                                                               |
| 3.  | Filtration Velocity             | m/min                       | <1.17                                                             |
| 4.  | Temperature of flue gas         | C                           | <200                                                              |
| 5.  | Size of filter bag              | Mm                          | Φ132×5000                                                         |
| 6.  | Quantity of filter bag          | Item                        | 1500                                                              |
| 7.  | Material Filter bag             | -                           | Polyester needle-felt<br>(Treatment for water and oil repellency) |
| 8.  | Manual Discharge valve          | 2 sets                      | 400 x 400                                                         |
| 9.  | Dust concentration at inlet     | g/m <sup>3</sup>            | <100                                                              |
| 10. | Dust concentration outlet       | mg/m <sup>3</sup>           | <50                                                               |
| 11. | Collection Efficiency           | %                           | >99                                                               |
| 12. | Injection pressure              | Mpa                         | 0.15-0.25                                                         |
| 13. | Injection width                 | S                           | 0.1-0.2                                                           |
| 14. | Gas consumption                 | m <sup>3</sup> /valve times | 0.17-0.2                                                          |
| 15. | Specification pulse valve       | Cun                         | 3                                                                 |
| 16. | Quantity of pulse valve         | Piece                       | 40                                                                |
| 17. | Material of dust catcher        | -                           | 3mm-Q235A(See figure)                                             |
| 18. | Running resistance of equipment | Pa                          | <1500                                                             |

### 3.5 Resource utilization

#### 3.5.1 Primary Material Source

The steel plant is designed to operate on 100% scrap feedstock. Hence materials required for operation is mainly steel scrap. This will be obtained from the local market through third party contractors and transported to the plant by road. In case domestic supply does not meet demand, steel scrap will be imported from the regional market and from the Asian region to augment supply. The main utilities required for the plant are water, electricity power and telecommunication facilities.

#### 3.5.2 Energy source

Electricity supply to the proposed steel factory will be from the GRIDCo National Interconnected Transmission System (NITS). The project will construct a 5.1 km, 34.5 kV medium voltage, double circuit 265 mm<sup>2</sup> (40MVA each) ACSR conductor feeder to connect the Rider Iron and Steel Plant to the transmission grid from the existing 161kV Konongo substation. The Management of the Company has officially applied to GRIDCo for direct power supply to their proposed new plant and are awaiting their official response, (See annex 3-3). So far, GRIDCo has been very positive about the request.

#### 3.5.3 Water sources

RISGL will connect to the Ghana Water Company Ltd water transmission line which takes its raw water from Barekese Headworks . In addition, the project proposes to construct a minimum of six (6.no) boreholes to supplement operations at the factory. The hydrogeological characteristics of the project area is very favourable and adequate supplemental supply to the GWSC supply is expected.

### 3.6 Waste Generation and Emissions

The steel plant will generate emissions in the form of dust and flue gas, discharges in the form of storm and surface water runoff, domestic waste, slag and by products of the scrap sorting process. The project proposes to manage dust and flue gas emission from the furnace using a state-of-the-art flue gas dedusting and air cleaning system to be installed on site. (Details in section 2.4.1). Rain water will also be harvested on site for reuse in the plant as cooling water. Surface runoff will be channelled into the drain provided by the property developers. Liquid and solid domestic waste will be treated and discharged with the aid of facilities provided for by the property developers. Slag from the furnace will be sold externally for re-use. The expected waste and emissions to be generated from the operations of the project have been summarized in Tables 3-6

Table 3-6; Waste generated and Disposal Option

| No | Waste Generated                                                                                | Disposal                                |
|----|------------------------------------------------------------------------------------------------|-----------------------------------------|
| 1. | Slag <ul style="list-style-type: none"> <li>Steel dust/Particles</li> <li>Dust Slag</li> </ul> | Recycled into the steel melting process |

|    |                                                                             |                                                                                  |
|----|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------|
|    |                                                                             | Purchased from external sources for Brick/Cement production or road construction |
| 2. | Waste from scrap sorting process                                            | Contractors                                                                      |
| 3. | Cooling water                                                               | Recycled and later vapourized                                                    |
| 4. | Overflow of rain water                                                      | Will be Let out through drainage system on site                                  |
| 5. | Dust and Flue gas (SiO <sub>2</sub> , FeO, Fe <sub>2</sub> O <sub>3</sub> ) | Air cleaning and Flaring                                                         |
| 6. | Domestic waste (from offices etc )                                          | To be disposed by solid waste management company                                 |

## 4.0 ALTERNATIVE CONSIDERATIONS

For the proposed development of the Project, a number of options are being considered throughout the project design stages to present the most feasible alternatives. These options are being considered according to their suitability to meet the project objectives. The alternatives under consideration are according to the following categorisation:

- Site Selection
- Raw material Type
  - o Scrap Material
  - o Iron ore, Coal and limestone
- Technology Analysis
  - o Basic Oxygen Furnace (BOF)
  - o Electrical Arc Furnace (EAF)
  - o Electric Induction Furnace
- No action option.

### 4.1 Site Selection

Alternative site analysis was carried out to determine the most optimal site for the project. Factors considered in site selection include the following:

- Availability of adequate land;
- Services and infrastructure available near selected site;
- Accessibility to industrial zone, source of raw material;
- Land use, including residential and other industrial concerns near selected site;
- Environmental concerns of selected site, with particular emphasis on flora, fauna and sensitive habitats.

Alternative sites identified for the project include land available in Berekeese, Offinso and Ahinsan in the Ashanti region. However, issues of concern identified include inadequate land sizes for the project, accessibility issues and current land use.

The final site selected as ideal for the project is located in Gruho a suburb of Odumase off the Konongo-Kumasi Highway. This was confirmed by the economic team from the office of the vice president under the 1D1F project. Other added advantages include the proximity of the site to the Kumasi –Accra Highway which will make it easily accessible to vehicles transporting scrap from especially, the northern part of Ghana.

### 4.2 Raw Material Type

Steel production uses recycled products as well as traditional raw materials such as iron ore etc. Both options have been discussed and the most appropriate option selected for the project which is the scrap metal.

#### 4.2.1 Scrap Material

Steel scrap is a vital ingredient in making steel; melting the scrap to make new steel is fundamental to energy and emissions savings as well as resource conservation. Recycling is an integral part of the steelmaking process because the use of steel scrap lowers the environmental impact of steelmaking, as well as the total cost of producing new steel. In addition, steel products made from recycled steel can be recycled again without any loss of quality. This option has been selected because there is well-established vibrant market for steel scrap in Ghana as well as the environmental benefits from recycling.



Plate 4-1: Stockpile of scrap metal(Sal, 2019)

#### 4.2.2 Iron Ore, Coal and limestone

The steelmaking process requires traditional raw materials namely iron ore and coking coal in large quantities. These traditional raw materials are mined. Iron does not occur naturally, being highly reactive, it combines easily with other minerals to form ores. Coke is produced from coal. The coal is heated, or 'carbonised' in an oven until it becomes coke. Similarly, limestone is removed from the quarry, crushed and transported to steel mills. Vast quantities of these mined raw materials are required by the industry. Nearly 80% of the steel industry's gross output comprises consumption of intermediate inputs, making the industry very vulnerable to supply and price disturbances in raw material markets. Also, for environmental reasons, but also increasingly due to socio-economic factors, the process of mining traditional raw materials is more costly and hence this option was not selected.



Plate 4-2; Iron ore (left) and Coal (right) (SAL, 2019)

### 4.3 Technology Assessment

The alternative plant furnace technologies considered include:

- The basic oxygen furnace (BOF).
- The electric arc furnace (EAF).
- The electric induction furnace (EIF).

#### 4.3.1 Basic Oxygen Steel Making (BOS)

A basic oxygen furnace, also known as Linz–Donawitz-steelmaking is a pear-shaped structure with a closed bottom and an open top that works to process steel. The process relies on steel production from pig iron, which is the intermediate product of smelting iron ore and has high carbon content. The BOF yields high production with minimal labor involved and creates a finished product that is low in nitrogen. Their need for raw materials to create the end product, however, has proven to be inefficient both financially and in terms of its use of time. This alternative was rejected at the project development phase, since Rider Iron and Steel intends to use locally available raw materials for steel making, hence the design objective to use steel scrap. Further, the BOF has higher atmospheric emissions and waste management issues compared with the other furnaces considered.

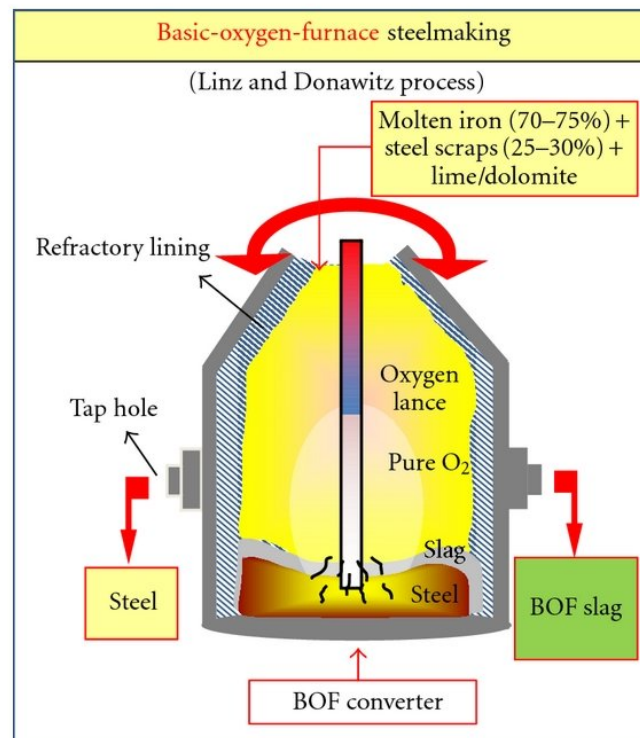


Figure 4-1; Basic oxygen Furnace (BOF)

#### 4.3.2 Electrical Arc Furnaces (EAF)

The electric arc furnace(EAF) is more modern and works by heating charged material by means of an electric arc. The EAF has several advantages over BOF in being more efficient, being able to use 100% scrap feedstock and having a better environmental performance. Although this system is highly efficient for recycling scrap, operations can have adverse environmental impacts. These include furnace off-gas with a high dust content; slag production; environmental effects of electricity generation, etc. Installation is capital intensive and this method relies so heavily on the unwanted and unused scrap that it creates traffic impacts of heavy goods vehicles engaged in scrap collection, materials handling, and product transport.

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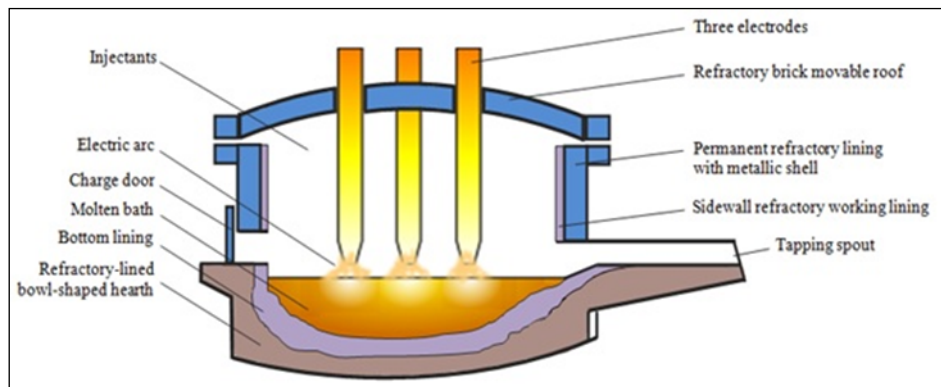


Figure 4-2: Electric Arc Furnace (EAF)

#### 4.3.3 Electric Induction Furnace(EIF)

An induction furnace is an electrical furnace, in which the heat is applied by induction heating of metal. The advantage of the induction furnace is a clean, energy-efficient and well-controllable melting process compared to most other means of metal melting. The EIF is also able to use 100% scrap feedstock. Most modern foundries use this type of furnace. Since no arc or combustion is used, the temperature of the material is no higher than required to melt it hence making EIF more efficient with minimal loss of valuable alloying elements. A major drawback to EIF is the lack of refining capacity, hence high tensile steel, which requires specific composition of alloying elements, is not easily produced.

The EIF was considered the most suited technology for the plant since because its able to use 100% scrap feedstock considering there is a vibrant scrap market in Ghana to readily provide scrap. It has a better environmental performance and has an optimized electric consumption. The drawbacks to the EIF were not considered to be significant disadvantages since the objective of the plant is to produce low to medium tensile strength steel products

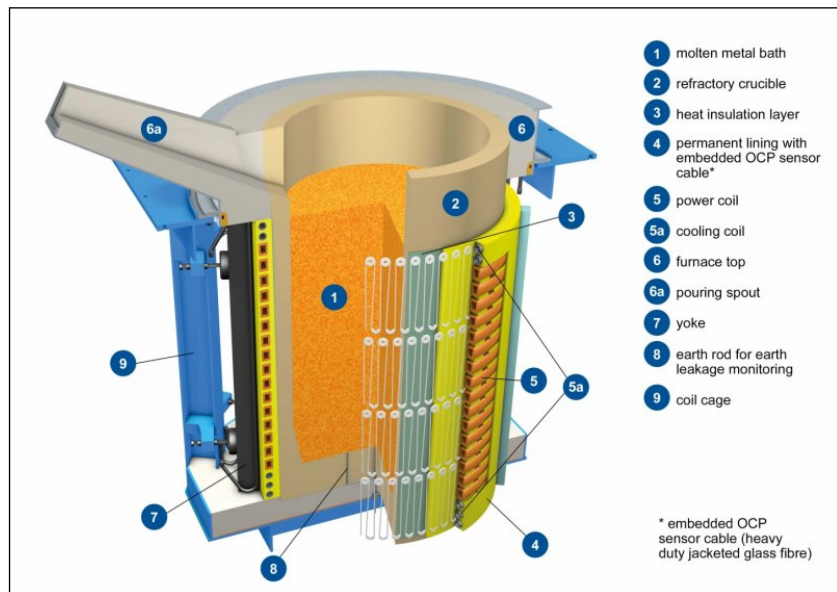


Figure 4-3: Induction Furnace

#### 4.4 No Action Option

The no action option means that the proposed project will not be implemented. The benefits to be derived from the proposed project will be lost. The absence of the project will deny the nation of significant contributions to the local and national economy. This option is untenable.

## 5.0 BASELINE ENVIRONMENTAL AND SOCIAL CONDITIONS

This chapter provides a description of the environmental and socio-economic baseline within the project site and surrounding areas where both direct and indirect impacts of the project are likely to occur. In addition to the primary data collected through site specific sampling campaigns, Baseline assessments and Information available from secondary sources have also been used to fully describe conditions at the project site.

### 5.1 Project Area of Influence

According to the IFC Performance Standard 1 which is consistent with the national requirements, the area of influence encompasses, as appropriate:

- The area likely to be affected by: (i) the project (e.g. project sites, immediate airshed and water shed or transport corridors) and the client's activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the project; (ii) impacts from unplanned but predictable developments caused by the project that may occur later or at a different location; or (iii) indirect project impacts on biodiversity or on ecosystem services upon which Affected livelihoods are dependent.
- Associated facilities, which are facilities that are not funded as part of the project and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable (e.g. railways, roads, transmission lines, warehouses, etc).
- Cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted (e.g. incremental contribution of gaseous emissions to an airshed, reduction of water flows in a watershed due to multiple withdrawals, increases in sediment loads to a water shed, interference with migratory routes or wildlife movement, or more traffic congestion and accidents due to increase in vehicular traffic on community roadways).

The ESIA study assesses the Project Area of Influence (Aol) which encompasses all areas directly and indirectly affected by the Proposed Steel Project components.

### 5.2 General Biophysical Environment

The Asante Akim Central Municipal Assembly is located in the eastern part of the Ashanti Region. It shares boundaries with Asante Akim North District at the North, Ejisu-Juaben and Sekyere East at the West, Asante Akim South at the East and South. The land size of the Municipality is 400 square kilometres (km<sup>2</sup>) forming 1.6 % of the total land area of Ashanti region. The Municipal Capital is Konongo – Odumasi which is about 48Km from Kumasi, the Regional Capital as shown in Figure 5-1.

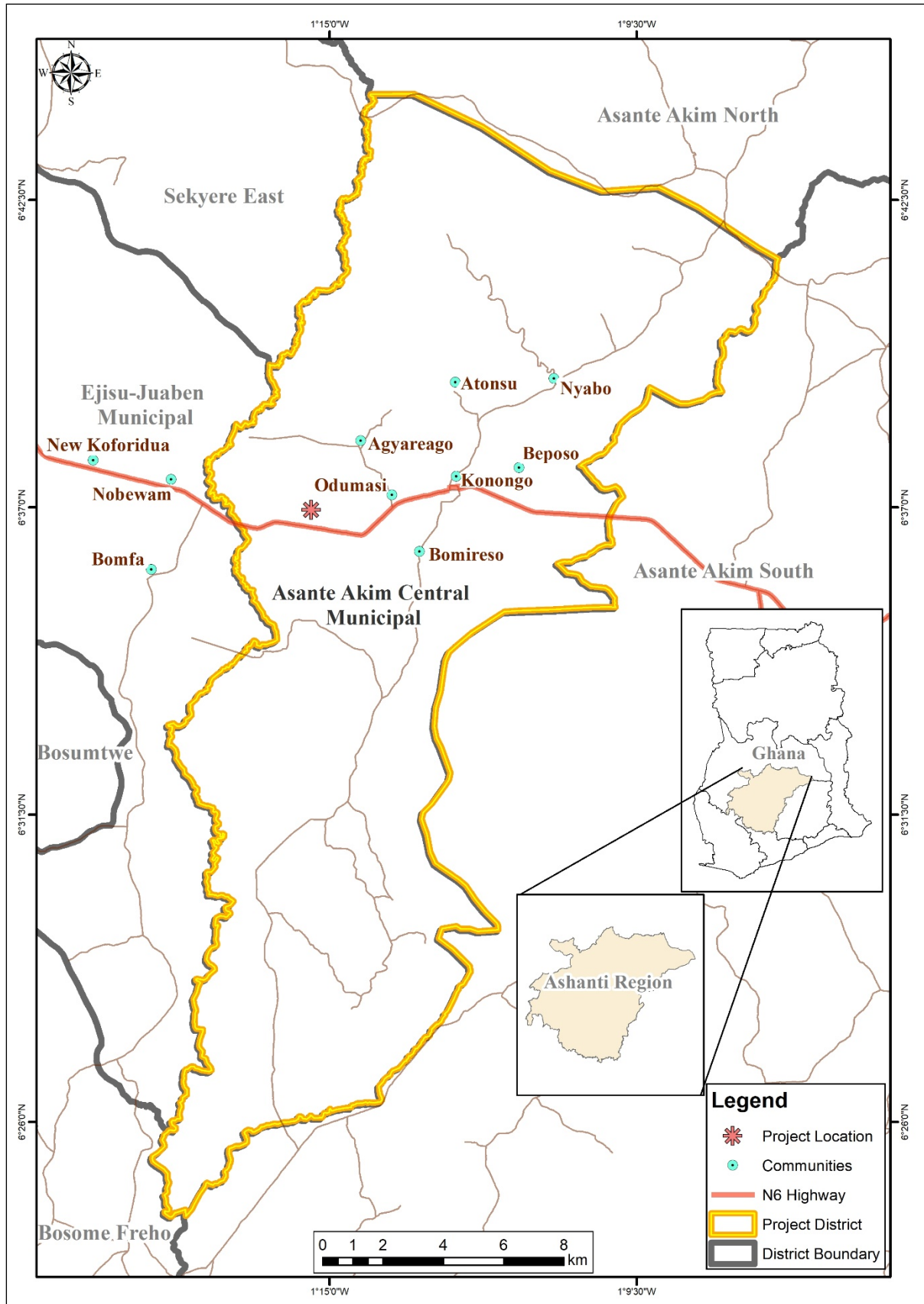


Figure 5-1: Location of the Asante Akim Central municipal Assembly (SAL,2019)

### 5.3 Physical Environment

This section provides information on general and project specific baseline conditions for the physical environment.

#### 5.3.1 Vegetation

The project site lies in the South-east subtype of Moist Semi-deciduous Forest in Ghana. The vegetation of the municipality comprises of open and closed forests. The forests consist of different species of tropical woods such as Wawa, Ofra, Sapele, Sanfina, Okyere (Kofo), Onyina, Kyenkyen, Otie and Yaya, which have high economic value. According to Hall and Swaine (1981), the characteristic species are *Turraeanthus africanus*, *Daniellia ogea*, *Khaya ivorensis*, *Illigera pentaphylla*, *Pteris togoensis*, *Chytranthus macrobotrys* and *Cola nitida*. The tallest trees in this forest type range between 50 to 60 m in height. The upper tree canopy is usually discontinuous and is composed of evergreen and deciduous species.

Food and cash crops such as cassava, rice, maize, cocoa, citrus, oil palm, plantain, and others are widely grown in the area. However, most of the original forest has degenerated into secondary forest and grassland due to indiscriminate felling of trees, bush-fires and poor farming practices. Part of the Dome River Forest Reserve lies within the municipality.

##### The proposed project site

The proposed project site is about 44 acres in size. It has undulating topography and is drained by a small stream (Adibesu stream). The natural vegetation of the site has been converted to agricultural land. A mosaic of Food Crop farms, Citrus, Cocoa and Oil Palm plantations occur in place of the natural forest vegetation. A small strip of degraded riverine forest along the upper reaches of the Adibesu stream. The main crops cultivated on the food crop farms were cassava (*Manihot* sp.), plantain (*Musa* sp.) and cocoyam (*Xanthosoma* sp.)



Plate 5-1: Mixed food crop farm on the project site (SAL, 2019)

The Cocoa plantations on site have tree species such as *Triplochiton scleroxylon*, *Spathodea campanulata*, *zanthoxylum gilettii*, *Pycnanthus angolensis* and *Ceiba pentandra* forming a discontinuous upper storey of about 25 m high. Regular weed clearing has suppressed the growth of

other plants on the plantation; abandoned cocoa farms have secondary thicket. The Oil palm plantations were mostly devoid of large trees. The riverine forest, which is degraded by cultivation, occupies a narrow strip along the course of the Atinsua stream which runs virtually midway through the project site. Some of the species found here are *Sarcophyllum brachystachyum*, *Acroceras zizanioides*, *Ludwigia decurrens* and *Alchornea cordifolia*. The secondary forest on the site is at various stages of development. The early stages of farm-re-growth and secondary thicket are well represented. The farm re-growth is dominated by *Chromolaena odorata* (Acheampong weed), *Panicum maximum*, *Solanum torvum*, *Lantana camara* and *Eleusine indica*. The secondary thicket is a dense climber tangle with shrubs and small trees such as *Vernonia conferta*, *Dioscorea sp.*, *Gongronema latifolium*, *Triclisia patens* and *Griffonia simplicifolia*.

### 5.3.2 Geology & Seismicity

The geology of the area is dominated by the Northeast trending bands of Birimian meta-sediments/volcanics and the Tarkwaian clastic formation. To the east, the Tarkwaian formation widens out very substantially and to the west of the district, there are mainly Birimian meta-sedimentary units of the Kumasi Basin. Within the basin domain are large masses of basin type granitoids belonging to the Kumasi complex (Griffis et al., 2002). The south-east of the district is dominated by the unusually large Bansa batholith, which is rich in radiometric potassium (Griffs, 1998). The project site is predominantly metasedimentary rocks with numerous quartz veins intruding them. These quartz veins are outcropping on the site. Konongo area is located in the low risk seismicity zone of Ghana (Figure 5- 2) with peak ground acceleration of between 0.00-0.009g

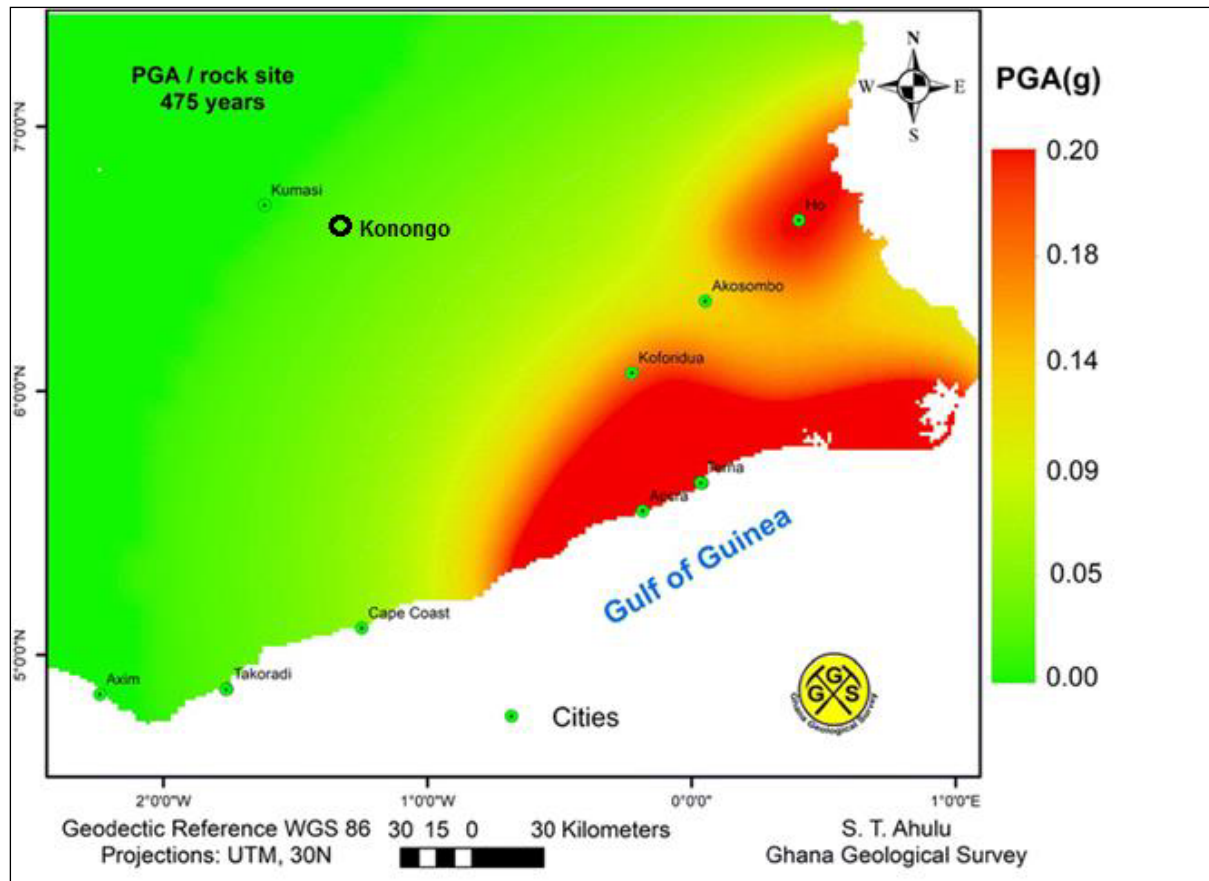


Figure 5-2: Distribution of mean peak ground acceleration values in southern Ghana (Preliminary Geotechnical and geophysical Final Draft Report, June 2019)

### 5.3.3 Climate

The Municipality lies within the semi-equatorial belt characterised by double rainfall maxima. The first rainy season is from May to July and the second from September to November. Mean annual rainfall ranges between 855mm and 1,500mm. The average number of rainy days for the year is between 110 and 120 days the dry harmattan season occur between December and April and is associated with drought conditions, high temperatures, and early morning moist/fog and cold weather conditions. Streams dry up during this period.

Temperature is found to be uniformly high all year round with a mean annual temperature of 26°C. Humidity is high during the rainy season. The months of December to February, however, record very low humidity. This climatic condition is suitable for the cultivation of cash and food crops such as cocoa, citronella, oranges, plantain and vegetables to feed the agro based industries in the Municipality. It is important to note however, that current trends in the climatic conditions of then Municipality is becoming unpredictable

### 5.3.4 Hydrology and Drainage

The Municipality is drained by a number of streams which include Anum, Anunu, Owerri, Bomire, Abosomtwe, All these streams are located within the Pra basin. Unfortunately, the activities of illegal miners continue to adversely impact the volume, discharge, colour and aquatic habitat of these rivers. The Atinsua stream drains the project site and it flows into the Anunu river which is about 1.5km from the site. Some communities use the rivers for their domestic water needs.

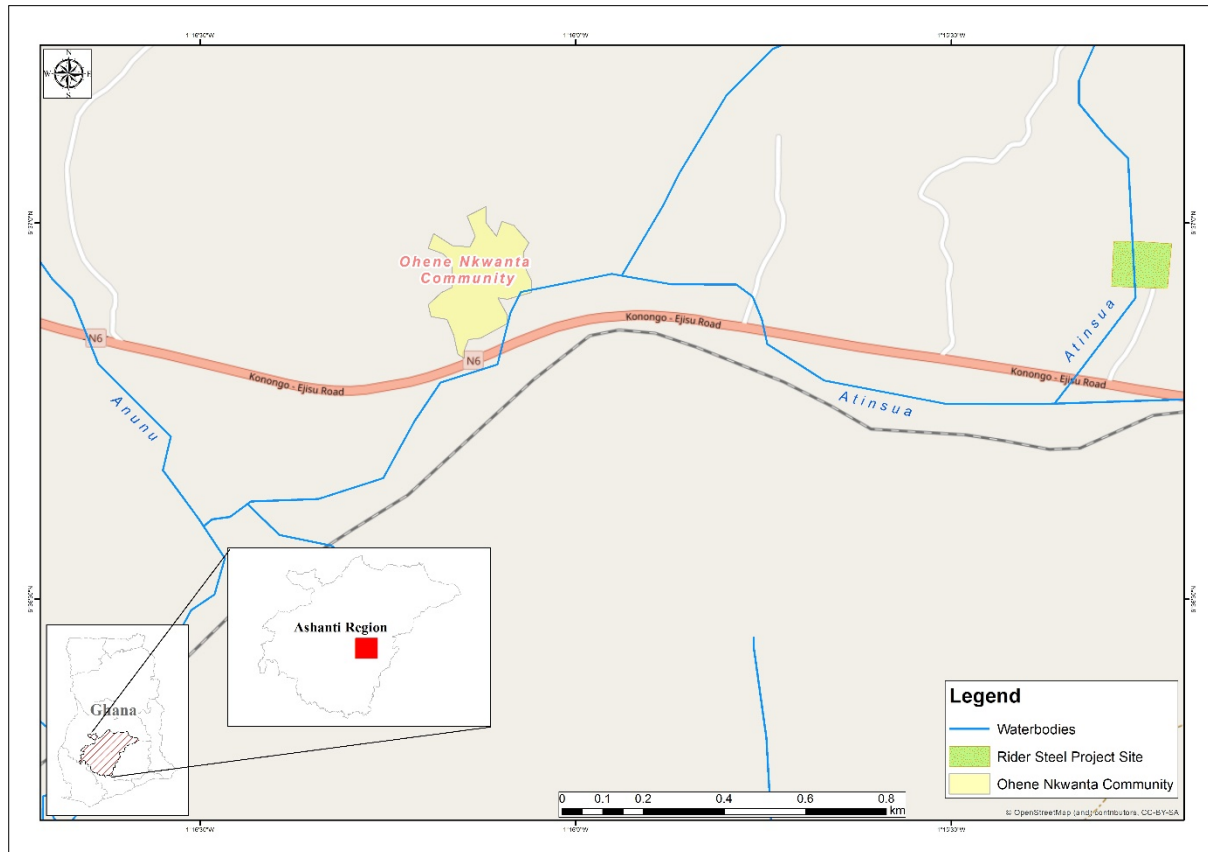


Figure 5-3; Drainage map of project area(SAL, 2019)

### 5.3.5 Hydrogeology

Geologically, the project area is generally underlain by the Birimian Supergroup and consist of the Volcano-Plutonic Group which is formed from basaltic and andesitic composition flows, sub-volcanic rocks and minor interbedded volcanoclastics. These rocks have now metamorphosed to hornblende actinolite-schist, calcareous chlorite schist and amphibolites lithologies as shown in Figure 5-4..

There are also patches of the Eburnean Plutonic Suites and the Tarkwaian Group underlying sections of the general area. The Eburnean granitic suites were formed during the Eburnean Orogeny and comprise muscovite granite, biotite granite, hornblende-biotite tonalite, granodiorites and hornblende-biotite granitoids etc, while the Tarkwaian Group were formed during the Tamnean Plutonic Suite and comprises of conglomerate, quartz pebbles, quartzose sandstones around the Ashanti Belt Area.

Generally, the Birimian rocks weather to form a thick overburden consisting of saprolites as well as friable soil materials such as sandy soils. In the lower topographic areas, the weathered profile is commonly covered by recent surficial sandy clay soil, sand with brushy quartzite.

The area falls within the Birimian Province of the five hydrogeological zonation in Ghana. Groundwater occurs and flow through the weathered zones and in fractures or openings within the rocks. Drilling results in the area give the indication that the common aquifer zones that can be exploited for borehole water supply are as follows:

- Fractures and fissures in the moderately weathered rocks;
- Interface fracture systems located between the overburden and the bedrock; and
- Fractures in the bedrock

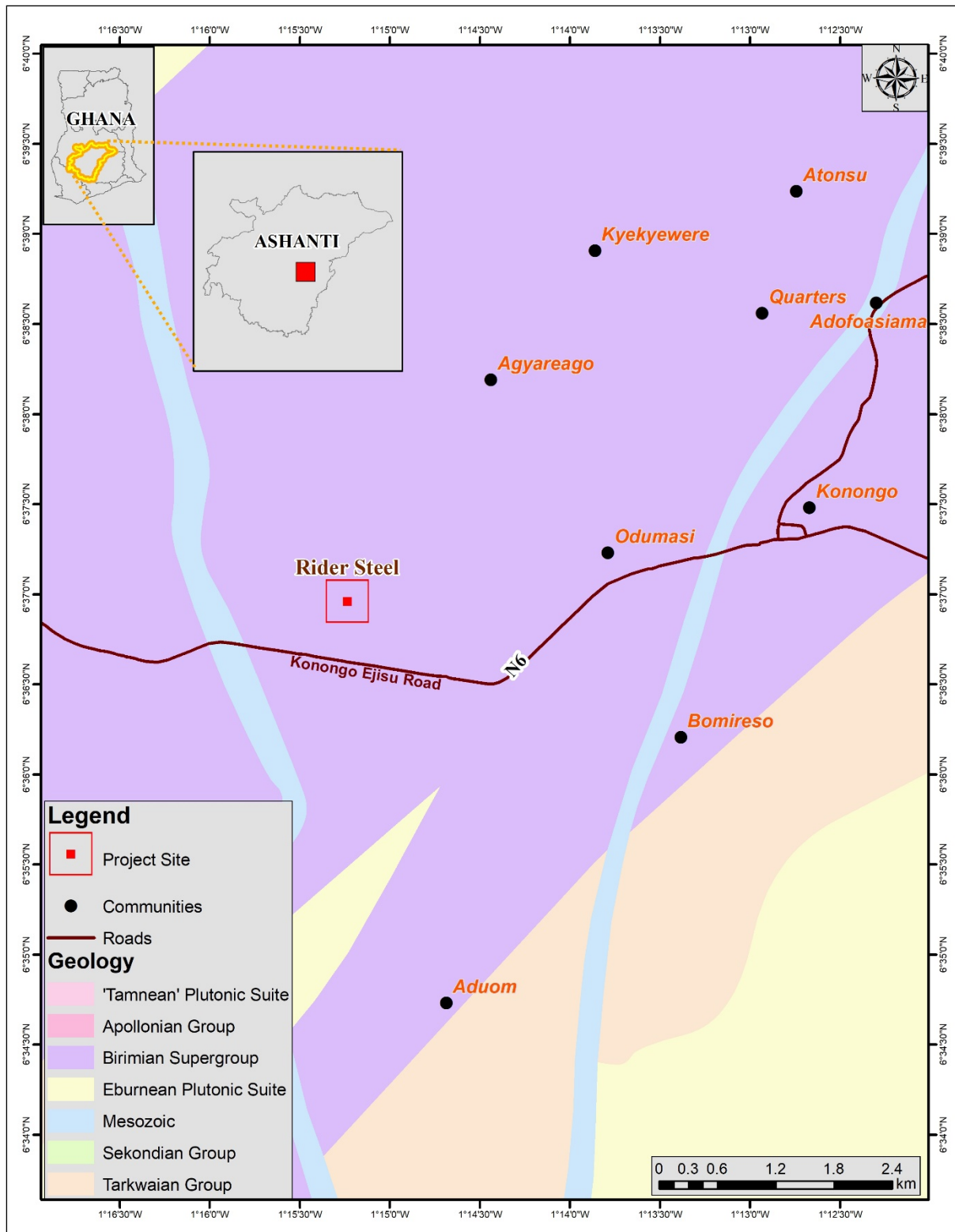


Figure 5-4 Hydrogeological map of the project area

### 5.3.6 Topography

The topography of the Municipality is generally undulating. From the North, the land rises gently to heights between 305 and 610 meters and is interrupted by a stretch of the Akwapim-Mampong Range.

From the preliminary topographical survey, the proposed project site is similarly, undulating in nature with elevations between 180m to 204m above mean sea level. Annex 5-1 shows a 3-meter irregular contour of the site generated from the topographical survey.

### 5.3.7 Surface Water Quality

Two (2.no ) water samples were obtained in October 2019 from the Atinsua stream which drains the project site . A third sample was collected from the Anunu river into which the Atinsua discharges. The sampling locations are shown in Figure 5-5. The water samples were analyzed at the Council for Scientific and Industrial Research's (CSIR) Water Research Institute laboratory and the results are compared with the Ghana Standard Environmental Protection –Requirements for effluent Discharge GS 1212:2019 as well as the WHO drinking water quality guidelines. The results are resented on Table 5-2.

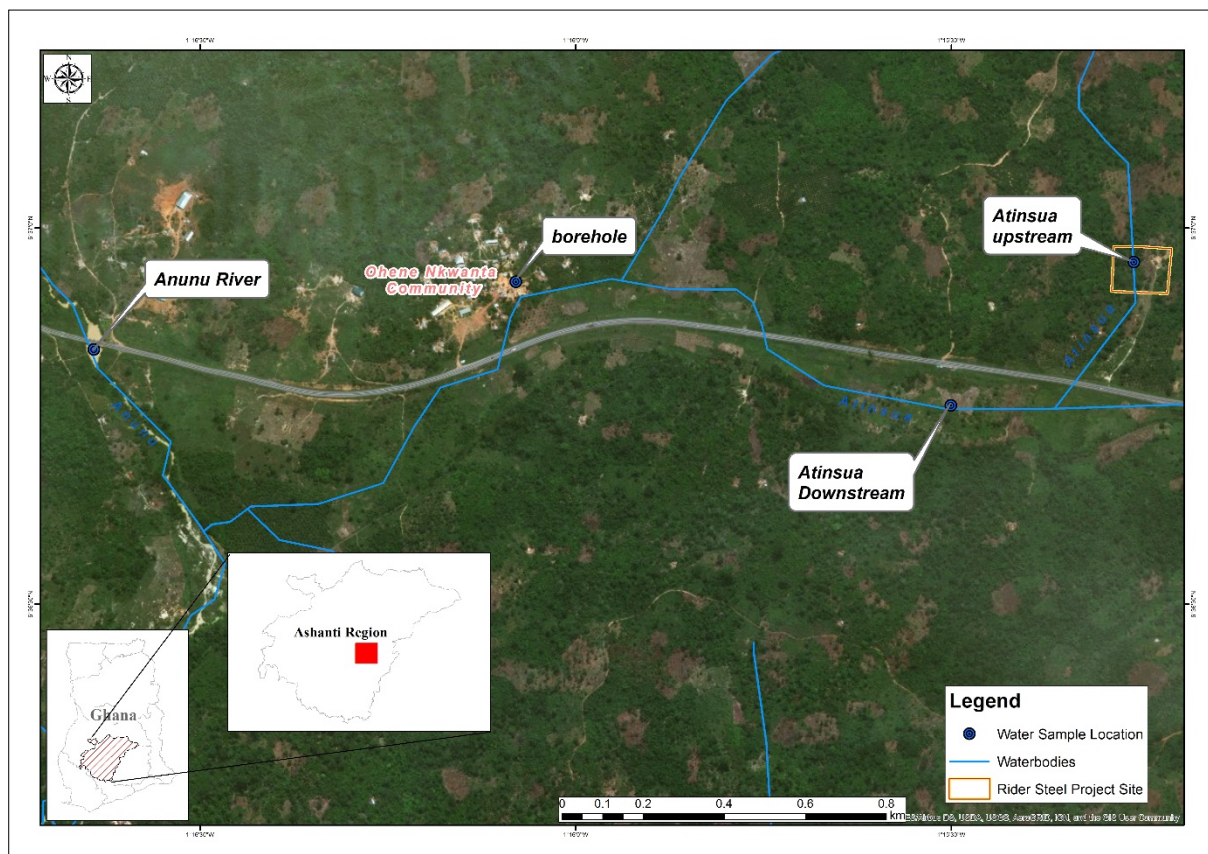


Figure 5-5; Sampling Locations(SAL,2019)

Table 5-1: Surface water quality results

| No  | Parameter                                             | Atinsua Upstream | Atinsua Downstream | Anunu Downstream | GS 1212:2019(Metal industry) | WHO DWQG |
|-----|-------------------------------------------------------|------------------|--------------------|------------------|------------------------------|----------|
| 1.  | pH (pH Units)                                         | 5.85             | 5.23               | 6.78             | 6-9                          | 6.5-8.5  |
| 2.  | Conductivity ( $\mu\text{S}/\text{cm}$ )              | 58.8             | 44.5               | 88.2             | 1500                         | -        |
| 3.  | Turbidity (NTU)                                       | 13.0             | 10.0               | 54.0             | -                            | 5        |
| 4.  | Colour (Hz)                                           | 10.0             | 10.0               | 40.0             | 200                          | 15.0     |
| 5.  | TSS (mg/l)                                            | 11.0             | 8.00               | 40.0             | 50                           | -        |
| 6.  | TDS (mg/l)                                            | 32.3             | 24.5               | 48.5             | 1000                         | 1,000    |
| 7.  | Nitrate-Nitrogen ( $\text{NO}_3\text{-N}$ ) (mg/l)    | 0.104            | 0.561              | 0.003            | -                            | -        |
| 8.  | Nitrite-Nitrogen ( $\text{NO}_3\text{-N}$ ) (mg/l)    | 0.014            | 0.042              | 0.194            | -                            | 50       |
| 9.  | Phosphate-Phosphorus( $\text{PO}_4\text{-P}$ ) (mg/l) | 0.976            | 0.422              | 0.761            | -                            | -        |
| 10. | Ammonia ( $\text{NH}_3\text{-N}$ ) (mg/l)             | <0.001           | <0.001             | 0.201            | -                            | 1.00     |
| 11. | Fluoride (mg/l)                                       | 0.800            | 1.10               | 0.800            | -                            | -        |
| 12. | Sulphide (mg/l)                                       | <0.005           | <0.005             | <0.005           | -                            | 1.50     |
| 13. | Alkalinity (mg/l)                                     | 48.8             | 54.8               | 60.4             | -                            | 500      |
| 14. | Chloride (mg/l)                                       | 21.6             | 25.8               | 20.4             | -                            | -        |
| 15. | BOD (mg/l)                                            | 10.5             | 13.6               | 14.2             | -                            | -        |
| 16. | COD (mg/l)                                            | 56.0             | 59.2               | 62.4             | 250                          | -        |
| 17. | Oil / Grease (mg/l)                                   | <1.00            | <1.00              | <1.00            | 5                            | 250      |
| 18. | Lead (mg/l)                                           | <0.005           | <0.005             | <0.005           | 0.1                          | 0.300    |
| 19. | Zinc (mg/l)                                           | 0.048            | 0.044              | 0.028            | 10                           | 4.00     |
| 20. | Iron (mg/l)                                           | 3.07             | 0.334              | 2.02             | 5                            | <0.005   |
| 21. | Manganese (mg/l)                                      | 0.430            | <0.005             | 0.071            |                              | 0.400    |

|     |                              |        |        |        |     |       |
|-----|------------------------------|--------|--------|--------|-----|-------|
| 22. | Copper (mg/l)                | 0.011  | 0.013  | 0.019  | 5   | 0.003 |
| 23. | Cadmium (mg/l)               | <0.002 | <0.002 | <0.002 | 0.2 | 2.00  |
| 24. | Chromium (mg/l)              | 0.014  | 0.012  | 0.010  | 0.5 | 0.050 |
| 25. | Cobalt (mg/l)                | <0.010 | <0.010 | <0.010 |     | -     |
| 26. | Total Coliforms (cfu/100ml)  | 236    | 324    | 465    | -   | 0     |
| 27. | Faecal Coliforms (cfu/100ml) | 13.0   | 60     | 156    | -   | 0     |

### Results

From the results, it can be observed that parameters measured for all the three surface water locations were below the applicable permissible standards GS 1212:2019. In comparing with WHO Drinking Water Quality Guideline (DWQG) all three sampling points exceeded the guideline limit for turbidity. The Anunu river exceeded guideline levels for colour and Iron whereas the Atinsua upstream sample exceeded guideline levels for iron only. All other parameters were within the specified guideline levels. A certified copy of the results is attached as Annex 5-2

### 5.3.8 Ground Water Quality

Ground water was sampled in October 2019 from the nearest borehole to the project site located in Ohene Nkwanta Community, about 1.5m from the project site as shown in Figure 5-5. The water sample was analyzed at the Council for Scientific and Industrial Research's (CSIR) Water Research Institute laboratory and the results are compared with the World Health Organization's (WHO) Drinking Water Quality Guideline (DWQG) and presented in Table 5-3. A certified copy of the results is attached as Annex 5-3

Table 5-2; Groundwater quality results

| No | Parameter                                          | Groundwater 1 | WHO DWQG |
|----|----------------------------------------------------|---------------|----------|
| 1. | pH (pH Units)                                      | 5.81          | 6.5-8.5  |
| 2. | Conductivity ( $\mu\text{S}/\text{cm}$ )           | 132           | -        |
| 3. | Turbidity (NTU)                                    | <1.00         | 5        |
| 4. | Colour (Hz)                                        | <2.50         | 15.0     |
| 5. | TSS (mg/l)                                         | 2.00          | -        |
| 6. | TDS (mg/l)                                         | 72.6          | 1,000    |
| 7. | Nitrate-Nitrogen ( $\text{NO}_3\text{-N}$ ) (mg/l) | 0.065         | -        |
| 8. | Nitrite-Nitrogen ( $\text{NO}_3\text{-N}$ ) (mg/l) | 0.029         | 50       |

|    |                                                       |        |        |
|----|-------------------------------------------------------|--------|--------|
| 9. | Phosphate-Phosphorus( $\text{PO}_4\text{-P}$ ) (mg/l) | 0.211  | -      |
| 10 | Ammonia ( $\text{NH}_3\text{-N}$ ) (mg/l)             | <0.001 | 1.00   |
| 11 | Fluoride (mg/l)                                       | 1.30   | -      |
| 12 | Sulphide (mg/l)                                       | <0.005 | 1.50   |
| 13 | Alkalinity (mg/l)                                     | 48.4   | 500    |
| 14 | Chloride (mg/l)                                       | 23.8   | -      |
| 15 | BOD (mg/l)                                            | 0.740  | -      |
| 16 | COD (mg/l)                                            | 4.00   | -      |
| 17 | Oil / Grease (mg/l)                                   | <1.00  | 250    |
| 18 | Lead (mg/l)                                           | <0.005 | 0.300  |
| 19 | Zinc (mg/l)                                           | 0.008  | 4.00   |
| 20 | Iron (mg/l)                                           | <0.010 | <0.005 |
| 21 | Manganese (mg/l)                                      | <0.005 | 0.400  |
| 22 | Copper (mg/l)                                         | <0.010 | 0.003  |
| 23 | Cadmium (mg/l)                                        | <0.002 | 2.00   |
| 24 | Chromium (mg/l)                                       | <0.010 | 0.050  |
| 25 | Cobalt (mg/l)                                         | <0.010 | -      |
| 26 | Total Coliforms (cfu/100ml)                           | 80.0   | 0      |
| 27 | Faecal Coliforms (cfu/100ml)                          | 0      | 0      |

### Results

All parameters sampled were below WHO DWQG levels with the exception of total coliforms. The Total coliforms in the groundwater sample may be due to microbial contamination within the piping system and may increase the risk of contracting water- borne illnesses.

### 5.3.9 Ambient Air /Noise Quality Monitoring

#### 5.3.9.1 Purpose of monitoring

It is a legal requirement in Ghana under the Environmental Protection Agency Act 1994, Act 490 and the Environmental Assessment Regulations 1999, LI 1652, that proposed undertakings of a certain threshold submit environmental assessment report to the Agency for permitting purposes. In addition, it is the policy of the Rider Steel Ghana Limited to ensure that all legal and regulatory requirements are met to facilitate the smooth operations of the company's business. The aim of this monitoring is therefore to gather relevant environmental quality data with respect to Ambient Air and Noise Levels to serve as baseline environmental data for the company. The data gathered will provide the Company

with useful information to help monitor its operational impacts on the environment, health and safety of its employees and surrounding neighbours. The baseline ambient air/noise quality assessment report is attached as Annex 5-4

#### 5.3.9.2 Monitoring Locations

Air quality (dust) analysis and noise level monitoring was conducted in October 2019, within the proposed project area as part of the baseline environmental studies for this proposed project. Three sampling locations were selected within the project site and the two adjoining communities namely Ohene Nkwanta and Alafia. Figure 5-6 shows a map of the monitoring locations and Table 5-3 provides the GPS coordinates of the project sites.

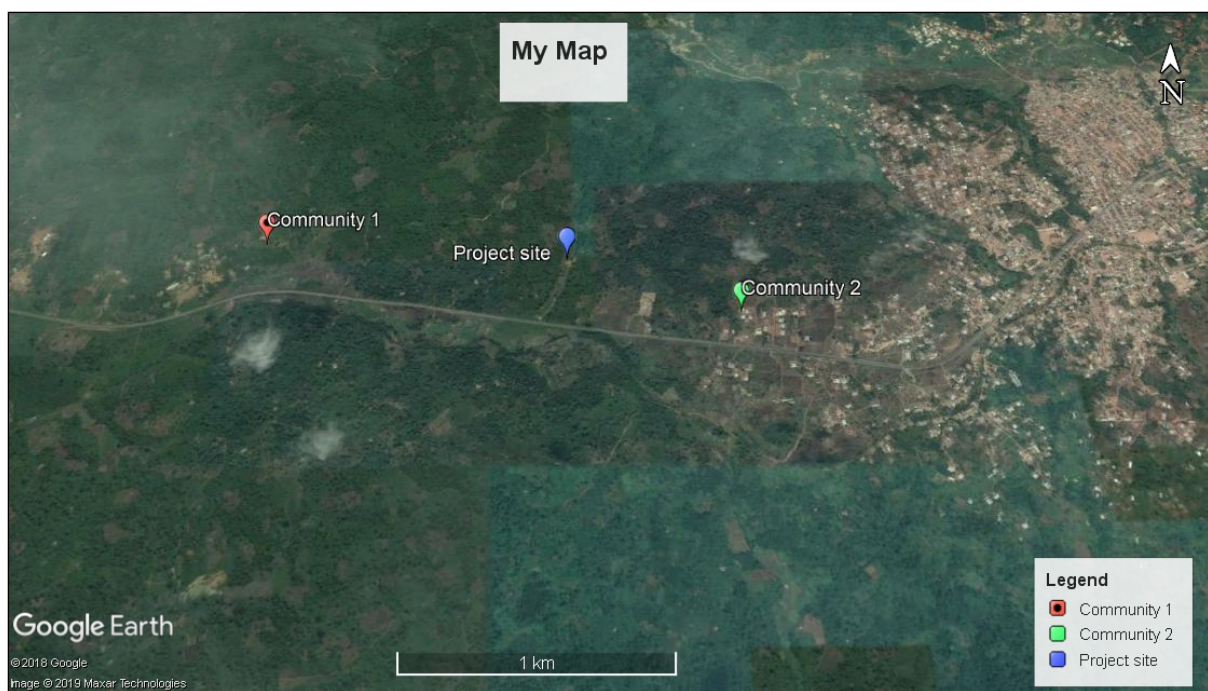


Figure 5-6; Monitoring Locations (Air quality assessment report, 2019)

Table 5-3; GPS Coordinates of monitoring Locations

| Location ID                    | GPS Coordinates |          |
|--------------------------------|-----------------|----------|
|                                | Western         | Northern |
| Project Site                   | 1.25385         | 6.61614  |
| Community 1(Ohene Nkwanta)     | 1.26624         | 6.61698  |
| Community 2( Alafia Community) | 1.24697         | 6.61341  |

#### 5.3.9.2.1 Ambient Air Quality

#### 5.3.9.2.2 Methodology

##### Particulate matter

Particulate matter was sampled using MiniVol samplers set to a flow rate of 5 L/min. Samplers were placed at a minimum height of 5 meters above ground level to prevent the collection of ground level dust temporarily made airborne by gusting winds.

Pumped air was siphoned through a quartz filter paper, mounted in the sampling unit and sampling undertaken for 24 hours at each sampling location. The quartz filter paper was stabilized for a minimum of 24 hours before and after sampling in a desiccator.

The fresh quartz filter paper was weighed before sampling. After the 24-hour sampling period, post sampling filters were weighed and the difference in weight (W2-W1) was used to calculate the concentration of the particulate matter in µg/m<sup>3</sup> using the formula below.

$$(PM_{10}/ PM_{2.5})\mu g/m^3 = \frac{\text{Net dust weight} * 10^6}{\text{Flow rate (L/Min)} * \text{Sampling time (Min)}}$$

##### Gases

Sulphur dioxide, Nitrogen dioxide and Carbon monoxide were sampled using the detector tube method. The detector tubes (dragger tubes) contain chemical agents that change color in the presence of the pollutant gas of interest. The dragger tubes were opened at both ends and hanged for a period of 24 hours to allow the diffusion of ambient air through the chemical resins in the tube (passive method). After the sampling period the length of the colored zone was read in parts per million (ppm) and the concentration of the gas calculated in µg/m<sup>3</sup> using the relation below.

$$\mu g/m^3 = \frac{\text{Concentration of gas (ppmh)} * \text{molecular weight of gas}}{22.4}$$



Plate 5-2: Air quality Monitoring Equipment within the communities

#### 5.3.9.2.3 Results

The results for the monitoring have been discussed below.

##### Particulate Matter

The PM<sub>2.5</sub> concentrations measured were 14.8 µg/m<sup>3</sup>, 18.4 µg/m<sup>3</sup> and 16.6 µg/m<sup>3</sup> for the Project Site, Community 1 and Community 2 respectively. Similarly, the PM<sub>10</sub> concentrations recorded were 26.0 µg/m<sup>3</sup>, 33.5 µg/m<sup>3</sup> and 35.7 µg/m<sup>3</sup> for Project Site, Community 1 and Community 2 respectively as shown in Table

Table 5-4; Results for Particulate Matter Monitoring

| LOCATION                                                                                   | PM <sub>2.5</sub> (µg/m <sup>3</sup> ) | PM <sub>10</sub> (µg/m <sup>3</sup> ) |
|--------------------------------------------------------------------------------------------|----------------------------------------|---------------------------------------|
| Project Site                                                                               | 14.8                                   | 26.0                                  |
| Community 1                                                                                | 18.4                                   | 33.5                                  |
| Community 2                                                                                | 16.6                                   | 35.7                                  |
| Ghana Standards for 24-hour ambient air quality for PM <sub>2.5</sub> and PM <sub>10</sub> | 35.0                                   | 70.0                                  |

##### Gases (SO<sub>x</sub>, NO<sub>x</sub>)

NO<sub>2</sub> and SO<sub>2</sub> concentrations recorded at the three locations were all less than 0.1 µg/m<sup>3</sup> (<0.1). However, CO concentrations were between < 0.1 µg/m<sup>3</sup> and 8.6 µg/m<sup>3</sup> for Project Site.

Table 5-5; Results for NO<sub>2</sub>, SO<sub>2</sub> and CO monitoring

| LOCATION     | NO <sub>2</sub> (µg/m <sup>3</sup> ) | SO <sub>2</sub> (µg/m <sup>3</sup> ) | CO (µg/m <sup>3</sup> ) |
|--------------|--------------------------------------|--------------------------------------|-------------------------|
| Project Site | < 0.1                                | < 0.1                                | < 0.1                   |
| Community 1  | < 0.1                                | < 0.1                                | 8.6                     |

|                                                              |       |       |     |
|--------------------------------------------------------------|-------|-------|-----|
| Community 2                                                  | < 0.1 | < 0.1 | 6.3 |
| Ghana Standards for NO <sub>2</sub> , SO <sub>2</sub> and CO | 150   | 150   | 60  |

#### 5.3.9.2.4 Ambient Noise Levels

#### 5.3.9.2.5 Methodology

Noise measurements/recordings were taken with a High Precision TSI Quest Sound Level Meter, Model Type 1. The sound level meter has an inbuilt calibrator, and was calibrated before measurement/recordings were taken. The noise meter was calibrated at 114 dB (A) prior to the measurement. To obtain representative noise levels, measurements were recorded at a rate of 3dB at ten-minute (10) intervals for 24 hours which was segregated into day and night in accordance with Ghana Standards.



Plate 5-3: Noise Monitoring Equipment

#### 5.3.9.2.6 Ambient Noise Quality Results

##### Day/Night Ambient Noise level

The daytime ambient noise levels (LEQ) recorded were 40.0, 48.2 and 46.2 dB(A) and nighttime ambient noise levels (LA<sub>EQ</sub>) recorded ranged from 36.8 dB (A) to 40.8 dB(A). The highest noise level was recorded in community 2 and the lowest value recorded at the Project Site.

Table 5-6: Day Time Ambient Noise Levels

| LOCATION     | LA <sub>EQ</sub> | L <sub>10</sub> | L <sub>50</sub> | L <sub>90</sub> | L <sub>MAX</sub> |
|--------------|------------------|-----------------|-----------------|-----------------|------------------|
| Project Site | 40.0             | 45.6            | 38.9            | 36.8            | 67.5             |
| Community 1  | 48.2             | 46.1            | 45.5            | 38.8            | 80.1             |

|                                                                                     |      |      |      |      |      |
|-------------------------------------------------------------------------------------|------|------|------|------|------|
| Community 2                                                                         | 46.2 | 47.4 | 43.5 | 41.8 | 64.3 |
| Ghana Standards for daytime ambient noise for Residential Area. Day (06h00 – 22h00) | 55   |      |      |      |      |

Table 5-7: Night Time Ambient Noise Levels

| LOCATION                                                                                | LA <sub>EQ</sub> | L <sub>10</sub> | L <sub>50</sub> | L <sub>90</sub> | L <sub>MAX</sub> |
|-----------------------------------------------------------------------------------------|------------------|-----------------|-----------------|-----------------|------------------|
| Project Site                                                                            | 36.8             | 28.6            | 43.4            | 21.1            | 57.6             |
| Community 1                                                                             | 40.1             | 42.4            | 37.5            | 30.8            | 60.6             |
| Community 2                                                                             | 40.8             | 43.6            | 41.0            | 36.8            | 58.9             |
| Ghana Standards for nighttime ambient noise for Residential Area. Night (22h00 – 06h00) | 48               |                 |                 |                 |                  |

### 5.3.9.3 Conclusion

Ambient PM<sub>2.5</sub> and PM<sub>10</sub> concentration recorded at the three locations were found to be below the Ghana Standards value of 70 and 35 (µg/m<sup>3</sup>) for all areas. The concentrations of the gases (NO<sub>2</sub>, SO<sub>2</sub> and CO) recorded for the monitoring period were below the Ghana Standards value of 150 µg/m<sup>3</sup>, 150 µg/m<sup>3</sup> and 60 µg/m<sup>3</sup> respectively. The ambient noise levels (LEQ values) recorded were below the Ghana Standards noise values of 55 and 48 dB (A) for day and night residential location.

## 5.4 Biological Environment

### 5.4.1 Aquatic Ecology

Aquatic ecological studies for the project was conducted in November 2019. The aquatic ecological assessment report is attached as Annex 5-5

#### 5.4.1.1 Location

To sampling locations selected for this assessment are as follows

- Rice Farm Spring
- River Anunu (Opp. Cement Factory)
- Atinsua/ Project Site (Upstream)
- Atinsua /Project Site (Downstream)

#### 5.4.1.2 Methodology

The various approaches/methodologies for sampling aquatic flora and fauna are described below

#### *Macrophytes*

A survey of the aquatic flora was conducted with visits to the selected sampling sites on foot. The composition of the aquatic vegetation of interest to the objectives of the assignment, was assessed,

and the members of interest were identified and recorded. In such exercises the presence of noxious or dangerous aquatic plants likely to impact negatively on the operation of the project are of special interest, and are therefore given particular attention during the survey. In addition to normal ecological assessment, the conservation status of all the species encountered, as provided for in the IUCN Red list, was considered

#### *Phytoplankton*

Water samples for aquatic micro flora assessment were collected at the same time and sites as for the macrophytes, phytoplankton groups, namely the Bacillariophyceae (Diatoms), the Chlorophyta (the Green algae) and Cyanophyta (Blue-Green), Rhodophyta (Red Algae) and the Flagellates were sampled.

#### *Collection and Preservation of Phytoplankton samples*

30ml water samples were collected in triplicates from each site, and were mixed into a composite sample for each site, and about 1 ml of Iodine in Potassium Iodide solution (Lugol's iodine) was added to the composite sample (Prescott, 1970). The samples were then kept appropriately for identification and enumeration of resident microalgae.

#### *Enumeration and Identification of Phytoplankton species*

The phytoplankton community in the samples collected was enumerated using 25 ml of the iodized samples, following the procedure of Biswas (1966) and Lund *et. al.*, (1958). Phytoplankton density, measured as numbers of individuals per ml, was estimated by counting species represented as single cells, colonies or filaments in a counting cell after about an hour of sedimentation. Identification of planktonic flora species, including flagellates, was done using relevant text, keys and manuals (Whitford and Schumacher, 1973) and complemented with web based sources like <http://algaebase.org>.

#### *Macro-Invertebrates (Benthos)*

Macro-invertebrate species (Benthos) associated with the vegetation in, or trailing into the water at the various sites were appropriately collected. Where necessary sampling sites around rocky areas were agitated and the water collected into glass tubes and fixed. The resultant suspension was later passed through a 500-µm mesh size sieve for identification and enumeration. Further, any tree branches submerged in the river were inspected for burrowing fauna. This approach also provides quantitative estimates of abundance when necessary.

#### *Aquatic fauna-Fish/Crustaceans/Amphibians*

A presence/absence survey on the fish, crustaceans and amphibians occurring in the catchment of the proposed project site, was carried out by active searching and direct or opportunistic observation of the sampling sites. This was complemented with information and knowledge on their ecological importance were solicited from the local people through interviews and discussions. Finally a literature review was also conducted to obtain existing information on the project area and on the aquatic fauna of the area.

### 5.4.1.3 Results /Findings

#### Macrophytes

The emergent aquatic and semi-aquatics found in the survey are quite common with similar tropical freshwater systems. These plants were present in quite small numbers confirming the poor nature of their occurrence. The structure of the macrophyte community can therefore be described as ordinary with marginal numbers of components, and with no unique or species of special interest.

Table 5-8: Macrophytes Diversity

| Vegetation Growth Habit | Rice Farm Spring                                                | River Anunu                                                                                                                 | River Atinsua Upstream                                         | River Atinsua Upstream                                                                                      |
|-------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Species Observed        |                                                                 |                                                                                                                             |                                                                |                                                                                                             |
| Emergents               | <u>Brachiara mutica</u>                                         | <u>Brachiara mutica</u>                                                                                                     | <u>Commelina flos-capa</u>                                     | <u>Commelina flos-capa</u>                                                                                  |
|                         | <u>Commelina flos-capa</u>                                      | <u>Commelina flos-capa</u>                                                                                                  | <u>Cyperus sp.</u>                                             | <u>Cyperus sp.</u>                                                                                          |
|                         | <u>Cyperus sp.</u>                                              | <u>Cyperus sp.</u>                                                                                                          | <u>Ipomoea sp.</u>                                             | <u>Ludwigia sp.</u>                                                                                         |
|                         | <u>Ludwigia sp.</u>                                             | <u>Echinochloa sp.</u>                                                                                                      | <u>Luffa sp.</u>                                               | <u>Polygonum sp.</u>                                                                                        |
|                         | <u>Polygonum sp.</u>                                            | <u>Mimosa sp.</u>                                                                                                           | <u>Ludwigia sp.</u>                                            | <u>Pycnus sp.</u>                                                                                           |
|                         | <u>Pycnus sp.</u>                                               | <u>Lemna sp.</u>                                                                                                            | <u>Polygonum sp.</u>                                           |                                                                                                             |
|                         |                                                                 | <u>Ludwigia sp.</u>                                                                                                         | <u>Pycnus sp.</u>                                              |                                                                                                             |
| Comments                | These plants were observed at this sites in marginal quantities | These plants, including grasses, at this site were in marginal quantities. This site was virtually free except few members. | These plants were observed at all sites in marginal quantities | Species observed in patches or marginal quantities. The vegetation here is dominated by <u>Ludwigia sp.</u> |

#### Free Floating aquatic vegetation

Aquatic vegetation of this life form includes dangerous invasive floating macrophytes with a very high growth rate generally observed in freshwater systems in Ghana. These plants generally prefer conditions of continuous supply of water like in a reservoir or stagnant collection of water for growth. With the exception of few stands of *Lemna* sp. observed at the River Anum (opposite the cement factory) site, the survey did not reveal any free floating aquatic vegetation.. The chances of proliferating and negatively impacting the project at any time during project operation are minimal considering the current environmental conditions observed in the survey.

#### Phytoplankton density and diversity

All the major phytoplankton groups were fairly represented in the aquatic ecosystem of the proposed project location, with the diatoms slightly dominant. All the species encountered are typical of fresh water systems and no species of special ecological interest were found. The diatoms (Bacillariophyceae) seemed to occur in relatively high densities or numbers influenced probably by sediment load, which showed from the colour of the water, as well as time of sampling i.e. just after

rain. The diversity of the phytoplankton community recorded during the survey area is typically pan-tropic, and is very characteristic of similar freshwater bodies in the tropics.

#### Macroinvertebrates (Benthos)

The macro invertebrates observed during the survey belonged to the order Ephemeroptera (mayflies) Diptera (Chironomid midges), and Odonata (dragonflies and damselflies), as well as benthic crustaceans. The number of species and diversity of benthos collected during the survey show a generally fair representation of macro-invertebrates and compare favourably with observations in similar habitats (Kyerematen, R., 2014). Significantly no species of special ecological interests were found.

Table 5-9; Mean Macroinvertebrates observed

| Site                  | Taxa          |                | Mean Numbers<br>m <sup>-2</sup> |
|-----------------------|---------------|----------------|---------------------------------|
| Rice Farm             | Odonata       | Calopterygidae | 33                              |
| Rice Farm             | Diptera       | Chironomidae   | 32                              |
| Rice Farm             | Diptera       | Chironomidae   | 54                              |
| Rice Farm             | Ephemeroptera | Heptageneidae  | 21                              |
| Rice Farm             | Odonata       | Libellulidae   | 112                             |
| River Anum            | Gastropoda    | Limnaeidae     | 36                              |
| River Anum            | Hemiptera     | Nepidae        | 35                              |
| River Anum            | Gastropoda    | Piladae        | 32                              |
| River Anum            | Prawn         | Crustacea      | 56                              |
| River Anum            | Odonata       | Coenagriidae   | 67                              |
| River Anum            | Prawn         | Crustacea      | 33                              |
| Project site Upstream | Hemiptera     | Notonectidae   | 23                              |
| Project site Upstream | Gastropoda    | Piladae        | 42                              |
| Project site Upstream | Hemiptera     | Gerridae       | 112                             |
| Project site Upstream | Coleoptera    | Gyrinidae      | 45                              |
| Project site Upstream | Odonata       | Coenagriidae   | 223                             |
| Project site Upstream | Hemiptera     | Belostomidae   | 98                              |
| Project site Upstream | Ephemeroptera | Baetidae       | 35                              |

|                          |               |               |     |
|--------------------------|---------------|---------------|-----|
| Project site Down stream | Hemiptera     | Belostomidae  | 40  |
| Project site Down stream | Gastropoda    | Limnaeidae    | 36  |
| Project site Down stream | Hemiptera     | Gerridae      | 132 |
| Project site Down stream | Ephemeroptera | Heptageneidae | 37  |
| Project site Down stream | Odonata       | Libellulidae  | 143 |
| Project site Down stream | Diptera       | Chironomidae  | 33  |

## Aquatic Fauna

### Fish

Interviews conducted with people during the survey did not provide relevant information on the presence/absence of these species, though information gathered was confirmed with literature search. The confirmed list is presented in Table 7-10 and none of these species is of conservation concerns. Tall species listed are classified as Least Concern.

Table 5-10: Specie Occurrence

| Sampling sites/<br>FAMILY/Species             | Rice farm | River Anunu | Atinsua<br>Upstream | Atinsua<br>Downstream |
|-----------------------------------------------|-----------|-------------|---------------------|-----------------------|
| CICHILDAE<br><i>Chromidotilapia guentheri</i> | +         | +           | +                   | +                     |
| CENTROPOMIDE <i>Lates<br/>niloticus</i>       |           | +           |                     |                       |
| CLARIIDAE<br><i>Clarias</i> sp.               | +         | +           |                     |                       |

### Crustaceans

Shrimps: Species identified include *Penaeus notialis*, *Parapenaeus longirostris*, *Penaeus kerathurus*, *Triops longicaudatus* (common name: Tadpole shrimp) *Asellus aquaticus* (common name: Aquatic sow bug or water louse), *Gammarus fossarum* (common name: Scud)

### Amphibian

The amphibian species found during the survey were *Afraxalus dorsalis* (the Brown banana frog), and the more common *Bufo* sp. (common toad). These species are common and widespread in the project area and similar habitats, and are not ecologically threatened by the proposed project. They are endemic to forests areas including the study area

## 5.4.2 Terrestrial Ecology

Terrestrial ecological assessment was conducted in October 2019. The full terrestrial ecological assessment report is attached as Annex 5-6

#### 5.4.2.1 Methodology

##### Flora Survey

A literature review was conducted to obtain already existing information on the flora of the project area. This was followed by a detailed field survey. The literature consulted include Taylor (1960), Hutchinson and Dalziel (1954-72) and Hall and Swaine (1981).

The following objectives were set for the field survey:

- To determine the spatial distribution of native vegetation patches across the site.
- To record GPS locations of Sample point positions.
- To determine critical terrestrial ecological features that would be affected negatively by the proposed project.

A reconnaissance survey was conducted in the study area and its external boundaries was to obtain an overview of the extent, topography and complexity of the vegetation. A total of 11 sample plots (25 m x 25 m) were studied in the proposed project site. The reconnaissance survey revealed that the project site has undulating topography with small streams draining some of the valleys. Sampling was carried out so as to capture representative samples of vegetation in the different terrains encountered viz., Valley bottom, well drained lowland/ lower slopes and hill tops.

Specimens of species that could not readily be identified in the field were identified in the Ghana Herbarium. Nomenclature follows Flora of West Tropical Africa (Hutchinson and Dalziel, 1972). The conservation status of the species encountered were defined using the Star Rating system (Table 2) adopted in the Forest Reserves of Ghana Geographic Information Exhibitor manual (Hawthorne, 1995) IUCN threat categories (IUCN,2019)

##### Fauna Survey

A literature review was conducted to obtain already existing information on the project area, followed by a detailed field survey.

The literature consulted include Cansdale (1948; 1951); Booth (1958); Schiotz (1969); Hughes and Barry (1969); Decher (1997a); Decher et al. (1997); Serle et al. (1992) and Kingdon (1997).

The detailed survey on the fauna of the area involved three main methods viz., direct/opportunistic observation, identification of animal spoor, and interviews. Direct/opportunistic observation involved recording any animal sightings while driving or walking along the main access roads or animal trails to the areas bordering the proposed project site. Transect walks to spot animal spoor (any sign left by a living animal, such as feeding sites, regular pathways, tracks, footprints, faecal pellets, nests, etc.) were also undertaken. Some hunters and farmers in villages around the project site were interviewed for information about the fauna of the area. The interviews focused mainly on the identification of the various animals that commonly occurred in the area, and some indication of their abundance (animals are listed as Abundant, Common or Rare). Species of national (Wildlife Conservation Regulations Schedules 1 and 2) and global conservation concern (IUCN Threat Category) were identified. The fauna were classified as either S.1 or S.2 depending on the degree of protection they enjoy under the national wildlife conservation regulation (Schedules, 1995) as follows:

- S.1. Schedule 1: The hunting, capturing or destroying of these species is prohibited at all times
- S.2. Schedule 2: The hunting capturing or destroying of these species is absolutely prohibited between 1st August and 1st December of any season. The hunting, capturing or destroying of any

young animal, or adult accompanied by its young, of these species is absolutely prohibited at all times.

The IUCN threat categories and the star rating systems are provided in the terrestrial ecological report.

#### 5.4.2.2 Sampling locations

The GPS coordinates of the sample sites and identified vegetation types are shown in Table 6-9.

Table 5-11: GPS Coordinates of sample sites and vegetation identified

| Sample No | Latitude      | Longitude      | Description                                                |
|-----------|---------------|----------------|------------------------------------------------------------|
| 1         | N 06°37'06.3" | W001°15'19.9"  | Cocoa farm with isolated trees/food crops                  |
| 2         | N 06°36'58.7" | W 001°15'16.6" | Cocoa farm with isolated trees                             |
| 3         | N 06°37'05.2" | W 001°15'15.4" | Cocoa farm /Riverine forest with seasonal stream (Adibesu) |
| 4         | N 06°37'04.6" | W 001°15'11.8" | Hill top, Upper Slope, thicket farm/ regrowth              |
| 5         | N 06°37'00.4" | W 001°15'09.7" | Farm (plantain, cassava)/ fam regrowth/thicket             |
| 6         | N 06°36'54.6" | W 001°15'11.0" | Cocoa farm with isolated trees                             |
| 7         | N 06°36'48.3" | W 001°15'13.4" | Oil Palm plantation                                        |
| 8         | N 06°36'49.6" | W 001°15'18.1" | Secondary thicket/stream bank vegetation                   |
| 9         | N 06°36'50.0" | W 001°15'22.7" | Citrus Plantation with isolated trees                      |
| 10        | N 06°36'54.8" | W 001°15'21.6" | Cocoa farm with isolated trees                             |
| 11        | N 06°37'00.9" | W 001°15'18.7" | Secondary thicket/old cocoa farm                           |

#### 5.4.2.3 Findings

The findings from the assessment are presented in this section.

#### Floristic Composition of the project site

The 11 quadrat samples and their species composition are presented in Appendix 1. A total of 102 species belonging to 94 genera in 41 families were encountered during the survey (Appendix 2). The families with the highest number of species were the Fabaceae (10), Malvaceae (9), Anacardiaceae (6), Asteraceae (6), Euphorbiaceae (6), Moraceae (5) and Poaceae (5). These families account for 46.1.7% of the total species record; the leguminous species (Fabaceae) showing greater diversity than any other taxon.

Appendix 3 shows the frequency distribution of species among the sample plots. The most abundant species (Percentage Frequency) in the project area were *Albizia zygia* (81.8%), *Elaeis guineensis* (81.8%), *Chromolaena odorata* (54.6%), *Macaranga barteri* (45.5%), *Panicum maximum* (45.5%), *Paullinia pinnata* (45.5%), *Pycnanthus angolensis* (45.5%) and *Spathodea campanulate* (45.5%).

The life form composition of the plants in the project site is presented in Table 6-10. Trees constitute the dominant life form (56.9%) whereas Herb, Climber and Shrub life forms are about equally represented.

Table 5-12; Life forms in the project area

| Life Form | No of Species | %      |
|-----------|---------------|--------|
| Climber   | 14            | 13.73  |
| Herb      | 13            | 12.75  |
| Shrub     | 17            | 16.67  |
| Tree      | 58            | 56.86  |
| Total     | 102           | 100.01 |

The ecological guilds of the species, which reflect the successional stage of the vegetation shows a preponderance of secondary species (i.e Non Forest weed/Pioneers and Pioneers) with a percentage composition of 52%. The primary species (Shade bearers and Non-Pioneer Light Demanders) constituted about 23%% of the species record (Table 5). This indicates that the vegetation is highly disturbed – agriculture being the major driver of disturbance in the area.

Table 5-13: Ecological guild composition of the flora

| Ecological Guild            | No of species | %     |
|-----------------------------|---------------|-------|
| N/A                         | 13            | 12.75 |
| Non Forest/ Savanna Planted | 7             | 6.86  |
| Non Forest/ W Pioneer       | 17            | 16.67 |
| Non Pioneer Light Demander  | 14            | 13.73 |
| Pioneer                     | 36            | 35.29 |
| Shade-bearing               | 9             | 8.82  |
| Swamp                       | 6             | 5.88  |
| Total                       | 102           | 100   |

#### Species of Conservation Concern in the project area

A summary of the Star Rating of species in the Study area are presented in Table 5-14. About 87.3% of the species encountered are of no immediate conservation Concern in Ghana (i.e. Green Star and Not Assessed species). 12 species of conservation concern in Ghana were recorded during the survey and are presented in Table 5-15 The Pink, Red and Scarlet Star species are of commercial value and are mostly exploited for timber. The Gold Star species (*Milicia excelsa*) is nationally and internationally. A conservation plan should be elaborated to preserve these species in the project site or within its area of influence.

Table 5-14 Summary of Star Rating Composition of Flora of the Project Area

| Star Rating | No of Species | %     |
|-------------|---------------|-------|
| Gold        | 1             | 0.98  |
| Green       | 56            | 54.9  |
| N/A         | 33            | 32.35 |
| Pink        | 7             | 6.86  |
| Red         | 2             | 1.96  |
| Scarlet     | 3             | 2.94  |
| Total       | 102           | 99.99 |

Table 5-15; Species of conservation Concern in Ghana

| Species                          | Star rating |
|----------------------------------|-------------|
| <i>Milicia excelsa</i>           | Gold        |
| <i>Funtumia elastica</i>         | Pink        |
| <i>Elaeis guineensis</i>         | Pink        |
| <i>Cola nitida</i>               | Pink        |
| <i>Antiaris toxicaria</i>        | Pink        |
| <i>Pycnanthus angolensis</i>     | Pink        |
| <i>Sterculia rhinopetala</i>     | Pink        |
| <i>Nesogordonia papaverifera</i> | Pink        |
| <i>Antrocaryon micraster</i>     | Red         |
| <i>Entandrophragma angolense</i> | Red         |
| <i>Albizia ferruginea</i>        | Scarlet     |
| <i>Terminalia ivorensis</i>      | Scarlet     |

The species of global conservation concern listed in the IUCN red list that were recorded during the survey are presented in Table 6-14,. 10 of the 102 species recorded are of global conservation concern. They are mostly species which are under exploitation as timber and were mostly found growing as isolated individuals in the cocoa farms.

Table 5-16; Species of Global Conservation Concern

| Species                          | IUCN Status |
|----------------------------------|-------------|
| <i>Milicia excelsa</i>           | NT          |
| <i>Lannea welwitschii</i>        | NT          |
| <i>Ricinodendron heudelotii</i>  | VU          |
| <i>Mallotus oppositifolius</i>   | VU          |
| <i>Pseudospondias microcarpa</i> | VU          |
| <i>Nesogordonia papaverifera</i> | VU          |
| <i>Antrocaryon micraster</i>     | VU          |
| <i>Entandrophragma angolense</i> | VU          |
| <i>Albizia ferruginea</i>        | VU          |
| <i>Terminalia ivorensis</i>      | VU          |

### Fauna

A faunal checklist of the project site was compiled from direct observations, interviews with some hunters encountered during the site survey. The interviews focused mainly on the identification of the various animals that commonly occurred in the area, and some indication of their abundance.

According to the information obtained from the methods mentioned above, the animals known to occur in the project site and its immediate environs are presented in Appendix 4. Some of the animals enjoy absolute protection under Ghana's Wildlife laws e.g. the Flying Squirrel (*Anomalurus pelii*), Tree

Hyrax (*Dendrohyrax dorsalis*), Black Kite (*Milvus migrans*) and Bush fowl (*Francolinus bicalcaratus*). All the species listed are listed as Least Concern or not yet assessed in the IUCN red list of threatened species, with the exception of *Phataginus tetradactyla* (*Manis tetradactyla*), the black-bellied pangolin, which is listed as Vulnerable.

According to the responses to the interviews, the bushbuck (*Tragelaphus scriptus*) and the Maxwell's duiker (*Cephalophus maxwelli*) are frequently killed in the area and Cane rat (*Thryonomys swinderianus*) is abundant. Some of the invertebrates observed on the site are termites that build huge mounds (*Macrotermis*) that provide suitable habitat for mushrooms, the variegated grasshopper (*Zonoceros Variegatus*), several species of ant, flies and butterflies of (e.g. *Papilio demodocus*, the swallow tail butterfly) and snails. Snakes and other reptiles are also well represented in the area.



Plate 5-4; Interviews with some hunters from the project area

#### 5.4.2.4 Conclusion

During the construction phase, it is likely that all the vegetation on the site would be removed. This will result in the loss of food/cash crops, medicinal plants and timber species. The survey showed that about 90% of the plants on the site are of no conservation concern since they are very common in Ghana. However, the medicinal plants and those of national and global conservation concern that occur on the site should be preserved. Seedlings of these plants could be raised and distributed to farmers in the projects area of influence to plant. Timber species of merchantable size should be removed in accordance with the national regulations.

Since the vegetation provides habitat and food for the fauna of the area, its removal will lead to the death or emigration of the fauna. Furthermore, compaction of soils which is expected during the construction phase, will destroy soil invertebrate fauna as well as burrowing mammals and reptiles. The removal of the vegetation would enhance dust pollution run off, erosion and sedimentation of the Atinsua stream. Fortunately, there is adequate land available as well as vegetation for fauna to migrate to, as well as enough floral presence in other areas outside of the specific project site. Furthermore, the proposed site is predominantly agricultural land.

### 5.5 Socioeconomic Environment

#### 5.5.1 Demographic Characteristics

The population of the Municipality, according to the 2010 population and Housing Census is 71,508. This comprises of 33,942 males (47.5%) and 37,566 (52.5%) females with the sex ratio of 90.4. This

means that, there are about 90 males to every 100 females in the municipality. The population is predominantly urban as most of the people in the Municipality are in urban localities

### 5.5.2 Land Use

The Odumase traditional Council oversees the land for the Juaben Traditional Council. The 44- acre site is mainly existing cocoa and cash crop farms. There are also as 3.no hamlets on the proposed site.



Plate 5-5 : Hamlet (Left) and Plantain Farm (Right) (SAL, 2019)

### 5.5.3 Economy

About 68.0 percent of the population aged 15 years and older are economically active while 32.0 percent are economically not active. Of the economically active population, 92.7 percent are employed while 7.3 percent are unemployed. For those who are economically not active, a larger percentage of them are students (46.5 %), 25.6 percent perform household duties and 5.4 percent are disabled or too sick to work. About 66.0 percent of the unemployed are seeking work for the first time.

### 5.5.4 Waste Disposal

The most widely method of solid waste disposal is by public dump in the open space accounting for 40.1 percent. About one 6 percent of households dump their solid waste indiscriminately. House to house, waste collection accounts for 4.1 percent. For liquid waste disposal, throwing waste onto street/outside (36.6%) and onto the compound (35.7%) are the two most common methods used by households in the municipality.

### 5.5.5 Cultural Heritage and Archaeology

The ESIA did not identify any site of historical, archeological religious, or other cultural significance in the project's physical area of influence thus there is a low possibility of chance finds. Where there is a chance find of cultural resource during project implementation, the procedure will be as follows;

- All construction activity in the area will cease immediately;
- The find location will be recorded and necessary steps taken to secure/protect the area; and

- The supervising engineer / contractor will inform RISGL to engage an archaeologist to assess the finding and advise on the necessary steps.

## 6.0 STAKEHOLDER CONSULTATIONS

Key stakeholders to the proposed RISGL project have been identified for consultations and these include regulatory bodies and local government institutions. Stakeholder consultation is a process and would continue through the ESIA stage through to implementation.

### 6.1 Objectives of Stakeholder

The main objective of the consultations with stakeholders is to discuss the proposed project environmental and social implications and to identify alternatives for consideration. Specifically, the consultations seek to achieve the following objectives:

- To provide information about the proposed project;
- To provide opportunities for stakeholders to discuss their opinions and concerns;
- To provide and discuss with stakeholders the alternatives considered to reduce anticipated impacts; both on the physical environment and socio- economic wellbeing;
- To identify and verify significance of environmental, social and health impacts; and
- To inform the process of developing appropriate mitigation and management options.

### 6.2 Identified Stakeholders

Key project stakeholders identified are categorized under the following groups:

**Regulatory agencies;** These are government agencies responsible for exercising autonomous authority in a regulatory or supervisory capacity. They are set up to enforce safety and standards, and/or to protect the public. They provide efficient processes to implement good regulatory practice and tools to monitor the actual implementation of projects .e.g. Permitting by EPA, Energy Commission etc

**Key sector agencies;** These are key governmental agencies that develop policies for implementation for the various national sectors eg . Energy, trade and Industry

**Administrative authorities;** These are public officials, bodies, commissions or institutions which are concerned with the Implementation of government policies; and/or b)Enforcement of duly enacted laws eg local assemblies.

**Local Communities;** These are host communities and surrounding communities within the project catchment. These groups will be consulted to provide information on the project from the planning phase to provide an opportunity for concerns to be raised and addressed. Early engagements assist in establishing strong relationships between the proponent and the community and continues throughout the implementation and operational stages of projects for sustainability of the project.

**Project Affected Persons:** These are individuals who are likely to be affected due to project activities. This could be through loss of part or all of their assets whether temporarily or permanently including land, houses, other structures, businesses, crops/trees, or other types of assets.

The identified stakeholders are listed under the headings below;

5. Project proponent

- Rider Iron and Steel GH Ltd

6. Regulatory Agencies

- Environmental Protection Agency (EPA);
- Department of Factories Inspectorate
- Ghana National Fire Service (GNFS);
- Water Resources Commission;
- Public Utilities Regulatory Commission;
- Ghana Highway Authority
- Labour Department.

7. Key Sector Agencies

- Land Use and Spatial Planning Authority; and
- National Development Planning Commission.
- Ministry of Trade and Industry
- Ghana Highway Authority

8. Administrative Authorities

Asante Akim Central Municipal Assembly

9. Representative of Neighbouring Communities

- Traditional Authorities
- Assembly members; and
- Existing community groups (youth and women).

6 Project Affected Persons

### 6.3 Outcome of Stakeholder Consultations carried out

The stakeholder consultations began in October 2019 towards the preparation of this ESIA report. The outcome of stakeholders consulted is summarized in Table 6-1 and evidence of stakeholders consulted is provided in Annex 6-1.

Table 6-1: Summary of stakeholder consultations

| Stakeholder/<br>Institution/<br>Location                          | Contact<br>Person                           | Role                                     | Contact No.                                                                                                                     | Date    | Consultation<br>type | Concerns Raised/ Information Received                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------|---------------------------------------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Project Proponents</b>                                         |                                             |                                          |                                                                                                                                 |         |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Rider Iron and<br>Steel Gh Ltd                                    | Mr. Majd N.                                 | Managing<br>director                     | 0200656760                                                                                                                      | -       | Interview            | <ul style="list-style-type: none"> <li>• Provided project documents</li> <li>• The Land acquired for the project is stool land protected by the paramount chief of Juaben, under the supervision of the Odumasehene. All parties have been duly compensated, farmers who had cash and food crops on the land were also duly compensated.</li> <li>• The Ghana highway authority has received the traffic impact assessment report. Client is awaiting results</li> <li>• The project site was selected under 1D1F initiative, this will enable scrap collected from the northern sector to be sent to the site for processing</li> </ul>                                                                                                                                                                                                                                                                                  |
| <b>Other Stakeholders</b>                                         |                                             |                                          |                                                                                                                                 |         |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Environmental<br>Protection<br>Agency,-<br>Konongo Area<br>Office | Prempeh<br>Adakwa<br>Yiadom<br>Edem K. Mawu | Area head<br><br>Assistant Area<br>head) | 547977555/0501301720<br><a href="mailto:adarkwa.prempeh@epa.gov.gh">adarkwa.prempeh@epa.gov.gh</a><br><br>0244032751/0501301493 | 1/10/19 | Interview            | <ul style="list-style-type: none"> <li>• Gave an overview of the functions of the EPA and staff strength</li> <li>• The project site is accident prone because of the highway, there is a need for a full traffic impact assessment study to provide suggestions to mitigate accidents and facilitate the entry of vehicles into the factory. The proponent is in discussion with the Ghana Highway Authority to conduct a traffic assessment</li> <li>• There is likely to be migration and an influx of people from all walks of life once the factory is up and running. Most semi-skilled technical expertise should be sought locally. There are a lot of semi-skilled technicians due to the now defunct Owere Mines.</li> <li>• The closure of the Owere Mines and the ban on small scale illegal mining has led to high levels of unemployment especially among the youth resulting in high crime rate</li> </ul> |

| Stakeholder/<br>Institution/<br>Location        | Contact<br>Person      | Role                                                               | Contact No. | Date    | Consultation<br>type | Concerns Raised/ Information Received                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------|------------------------|--------------------------------------------------------------------|-------------|---------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Asante Akim<br>Central<br>Municipal<br>Assembly | Madam Susan<br>Akomeah | -Municipal<br>Chief<br>Executive                                   | 0243575222  | 2/10/19 | Interview            | <ul style="list-style-type: none"> <li>The project is under 1D1F.</li> <li>The role of the Assembly is to facilitate procurement of needed services and permits for the construction and running of the factory eg . Supply of electricity to the project site which is on going .</li> <li>The Assembly has to ensure majority of labour is sourced from locals within the nearby communities with the exception of special skills or expertise that could not be found locally</li> <li>Pilfering is common in the area and quite recently, some youth had taking to cutting off parts of an old railway line that runs through Konongo.</li> <li>Concerned about gases that will be emitted from the factory during operations and its effect on future generations. They emphasized on the necessity of chimneys being up to the standard requirement.</li> <li>The Assembly would like to participate in the grievance redress mechanism which should not be spearheaded by Traditional Authority</li> <li>The project site was originally zoned as an agricultural area but currently, 520 acres is being demarcated as an industrial zone. The project site will use 44acres. SAL will be furnished with drawings of this once it is completed</li> <li>The Assembly plans to build an industrial enclave for local artisans (garages) on the other side of the road which is to the west of the project. The site will host all mechanics within the municipality and in addition have sanitary and recreational facilities</li> </ul> |
|                                                 | Joe Bashir             | -Planning<br>Officer                                               | 0244594234  |         |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                 | Gideon Tetteh          | -Physical<br>planning<br>officer – Town<br>and country<br>planning | 0242140438  |         |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

| Stakeholder/<br>Institution/<br>Location     | Contact<br>Person                                                                           | Role                                                                                              | Contact No. | Date    | Consultation<br>type | Concerns Raised/ Information Received                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-------------|---------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Odumase<br>Traditional<br>Authority          | Nana Kofi<br>Antwi II)<br><br>Okyere Boadu<br>Nana Akoma<br>Boateng II)<br>Fobi<br>Emmanuel | Odumasehene<br>and Nifahene<br>of Juabenman<br>-Linguist<br>-Nifahene of<br>Odumase<br>-Secretary | O246735020  | 1/10/19 | Interview            | <ul style="list-style-type: none"> <li>The proposed project land belongs to the stool The Palace fully participated in the land acquisition and compensation process. The regional deputy valuation officer valued assets and over 400,000 cedis has so far been paid in cash to farmers and residents within the project site</li> <li>The 3 types of PAPs identified were, Persons who were caretakers of farms that belonged to indigenes, Persons who were on shared cropping with the owners of the farm and Farms that belonged to families</li> <li>With the current GRM in place, anyone with a grievance goes through the chief to reach the client for resolution. The secretary of the palace is to be contacted who then refers the issue to the chief. A valuer, the chief and PAP will go back to re assess the asset and a solution will be reached.</li> <li>The client will pay stool rent at the end of every year. This will be used to build a community center to provide ICT services to JHS students, a guidance and counselling unit and a recreational center for social gatherings.</li> </ul> |
| Neighbouring<br>Community –<br>Ohene Nkwanta | Vincent Tetteh<br>Vida Ayisi                                                                | Unit<br>committee<br>member                                                                       |             | 2/19/19 | Interview            | <ul style="list-style-type: none"> <li>Ohene Nkwanta is about 1.3km north of the project site and has a population of about 600 people.</li> <li>On the north of the village lies the Anunu River just before the cement factory which flows into the Pra River. Other water bodies nearby are the Odumase-Owere to the south and Adebinsu to the west</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

| Stakeholder/<br>Institution/<br>Location | Contact<br>Person               | Role                | Contact No. | Date    | Consultation<br>type | Concerns Raised/ Information Received                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------|---------------------------------|---------------------|-------------|---------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                          |                                 |                     |             |         |                      | <ul style="list-style-type: none"> <li>Most youth are unemployed after the closure of the Owere mines. Others work at the nearby cement factory</li> <li>The two prevalent associations are the Rice growers' association and Cocoa growers' association</li> <li>Some members of the community asked to be employed once the project is implemented .</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Project Affected<br>Persons (PAPs)       | Yaw Gyimah<br>Akua<br>Amoabemaa | -Rep of PAP<br>-PAP |             | 1/10/19 | Interview            | <ul style="list-style-type: none"> <li>There are 29 PAPs and all were displaced permanently. All PAPs had farms on the project site and 3 had both hamlets and farms. The sizes of the farms range from .05 -4 acres.</li> <li>2 PAPs were engaged while on site. One had farm of food crops while the other had both farmland and a hamlet that served residential purposes.</li> <li>Yaw Gyimah and Akua Amoabemaa received an amount of 6000 and 4,500 cedis respectively as compensation.</li> <li>Affected property includes Cocoa farms, Plantain, cassava and other food crops, Residences. They could not confirm the sizes of their farm lands lost to the project.</li> <li>Alternative dwellings were not provided</li> <li>The current GRM in place is not favourable and the PAPs would like alternative arrangements aside of traditional authority</li> <li>Some PAPs were not satisfied with current compensation arrangements and amounts</li> </ul> |

| Stakeholder/<br>Institution/<br>Location      | Contact<br>Person                                                                                  | Role                                | Contact No.                                              | Date      | Consultation<br>type | Concerns Raised/ Information Received                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------|-------------------------------------|----------------------------------------------------------|-----------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Konongo-<br>Odumase<br>Government<br>Hospital | James Kepah<br>Agyapong<br>Kwame Addo<br>Rejoice Yawo<br>Banini<br>Olivia Naa<br>Norley<br>Aboagye | AG MDHS<br>MHIO<br><br>MPHN<br>MHPO | 0248085721<br>0544229898<br><br>0547138966<br>0242875141 | 6/11/2019 | Interview            | <ul style="list-style-type: none"> <li>The Konongo district has 15 health facilities. There are 2 hospitals, 1 private and the other a government hospital There are 5 CHPs compound</li> <li>There is a CHPs zone near Ohene Nkwanta.</li> <li>The Odumase health center is the closest to the factory site.</li> <li>The top 10 common diseases include malaria, upper respiratory tract infection, Diarrhea, Anaemia, skin diseases, urinary tract infection, intestinal worms, hypertension, pneumonia, rheumatism...</li> <li>HIV cases are also reported in the area.</li> <li>There are low cases of malnutrition reported (2016-69, 2017-94, 2018-50)</li> <li>The average life expectancy in Konongo is 70 for women and 65 for men</li> <li>Low maternal mortality rates are recorded</li> <li>Road accidents recorded (2016-271, 2017-62, 2018-106)</li> <li>Mental health issues recorded (2016-107, 2017-1026, 2018-128)</li> <li>Services offered by the Konongo-Odumase government hospital include OPD, ANC, RCH, Lab, Pharmacy, Psychiatry unit, special clinic, emergency unit</li> <li>As at 2018 staff strength are as follows:<br/>Doctors - 5<br/>CHN-36<br/>EN-75<br/>MIDWIVES-33<br/>GN-55<br/>Physician Assistants-9</li> </ul> |

| Stakeholder/<br>Institution/<br>Location | Contact<br>Person     | Role                  | Contact No.            | Date      | Consultation<br>type | Concerns Raised/ Information Received                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------|-----------------------|-----------------------|------------------------|-----------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                          |                       |                       |                        |           |                      | <u>Mitigation</u> <ul style="list-style-type: none"> <li>There should be quarterly screening for factory staff and frequent monitoring of the factory filter to ensure compliance with good air quality standards.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Motto Traffic and Transport Department   | DSP/Mr. S.P. Yeboah   | Deputy Supt of police | 0502775939/ 0576226800 | 5/11/2019 | Interview            | <ul style="list-style-type: none"> <li>The nature of the road where the site is located makes the area an accident-prone area.</li> <li>For mitigation, it will be necessary for the road to be expanded</li> <li>Floor lights should be erected to assist trucks to initiate the appropriate curves</li> <li>The road markings should be made to be more visible; it must be done with wood paint and it should be reflective</li> <li>8-10 accidents usually occur in a month within the area</li> <li>Recovery trucks by MTTD do not have the capacity to remove other trucks that have been stuck due to accidents; to resolve this, 42 tonner trucks should be made available to assist remove the trucks from the road</li> <li>Communication lines must be clearly established to enable information sharing on any accidents that may have occurred along the road inhibiting free flow of vehicles</li> </ul> |
| NADMO                                    | Rejoice okyere-Abayie | Operations Head       | 0244894861             | 5/11/2019 | Interview            | <ul style="list-style-type: none"> <li>The NADMO Office handle many different forms and types of disasters.</li> <li>Bushfires are more prevalent during the harmattan season</li> <li>The bridge at Odumase sometimes overflows its bounds which in turn causes flooding.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| Stakeholder/<br>Institution/<br>Location               | Contact<br>Person                | Role                                        | Contact No.              | Date      | Consultation<br>type | Concerns Raised/ Information Received                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------|----------------------------------|---------------------------------------------|--------------------------|-----------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                        |                                  |                                             |                          |           |                      | <ul style="list-style-type: none"> <li>• There are years with no disasters at all and others years with counts of disasters</li> <li>• The Asante Akim Konongo NADMO office has 10 zonal officers and 9 secretarial staff</li> <li>• NADMO responds to disasters as and when they occur and they are prepared to assist with any disaster in relation to the factories' operations in collaboration with the fire service</li> </ul>                                                                                                                    |
| Department of Feeder Roads                             | Gideon Osafo                     | Feeder Roads Engineer                       | 0244787438               | 7/11/2019 |                      | <ul style="list-style-type: none"> <li>• Most drivers are not educated on the road markings which is a major cause of accidents on the odumase stretch</li> <li>• The hill at Odumase obstructs sight view and must be levelled</li> <li>• The vertical curve must be removed if any remedy must be considered to halt the accidents</li> </ul>                                                                                                                                                                                                         |
| Fire Service Department                                | M.F.O Mensah                     | Municipal Fire Officer                      | 0244 665337              | 7/11/2019 | Interview            | <ul style="list-style-type: none"> <li>• The fire department has a staff strength of 26 and 1 fire tender</li> <li>• The company (RISGL) has already requested for a fire permit. Their offices will be inspected after construction and a certificate issues if requirements are met.</li> <li>• The department only has experience putting put domestic fires. This is the first industry in the district.</li> <li>• Recommends that training on putting out fires should be carried out for employees once the company starts operation.</li> </ul> |
| Ohene Nkwanta Community/<br>Assemblyman<br>for Odumase | Ohemeng Samuel<br>Tetteh Vincent | Assembly Man<br>Unit<br>Committee<br>Member | 0200497823<br>0242734809 | 7/11/2019 | Interview            | <ul style="list-style-type: none"> <li>• Ohene Nkwanta has two unit committee members.</li> <li>• There is also an assembly man whose jurisdiction covers Ohene Nkwanta, Alafia and Odumase.</li> <li>• The population of Ohene Nkwanta is about a 1000 with 25% being female</li> </ul>                                                                                                                                                                                                                                                                |

| Stakeholder/<br>Institution/<br>Location | Contact<br>Person | Role | Contact No. | Date | Consultation<br>type | Concerns Raised/ Information Received                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------|-------------------|------|-------------|------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                          |                   |      |             |      |                      | <ul style="list-style-type: none"> <li>• The average household size is 8</li> <li>• Settlers of Ohene Nkwanta are migrants from various places including Somanya, the north and the Volta region. There are also a few settlers from Togo and Burkina Faso</li> <li>• The population is increasing in the town due to birth and opportunity for farming activities.</li> <li>• There's a record of one person with special needs.</li> <li>• Languages spoken by the town folk are ewe, Frafra, French, Twi, Ga etc.</li> <li>• The town is majority Christian</li> <li>• Major occupation is farming followed by others such as driving, carpentry, masonry, watchmen etc.</li> <li>• The 2 major associations are Quality rice farmers association and Ohene Nkwanta cocoa farmers association.</li> <li>• The School located in the community covers KG to JHS</li> <li>• Sick folk mainly patronize the Konongo government hospital. A few others use traditional medicine</li> <li>• There are 2 boreholes which serve the community</li> <li>• Some needs of the community folk are:<br/>a health facility,<br/>a toilet facility,<br/>employment for the youth in the community,<br/>a proper waste disposal service and<br/>a more stable electric power supply</li> <li>• Some identified positive impacts of the project are Employment for the youth, industrialization of the community and monetary benefits for female food vendors to staff of factory.</li> </ul> |

| Stakeholder/<br>Institution/<br>Location | Contact<br>Person | Role | Contact No. | Date | Consultation<br>type | Concerns Raised/ Information Received                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------|-------------------|------|-------------|------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                          |                   |      |             |      |                      | <ul style="list-style-type: none"> <li>Some negative impacts identified by the project would be that bad waste disposal can lead to health problems, game and medicinal plants at factory site have been lost</li> <li>Deforestation as a problem facilitating climate change</li> <li>Adebesu water source can be affected especially for rice farmers</li> </ul> <p><u>Mitigation measures</u></p> <ul style="list-style-type: none"> <li>Ensure proper waste disposal to measure with EPA standards</li> <li>Environmental officers at assembly must ensure the factory compliance with EPA standards</li> <li>The cement factory must be monitored to ensure that its activities does not affect the water body which is a source of drinking water.</li> <li>There is the need for the provision of irrigation dam for farmers.</li> <li>Mechanized water pumps would also be of help to the community people.</li> </ul> |

### 6.3.1 Key Concerns Raised

| Name /Organization                                       | Concern /Issue                                                                                                                                                                                                                                                                                                                                         | Response                                                                                                                                                                                                                                                                |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Asante Akim Central Municipal Assembly                   | <u>Environment and Health</u><br>Concerns were raised on emissions from the factory into the atmosphere and its effects on the health of inhabitants in and around the area.                                                                                                                                                                           | RISGL will install a flue gas dedusting and air cleaning system to control the emissions into the environment in accordance with best practice. All emissions will meet Ghana EPA and IFC performance standards                                                         |
| Environmental Protection Agency                          | <u>Traffic</u><br>The location of the proposed steel factory is off the Kumasi –Konongo highway. The area is accident-prone and hence the proposed entrance to the factory should be assessed and the concern mitigated.                                                                                                                               | A traffic impact assessment has been conducted by the Ghana Highway Authority. Recommendations by the GHA have been included in the ESIA as mitigation measures for this concern. The traffic Assessment report is included in this report                              |
| Project affected Persons                                 | <u>Compensation</u><br>Alternative dwellings were not provided for those whose hamlets were on the site<br><u>Grievance Redress mechanism</u><br>The current GRM in place is not favourable for the PAPS and they would want a better-structured GRM in place, probably channelling grievances through the Assembly rather than traditional authority. | The occupants of the hamlets have been fully paid as compensation for the loss of crops and hamlets from the valuation report.<br><br>A Grievance Redress Mechanism has been proposed in the ESIA. This would be adopted by RISGL to aid solve issues /concerns of PAPS |
| Health Directorate , Assembly member , Community Members | <ul style="list-style-type: none"> <li><u>Air Pollution</u></li> </ul> There were concerns that emissions from the factory would contribute to the increase in upper respiratory infections the community                                                                                                                                              | The project will include a flue gas dedusting and air cleaning system to filter and clean the emissions produced.<br>Regular air quality monitoring has been proposed to assess any changes over time.                                                                  |

### 6.3.2 Scoping Notice and Public Involvement

A Scoping Notice, which aims at inviting public comments on the proposed project has been published, as required in accordance with Regulation 15 (1) of LI 1652. The publication was made in the Ghanaian Times, a national newspaper, on 20<sup>th</sup> October 2019. A copy of the notice is provided as Annex 6-3 .

The mandatory 21 days' disclosure period has since expired and no adverse comments were received from the public.

## 7.0 IMPACT ANALYSIS , APPROACH AND METHODOLOGY

This chapter presents the methodology used to assess the significance of impacts that may result from the RISGL project. It outlines general assessment methods and presents the criteria for determining receptor sensitivity, impact magnitude and impact significance.

### 7.1 Impact Assessment

The impact assessment for this study includes;

- Identification of Potential Environmental and Social Issues and Impacts;
- Evaluation and interpretation of impacts; and
- Impact Mitigation and Control.

#### 7.1.1 Identification of Potential Environmental and Social Issues and Impacts

The potential environmental and social impacts of the proposed project have been identified and assessed as positive/beneficial or negative/adverse. The potential impacts of the Project have been identified and described for the various phases of the Project including impacts resulting from:

1. Preparatory/planning phase activities;
2. Construction phase activities;
3. Operational phase activities; and
4. Decommissioning phase activities.

#### 7.1.2 Evaluation and Interpretation of Impacts

The significance of each impact has been evaluated and compared with national, international as well as applicable industry standards. The methodology for evaluating an impact is outlined below:

##### 7.1.2.1 Impact Identification and Characterisation

Impacts are described in terms of their characteristics, including the impact's type and the impact's spatial and temporal features (namely extent, duration, scale and frequency). The definitions of the terms used are described in Table 7-1.

Table 7-1: Impact Characteristics

| Characteristic | Definition                                                                                            | Terms                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type           | A descriptor indicating the relationship of the impact to the Project (in terms of cause and effect). | <p>Direct - Impacts that result from a direct interaction between the Project and a resource/receptor (e.g., between occupation of a plot of land and the habitats which are affected).</p> <p>Indirect - Impacts that follow on from the direct interactions between the Project and its environment as a result of subsequent interactions within the environment (e.g., viability of a species population resulting from loss</p> |

| Characteristic | Definition                                                                                                                                                                                            | Terms                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                |                                                                                                                                                                                                       | <p>of part of a habitat as a result of the Project occupying a plot of land).</p> <p>Induced - Impacts that result from other activities (which are not part of the Project) that happen because of the Project.</p> <p>Cumulative - Impacts that arise because of an impact and effect from the Project interacting with those from another activity to create an additional impact and effect.</p>                                                |
| Duration       | The time period over which a resource / receptor is affected.                                                                                                                                         | <p>Temporary - (period of less than 3 years - negligible/associated with the notion of reversibility)</p> <p>Short term - (period of less than 5 years i.e. production ramp up period)</p> <p>Long term - (period of more than 5 years and less than 15 years i.e. life of plant)</p> <p>Permanent - (a period that exceeds the life of plant – i.e. irreversible. Or may last for a very long time )</p>                                           |
| Extent         | The reach of the impact (i.e. physical distance an impact will extend to)                                                                                                                             | <p>On-site - impacts that are limited to the Project site.</p> <p>Local - impacts that are limited to the Project site and adjacent properties.</p> <p>Regional - impacts that are experienced at a regional scale, i.e. beyond adjacent properties, covering the metropolis and beyond</p> <p>National - impacts that are experienced at a national scale.</p> <p>Trans-boundary/International - impacts that are experienced outside of Ghana</p> |
| Scale          | Quantitative measure of the impact (e.g. the size of the area damaged or impacted, the fraction of a resource that is lost or affected, etc.) or the professional viewpoint of the measure of impact  | Quantitative measures as applicable for the feature or resources affects/ professional viewpoint of expert as applicable for the feature or resource in terms of severity of impact measure (i.e. minor, moderate, severe)                                                                                                                                                                                                                          |
| Frequency      | Measure of the constancy or periodicity of the impact.                                                                                                                                                | No fixed designations; intended to be a numerical value or a qualitative description.                                                                                                                                                                                                                                                                                                                                                               |
| Likelihood     | Characteristic that pertains to unplanned events determined either qualitatively or quantitatively estimated on the basis of experience and/or evidence that such an outcome has previously occurred. | <p>Unlikely – The event is unlikely but may occur at some time during normal operating conditions.</p> <p>Possible – The event is likely to occur at some time during normal operating conditions.</p> <p>Likely - The event will occur during normal operating conditions (i.e., it is essentially inevitable).</p>                                                                                                                                |

### 7.1.2.2 Determining Impact Magnitude

Once an impact's characteristics are defined, the next step in the impact assessment phase is to assign each impact a 'magnitude'. Magnitude is typically a function of some combination (depending on the resource/receptor in question) of the following impact characteristics:

1. extent;
2. duration;
3. scale; and
4. frequency.

Magnitude (from small to large) is in practice a continuum, and evaluation along the spectrum requires the exercise of professional judgement and experience. Each impact is evaluated on a case-by-case basis, and the rationale for each determination is noted. The universal magnitude designations, for negative effects, are: negligible, small, medium and large. The magnitude designations themselves are universally consistent, but the definition for the designations varies by issue. In the case of a positive impact, no magnitude designation has been assigned as it is considered sufficient for the purpose of the impact assessment to indicate that the Project is expected to result in a positive impact.

### 7.1.2.3 Determining Receptor Sensitivity

The other principal step necessary to assign significance for a given impact is to define the sensitivity of the receptor. There are a range of factors to be taken into account when defining the sensitivity of the receptor, which may be physical, biological, cultural or human. As in the case of magnitude, the sensitivity designations themselves are universally consistent, but the definitions for these designations will vary on a resource/receptor basis. The sensitivity of receptor used is low, medium and high as shown in the table below.

Table 7-2: Sensitivity Criteria

| Value / Sensitivity                                 | Low                                                                                                                                  | Medium                                                                                                                                                                                                   | High                                                                                                                                          |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Biological and Species Value / Sensitivity Criteria |                                                                                                                                      |                                                                                                                                                                                                          |                                                                                                                                               |
| Criteria                                            | Not protected or listed as common / abundant; or not critical to other ecosystem functions (e.g. key prey species to other species). | Not protected or listed but may be a species common globally but rare in Ghana with little resilience to ecosystem changes, important to ecosystem functions, or one under threat or population decline. | Specifically protected under Ghana legislation and/or international conventions e.g. CITES Listed as rare, threatened or endangered e.g. IUCN |
| Socio-Economic Sensitivity Criteria                 |                                                                                                                                      |                                                                                                                                                                                                          |                                                                                                                                               |

| Value / Sensitivity                  | Low                                                                                 | Medium                                                                                                           | High                                                                                                                     |
|--------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Criteria                             | Those affected are able to adapt with relative ease and maintain pre-impact status. | Able to adapt with some difficulty and maintain pre-impact status but only with a degree of support.             | Those affected will not be able to adapt to changes and continue to maintain-pre impact status.                          |
| <b>Physical Sensitivity Criteria</b> |                                                                                     |                                                                                                                  |                                                                                                                          |
| Criteria                             | The resource remains unaffected and maintains pre-impact status.                    | Pre-impact status is temporarily altered. May be restored over time naturally or through specific interventions. | Pre impact status is permanently altered by the development. Receptor or resource is held in high-esteem by stakeholders |

#### 7.1.2.4 Assessing Significance

Once magnitude of impact and sensitivity of a receptor have been characterised, the significance can be determined for each impact. The impact significance rating was determined, using the matrix provided in Table 7-3.

##### Impact Minor Significance

An impact of minor significance, hereafter referred to as a 'minor impact' is one where an effect will be experienced, but the impact magnitude is sufficiently small and well within accepted standards, and/or the receptor is of low sensitivity/value. The repercussions on the environment are not significant and may or may not require the application of mitigation measures.

##### Moderate Significance

An impact of moderate significance hereafter referred to as a 'moderate impact', will be within accepted limits and standards. Moderate impacts may cover a broad range, from a threshold below which the impact is minor, up to a level that might be just short of breaching an established (legal) limit. The repercussions on the environment are substantial but can be reduced through specific measures.

Table 7-3: Impact Significance

|                     |            | Sensitivity / Vulnerability of Resource / Receptor |            |            |
|---------------------|------------|----------------------------------------------------|------------|------------|
|                     |            | Low                                                | Medium     | High       |
| Magnitude of Impact | Negligible | Negligible                                         | Negligible | Negligible |
|                     | Small      | Negligible                                         | Minor      | Moderate   |
|                     | Medium     | Minor                                              | Moderate   | Major      |
|                     | Large      | Moderate                                           | Major      | Major      |

### Major Significance

An impact of major significance, hereafter referred to as a 'major impact' is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. The repercussions on the environment are very strong and cannot easily be reduced.

#### *7.1.3 Mitigation and Control*

All significant impacts identified have been considered for mitigation and control through preventive, reductive/enhancement and curative strategies and control measures. Measures have been identified, described and recommendations incorporated into the proposed development to minimise or avoid the key impacts. Where the effectiveness of mitigation measures is uncertain, or depends on assumptions about operational procedures, monitoring programmes and/or operations/management procedures will define the required practice.

A provisional environmental management plan (PEMP) has been developed for the project and its facilities in accordance with the Environmental Assessment Regulations 1999, LI 1652. An Environmental Monitoring Plan section of the PEMP presents detailed plans to monitor the implementation of mitigating measures and the identified impacts of the project during the construction and operation phases. The plan includes an estimate of capital and operating costs

## 7.2 Potential Impacts Identification and Assessment

The ESIA serves principally to identify those impacts most likely to be significant and therefore needs to be addressed. In undertaking the ESIA, the team has drawn upon:

- its knowledge of sources of potential impacts associated with the steel manufacturing process and developments;
- an identification of the main environmental and social resources and receptors from the preliminary baseline data collection work; and
- the results of the initial scoping stakeholder engagement.

## 7.3 Environmental and Social Resources and Potential Receptors

For this Project the following main resource / receptor types: physical environment, biological environment and human/socioeconomic environment

### 7.3.1 *Physical Environment*

The proposed project will have an impact on land and soil. The Anunu River (about 3km from the project site )and its associated wetland will be the recipient of any run off water from the project site. The ambient air quality may also be affected by dust and emissions from project activities.

### 7.3.2 *Biological Environment*

Construction activities may have an impact on surface water within the project catchment. Land preparation will affect terrestrial fauna and flora within the project area.

### 7.3.3 *Human/Socioeconomic Environment*

The project site is about 44 acres. About 90 percent of the land is occupied by cocoa, oil palm, food crop farms among others. There about 4.no hamlets on the project site, however the nearest community is about 1.3km from the site and has a population of about 600 people. The project will result in impacts on the local economy, including employment and business opportunities, occupational and community health and safety.

## 7.4 Project Activities of Environmental and Social Concern

### 7.4.1 *Preparatory Phase Activities*

Preparatory phase activities of environmental concern include among others:

- Land acquisition and other resettlement related activities;
- Survey work, feasibility studies to analyse effectiveness of project designs;
- Stakeholder consultations

- Statutory permitting activities from EPA, The Municipal Assembly and Department of Factories Inspectorate etc

#### 7.4.2 Construction Phase Activities

Construction phase activities of environmental concern include among others:

- Site clearance ie Vegetation Clearance and Removal of Topsoil;
- Excavation of earth (soil), installation and erection of equipment,
- Transportation of materials and equipment;
- Commissioning and testing activities;
- Disposal of construction spoil and waste in general; and
- Decommissioning of work camps

#### 7.4.3 Operational and Maintenance Phase Activities

Operational and maintenance phase activities of environmental concern include:

- Sorting of steel scrap and loading into furnace,
- Operation of furnace and rolling mill,
- Management of slag waste from furnace,
- Cooling water and general waste from factory,
- Management of atmospheric emissions from the factory
- Storage and transport of finished products
- Maintenance of machinery and equipment
- Wastewater treatment, storage and disposal
- Solid waste generation and disposal;
- Factory management and Security
- Resource utilisation;
- Emergency response.

#### 7.4.4 Decommissioning Phase Activities

Decommission activities to potentially impact on the environment include operational and post operational phase activities including:

- dismantling of infrastructure; and
- replacement of dysfunctional equipment and installations.

### 7.5 Evaluation of Potential Positive Impacts from the Project

The potential positive impacts from the project include:

- Employment opportunities and improved local economy;
- Availability of steel and iron rods
- Improved institutional & national revenue.

### *7.5.1 Employment Opportunities and Improved Local Economy*

Workers will be employed for the various aspects of feasibility and construction activities. During the project implementation phase about 950 workers ie, skilled ,unskilled and semi-skilled will be employed. The project implementation will provide direct and indirect job opportunities over its useful life to both skilled and unskilled persons nationwide. For example, small scrap collectors will earn an income while also cleaning up the communities. Local contractors/consultancy companies will be contracted to carry out various project activities and these will create job opportunities for the local firms. The project is under the 1D1F policy initiative and will create massive employment particularly for the youth in rural towns and thereby improve levels and standard of living, as well as reduce rural-urban migration

### *7.5.2 Availability of Steel and iron rods rods at competitive prices for national infrastructural development*

The proposed project is expected to increase iron rod production to about 300,000MT/year. Currently, there is a significant and steady increase in the importation of iron rods and steel coils into the country, which is adversely affecting the local Steel Industry. An increase in production will reduce importation, increase production and product availability on the market.

### *7.5.3 Improved Institutional & National Revenue*

Revenue will accrue to the State in the form of tax deductions from wages of workers and Contractor fees. Government agencies e.g. EPA will charge processing and permit fees, which will increase the revenue base of these institutions.

In the medium to longer term, government will earn tax revenue both directly from the project and indirectly from the expanded industrial and commercial activities. Resources, which were hitherto used to import iron rods to supplement low production, could be channelled into other areas of the economy.

## **7.6 Evaluation of Adverse Impacts from the Proposed Project**

The adverse environmental and social issues which could possibly arise from the implementation of the proposed project are described in Table 7-4 with respect to the planning/preparatory phase activities, constructional phase activities, operational phase and decommissioning phases.

Table 7-4: Potential Impact Identification

| No.                                   | Potential Impact                             | Project activities                                              | Key Receptor(s)                       | Evaluation of Impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Magnitude | Sensitivity | Rating   |
|---------------------------------------|----------------------------------------------|-----------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------|----------|
| <b>Preparatory and Planning Phase</b> |                                              |                                                                 |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |             |          |
| 1.                                    | Land Acquisition                             | Feasibility studies , stakeholder consultations                 | Land owners/users                     | <ul style="list-style-type: none"> <li>The construction of the proposed steel factory will require land to be properly acquired and documented.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Medium    | Medium      | Moderate |
| 2.                                    | Anxiety on the part project affected persons | Survey works and feasibility studies, stakeholder consultations | Land owners/ users, Konongo – Odumase | <ul style="list-style-type: none"> <li>Inadequate dissemination of information with regards to the scope, schedule and impact of the proposed project, as well as measures in place to safeguard the interests of nearby communities and potentially affected institutions could result in strong resistance to the implementation of the project. This could be expressed in terms of obstruction of workers from carrying out their respective services, vandalism of equipment, public demonstration and violent behaviour.</li> <li>Bad publicity on the project can be detrimental to its success as it would slow down necessary permit acquisition process and hamper access to funding from international lending agencies</li> <li>Failure to reach an amicable agreement with the project affected</li> </ul> | Large     | Medium      | Moderate |

| No.                       | Potential Impact             | Project activities                                                                                                              | Key Receptor(s)      | Evaluation of Impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Magnitude | Sensitivity | Rating   |
|---------------------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------|----------|
|                           |                              |                                                                                                                                 |                      | persons could hinder project implementation                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |             |          |
| 3.                        | Occupational Health & Safety | Survey works and feasibility studies                                                                                            | Technical teams      | <ul style="list-style-type: none"> <li>Technical teams carrying out topographical survey works, geotechnical survey, and environmental baseline studies may be exposed to injury and bites from insects and dangerous reptiles such as snakes, scorpions, bees, ants, etc.</li> <li>This effect can be prevented or minimised through the use of appropriate personal and protective equipment such as safety boots and gloves.</li> <li>The impact is temporary lasting for the survey period.</li> </ul> | Small     | Medium      | Minor    |
| <b>Construction Phase</b> |                              |                                                                                                                                 |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |             |          |
| 1.                        | Air quality deterioration    | Site clearance, excavation of earth/topsoil, installation and erection of equipment<br><br>Commissioning and testing activities | construction workers | <ul style="list-style-type: none"> <li>Loose and exposed soils from construction activities such as excavation works and movement of vehicles on untarred roads may result in deterioration of ambient air quality through increase of airborne particles</li> <li>Exhaust emissions and greenhouse gas emissions from engines, machinery, vehicles and generators will also impact on the air quality</li> </ul>                                                                                          | Medium    | Medium      | Moderate |

| No. | Potential Impact             | Project activities                                                                                                               | Key Receptor(s)                    | Evaluation of Impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Magnitude | Sensitivity | Rating   |
|-----|------------------------------|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------|----------|
|     |                              |                                                                                                                                  |                                    | <ul style="list-style-type: none"> <li>Welding is also expected to contribute some minor emissions</li> <li>There was no activity on site at the time of monitoring. All ambient air quality levels were below the Ghana standard (GS 1236:2019) levels,</li> <li>The impact is temporary lasting during the constructional phase.</li> <li>The application of standard dust suppression measures will assist to ensure that these issues are minimised.</li> </ul>                                                                                                                                                  |           |             |          |
| 2.  | Vibration and noise nuisance | Site clearance , excavation of earth/topsoil, installation and erection of equipment , Transportation of materials and equipment | Neighbouring communities , workers | <ul style="list-style-type: none"> <li>Potential sources of noise will be through the movement and operation of machines, trucks and equipment. The operation of heavy construction equipment may also result in minor vibration at the immediate project area.</li> <li>Typical noise level from construction activities range from 80dBA to 112dBA within the operational areas and is expected to significantly reduce by up to about 30dBA at a distance of about 50m from the site.</li> <li>Noise quality assessment showed noise levels were below the acceptable standard limits (GS 1222: 2018 )</li> </ul> | Medium    | Medium      | Moderate |

| No. | Potential Impact                                  | Project activities                                                                                | Key Receptor(s) | Evaluation of Impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Magnitude | Sensitivity | Rating   |
|-----|---------------------------------------------------|---------------------------------------------------------------------------------------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------|----------|
|     |                                                   |                                                                                                   |                 | <ul style="list-style-type: none"> <li>The impact is temporary lasting during the constructional phase. The application of standard noise control measures will assist to ensure that these issues are reduced.</li> </ul>                                                                                                                                                                                                                                                                                                                                       |           |             |          |
| 3.  | Loss of vegetation and impacts on flora and fauna | Site clearance                                                                                    | Flora and fauna | <ul style="list-style-type: none"> <li>The removal of the topsoil for the construction of the proposed facilities will result in the loss of flora and their associated fauna.</li> <li>The ESIA baseline survey showed that about 90% of the plants on the site are of no conservation concern since they are very common in Ghana. However a few species of national and global conservation concern occur on the site and should be preserved even though these are not specific to the project site and are also found at neighbouring locations.</li> </ul> | Small     | Medium      | Moderate |
| 4.  | Sanitation issues                                 | Site clearance , excavation of earth/topsoil, installation and erection of equipment, Disposal of | Soil            | <ul style="list-style-type: none"> <li>Sanitation and health problems are anticipated from poorly managed construction site camps.</li> <li>Other wastes to be generated include metal scrap, construction waste and domestic waste ie plastic waste .</li> </ul>                                                                                                                                                                                                                                                                                                | Medium    | High        | Moderate |

| No. | Potential Impact              | Project activities                                                                                                | Key Receptor(s)                           | Evaluation of Impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Magnitude | Sensitivity | Rating |
|-----|-------------------------------|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------|--------|
|     |                               | construction waste                                                                                                |                                           | <ul style="list-style-type: none"> <li>The impact is temporary lasting during the constructional phase and are manageable</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |             |        |
| 5.  | Occupational health & safety  | All construction phase activities                                                                                 | Construction workers,                     | <ul style="list-style-type: none"> <li>Risks to safety and health of workers during construction will arise from installation of machinery/ equipment, transportation of construction materials, inhalation of dust and fumes, accidents from falling objects.</li> <li>Accidents and hazards from construction work include slips, falls, collision, burns, ingestion of poisonous materials and accidental fires .</li> <li>Electrocution from welding may also occur.</li> <li>Poor management of waste could also significantly affect safety in the workplace.</li> </ul> | Medium    | Medium      | Major  |
| 6.  | Public health & safety issues | Excavation of topsoil, site clearance , Transportation of materials and equipment, disposal of construction spoil | workers, communities along haulage routes | <u>Traffic Impacts</u> <ul style="list-style-type: none"> <li>The location of the site is off the Konongo –Kumasi Highway and that section of the road is known to be accident prone</li> <li>The transportation of construction materials and the movement of heavy equipment to the project site</li> </ul>                                                                                                                                                                                                                                                                  | Large     | High        | Major  |

| No. | Potential Impact | Project activities | Key Receptor(s) | Evaluation of Impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Magnitude | Sensitivity | Rating |
|-----|------------------|--------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------|--------|
|     |                  |                    |                 | <p>may pose risk of accidents along the affected routes.</p> <p><u>Spread of HIV/AIDS and other Sexually Transmitted Diseases (STDs)</u></p> <ul style="list-style-type: none"> <li>• Migration, short term or long term, increases the probability to have sexual relationship with multiple partners, thus becoming a critical factor in the propagation of HIV/AIDS and other STDs. The more affluent migration workers are susceptible to irresponsible sexual behavior and thus encourage prostitution in these communities. They could also have a negative influence on especially the youth and lead to the spread of HIV/AIDS and increase in teenage and unwanted pregnancies.</li> </ul> <p><u>Labour</u></p> <p>The project construction activities will require different artisanal workers therefore labour influx from distant communities' will be required. The conduct of workers on site will be guided by the model code of ethics provided by the contractors. The contractor will also abide by the national labour laws.</p> |           |             |        |

| No. | Potential Impact                                         | Project activities                                                  | Key Receptor(s) | Evaluation of Impact                                                                                                                                                                                                                                                                                                                                                                                                                                    | Magnitude | Sensitivity | Rating   |
|-----|----------------------------------------------------------|---------------------------------------------------------------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------|----------|
|     |                                                          |                                                                     |                 | <u>Public health issues</u> <ul style="list-style-type: none"> <li>Contamination of surface water through open defecation may be promoted if adequate toilet facilities are not provided during construction.</li> <li>Unsecured excavations may compromise public safety.</li> <li>This impact on public health is long term and severe but probability of occurrence depends on the number of workers expected for the construction stage.</li> </ul> |           |             |          |
| 7.  | Loss of livelihood and access to land                    | Site Clearance                                                      | Farmers         | <ul style="list-style-type: none"> <li>Farmers occupying the land will lose their sources of livelihood and will have to be adequately compensated to find alternative farm lands</li> <li>Occupants of the 3.no hamlets on site will also have to be relocated</li> <li>The impact is significant and long lasting</li> </ul>                                                                                                                          | Small     | High        | Major    |
| 8.  | Surface water contamination/ impact on aquatic organisms | Site Clearance, excavation of earth, disposal of construction waste | Anunu River     | <ul style="list-style-type: none"> <li>Site preparation, comprising removal of the topsoil could facilitate erosion and sediment transport into nearby water bodies.</li> <li>The Anunu River about 3km from the site and is used for domestic</li> </ul>                                                                                                                                                                                               | Large     | Medium      | Moderate |

| No.                             | Potential Impact             | Project activities                                                                                                           | Key Receptor(s)      | Evaluation of Impact                                                                                                                                                                                                                                                                                                                                                                                                                                       | Magnitude | Sensitivity | Rating   |
|---------------------------------|------------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------|----------|
|                                 |                              |                                                                                                                              |                      | <p>purposes by Ohene Nkwanta the closest village to the site.</p> <ul style="list-style-type: none"> <li>Aquatic ecological studies showed that none of the species observed in the study area are considered rare or of conservation concern, and would face no threats from the project.</li> </ul>                                                                                                                                                      |           |             |          |
| 9.                              | Impacts on cultural heritage | Site Clearance ,<br>Excavation of topsoil                                                                                    | Project area         | <ul style="list-style-type: none"> <li>No culturally sensitive areas have been identified to be potentially affected by the proposed project.</li> <li>The EIA baseline studies has also established the cultural significance of the seasonal stream within the site as not significant.</li> </ul>                                                                                                                                                       | Small     | Medium      | Moderate |
| Operation and Maintenance Phase |                              |                                                                                                                              |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |             |          |
| 1.                              | Air quality deterioration    | Operation of furnace and rolling mill,<br>Maintenance of equipment and machinery ,<br>Atmospheric emissions from the factory | Air quality, workers | <p>Emissions that may cause air quality to deteriorate during operations include;</p> <ul style="list-style-type: none"> <li>Emissions from the electric induction furnace during scrap smelting;</li> <li>Emission from goods-carrying vehicles and other vehicles on site;</li> <li>Emissions from standby generators used in circulating cooling water for furnace; and</li> <li>Plant repair and maintenance activities may also emit small</li> </ul> | Medium    | Medium      | Moderate |

| No. | Potential Impact         | Project activities                                                                                                                 | Key Receptor(s) | Evaluation of Impact                                                                                                                                                                                                                                                                                                                                                                                                                    | Magnitude | Sensitivity | Rating   |
|-----|--------------------------|------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------|----------|
|     |                          |                                                                                                                                    |                 | amounts of air pollutants from welding activities<br>Vaporative water losses from cooling tower; dust and other particulate matter.                                                                                                                                                                                                                                                                                                     |           |             |          |
| 2.  | Noise and vibration      | Operation of furnace and rolling mill, Sorting of steel scrap and loading unto furnace , Storage and transport of finished product | Workers, Public | Noise impacts associated with the operation of the plant may originate from: <ul style="list-style-type: none"> <li>the furnace, factory equipment and machinery</li> <li>power generators, cars, truck and heavy duty vehicles; and</li> <li>residential/ office noise associated with air conditioners, persons, etc.</li> <li>Noise emissions and vibration from the plant's activities will be limited to the plant site</li> </ul> | Medium    | Medium      | Moderate |
| 3.  | Impact on Climate Change | Emissions from the factory                                                                                                         | General climate | <ul style="list-style-type: none"> <li>Virtually all of the greenhouse gas emissions associated with steel production are from the carbon dioxide emissions related to energy consumption.</li> <li>Per the project design greenhouse gas emissions are expected to be minimal from the proposed project.</li> </ul>                                                                                                                    | Large     | Medium      | Moderate |

| No. | Potential Impact                      | Project activities                                                                            | Key Receptor(s)  | Evaluation of Impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Magnitude | Sensitivity | Rating   |
|-----|---------------------------------------|-----------------------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------|----------|
|     |                                       |                                                                                               |                  | The carbon footprint of the project will be fully established and regularly updated                                                                                                                                                                                                                                                                                                                                                                                                     |           |             |          |
| 4.  | Waste management issues               | Management of slag waste from the furnace<br>Cooling water and general waste from the factory | Soil, water, air | <ul style="list-style-type: none"> <li>The industrial wastes that will be generated by the Plant are slag waste from the furnace and scrap waste from sorting of scrap.</li> <li>Hazardous wastes to be generated include waste equipment and facility maintenance chemicals (e.g., paints, lubricants, and cleaners), used chemical containers, etc</li> <li>Other waste to be generated from the steel factory include general office and packaging wastes and food wastes</li> </ul> | Medium    | Medium      | Moderate |
| 5.  | Occupational health and safety issues | All operation phase activities                                                                | Workers          | <p>Occupational health and safety issues associated with the proposed project operation include:</p> <ul style="list-style-type: none"> <li>Fires and explosions from the induction furnace. Possible ignition sources include sparks associated with the build-up of static electricity, lightning, open flames and deliberate ignition by a saboteur and accidental.</li> <li>Structural damage to equipment/machinery</li> </ul>                                                     | Small     | High        | Major    |

| No. | Potential Impact              | Project activities                                                | Key Receptor(s)   | Evaluation of Impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Magnitude | Sensitivity | Rating |
|-----|-------------------------------|-------------------------------------------------------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------|--------|
|     |                               |                                                                   |                   | <ul style="list-style-type: none"> <li>Hazards from contact with very high temperatures and hot surfaces</li> <li>Risk of injury from slips, falls and drowning during operation and maintenance activities.</li> <li>Confined space hazards (poor air quality, limited oxygen, excessive heat) may occur during maintenance and testing exercise for tanks, wastewater treatment facilities.</li> </ul>                                                                                             |           |             |        |
| 6.  | Traffic Impacts               | Transportation of steel scrap<br>Transport of finished products , | Public, Workers   | <ul style="list-style-type: none"> <li>Increase in traffic impacts on the road may be as a result of the following;</li> <li>Trucks transporting steel scrap to factory and carrying produce away from the factory could cause traffic accidents on the Konongo –Kumasi Highway</li> <li>Additional traffic impacts may be from vehicles conveying workers and staff from and to the factory site</li> <li>This could lead to traffic accidents and temporary inconveniences to motorists</li> </ul> | Medium    | High        | Major  |
| 7.  | Public health & safety issues | All operation phase activities                                    | Communities along | <ul style="list-style-type: none"> <li>Fire/explosion risk as a result of leakages/bursts, accidents during transfer of finished products</li> </ul>                                                                                                                                                                                                                                                                                                                                                 | Large     | High        | Major  |

| No.                          | Potential Impact                        | Project activities                                                                                                                                                                                                          | Key Receptor(s)                 | Evaluation of Impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Magnitude | Sensitivity | Rating   |
|------------------------------|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------|----------|
|                              |                                         |                                                                                                                                                                                                                             | transport route, Ohene Nkwanta, | <ul style="list-style-type: none"> <li>Emissions could have long-term effects on the public within the project catchment.</li> <li>Improperly disposed wastewater from the cooling tower may result in public health issues.</li> <li>This impact on public health is long term and severe</li> </ul>                                                                                                                                                                                                 |           |             |          |
| <b>Decommissioning Phase</b> |                                         |                                                                                                                                                                                                                             |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |             |          |
| 1.                           | Occupational/ public safety and traffic | Post – construction activities (dismantling of construction work camps); and Operational and post operational phase activities (dismantling of infrastructure and replacement of dysfunctional equipment and installations) | Workers, public                 | <ul style="list-style-type: none"> <li>The relocation of all construction facilities and remaining materials could result in accident and injury to workers.</li> <li>The replacement of dysfunctional equipment and installations places the respective workers at risk of injury and accidents.</li> <li>The transportation of such equipment and materials could also pose traffic risks and public safety concerns.</li> <li>The duration of the impact is temporary and local extent.</li> </ul> | Medium    | Medium      | Moderate |
| 2.                           | Waste disposal                          | Post – construction activities                                                                                                                                                                                              | Soil /surface water             | <ul style="list-style-type: none"> <li>The dismantling and removal of work camp facilities, equipment and materials at the site could generate</li> </ul>                                                                                                                                                                                                                                                                                                                                             | Medium    | Medium      | Moderate |

| No. | Potential Impact | Project activities                                                                                                                                                                           | Key Receptor(s) | Evaluation of Impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Magnitude | Sensitivity | Rating |
|-----|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------|--------|
|     |                  | (dismantling of construction work camps); and Operational and post operational phase activities (dismantling of infrastructure and replacement of dysfunctional equipment and installations) |                 | <p>waste such as scraps metal, wood, concrete debris and garbage (pieces of plastic bags, food wrappers, etc.).</p> <ul style="list-style-type: none"> <li>• During the operational phase of the project, equipment and facilities that become dysfunctional may need to be decommissioned and replaced with newer ones</li> <li>• Waste disposal from decommissioning will be further discussed at the ESIA stage.</li> <li>• The duration of the impact is temporary, the extent local and the severity minor.</li> </ul> |           |             |        |

## 8.0 IMPACT MITIGATION AND MANAGEMENT

The anticipated impacts from the proposed project have been evaluated in the previous chapter in line with the objectives of this environmental study. Mitigation and management measures have been proposed as part of the EIA study to ensure that the project impacts are managed within reasonable and acceptable limits.

The general rules followed in designing the mitigation measures are:

- a. Avoidance of major impacts: major impacts are generally considered unacceptable, impacts that would endure into the long-term or extend over a large area;
- b. Reduction of major and moderate impacts to as low as reasonably practicable (ALARP) by planning, designing and controlling mitigation measures. This implies that mitigation measures will be applied until the limitations of cost effectiveness and practical applications are reached. The limitations are established by best international practice; and

Implementation of good contractor practices for impacts rated as minor, in order to ensure that impacts are managed within good reason.

### 8.1 Type of Mitigation Measures

The mitigation measures adopted may be classified as preventive, control and compensatory measures.

#### 8.1.1 *Preventive Measures*

These are measures adopted during the design and pre-construction phase. The measures are aimed at avoiding or minimising potential major impacts at source. Avoiding or reducing an impact at source is essentially 'designing' the project so that a feature causing an impact is designed out or altered or avoided.

#### 8.1.2 *Control Measures*

These are measures adopted to abate or remedy the impacts occurring during construction and operation/ maintenance phases. Impacts can be abated on site or at receptor end. Repair or remedy of impacts involves unavoidable damage to a resource, e.g. sediment transport from dredging activities. In this case, the control essentially involves engineering controls and implementation of best practices to reduce sediment transport.

#### 8.1.3 *Compensatory Measures*

Where other mitigation measures are not possible or fully effective, then compensation in some measure for loss, damage or general intrusion might be appropriate. This will mainly be 'in cash'. Monetary compensations will be paid to individuals whose legal properties or legal occupancy of a place will be affected by the project.

#### 8.1.3.1 Compensation Payment Procedure

Cash compensation has been paid for loss of land, loss of standing crops and for loss of livelihood.

Compensation was paid prior to the affected persons vacating the land. Each eligible affected person signed a compensation claim form (as shown in Annex 6-4) together with the authorized project representative. The compensation claim form clarifies mutual commitments as follows:

- On the project side: commitment to pay the agreed compensation, including all its components (loss of land /livelihood etc) and
- On the affected person's side: commitment to vacate the land by the agreed date before the start of construction work.

#### 8.1.3.2 Principles

The principles that guided the implementation of the compensation arrangement are summarized below.

##### 8.1.3.2.1 Minimization of Displacement

In line with the IFC PS5, the proposed Project will minimize displacement through the following measures:

- No dwellings, settlements or households will be involuntarily relocated and no resettlement will take place, and the design will avoid any destruction of settlement. The project has been designed so that only structures within RoW of drains may be affected by project development.
- For the affected structures and crops, reinstatement and compensation packages will be proposed.
- Where applicable, the project will ensure that affected temporary structures are relocated to few distances from its original locations to ensure continuation. Structures should be returned to its original place after project completion where feasible.
- Notify potential affected persons about the proposed Project in line with Ghanaian laws.

##### 8.1.3.2.2 Cut-off Date – Eligibility

The objective of the cut-off date is to establish a deadline date for which project affected persons qualify for entitlement to compensation. Persons entering the Project Area after the Cut-Off Date are not eligible for compensation and/or resettlement assistance.

The consultant has engaged the affected persons on the resettlement/compensation processes as well as the grievance redress process and solicited their concerns

Persons who encroach on the project areas after the final valuation exercise are not entitled to or expected to receive any form of compensation unless their claims are investigated and found justified by the Grievance Redress Process.

##### 8.1.3.2.3 Community Information and Sensitization

The Project will create a platform using local meetings and the media to periodically engage the PAPs and the public on relevant project information, construction activities and likely project

impacts and the resettlement/compensation programme to ensure project success. Measures instituted to address negative project impacts will be communicated to the PAPs and the public.

#### 8.1.3.2.4 Income and Livelihood Restoration

One paramount principle of the IFC Performance Standard is that where people are affected by project implementation, the aim of compensation must be that they should be “*no worse-off if not better off*” after the compensation arrangement has taken place. Measures to ensure the continuation of business of affected persons include the following:

- Compensation for loss of income during the construction phase.
- Relocation of temporary structures used for commercial purposes to very few meters from its original location.
- Movement of such structures back to its original location where appropriate

#### 8.1.3.2.5 Asset Valuation and Compensation

Valuation of affected properties is based on the World Bank Full Replacement Cost approach. Compensation principles are as follows:

- Compensation shall be paid prior to displacement / destruction of asset;
- Compensation will be at full replacement value; and
- Concrete pavements or structures that could be reinstated by the contractor will be factored into the contractor’s cost estimates.

By contrast with the depreciated or net value of a structure, the “replacement value” includes the full cost of materials and labour required to reconstruct a structure of similar surface and standing. In other words, the affected person must be able to have their structure rebuilt in a different location using the compensation paid for the structure.

#### 8.1.3.2.6 Grievance Mechanisms

The objective or purpose of the Grievance Redress Procedure is to address and resolve grievances or complaints from affected persons promptly, fairly, and in a manner that is, to the extent possible, acceptable to all parties. The following principles will guide the process:

- meaningful information and consultation to take place before the process leading to displacement is launched in each particular location concerned; and
- a specific grievance registration and processing mechanism will be put in place.

#### 8.1.3.3 Compensation Payment

All project-affected persons have been paid by RISGL in line with the valuation report prepared for the project. The total compensation sum cost is GHS 478,930.00.

## 8.2 Summary of Significant Potential Adverse Impacts

The significant adverse impacts (rated as moderate or major) identified from the analysis and evaluation of the potential impacts from the proposed project in the preceding Chapter are summarized below.

### 8.2.1 *Planning and Preparatory Phase*

- Land Acquisition
- Anxiety on the part of potentially affected persons
- Occupational Health and Safety

### 8.2.2 *Construction Phase*

- Air Quality Deterioration
- Vibration and Noise Nuisance
- Loss of vegetation and impacts on flora and fauna
- Sanitation Issues
- Occupational Health and Safety
- Public Health and Safety issues
- Loss of livelihood and Access to land
- Surface water contamination /Impacts on aquatic organisms

### 8.2.3 *Operation Phase*

- Air Quality Deterioration
- Vibration and Noise Nuisance
- Impact on climate change
- Waste Management
- Occupational Health and Safety
- Traffic Impacts
- Public Health and Safety

### 8.2.4 *Decommissioning Phase*

- Occupational Health and Safety
- Waste Disposal

## 8.3 RECOMMENDED MITIGATION MEASURES

Table 8-1 provides a summary of the significant impacts, as per the evaluation, the impact receptors and the recommended mitigation measure for each impact. The application of the mitigation measures in general is expected to reduce major and moderate impacts to minor or negligible impacts that may not require further mitigation

Table 8-1; Proposed Mitigation Measures

| Anticipated Environmental & Social Impacts          | Receptor(S)                                                | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Residual Impact | Responsibility (implementation / supervision) | Estimated Cost (GHS) |
|-----------------------------------------------------|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------|----------------------|
| Planning and Preparatory Phase                      |                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |                                               |                      |
| Acquisition of land                                 | Potentially affected persons                               | <ul style="list-style-type: none"> <li>Ensure all stakeholders are engaged in the early stage of the project.</li> <li>All necessary documentation needed for acquiring the land must be approved.</li> <li>Disclose publicly all relevant information on the project.</li> <li>Prepare and implement an Abbreviated Resettlement Action Plan with an effective grievance redress mechanism in place</li> </ul>                                                                                                                                                                                                                                                                                                    | Negligible      | RISGL                                         | -                    |
| Anxiety on the part of potentially affected persons | Potentially affected persons including farmers on the land | <ul style="list-style-type: none"> <li>Stakeholder interactions to educate all on proposed project activities, impacts and proposed mitigation measures.</li> <li>Develop and implement grievance mechanism as a part of a wider Stakeholder Engagement Plan enabling concerns to be documented and resolved in a timely fashion.</li> <li>The Odumase Traditional Council will be consulted prior to the commencement of work to ensure that all the necessary customary rites are performed and a mechanism found/agreed with the stool to ensure peaceful coexistence.</li> <li>Prepare and implement an Abbreviated Resettlement Action Plan with an effective grievance redress mechanism in place</li> </ul> | Negligible      | RISGL                                         | -                    |
| Occupational health and safety                      | RISGL staff and Consultants                                | <ul style="list-style-type: none"> <li>The various third party agents to be engaged will be required to comply with RISGL Occupational Health and Safety Policy.</li> <li>All agents on site will be required to provide first Aid Kits to treat minor ailments and cuts. However, major cases will be</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                  | Negligible      | RISGL                                         | -                    |

| Anticipated Environmental & Social Impacts | Receptor(S)                               | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Residual Impact | Responsibility (implementation / supervision) | Estimated Cost (GHS) |
|--------------------------------------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------|----------------------|
|                                            |                                           | <p>referred to the Konongo –Odumase Government hospital for treatment or referral to the Komfo Anokye Teaching hospital.</p> <ul style="list-style-type: none"> <li>• Provision and use of appropriate personal protective equipment such as safety boots and coats, hand gloves, earplugs and nose masks when carrying out work on site. Supervisors will be mandated to ensure the use of these protective devices and implement sanctions when necessary.</li> <li>• Ensure that well-trained workers will be engaged for the various construction roles.</li> </ul>                                                                                                                                                                                                                                                                                              |                 |                                               |                      |
| <i>Construction Phase Impacts</i>          |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |                                               |                      |
| Air Quality Deterioration                  | Workers/ Local communities and road users | <ul style="list-style-type: none"> <li>• Ensure that equipment's such as generators, machines and vehicles with atmospheric emissions do not exceed emission standards imposed by industry and the EPA.</li> <li>• Regular air quality monitoring for dust emissions, exhaust gases and fumes at onsite and offsite locations will be conducted to assess atmospheric pollution performance of the construction activities.</li> <li>• The Project will implement a dust emissions control program including measures such as wet sweeping and covering to minimize atmospheric dust from constructional activities.</li> <li>• All excavation activities would be closely supervised to ensure minimal disturbance to surrounding land users and dust.</li> <li>• Ensure that all construction personnel use approved PPE during construction activities</li> </ul> | Minor           | HSE Supervisor / Contractor                   |                      |

| Anticipated Environmental & Social Impacts        | Receptor(S)                               | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Residual Impact | Responsibility (implementation / supervision) | Estimated Cost (GHS)                                  |
|---------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------|-------------------------------------------------------|
| Vibration and noise nuisance                      | Workers/ Local communities and road users | <ul style="list-style-type: none"> <li>The contractor to employ standard noise abatement measures and engineering best practices to ensure that the impacts are minimized to acceptable limits.</li> <li>The contractor to ensure that earthworks and other construction activities will be phased out or controlled to reduce noise generation during construction.</li> <li>All equipment to be operated and maintained in accordance with appropriate industry and equipment standards including specifications for noise levels and manufacturer's specifications (including regular checks and maintenance).</li> <li>Machines in intermittent use to be shut down in the intervening periods between works or throttled down to a minimum.</li> </ul> | Minor           | Contractor                                    | To be incorporated in Contractor's bill of quantities |
| Loss of vegetation and impacts on flora and fauna | Terrestrial Flora, Fauna                  | <ul style="list-style-type: none"> <li>The Terrestrial ecological studies for the ESIA assessment showed that there are some species of conservation concern within the project area. Seedlings of these plants could be raised and distributed to farmers in the projects area of influence to plant. Timber species of merchantable size should be removed in accordance with national regulations</li> <li>Limit construction activities to only designated places and clearly mark out all vegetation, which will not be cleared, so that they are clearly visible as "no-go areas" to construction staff and vehicles.</li> <li>Dismantle and remove all equipment and machinery after construction from site.</li> </ul>                              | Negligible      | Contractor                                    | Included in contractors Bill of Quantities            |

| Anticipated Environmental & Social Impacts | Receptor(S)      | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Residual Impact | Responsibility (implementation / supervision) | Estimated Cost (GHS)                       |
|--------------------------------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------|--------------------------------------------|
|                                            |                  | <ul style="list-style-type: none"> <li>Rehabilitate trenches and disturbed areas as soon as possible.</li> <li>Construction zones to be created so as to minimize the work footprint. Zones will be demarcated and construction crews will restrict works to demarcated roads. A construction-phase site drainage plan will be established to include measures to reduce runoff across the site and to minimize erosion.</li> <li>A monitoring program shall be established to include a site evaluation of over land run-off and sedimentation in water courses as well as effectiveness of erosion control measures (i.e. netting and sand bags) will decrease the magnitude of the potential for increased soil erosion</li> <li></li> </ul>   |                 |                                               |                                            |
| Sanitation/Waste Generation concerns       | Public , Workers | <u>General Waste</u> <ul style="list-style-type: none"> <li>The contractor to appoint an HSE coordinator. The coordinator shall prepare and implement a Waste Management Plan which specifies procedures and, incorporates the existing waste management plan for the project This is to facilitate tracking of loads, and protocols for the maintenance of records of the quantities of wastes generated, recycled and disposed.</li> <li>Waste remaining after implementation of the waste hierarchy measures will be collected by private waste management companies for onward disposal.</li> <li>The contractor should provide adequate waste bins at the temporary work camps to minimise littering and indiscriminate dumping .</li> </ul> | Negligible      | Contractor                                    | Included in contractors Bill of Quantities |

| Anticipated Environmental & Social Impacts                | Receptor(S) | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Residual Impact | Responsibility (implementation / supervision) | Estimated Cost (GHS)                       |
|-----------------------------------------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------|--------------------------------------------|
|                                                           |             | <ul style="list-style-type: none"> <li>Good site practices to be implemented to avoid waste generation and promote waste minimisation.</li> </ul> <u>Construction Waste</u> <ul style="list-style-type: none"> <li>All scraps or other solid wastes to be disposed of at the approved disposal site of the AACMA.</li> <li>Excavated soils/concrete to be reused as much as possible for backfilling trenches dug during construction.</li> <li>Excavated material to be used on site to the extent practical.</li> </ul> <u>Hazardous Waste</u> <ul style="list-style-type: none"> <li>All hazardous waste (e.g. oily waste) generated during construction/installation will be appropriately stored as per manufacturer's instructions. For onward recycling, treatment or disposal, EPA approved hazardous waste collectors will be engaged for collection and disposal of all hazardous waste</li> </ul> |                 |                                               |                                            |
| Occupational Health and Safety Concerns and Labour Issues | Workers     | <ul style="list-style-type: none"> <li>Conduct activities in the factory in accordance with relevant national and international laws and regulations on occupational health and safety. This includes Labour Act, 2003 (Act 651), the Factory, Offices and Shops Act, 1970 (Act 328), the Fire Service Act, 1997 (Act 537), Building Regulations, 2003 (LI 1724) and , 155 and 16</li> <li>In accordance with ILO Convention 138) persons under 15 years old will not be employed. Employment of a young person must be suitable for his or her physical, emotional and developmental capacity.</li> <li>Workers should be free from discrimination of any kind (gender, race, ethnicity, religion etc) in employment or working conditions working conditions, and social benefits.</li> </ul>                                                                                                              | Minor           | Contractor/Supervising Engineer               | Included in contractors Bill of Quantities |

| Anticipated<br>Environmental<br>Social Impacts | & Receptor(S) | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Residual<br>Impact | Responsibility<br>(implementation<br>/ supervision) | Estimated Cost<br>(GHS) |
|------------------------------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------|-------------------------|
|                                                |               | <ul style="list-style-type: none"> <li>All work will be carried out under conditions with appropriate work safety standards</li> </ul> <p><u>Adoption of Health and Safety Policies</u></p> <ul style="list-style-type: none"> <li>The contractor to establish and maintain high standards of occupational health, safety and environmental protection in line with RISGLs policy, to prevent personal injury or illness, property damage, fires, security losses and environmental pollution.</li> <li>The contractor required to prepare and implement health, safety and environmental protection at the workplace to guide the construction activities in compliance with the policy of RISGL. The responsibility for implementing this policy lies directly and personally with the contractor through its workers. The policy objectives shall include the following: <ul style="list-style-type: none"> <li>Conduct activities in accordance with relevant national and international laws and regulations on occupational health and safety. This includes Labour Act, 2003 (Act 651), the Factory, Offices and Shops Act, 1970 (Act 328), the Fire Service Act, 1997 (Act 537), Building Regulations, 2003 (LI 1724), MARPOL Convention 73/78, ILO Convention 152, 155 and 160; <ul style="list-style-type: none"> <li>establish regulatory and organizational framework for the efficient and effective management of occupational health, safety and environment issues;</li> <li>maintain safe plant, machinery and equipment;</li> <li>maintain safe and healthy work place for all users</li> <li>maintain incident and injury-free working environments;</li> </ul> </li> </ul> </li> </ul> |                    |                                                     |                         |

| Anticipated Environmental & Social Impacts | Receptor(S) | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Residual Impact | Responsibility (implementation / supervision) | Estimated Cost (GHS) |
|--------------------------------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------|----------------------|
|                                            |             | <ul style="list-style-type: none"> <li>o prevent occupational related diseases/ illness among workers; and</li> <li>o promote and maintain a clean, healthy and hygienic environment.</li> </ul> <p><u>The Contractors OHSP</u></p> <ul style="list-style-type: none"> <li>• The contractor required to develop an Occupational Health and Safety Plan to international standards, including requirements for PPE, task risk assessment, mandatory training, audit and monitoring, incident reporting etc.</li> <li>• The Contractor to apply the hazard hierarchy when planning work to avoid/eliminate risks and reduce risk to as low as reasonably practical.</li> <li>• The contractors to educate workers on its health and safety policy. The adoption of the health and safety policy at site will serve as a precautionary measure to prevent/ minimize the possibility of accidents and reduce health associated risks.</li> <li>• The contractors to train selected workers as first aid givers and provide adequate first aid kits at the construction areas to treat minor ailments and cuts. However, major cases will be referred to the Konongo-Odumase Government Hospital for treatment or referral to the Komfo Anokye Teaching Hospital.</li> </ul> <p><u>Use of Experienced Personnel</u></p> <ul style="list-style-type: none"> <li>• The contractors to ensure that well-trained workers will be engaged for the various construction roles. Only drivers with the requisite licenses will be allowed to handle vehicles and earth-moving equipment into the site Initial training and testing in</li> </ul> |                 |                                               |                      |

| Anticipated<br>Environmental<br>Social Impacts | &<br>Receptor(S) | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Residual<br>Impact | Responsibility<br>(implementation<br>/ supervision) | Estimated Cost<br>(GHS) |
|------------------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------|-------------------------|
|                                                |                  | <p>machine/ equipment handling and safe working procedures will be given to all new drivers, operators and other field workers to help minimize the occurrence of accidents on site.</p> <ul style="list-style-type: none"> <li>The contractors to ensure that regular defensive driving training sessions are organized for the drivers to ensure their safety and the safety of the general public.</li> </ul> <p>Provision of Personal Protective Equipment (PPE)</p> <ul style="list-style-type: none"> <li>The contractor to ensure that workers are provided with the appropriate personal protective equipment such as safety boots and coats, hand gloves, earplugs and nose masks. Supervisors will be mandated to ensure the use of these protective devices and implement sanctions when necessary.</li> </ul> <p><u>Phasing out of Material Movements/ Scheduling Material Movements</u></p> <p>Movement of tanks, pipes and other construction materials to site or storage areas to be carried out in phases and properly regulated to control the number of cargo vehicles coming into the project site at any given time to reduce the risk of accidents.</p> <p><u>Use of Equipment</u></p> <p>All equipment's to be used will be in good condition and scheduled regular maintenance will be ensured to reduce/minimize of accidents.</p> <p><u>Worker Rights and Wellbeing</u></p> <p>The Contractor to develop and implement a Human Resource Policy and plan that adheres to the requirements of IFC PS2, including requirements for workers to have contracts, Workers Grievance</p> |                    |                                                     |                         |

| Anticipated Environmental & Social Impacts | Receptor(S)                                     | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Residual Impact | Responsibility (implementation / supervision) | Estimated Cost (GHS)                   |
|--------------------------------------------|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------|----------------------------------------|
|                                            |                                                 | Mechanism and develop retrenchment plans if there is a requirement for collective dismissals.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 |                                               |                                        |
| Public Health Safety and Security Impacts  | RISGL vehicles, commercial and private vehicles | <p><u>Restriction of Access</u></p> <p>(f) RISGL will maintain security at the proposed site to ensure that only authorised persons are allowed into the construction area.</p> <p>(g) The security personnel will be trained to respect the human rights of the local people</p> <p>(h) IFC PS4 will be used as the standard in relation to hiring, training and monitoring of security personnel.</p> <p><u>Public Health /Toilet facilities</u></p> <ul style="list-style-type: none"> <li>The contractor to provide mobile toilet facilities for workers during construction.</li> </ul> <p><u>Use of warning signs</u></p> <ul style="list-style-type: none"> <li>Uncovered trenches or deep excavations will be protected using indicator linings or illustrative warning notices or wire mesh (whichever best suits the situation) to prevent fall hazards. All trenches and excavation will be covered as soon as possible.</li> <li>As much as possible the contractor will adopt progressive opening of trenches to reduce risks to as low as reasonably practicable</li> </ul> | Minor           | Contractor /HSE Supervisor                    | To be incorporated into Contractor BOQ |

| Anticipated<br>Environmental<br>Social Impacts | &<br>Receptor(S) | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Residual<br>Impact | Responsibility<br>(implementation<br>/ supervision) | Estimated Cost<br>(GHS) |
|------------------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------|-------------------------|
|                                                |                  | <ul style="list-style-type: none"> <li>Caution/warning signs should be placed at vantage points around the project site</li> </ul> <p><u>Scheduling of Work</u><br/>The contractor will analyse traffic flows and ensure that the transport of equipment is carried out during low peak periods.</p> <p><u>Announcement and Notification of Work</u><br/>The AACMA will be informed at least seven days before start of work. RISFL will make announcements and give notices for work schedule through local FM stations as well as , Assemblymen and Unit Committee leaders.</p> <p><u>Transport of Equipment and Materials</u><br/>A Traffic Management Plan to be prepared by the contractor for the movement of materials.<br/>Flagmen will be employed to man all major intersections to assist with passage of trucks conveying materials and equipment, on the route to the construction site and storage area.<br/>All the vehicles to be used for the project and especially in transporting equipment and materials will be serviced regularly and all the drivers to be engaged/ assigned would be required to hold the requisite driver's license as prescribed by the Drivers and Vehicles Licensing Authority (DVLA), and would be educated on public safety issues. Adequate traffic management measures will be instituted to caution the public and to create safety awareness. Some adequate measures and conditions to be instituted by the contractor in the transport of materials include the following:</p> |                    |                                                     |                         |

| Anticipated Environmental & Social Impacts | Receptor(S)                                     | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Residual Impact | Responsibility (implementation / supervision) | Estimated Cost (GHS) |
|--------------------------------------------|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------|----------------------|
|                                            |                                                 | <ul style="list-style-type: none"> <li>All temporary traffic controls will be done in consultation with the Department of Urban Roads (DUR) and MTTD;</li> <li>Haulage of materials will be limited to off-peak hours;</li> <li>All trucks conveying materials will carry appropriate warning signals such as red flag and rotating amber lights;</li> <li>Road worthy dump trucks will be used;</li> <li>Very experienced drivers will be engaged;</li> <li>Traffic wardens will monitor dump truck movements and ensure public and traffic safety; and</li> <li>Speed limits of between 20-30 km/hour will be allowed along the route to the fishing harbour area for all trucks.</li> <li>Carry out regular inspections of haulage roads. In the event of truck failure along haulage routes, such trucks will be towed within 24 hours.</li> </ul> |                 |                                               |                      |
| Traffic Impacts                            | RISGL vehicles, commercial and private vehicles | <ul style="list-style-type: none"> <li>Rider Steel will prepare and implement a Traffic Management Plan (TMP), including a Journey Management Plan (JMP) for trips to and from site</li> <li>All drivers (employed by Rider Steel or by contractors) will be required to undergo driver training that includes instruction on speed limits and the hazards associated with the routes they will be travelling.</li> <li>Transport of materials will as much as possible be carried out during off-peak traffic hours to minimise the impact on traffic on the N6 Highway.</li> <li>Illustrative warning signage and indicators will be provided in and around the facility.</li> </ul>                                                                                                                                                                 | Minor           | Contractor /HSE Supervisor                    | -                    |

| Anticipated Environmental & Social Impacts | Receptor(S)     | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Residual Impact | Responsibility (implementation / supervision) | Estimated Cost (GHS)                     |
|--------------------------------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------|------------------------------------------|
|                                            |                 | <ul style="list-style-type: none"> <li>Consider road engineering measures such as bumps to slow vehicles down about 50 metres to the turning that goes into the project site</li> <li>Warning signs will be provided on the highway when approaching the project site</li> </ul> <p>In conjunction with the Ghana Highway Authority ensure that the visibility splay distance (distance which allows drivers who are entering main roads from minor roads to see oncoming vehicles and vice versa) when constructing the road to the project site is adequate. This will enable emerging drivers from the project site as well as those on the highway have sufficient visibility in each direction to see oncoming vehicles in sufficient time to prevent road accidents.</p> |                 |                                               |                                          |
| Loss of livelihood and access to land      | PAPs            | <ul style="list-style-type: none"> <li>Ensure that compensation/ livelihood assistance arrangements are implemented and documented prior to the start of the project as required</li> <li>Appropriate compensation value for affected person will be paid.</li> <li>Monitoring will be undertaken to determine potential compensation/livelihood assistance measures required and verify that they have been effective</li> </ul>                                                                                                                                                                                                                                                                                                                                              | Negligible      | RISGL Project Manager                         |                                          |
| Operations/Maintenance Phase               |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 |                                               |                                          |
| Air Quality Deterioration                  | Workers, Public | <ul style="list-style-type: none"> <li>Make use of equipment's, generators, machines and vehicles with atmospheric emissions meeting standards imposed by industry and the EPA.</li> <li>Ensure that all equipment and engines are maintained and operated as original designed.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Minor           | HSE Supervisor                                | Incorporated in RISGL operational budget |

| Anticipated Environmental & Social Impacts | Receptor(S)                           | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Residual Impact | Responsibility (implementation / supervision) | Estimated Cost (GHS)                         |
|--------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------|----------------------------------------------|
|                                            |                                       | <ul style="list-style-type: none"> <li>Prohibit the use of poorly maintained equipment for operations .</li> <li>Ensure that all equipment is properly operated according to standard operating procedure that will ensure safe operation of equipment/vehicle/generator while meeting environmental emission best practices.</li> <li>Monitor dust emissions, exhaust gases and fumes at onsite and offsite locations (preferable same sample sites monitored during the ESIA) to assess atmospheric pollution performance of operational activities</li> <li>The flue gas dedusting and air cleaning system will be used to reduce emissions. <ul style="list-style-type: none"> <li>Ensure that workers and persons on site always use the approved PPE to minimize effect of inhalation of dust and noxious fumes on worker health.</li> </ul> </li> </ul> |                 |                                               |                                              |
| Noise and Vibration Nuisance               | Workers ,<br>Neighbouring communities | <ul style="list-style-type: none"> <li>Noise and vibration impacts associated with the operation of the plant to be adequately managed will be from: <ul style="list-style-type: none"> <li>the melting furnace;</li> <li>rolling mill and hammering processes;</li> <li>cooling tower facility;</li> <li>generators, cars, truck and heavy duty vehicles; and</li> <li>domestic noise associated with air conditioners, persons, etc.</li> </ul> </li> <li>Develop work guidelines for truck operators that specify noise emission limits and provide guidance for minimizing noise from activities. This will include requirements for equipment maintenance and operation and operational controls such as specification of limits to engine idling.</li> </ul>                                                                                             | Minor           | HSE Supervisor                                | Incorporated in the RISGL operational budget |

| Anticipated Environmental & Social Impacts                | Receptor(S) | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Residual Impact | Responsibility (implementation / supervision) | Estimated Cost (GHS)                         |
|-----------------------------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------|----------------------------------------------|
|                                                           |             | <ul style="list-style-type: none"> <li>Carry out regular monitoring of noise levels at the established sampling sites. Should noise exceed the specified noise criteria, corrective measures will be taken including operational controls and use of sound baffling devices or techniques.</li> <li>Monitor public complaints about noise and take corrective measures where required. <ul style="list-style-type: none"> <li>Provide appropriate PPEs for workers use.</li> </ul> </li> </ul>                                                                                                                                                                                                                                        |                 |                                               |                                              |
| Impact on Climate Change                                  | Public      | <ul style="list-style-type: none"> <li>Explore breakthrough technologies for low-carbon steel technologies production</li> <li>Ensure efficient use of resources, re-use and recycling for sustainable development</li> <li>The flue gas deducting and air cleaning system will be used to reduce air emissions</li> <li>Educate the drivers and contractors on road transport effects contributing to GHG emissions for sustainable development.</li> <li>Reduce Carbon footprint by <ul style="list-style-type: none"> <li>Monitoring Energy use</li> <li>Regular review of logistics eg bulk delivery of supply</li> </ul> </li> </ul> <p>Consider renewable energy sources (solar) to supplement regular supply from the ECG.</p> | Moderate        | HSE Supervisor                                | Incorporated in the LNG operational budget   |
| Occupational Health and Safety Concerns and Labour Issues | Workers     | <ul style="list-style-type: none"> <li>Conduct activities in the factory in accordance with relevant national and international laws and regulations on occupational health and safety. This includes Labour Act, 2003 (Act 651), the Factory, Offices and Shops Act, 1970 (Act 328), the Fire Service Act, 1997 (Act 537), Building Regulations, 2003 (LI 1724) and , 155 and 16</li> <li>In accordance with ILO Convention 138) persons under 15 years old will not be employed. Employment of a</li> </ul>                                                                                                                                                                                                                         | Minor           | HSE Manager                                   | Incorporated in the RISGL operational budget |

| Anticipated<br>Environmental<br>Social Impacts | & Receptor(S) | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Residual<br>Impact | Responsibility<br>(implementation<br>/ supervision) | Estimated Cost<br>(GHS) |
|------------------------------------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------|-------------------------|
|                                                |               | <p>young person must be suitable for his or her physical, emotional and developmental capacity.</p> <ul style="list-style-type: none"> <li>Workers should be free from discrimination of any kind (gender, race, ethnicity, religion etc) in employment or working conditions working conditions, and social benefits.</li> <li>All work will be carried out under conditions with appropriate work safety standards to protect him or her from exposure to potential hazards</li> <li>Train workers on all procedures on materials handling, chemical hazards, fire and explosions, confined spaces and on site-traffic hazards.</li> <li>Ensure regular medical checks for all staff and workers</li> <li>All workers must be well informed of the grievance redress procedures</li> <li>Train workers on all procedures on materials handling, chemical hazards, fire and explosions, confined spaces and on site-traffic hazards.</li> </ul> <p><u>Preventive Measures</u></p> <ul style="list-style-type: none"> <li>Prepare comprehensive maintenance programme on commencement of operations to put in place measures to avert any serious breakdowns or failures. The required maintenance for the systems will include among others: <ul style="list-style-type: none"> <li>Environmental incident/accident investigation;</li> <li>Routine equipment maintenance/inspection schedule;</li> <li>Annual equipment inspection and maintenance record;</li> <li>Procedure for pre-arranged repair service;</li> <li>Procedure for preventive maintenance</li> </ul> </li> </ul> |                    |                                                     |                         |

| Anticipated Environmental & Social Impacts | Receptor(S)                                                                    | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Residual Impact | Responsibility (implementation / supervision) | Estimated Cost (GHS)                          |
|--------------------------------------------|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------|-----------------------------------------------|
|                                            |                                                                                | <ul style="list-style-type: none"> <li>At the substation, as much as possible avoid working on live electrical parts except when de-energizing the equipment creates additional hazards or when the equipment must be energized to allow for testing that can only be performed live.</li> </ul> <u>Emergency Provisions</u> <ul style="list-style-type: none"> <li>All workers will be trained on emergency response procedures including fire, mechanical failures etc. that will arise from operations to minimize any hazards to humans and the environment. Management will ensure a triennial review of the plan.</li> </ul> <u>Housekeeping</u> <ul style="list-style-type: none"> <li>Good housekeeping practices will be an integral part of operations to maintain a well laid out working space and avert accidents resulting from slips and falls.               <ul style="list-style-type: none"> <li>Provide PPEs for all works</li> </ul> </li> </ul> |                 |                                               |                                               |
| Public Health and safety                   | Local communities along the haulage route ,land , air, water<br>General Public | <ul style="list-style-type: none"> <li>Provide procedures for community reporting of observed incidents/community grievance redress mechanism.</li> <li>Will identify emergency scenarios and develop emergency preparedness and response plans with allocation of responsibilities to local communities and authorities, (where appropriate)</li> <li>Conduct safety awareness and education programs for neighbouring community.</li> <li>After construction, boreholes and ancillary facilities shall be sealed and secured in such a way as to reduce likelihood of contamination of groundwater resource.</li> <li>Develop and implement a Groundwater Management Plan including monitoring to ensure that water use is optimized.</li> </ul>                                                                                                                                                                                                                    | Minor           | HSE Manager /Project manager                  | Incorporated in the operation and maintenance |

| Anticipated Environmental & Social Impacts | Receptor(S)                             | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Residual Impact | Responsibility (implementation / supervision) | Estimated Cost (GHS)                                         |
|--------------------------------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------|--------------------------------------------------------------|
|                                            |                                         | <ul style="list-style-type: none"> <li>Organise, in collaboration with the Asante Akim Central municipal Assembly, awareness creation seminars and educational programmes for all workers and the general public on the behavioural changes required to prevent the spread of HIV/AIDS and other STDs.</li> <li>Cooling water will be recycled and vaporized to prevent contamination of the Anunu River, which is used by Ohene Nkwanta Community for domestic purposes.</li> <li>Ensure that run off from the factory is channelled into the drains to prevent contamination of surface water bodies</li> </ul>                                                                                                                                                                                                                                                                                                              |                 |                                               |                                                              |
| Traffic Impacts                            | Public, Communities along Haulage route | <ul style="list-style-type: none"> <li>Rider Steel will prepare and implement a Traffic Management Plan (TMP), including a Journey Management Plan (JMP) for trips to and from site</li> <li>All drivers (employed by Rider Steel or by contractors) will be required to undergo driver training that includes instruction on speed limits and the hazards associated with the routes they will be travelling.</li> <li>Transport of materials will as much as possible be carried out during off-peak traffic hours to minimise the impact on traffic on the N6 Highway.</li> <li>Illustrative warning signage and indicators will be provided in and around the facility.</li> <li>Consider road engineering measures such as bumps to slow vehicles down about 50 metres to the turning that goes into the project site</li> <li>Warning signs will be provided on the highway when approaching the project site</li> </ul> | Minor           | HSE Manager                                   | Incorporated in the RISGL operational and maintenance budget |

| Anticipated Environmental & Social Impacts  | Receptor(S)                   | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Residual Impact | Responsibility (implementation / supervision) | Estimated Cost (GHS)                     |
|---------------------------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------|------------------------------------------|
|                                             |                               | <ul style="list-style-type: none"> <li>In conjunction with the Ghana Highway Authority ensure that the visibility splay distance (distance which allows drivers who are entering main roads from minor roads to see oncoming vehicles and vice versa) is adequate and free. This will enable emerging drivers from the project site as well as those on the highway have sufficient visibility in each direction to see oncoming vehicles in sufficient time to prevent road accidents.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |                                               |                                          |
| Sustainability of the RISGL Konongo Project | Public, GoG, Investors, RISGL | <ul style="list-style-type: none"> <li>Management will develop and implement an emergency response plan to handle all emergencies including fire, and accidents from all its operations to minimize any hazards to humans and the environment. Management will ensure a triennial review of the plan.</li> <li>A comprehensive maintenance programme will be put in place to avert any serious breakdowns or failures or accidents. The required maintenance for the systems will include among others: <ul style="list-style-type: none"> <li>Environmental incident/accident investigation;</li> <li>Carry out mock emergency response drills</li> <li>Routine equipment maintenance/inspection schedule;</li> <li>Annual equipment inspection and maintenance record;</li> <li>Procedure for pre-arranged repair service;</li> <li>Procedure for preventive maintenance;</li> <li>Procedures for handling materials;</li> </ul> </li> <li>Coordinate with the assembly , the traditional authority and the neighbouring communities to identify corporate social responsibilities beneficial to the community</li> </ul> | Minor           | Project Manager /HSE Manager                  | Incorporated in RISGL operational budget |

| Anticipated Environmental & Social Impacts | Receptor(S)              | Proposed Mitigation And Management Measures                                                                                                                                                                                                                                                | Residual Impact | Responsibility (implementation / supervision) | Estimated Cost (GHS) |
|--------------------------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------|----------------------|
|                                            |                          | <ul style="list-style-type: none"> <li>Ensure resource use efficiency influencing supply chain sustainability</li> <li>Adopt a comprehensive monitoring plan to ensure effective implementation of mitigation and management measures.</li> </ul>                                          |                 |                                               |                      |
| Decommissioning Phase                      |                          |                                                                                                                                                                                                                                                                                            |                 |                                               |                      |
| Occupational Health and Safety             | Workers                  | A retrenchment policy will be develop and included in the condition of service/service agreement for workers for them to know what they will be entitled to during retrenchment and closure of the affected company/ operator.<br>(Also apply mitigation measures for construction phase ) | Negligible      | RISGL/Contractor                              | -                    |
| Waste Disposal                             | Public , Workers General | (apply mitigation measures for construction phase )                                                                                                                                                                                                                                        | Negligible      | RISGL/Contractor                              | -                    |

## 9.0 PROVISIONAL ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN-

A Provisional Environmental and Social Management Plan (PESMP) is developed for the project in accordance with the Environmental Assessment Regulations of 1999, LI 1652 to assist the RISGL project to be carried out in an environmentally safe and sustainable manner. The provisional ESMP outlines management commitment and the required training programmes for the sustainable implementation of the proposed project. An estimated budget for the PESMP is also included in this section.

### 9.1 Objectives of the PEMP

The implementation of the PEMP is expected to meet the following objectives:

- provide the platform to accommodate changes and uncertainties during project implementation;
- manage actual impacts during project implementation phase;
- ensure proper implementation of project permitting conditions;
- ensure satisfactory environmental performance; and
- serve as a source of background information for future projects

### 9.2 Programme to meet Requirements

The programmes proposed to meet mitigation measures and monitoring programmes will include the following:

- Adoption of Environmental and Social Management System ;
- Establishment of Health, Safety and Environment (HSE) Committee ;
- HSE Management Structure
- Workers Information and Training;
- Public and community participation;
- Environmental and social monitoring programmes;
- Dispersion Modelling
- Audits and Reviews;
- Social Responsibility;
- Environmental Reporting;
- Document control and tracking;
- Emergency Response Planning; and
- Environmental and social management budgeting

#### 9.2.1 *Adoption of Environmental and Social Management System*

RISGL recognizes that protecting its environment is critical to the sustenance of the Project. It is therefore committed to engaging in environmentally conscious practices in its development and operations. The company shall develop environmental, health and safety policies to guide the sustainable implementation of the project. It will formulate standard procedures for all its operations from construction phase to the different operational phase activities. The standard operational procedures will serve to guide the workers in their daily activities and serve as a training manual for employees and will ensure compliance with all relevant environmental conventions and legislations

aimed at avoiding or minimising adverse impacts to water, air and soil, and ensuring worker health and safety as well as community health safety and security.

RISGL will establish and maintain an Environmental and Social Management System (ESMS) as appropriate to its scale of operations and level of its environmental and social risks and impacts. The ESMS to be put in place will conform to good international industry practice and will incorporate the following elements:

- Rider Iron and Steel Ghana Ltd Company Policies;
- Identified risks and impacts;
- Management programs;
- Organisational capacity and competencies;
- Emergency preparedness and response;
- Stakeholder engagement and grievance redress; and
- Monitoring and reviews.

### *9.2.2 Establishment of Environmental, Health and Safety Committee*

RISGL will establish an Environmental, Health and Safety Committee to formulate policies and draw up programs and procedures to manage the steel factory. The Committee will be headed by the RISGL HSE Group Head.

The functions of the Committee will among other things include:

- Responsibility for implementing the environmental policies of the steel factory
- Spearheading the implementation of the environmental permit conditions and mitigation, monitoring and management measures in the ESIA report;
- Ensuring collaboration among all supervisors to co-ordinate activities with bearing on the environment and occupational health and safety of workers;
- Process and share environmental, health and safety data generated with workers, the public and stakeholders;
- Liaise with other relevant departments and attend to complaints from the communities on all such matters of environmental, health and safety concern arising from the operations; and
- Consult with Management to decide on the role of consultants/experts in assisting with the environmental management activities including monitoring.

### *9.2.3 HSE Management Structure*

The six (6) member HSE committee will include the HSE Head (Group) who will also act as the EHS coordinator, HSE Head (Corporate ), General Manager (Works), Project manager , HSE Manager and HSE Supervisor. The EHS committee organogram is illustrated in Figure 9-1.

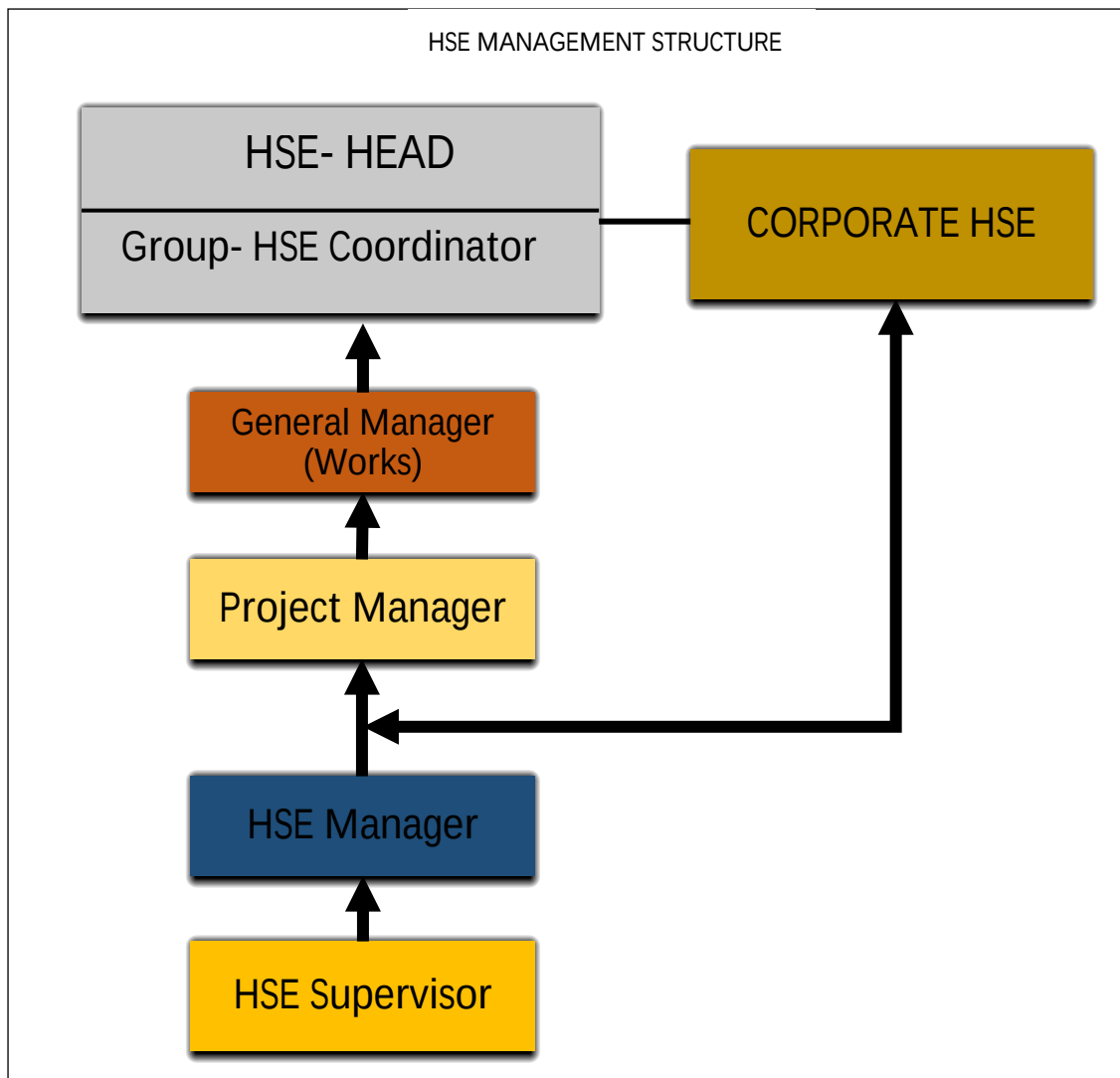


Figure 9-1; Organizational Structure for EHS Management for RISGL

### Key functions of the HSE Coordinator and Supervisors.

#### EHS Coordinator

1. Lead the implementation of environment, health, safety and security policies of the project, including technical and non-technical operations.
2. Liaise with the HSE Manager to ensure all required PPEs, waste bins and other logistics are provided for the project.
3. Ensure all machinery and equipment are in good condition and well serviced and the operators adhere to environment, health and safety procedures.
4. Liaise with regulatory institutions such as EPA for permitting and regulatory requirements
5. Conduct HSE compliance training
6. Ensure that supervisors implement environment, health and safety procedures.

#### HSE Committee Members

1. Liaising with the HSE Coordinator to ensure implementation of environment, health and safety policies.
2. Ensuring adherence to environment, health and safety procedures and the correct use of PPEs provided for workers in carrying out their activities.
3. Keeping up to date records and report all incidents/accidents and illnesses to the EHS Coordinator
4. Communicate, coach and assist the field staff to ensure that all safety expectations are understood and met
5. Report all complaints from committee and community members
6. Report all non-compliant situations on environment, health and safety procedures to the EHS Coordinator for appropriate action. Investigate or refer these concerns to the appropriate persons promptly.

### 9.2.4 Workers Information and Training

The HSE manager through the HSE Coordinator, will make available all operational manuals needed by staff and organize on the job training programs for staff. Management is aware that a well-informed and trained staff will contribute greatly towards environmental management through the judicious use of resources and the prevention of accidents that might damage equipment, personnel and the environment.

The objective of the EMP will only be achieved if every worker is adequately informed on the impacts or effects of the activities or operations of the decentralized system on the environment. RISGL will ensure that personnel to be engaged on the various project activities are educated and well sensitized on environmental issues arising from its operations and activities. This will be done through series of scheduled meetings, seminars and workshops.

### *9.2.5 Public and Community Participation*

It is the desire of Management that the public will appreciate the on-going environmental changes associated with the proposed project. Management will consider suggestions, advice from all stakeholders, its contractors, subcontractors, visitors, and the public/local communities, which will help improve its operations in order to minimise impact on the environment, the public and worker health and safety.

RISGL will ensure the contractor/ HSE supervisor will welcomes any complaints, constructive suggestions and advice on environmental, health and safety issues of concern during construction stage. On completion, HSE Coordinator will lead the effort to address relevant facility operational concerns.

Aggrieved individuals will submit all complaints or concerns to the RISGL HSE Supervisor for redress.

### *9.2.6 Environmental and Social Monitoring Programmes*

Monitoring programmes will be developed for relevant parameters, which serve as indicators of pollution on environmental media such as land, water and air as provided in Section 11. The monitoring programme will be consistent with the provisions of the EPA environmental permit.

### *9.2.7 Dispersion Modeling*

Dispersion modeling would be conducted prior to operation phase to ascertain how emissions may affect ambient air quality. Preliminary containment analysis has been conducted for the proposed furnaces as part of the preliminary design. The results from the modeling will further provide inputs into the design of the furnaces to be installed. Periodic modeling based on IFC guidelines and recommendations will provide data on the general emission performance and consequent impact on the environment throughout project life.

### *9.2.8 Audits and Reviews*

Annual environmental, health and safety audits and reviews will be conducted to assess the performance of the facilities and the effectiveness of environmental, health and safety policies and procedures put in place. The monitoring programme will form the basis for effective auditing and reviews. The outcome of the annual audits and reviews will underpin the periodic update of the EMP of the proposed project.

### *9.2.9 Social Responsibility*

In order to produce an overall positive impact on society, RISGL in consultation with the community members and the traditional authority will develop and implement CSR programmes to benefit inhabitants of the project area.

### 9.2.10 Environmental Reporting

In order to comply with statutory as well as internal review, periodic reporting will be done. Reports to be prepared to serve as sources of environmental and safety information for stakeholders will include:

- Annual Environmental Reports – statutory requirement to EPA;
- Quarterly Environmental Monitoring Returns – statutory requirement to EPA;
- Annual Environmental Audit Report – for in-house reporting; and
- Environmental Management Plan will be submitted within 24 months of commencement of operations and thereafter after every three years in line with the legislative instrument

### 9.2.11 Emergency Response Plan

The Emergency Response Plan is aimed at addressing potential accidental occurrences during the development and operational phases with the general objective of minimizing hazards to workers, local communities, the public and the general environment.

The specific objectives of the emergency response plan are to:

- Identify all stakeholders and their roles.
- Identify the key persons to be involved and clearly define their roles and the procedures that must be followed during an emergency;
- Identify all the likely emergency scenarios associated with the operations and provide effective response procedures for each identified emergency scenario;
- Save human life and minimize damage to equipment, property and the general environment;
- Identify training needs of personnel and resources required to ensure emergency preparedness at the site;
- Establish notification procedures and communication arrangements;
- Establish evacuation procedures
- Provide clean-up and remediation arrangements;
- Put in place emergency response plan review arrangements; and
- Develop budget for the implementation ERP.

The emergency response plan will be based upon all the different operational facilities in place and will be disclosed to all potentially impacted parties.

The quantitative risk assessment study carried out had the following objectives:

- To Identify all credible fire events associated with the Steel making processes;
- To Assess the relevant frequencies of occurrence and consequences; and
- Calculate the resulting risk to both operators and public and associated conclusions

A hazard identification will be conducted for all operational assets eg , furnace , rolling mill etc. The objective of the hazard identification study is to ensure that the safety and operational risks are eliminated or reduced to as low as reasonably practicable (ALARP).

The ERP will cover the following risk situations:

- Fire risk
- Explosion
- Natural disasters – earthquake/seismic activity, Tsunamis etc. and
- Medical emergencies

Management will report, as appropriate, emergencies/accidents to relevant stakeholders/regulatory bodies such as the, EPA, the Energy Commission, Ghana National Fire Service (GNFS), the Municipal Assembly, NADMO and Ghana Police Service.

Work location Managers would be required to ensure that procedures are revised to reflect changes in personnel, facilities or desired action. It is expected that details of particular actions required in the various emergency plans would be reproduced in easy-to-read type and posted at areas where they are required.

It is also expected that drills and practices of the various procedures would be carried out, at least, twice a year. After the drills, there should be discussions of what transpired, and any shortcomings pointed out. Suggestions for any improvements to the procedures are welcomed and encouraged.

All authorised hard copies of the ERP document must have the signatures of the review and approval authorities. Authorised electronic copies of the document will have the approval date and the date printed as a footer on every page.

#### *9.2.12 Document Control and tracking*

##### Documentation

The HSE manager will keep records on all environmental and public health/safety data including, environmental emergencies. Environmental data will be kept in both electronic and hard copy formats. A format for documentation of information in electronic form will be developed to capture daily/weekly information on climate, environmental sampling/monitoring, environmental quality results, waste generation and disposal, environmental resource use (water, energy, raw materials, chemicals), environmental incidences and emergencies, training and awareness creation programmes such as workshops, seminars and meetings.

##### Document Tracking and Control

RISGL will establish and maintain procedures to control all documents and permits that are required to ensure compliance and to make sure that:

- All documents and permits are easily traceable;
- All statutory documents are periodically reviewed, revised as necessary and approved as adequate by the relevant regulatory agency;
- All permits and approvals are renewed as and when necessary;
- Current versions of relevant documents or literature for workers use are available on site; and
- Any obsolete document or part of a document retained for legal and/or information preservation purposes is correctly labelled and identified.

Documentation will be legible, dated (with dates of revision) and readily identifiable, maintained in an orderly manner and retained for specified periods.

## 10.0 GRIEVANCE REDRESS MECHANISM

A grievance is any query, call for clarification, problems, and concerns raised by individuals or groups related to activities undertaken or processes applied by the project. Grievances can be an indication of growing stakeholder concerns and can escalate if unidentified and resolved. The management of grievances is therefore a vital component of stakeholder management in ensuring the sustainability of the project. The proposed Grievance Redress Mechanism (GRM) will respond to all queries or clarifications about the project and the implementation problems that may arise will be resolved efficiently and effectively. The GRM will be accessible and understandable for all stakeholders in the project and during the entire project life. The GRM will be communicated to all relevant stakeholders and will also be the reference point for all contractor that will occupy and/or use land during the construction and operations phase. An effective and efficient GRM should have multiple avenues or channels for lodging complaints, transparency, promptness and timeliness of responses and clear procedures.

The general steps of the grievance redress process comprise:

- ◆ Registration of complaints;
- ◆ Determining and implementing the redress action;
- ◆ Verifying the redress action; and
- ◆ Monitoring and Evaluation.

### 10.1 Construction Phase Grievance Redress

#### Registration of complaints

Complaints can be lodged verbally or in writing or through phone calls to the Contractors site Supervisor/Foreman or the AACMA Assembly member. The elected local Assemblyman for the area is eligible to receive complaints (because the Assemblyman lives within the community) and ensure that such complaints reach the contractor. The site supervisor shall receive all complaints and shall officially log these complaints in a dedicated log book for that purpose. The site supervisor will inform the team leader for the Grievance Redress Committee (see below for composition of the committee) within 24 hours on any complaint lodged. A sample grievance redress form to guide the logging and resolution of complaints is provided in Annex 10-1

#### Determining and implementing the redress action

When a grievance/dispute is recorded as per above-mentioned registration procedures, the grievance redress team will be called into action, and mediation meetings will be organized with interested parties. Minutes of meetings will be recorded.

The grievance redress team will determine the redress action in consultation with the complainant if necessary. The proposed redress action and the timeframe in which it is to be implemented will be discussed within 3 working days of receipt of the grievance. The grievance issue will be resolved within 5 working days of receipt of complaints.

#### Verifying the redress action

The grievance redress team will visit the affected property site or get in touch with the complainant to confirm that the redress action is carried out. If the complainant is not satisfied with the outcome

of the redress action, additional steps will be taken to resolve the issue or reach an amicable agreement. Verification will be completed within 7 days of the execution of the redress action.

#### Monitoring and Evaluation

The RISGL HSE Manager will monitor the activities of the Grievance Redress Team to ensure that complaints and grievances lodged by complainants are followed-up and resolved amicably as much as possible during the construction period.

#### Additional Steps and Court of Law

If the complainant is not satisfied with the decision of the grievance redress team, he/she can bring it to the attention of the Managing Director, If the issue is still unresolved

If the complainant remains dissatisfied, the complainant has the option to pursue appropriate recourse via judicial process in Ghana. The Constitution allows any aggrieved person the right of access to Court of law. However, noting that court cases can be cumbersome and time consuming, all effort must be made to reach amicable settlement with the affected person(s).

#### *10.1.1 Membership and Functions of the Grievance Redress Committee during the construction stage*

The Grievance Redress Committee will include the following:

- The Site supervisor
- The Supervising Engineer;
- The Contractor;
- The elected local Assemblyman; and
- A representative of the PAPs.

In addition to the main function of resolving grievances, disputes, complaints and conflicts, the Grievance Redress Team will also

- i. assist to ensure smooth implementation of the project;
- ii. establish dialogue with the PAPs; and
- iii. ensure that their concerns and suggestions are incorporated and implemented during the project

## 10.2 Operational Phase Grievance Redress

During the operational phase of the project, the HSE supervisor will be officially responsible for receiving grievances which may be channeled to him directly through face-to-face communication, phone calls, letters, e-mail, text messages, etc. Complaints received shall be forwarded to the General Manager and the EHS coordinator through the hierarchy

All grievances, presented in writing or verbally, will be logged by filling a grievance redress form and will ensure that each complaint has an individual reference number, and is appropriately tracked and recorded actions are completed.

There will be a log book for keeping records of all grievances received and copies of the records kept with all the relevant authorities. A review of grievances will be conducted at least every three months during implementation in order to detect and correct systemic problems. The log book should take into account the following: date the complaint was reported; date on which the grievance form was submitted to the grievance committee, date information on proposed corrective action sent to complainant (if appropriate); the date the complaint was closed out and date response was sent to complainant.

#### Redress decision, feedback and implementation

The Grievance Redress Committee (see composition below) will make a decision on all matters received, in consultation with the complainant, if necessary, in not more than two working days. The agreed redress action should be implemented within an agreed timeframe of not more than five days, depending on the nature of the complaint.

If field verification is required, the redress committee, in company of the complainant, will visit the complaint area to verify satisfactory redress action is carried out. When the complainant is satisfied with the redress action, the complaint will be closed and logged in the grievance log book and endorsed by the complainant.

#### Dissatisfaction and alternative action

1. If no understanding or amicable solution is reached, or the affected person does not receive a response from the redress committee within 5 working days, the affected person may appeal to the HSE manager. Grievances involving the community members will be resolved in consultation with the Community leadership and complainant, as necessary.
2. If the grievance remains unresolved, the affected person can appeal to the General manager (works), in consultation with the grievance redress committee should act on the complaint/grievance within 5 working days of its filing.
3. If a resolution is not reached from the first three steps, the complainant may appeal to the Chief Director, RISGL Group. Subsequently, he/she may seek legal action for redress. However, noting that court cases can be cumbersome and time consuming, it is of high opinion that Court cases should be the last 'resort' and all effort must be made to reach amicable settlement at the very early stages of complaints by affected persons

#### Monitoring and Evaluation

Monitoring and evaluation activities will be conducted by RISGL management to ensure complaint and grievances lodged by the affected persons are followed-up and amicably resolved.

#### *10.2.1 Membership and Functions of the Grievance Redress Committee during the Operational Phase*

The Grievance Redress Committee will include the following:

- HSE Supervisor
- HSE Manager
- Project Manager; and
- General Manager (Works)

## 11.0 ENVIRONMENTAL AND SOCIAL MONITORING

Environmental and social monitoring is an essential component of a post project review phase following Environmental and Social Assessment. The monitoring of various environmental and social parameters will also help to confirm any predicted impact or otherwise and address the effectiveness of the implementation of the mitigation measures.

A comprehensive monitoring plan which includes a data collection exercise has been developed in Table 13-1 for all the potential adverse environmental and social impacts identified in Chapter 6. The monitoring plan includes the responsible institutions or persons and estimated budget/cost requirements. Detailed cost analysis from prospective consultants and experts to be engaged as part of the monitoring programme will be needed to confirm cost requirements.

An ESMP implementation progress monitoring reporting template is provided in the Annex 11-1 to provide the contractor and RISGL with relevant data and information to ensure the successful implementation of the ESMP. The format requires the implementing body to specify evidence of completion for each mitigation measure (e.g. a document that proves the completion of the measure or a short description of the expected achievement or pictures

### 11.1 Environmental and Social Monitoring Plan

Environmental and social monitoring is an essential component of a post project review phase following Environmental and Social Assessment. The monitoring of various environmental and social parameters will also help to confirm any predicted impact or otherwise and address the effectiveness of the implementation of the mitigation measures.

A comprehensive monitoring plan has been developed in Table 11-1 to help track the implementation of the mitigation measures recommended for the identified adverse environmental and social impacts in Chapter 8. The monitoring plan includes the proposed responsible institutions or persons and estimated budget/cost requirements. Detailed cost analysis from prospective consultants and experts to be engaged as part of the monitoring programme will be needed to confirm cost requirements

Figure 11-1; Environmental Monitoring Programme

| Environmental component                           | Parameters to be monitored                                                                                                                                                                                   | Monitoring Sites                                                          | Methodology/ standards                                     | Frequency/ Responsibility                                                       | Estimated cost/ annum (GH¢) |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------|
| <b>Construction Phase</b>                         |                                                                                                                                                                                                              |                                                                           |                                                            |                                                                                 |                             |
| Noise Levels                                      | Sound levels in dBA                                                                                                                                                                                          | Established sampling points<br>-Project site<br>-Ohene Nkwanta<br>-Alafia | GS GS 1236: 2019                                           | Quarterly / contractor /HSE Supervisor                                          | 15,000.00                   |
| Air quality                                       | VOCs, Noxious gases (NO <sub>x</sub> , CO <sub>x</sub> , SO <sub>x</sub> ), and particulate matter (PM <sub>10</sub> and TSP)<br>-Dispersion Modeling                                                        | Established sampling points<br>-Project site<br>-Ohene Nkwanta<br>-Alafia | HiVol Sampler and Draegger Tubes/GS GS 1222: 2018          | Quarterly /contractor /HSE Supervisor<br><br>Prior to the start of construction | 30,000.00                   |
| Loss of vegetation and impacts on flora and fauna | Area of land cleared or disturbed outside authorization (m <sup>2</sup> )<br>Mitigation for species of environmental concern                                                                                 | Project site                                                              | Field Observations and measurements.<br>-                  | Weekly / Contractor /HSE Supervisor                                             | 25,000.00                   |
| Traffic Impacts                                   | Vehicle maintenance (including condition, log books, axle weights, loading, etc)<br>• Roads (local and regional)<br>• Drivers and driver training records<br>Complaints from the public<br>-Accident Records | Project Site<br>Transport Routes – N6 Highway<br>From Highway to factory  | Observations<br>Audits<br>Complaints/Grievances            | Weekly / Contractor /HSE Supervisor                                             | 10,000.00                   |
| Surface water quality                             | General physicochemical parameters including Oil/grease and trace metals                                                                                                                                     | Established Sampling Points                                               | Sampling, field work and laboratory analysis/ GS 1212:2019 | Quarterly/Contractor /HSE Supervisor                                            | 16,000.00                   |

| Environmental component                                   | Parameters to be monitored                                                                                                                                                                                                                                                                               | Monitoring Sites                                        | Methodology/ standards                                                                                                                                                                                 | Frequency/ Responsibility                                           | Estimated cost/ annum (GH¢) |
|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|-----------------------------|
|                                                           | Turbidity from sediment transport                                                                                                                                                                                                                                                                        | - -Atunsua stream Upstream/ downstream<br>-Anunu stream |                                                                                                                                                                                                        |                                                                     |                             |
| Sanitation /Waste generation Concerns                     | -Metallic wastes<br>-Garbage<br>-Waste oil<br>-Hazardous waste<br>- Construction Spoil<br>-Contractors waste management plan                                                                                                                                                                             | Project Site                                            | Record quantity and type of waste generated. Inspect quantity of waste.<br>-Inspect quantities and conditions of waste bins<br>Keep records of time and place of final disposal<br>-Assessment of KPIs | Daily /HSE Supervisor Contractor                                    | 25,000.00                   |
| Occupational Health and Safety concerns and Labour issues | -Type, frequency and cause of injuries /accidents<br>-Availability /Use of Personal protective gears (Life jackets, Safety boots, gloves, earplug, Helmet etc.)<br>-Occupational health and safety training records<br>-Worker grievance mechanism records<br>-Records of worker contracts and payments. | Project site                                            | Observation, audits, complaint/ incident records/ Safety Policy of RISGL/Safety Policy of Contractor /Local Labour Laws/ IFC PS2                                                                       | -Daily-Contractor /HSE Supervisor<br>-Quarterly<br>Daily /Quarterly | 40,000.00                   |
| Public Health and Safety and security                     | - Absence of unauthorized persons at construction site                                                                                                                                                                                                                                                   | Neighbouring Communities<br>-Alafia<br>-Ohene Nkwanta   | Observations and complaints/incidents records/ Safety Policy of RISGL/Contractor                                                                                                                       | -Daily –HSE Supervisor                                              | 5,000.00                    |

| Environmental component | Parameters to be monitored                                                                                                                                                                                                                                                                           | Monitoring Sites                                                          | Methodology/ standards                                                                        | Frequency/ Responsibility                       | Estimated cost/ annum (GH¢) |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------|-----------------------------|
|                         | -Availability and use of warning signs and cautionary tapes around excavations/trenches<br><br>-Konongo highway related road accidents/ incidents<br>-Public complaints, Type and nature of complaints and concerns<br>-Records on training of security personnel<br>-Records of human rights abuses | Odumase –Konkgo Township                                                  | Records of grievances and implemented actions<br>Stakeholder meetings<br>IFC PS4 requirements |                                                 |                             |
| Impacts on livelihood   | -Records on consultations with PAPs<br>-Records on affected persons<br>- Records mitigation measures<br>-Records on public complaints relating to disruption of livelihoods                                                                                                                          | Record Keeping and analysis                                               | Livelihood restoration/Compensation documents                                                 | RISGL                                           | -                           |
| <b>Operations Phase</b> |                                                                                                                                                                                                                                                                                                      |                                                                           |                                                                                               |                                                 |                             |
| Air quality             | VOCs, Noxious gases (NOx, COx, SOx), and particulate matter (PM <sub>10</sub> and TSP)                                                                                                                                                                                                               | Established sampling points<br>-Project site<br>-Ohene Nkwanta<br>-Alafia | HiVol Sampler and DraeggerTubes/GS<br>GS 1222: 2018                                           | Contractor /HSE Supervisor/ External Consultant | 15,000.00                   |

| Environmental component        | Parameters to be monitored                                                                                                                                                                                                                                                                  | Monitoring Sites                                                                              | Methodology/ standards                                                                                             | Frequency/ Responsibility                             | Estimated cost/ annum (GH¢) |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|-----------------------------|
| Ambient Noise levels           | Sound levels in dBA<br>Complaints of noise nuisance                                                                                                                                                                                                                                         | Established sampling points<br>-Project site<br>-Ohene Nkwanta community<br>-Alafia community | GS GS 1236: 2019                                                                                                   | Contractor /HSE Supervisor/ External Consultant       |                             |
| Occupational Health and Safety | Type and frequency of injuries /accidents/incidents /near misses<br>-Availability /Use of PPE's<br>-EHS Training programmes<br>-Scheduled monitoring and maintenance work<br>-Worker grievance mechanism records<br>-Records of worker contracts and payments.<br>-Worker training records. | RISGL Factory                                                                                 | Observation, audits, complaint/ incident records/ Safety Policy of RISGL/Local Labour Laws/ IFC PS 2 requirements. | Continuous / QHSE Officer<br>-Quarterly<br>-Quarterly | 25,000.00                   |
| Public Health and Safety       | - AIDS sensitization workshops<br>-Good housekeeping practices within project area<br>-Proper handling of waste material<br>-No unauthoriaed person(s) on site<br>-Availability and use of warning signs                                                                                    | -Neighbouring communities<br>-Project site<br>-Haulage routes                                 | Health, safety and traffic records; audit and review                                                               | Daily                                                 | 20,000.00                   |

| Environmental component  | Parameters to be monitored                                                                                                                                                                                                    | Monitoring Sites                                                                                                                          | Methodology/ standards                                                        | Frequency/ Responsibility          | Estimated cost/ annum (GH¢) |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------|-----------------------------|
|                          | <ul style="list-style-type: none"> <li>-Records on frequency and type of incident/accidents involving public</li> <li>- Availability of bins</li> <li>-Proper and regular disposal of waste generated</li> </ul>              |                                                                                                                                           |                                                                               |                                    |                             |
| Traffic                  | <ul style="list-style-type: none"> <li>-Availability and use of warning signs</li> <li>-Records on frequency and type of incident/accidents involving public</li> <li>- Vehicle maintenance records</li> </ul>                | Project site /area                                                                                                                        | Record keeping and analysis                                                   | Weekly                             | 5,000.000                   |
| Grievance Redress        | <ul style="list-style-type: none"> <li>-Type and nature of complaints and concerns;</li> <li>-Complaint records (Record of grievance and number resolved/unresolved)</li> <li>-Management and Stakeholder Meetings</li> </ul> | <ul style="list-style-type: none"> <li>-Communities in the project area</li> <li>-PAPS</li> <li>-Project/ Stakeholder meetings</li> </ul> | Record keeping and analysis                                                   | Weekly                             | 5,000.00                    |
| Environmental compliance | <ul style="list-style-type: none"> <li>-Environmental, health and safety audits</li> <li>-Quarterly returns of Monitoring Reports to EPA (in line with LI 1652)</li> <li>-</li> </ul>                                         | -                                                                                                                                         | Analysis of monitoring reports/ Environmental Assessment Regulations, LI 1652 | Quarterly/Yearly/Every three years | -                           |

| Environmental component     | Parameters to be monitored                                                                                                                           | Monitoring Sites                  | Methodology/ standards                                   | Frequency/ Responsibility | Estimated cost/ annum (GH¢) |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------------------------------|---------------------------|-----------------------------|
|                             | -Preparation Of Annual environmental Reports<br>-Preparation of Environmental and Social Management Plan in three year cycles (in line with LI 1652) |                                   |                                                          |                           |                             |
| Corporate Social Engagement | -Number of engagements or sensitisation programmes organised<br><br>-Development benefits provided to local communities                              | Local communities/ general public | Corporate social responsibility policy of RISGL, Konongo | Annually                  | 20,000.00                   |
| TOTAL                       |                                                                                                                                                      |                                   |                                                          |                           | 226,000.00/year             |

## 11.2 Environmental and Social Management Budget

The environmental and social management plans described above require detailed cost analysis after project development to determine the budget needed for implementation. About GHS 341,000 annually (excluding contractor budget) will be required for environmental management including reporting as shown in Table 13-1. This figure is subject to review following confirmation from cost studies to be carried out after project development and does not include the contractor's estimates.

Table 11-1: Environmental and Social management

| No.   | Programme                                                                                                                                                                                                                                                                                                                                                                                     | Cost/year<br>(GH¢) |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| 1.    | Environmental monitoring (refer to Table 13-1)                                                                                                                                                                                                                                                                                                                                                | 256,000            |
| 2.    | Implementation of mitigation measures (refer to Table 10-1)                                                                                                                                                                                                                                                                                                                                   | -                  |
| 3.    | Environmental, Health and Safety Training and Awareness Creation Programmes among Staff/Workers                                                                                                                                                                                                                                                                                               | 40,000             |
| 4.    | <u>Environmental Auditing and Reporting</u> <ul style="list-style-type: none"> <li>• Annual environmental, health and safety audits</li> <li>• Returns of Monitoring Reports to EPA (in line with LI 1652)</li> <li>• Preparation of Annual Environmental Reports (in line with LI 1652)</li> <li>• Preparation of Environmental and Social Management Plan (in line with LI 1652)</li> </ul> | 30,000             |
| 5.    | Implementation of Grievance Redress mechanism                                                                                                                                                                                                                                                                                                                                                 | 15,000             |
| Total |                                                                                                                                                                                                                                                                                                                                                                                               | 341,000            |

## 12.0 DECOMMISSIONING

A decommissioning plan will need to be fashioned out should it become necessary at any point in time.

### 12.1 Decommissioning Plan

In the event that the project has to be decommissioned, the principles of Reduce, Reuse, Recycle and Recover (4 R's) will be applied in all decommissioning phase activities.

The scope of decommissioning is categorised below under the post-construction and post operational phase. Post construction decommissioning involves construction facilities and equipment, while post operational phase decommissioning will involve sewer lines, manhole/pre-treatment facility and detention basin infrastructure and site restoration

### 12.2 Post-construction Decommissioning

The construction facilities will be dismantled and relocated for use at other project sites of the contractor. Excavators, pumps, generators, vehicles etc and other equipment used for the project will be relocated to new or other project sites managed by the Contractor.

Any waste to be generated from the decommissioning process will be properly disposed of. Recyclable waste such as machinery and equipment parts will be handed over to scrap dealers for recycling. Non-recyclable waste will be collected and dumped at the Assembly's approved dump site.

### 12.3 Post-Operational Phase Decommissioning

It is unlikely that the proposed RISGL project will be decommissioned at any time soon. In the future event that any large scale additional work is to be undertaken, a new environmental impact assessment study will be carried out in accordance with the Environmental Assessment Regulations 1999, LI 1652. The EPA will be notified through registration of the undertaking. Stakeholders will be informed prior to the commencement of such a project. The decommissioning plan in the new EIA will contain the following segments.

#### *12.3.1 Decommissioning plan*

In keeping with environmental regulations of the country including the Environmental Assessment Regulations 1999, LI 1652, a reclamation or post project closure plan with time frame and cost estimates will be prepared.

The likely activities to be carried out during this decommissioning are described below.

#### *12.3.2 Stakeholder Consultation*

Before a decision is taken to discontinue the project RISGL will extensively inform and make its programme available to relevant stakeholders including regulatory agencies such as the EPA, The Ministry of Trade and Industry, Energy Commission etc, local authorities including the Chiefs and elders of the Odumase Traditional Council.

#### *12.3.3 Evacuation Workers*

Decommissioning procedures will ensure that workers are well protected and be made to leave the site if required.

#### *12.3.4 Removal of Moveable Property*

Moveable property including equipment and machinery will be removed from the site and sent to new project sites for use or sold to potential users or donated.

#### *12.3.5 Transfer of ownership of Non-moveable Property*

Non-moveable property like buildings will be retained by the Asante Akim Central Municipal Assembly

#### *12.3.6 Waste Management*

Any waste to be generated from the decommissioning process will be properly disposed of. Recyclable waste such as machinery and equipment parts will be handed over to scrap dealers for recycling. Non-recyclable waste will be collected and dumped at the Assembly's approved dump site.

### *12.3.7 Site Restoration*

All affected properties will be properly reinstated. Previously disturbed surfaces eg the detention basin area, will be filled where necessary and re -vegetated.

## 13.0 CONCLUSION

Consultations with stakeholders, review of relevant literature, field inspections and studies underpinned the identification of the project adverse environmental and social impacts. Mitigation measures have been provided to address these impacts and any residual impacts arising after application of the full mitigation measures will be minor or negligible. A monitoring programme to help detect changes arising from the predicted adverse impacts has also been prepared and presented in the report together with a PESMP. The recommendations laid out in the PESMP for the project should also ensure that a high level of environmental protection is maintained and the project is socially acceptable.

The proposed project has the potential to provide numerous health and economic benefits to the project communities and beyond. These include employment opportunities for community members and other workers, enhancement of income and livelihoods and improvement in revenue generation of regulatory institutions and a positive impact on the national economy.

## 14.0 REFERENCES

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## ANNEXES

|             |                                                                     |
|-------------|---------------------------------------------------------------------|
| Annex 1-1:  | EPA Response to Registration                                        |
| Annex 1-2   | EPA Response to scoping and comments Matrix                         |
| Annex 3-1   | Zoning Status                                                       |
| Annex 3-2   | Proposed General layout and Block plan Layout of project facilities |
| Annex 3-3   | Gridco Application Report                                           |
| Annex 5-1   | 3m Contour of the site                                              |
| Annex5-2    | Surface Water Assessment                                            |
| Annex 5-3   | Groundwater Assessment                                              |
| Annex 5-4   | Air /Noise Quality Assessment                                       |
| Annex 5-5   | Aquatic Ecological Assessment                                       |
| Annex 5-6   | Terrestrial Ecology Assessment                                      |
| Annex 6-1   | Evidence of Stakeholder Engagement                                  |
| Annex 6-2   | Traffic Impact Assessment                                           |
| Annex 6-2   | Scoping Notice                                                      |
| Annex 6-3   | Compensation claim form                                             |
| Annex 10-1  | Sample Grievance redress Form                                       |
| Annex 11-1: | Progress monitoring implementation Report                           |

Annex 1-1: EPA Response to project Registration

vAnnex 1-2: EPA response to Scoping and comments Matrix

## EPA COMMENTS AND RESPONSES

|                                           | EPA COMMENTS                                                                                                                                                                                                                                                                                                                                     | SECTION ADDRESSED/RESPONSE                                                                                                                                                                                                    |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EXECUTIVE SUMMARY                         | Executive summary is not a requirement for scoping                                                                                                                                                                                                                                                                                               | Noted                                                                                                                                                                                                                         |
| INTRODUCTION                              | Page, section 1.4.1 National and sector policies and plans<br>Ghana Shared Growth and Development Agenda (GSDAI) 2015. This policy framework ended in 2017 and the new policy is the coordinated program of economic and social development policy (2017-2021)                                                                                   | The policy has been revised in section 1.4.1.                                                                                                                                                                                 |
|                                           | Page 13 section 1.4.4 international Conventions<br>Convention on the civil liability for oil pollution damage (CLC). How is this convention relevant to the project                                                                                                                                                                              | The convention has been deleted                                                                                                                                                                                               |
| BRIEF DESCRIPTION OF THE PROPOSED PROJECT | PAGE 21, SECTION 2.1 Location of the proposed project.<br>Although the zoning status provided in the report is industrial, a project of this nature requires the zoning to be heavy industrial to prevent any potential conflicts relating to air pollution<br>Indicate the proximity of the proposed site to the nearest community/ communities | The proximity of the closest community to the project is stated in section 3.1 on page 23                                                                                                                                     |
|                                           | Page 22, section 2.2.2 specification of pumping stations<br>Explain further the three pumping stations in the table 2-1                                                                                                                                                                                                                          | The project proposes to have boreholes to supply water for the project. Geophysical surveys will be conducted to select the locations however Section 3.2.1 on page 24 provides specifications for the proposed pump station. |
|                                           | Page 24, fig 2-2. Process flow diagram<br>Select each of the steps in the process and provide detailed description in EIS                                                                                                                                                                                                                        | Section 3.3 provides details of the steelmaking process from one stage to the next                                                                                                                                            |
| STAKEHOLDER ENGAGEMENT                    | PAGE 38, Section 5.2. identified stakeholders<br>Define and explain the role of each of the stakeholders identified to the project                                                                                                                                                                                                               | The role of identified stakeholder groups have been summarized in section 6.2                                                                                                                                                 |
|                                           | Page 39 section 5.3 stakeholder analysis<br>The project has not provided provided alternative housing for the three PAPs who will lose their hamlets located on site.                                                                                                                                                                            | All PAPs for the RISGL project have received monetary compensation for loss of crops/ residence. See section 8.1.3                                                                                                            |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                               |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <p>Discuss compensation issues and the packages to be given out to those who are supposed to be compensated</p> <p>The communities should be engaged in such a way that they understand the project benefits and also the impacts of the project. Their expectations should be well managed especially with regard to potential job opportunities.</p> <p>A proper grievance redress Mechanism should be put in place without using the traditional authority</p> | <p>A grievance redress has been developed in section and the detailed GRM process is provided in Section 10.</p>                                                                                                                                                                                                                                              |
|                  | <p>Page 5.4.3 key concerns raised</p> <p>Key issues must include:</p> <p>Defining the size and number of farms that will be affected by the project</p> <p>Dealing with the project affected persons dissatisfaction on the current compensation arrangement.</p>                                                                                                                                                                                                 | <p>The number of farms to be affected and the farm sizes ranging from 0.5 – 4 acres is stated in Table 7-1 on page 71</p>                                                                                                                                                                                                                                     |
|                  | <p>6.0 environmental impacts</p> <p>A traffic Impact Assessment should be conducted and a copy sent to the GHA for comments due to sensitive nature of site location</p> <p>The Anunu river is close to the project site and is used for domestic purposes hence the impact on the project on this resource should be considered and discussed in detail.</p>                                                                                                     | <p>The traffic Impact Assessment conducted for the project is attached as Annex 6-2. The report has been submitted to the GHA RISGL is awaiting feedback.</p> <p>The Anunu river is about 3km from the project site. The mitigation measures to ensure that the project does not adversely impact the water resource is provided in Table 7-1 on page 118</p> |
| General comments | <p>Looking at the history of Rider steel and environmental pollution, it is imperative that some modeling is done to ascertain how emissions may affect ambient air quality</p>                                                                                                                                                                                                                                                                                   | <p>This has been included as a management plan in section 11. However RISGL proposes to conduct dispersion modeling as this input influences the outcome of the designs and procurement of the furnaces</p>                                                                                                                                                   |
|                  | <p>The site should also be critically assessed as indicated above</p>                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                               |

### Annex 3-1: Zoning Status

Annex 3-2: Proposed General Layout and Block plan

### Annex 3-3: Gridco Report

## Annex 5-1: 3m Contour

## Annex 5-2 Surface quality assessment report

## Annex 5-3 : Groundwater quality assessment report

## Annex 5-4 Air/Noise Quality Assessment Report

## Annex 5-5; Aquatic Ecological Assessment Report

## Annex 5-6: Terrestrial Ecological Assessment Report

## Annex 6-1:Evidence of Stakeholder Assessment

## Annex 6-2: Traffic Impact assessment report

## Annex 6-3 Evidence of Stakeholder Engagement

## Annex 6-4 Compensation Claim form

## Annex 10-1 Sample Grievance Redress Form

## Annex 11-1: Implementing progress monitoring report format

